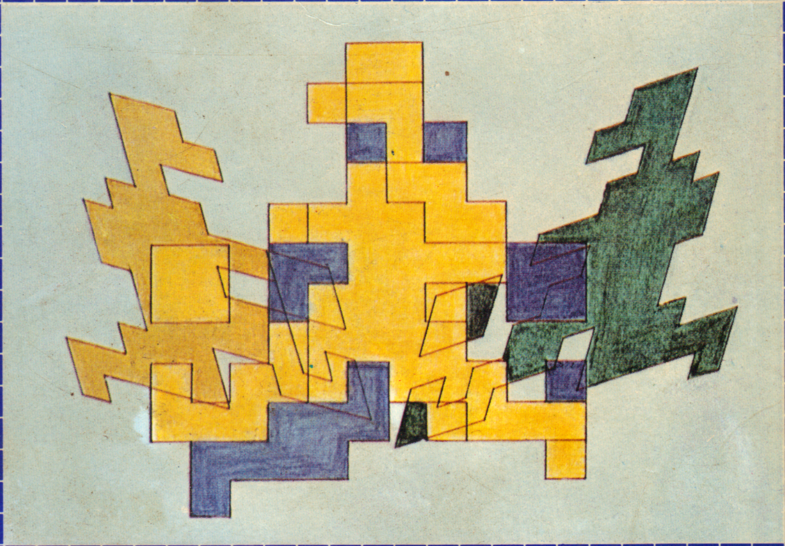
ZALOŽBA



programi za ZX Spectrum

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CANKARJEVA ZALOŽBA

Izvorni naslov:
PROGRAMI ZA MAVRICO

Preveo
Slobodan Vukmirović

Sadržaj

Napomena

Autori su se trudili da ispisi programa i upute budu bez greške. Ipak, ne mogu na sebe preuzeti nikakvu odgovornost za eventualnu štetu koju bi mogla prouzročiti upotreba tih programa.

— Blok grafika ispisana je kao na tipkovnici
— UDG znakovi podvučeni su točkastom linijom
— Inverzni znakovi podvučeni su punom linijom
— Kodovi u boji ispisani su između trokuta
— Oznake »karo« u tekstu označavaju razmake

Programi

Slomljeno staklo

Ne trebate se ničega bojati! Neće vam pući zaslon ili nešto slično. Vidjet ćete samo veliki broj mogućnosti simulacija pucanja stakla uz odgovarajuće zvučne efekte.

```
 10◆REM◆slomljeno◆staklo
 20 PAPER 7
 30 LET a=INT (RND*8)
 40 LET b=INT (RND*7)
 50 IF a=b THEN GO TO 40
 60 BORDER a
 70 INK b
 80 CLS
 90 LET c=INT (RND*256)-128
100 LET d=INT (RND*172)-85
110 PLOT 128,86
120 DRAW c,d
130 BEEP .01,RND*100-50
140 IF RND>0.02 THEN GO TO 90
150 RUN
```


Galaksija

Ovo nije nikakva svemirska igra, već program koji živi i stvara galaksiju. To je beskonačan program kao što je beskonačna i galaksija. Slažete li se? Možda ćete reći da je dug samo 11 redaka? U pravu ste, ali program nema kraja! Nakon izvođenja retka 100, ponovno započinje izvođenje na retku 50, što određuje koordinate nove zvijezde, itd.

```
 10◆REM◆galaksija
 20 PAPER 0: BORDER 0: CLS
 30 LET c=255: LET d=175
 40 INK RND*7
 50 LET a=c*RND
 60 LET b=d*RND
 70 PLOT a,b: PLOT a,d-b
 80 PLOT c-a,b: PLOT c-a,d-b
 90 IF RND>.5 THEN GO TO 60
 95 INK RND*7
100 GO TO 50
```

Slike

Ako se još niste odlučili bi li učili strojni jezik Z 80, razmotrite ovaj program i zapazit ćete razliku u brzini spram basica. Šesnaest uzastopnih slika nanizanih u basicu pohrani se pomoću strojne rutine u memoriju računala. Nakon što su sve slike pohranjene, započinje brzo prikazivanje, spojeno u beskonačnu petlju.

```
 10◇REM◇slike
 20 CLEAR 32575

 30◇REM◇strojni◇jezik
 40 DATA 17,64,0,33,0,64,1,0,8,237,176,201
 50 DATA 33,64,0,17,0,64,1,0,8,237,176,201
 60 FOR n=65344 TO 65367
 70 READ a:
    POKE n,a
 80 NEXT n

 90◇REM◇unos◇16◇slika
100 FOR n=1 TO 16
110 PRINT AT 14,0;"Ekran◇:";n

120◇REM◇◁p6▷crtanje◇n-te◇slike◁p7▷
130 CIRCLE 127,143,n*2
140 CIRCLE 127-3*n,143,n
150 CIRCLE 127+3*n,143,n
160 PLOT n*4,175-2*n
170 DRAW 255-8*n,0
180 PLOT n*4,112+2*n
190 DRAW 255-8*n,0

200◇REM◇◁p6▷end◇crtanje◁p7▷
210 POKE 65346,n*8+119
220 RANDOMIZE USR 65344
230 CLS
240 NEXT n

250◇REM◇brzo◇crtanje◇slika
260 FOR n=1 TO 16
```



```
270 PRINT AT 14,0;"Ekran◇:";n;"◇"
280 POKE 65358,119+8*n
290 RANDOMIZE USR 65356
300 NEXT n
310 FOR n=15 TO 1 STEP -1
320 PRINT AT 14,0;"Ekran◇:";n;"◇"
330 POKE 65358,119+8*n
340 RANDOMIZE USR 65356
350 NEXT n
360 GO TO 250
```

Crta

Program stvara i briše sliku. Zakoni stvaranja slike upisani su u rutini »petlja« i bit će vam jasni čim pokrenete program. Slika se oblikuje u dijelu ekrana koji je određen rutinom »okvir«, a izgled slike ovisi o rasporedu raznih likova određenih rutinom »likovi«. Kad budete umetali program, pokušajte rasporediti likove tako da stvorena slika što bolje popuni zaslon. Ako vam uspije, možete dobiti vrlo lijepe uzorke.

```
10 PAPER 7: INK 9: BORDER 7: CLS

20◇REM◇program◇crta
30 GO SUB 140
40 GO SUB 200
50 GO SUB 270

60◇REM◇petlja
70 PLOT  OVER 1;x,y
80 IF POINT (x+1,y+1)=0 THEN GO TO 110
90 IF POINT (x,y+1) OR POINT (x,y-1)=1
   THEN LET ys=ys*(-1): BEEP .05,20
100 IF POINT (x+1,y) OR POINT (x-1,y)=1
   THEN LET xs=xs*(-1): BEEP .05,20
110 LET x=x+xs
120 LET y=y+ys
130 GO TO 60

140◇REM◇pocetne◇definicije
150 LET x=1
160 LET y=1
170 LET xs=1
180 LET ys=1
190 RETURN

200◇REM◇okvir
210 PLOT 0,0
220 DRAW 255,0
230 DRAW 0,175
240 DRAW -255,0
250 DRAW 0,-175
```



```
260 RETURN

270◇REM◇Likovi
280 CIRCLE 36,58,27
290 CIRCLE 132,103,35
300 CIRCLE 75,100,30
310 RETURN
```

Sat

Program riše lijep sat s brojevima i kazaljkama, a ispod njega i digitalni sat. Program na početku ima upisane i upute za korištenje sata i oba budilnika. Računalo mjeri vrijeme pomoću sistemskih varijabli 23672, i 23673 i 23674. Na koji način? To možete pogledati u knjizi »ZX SPECTRUM basic programming« u poglavlju 18.

```
1 REM URA
2 BEEP .5,-15: BORDER 0: PAPER 0: INK 7:
  CLEAR : LET z$="
  ": PRINT TAB 12; BRIGHT 1; FLASH 1;
  PAPER 2;" S A T "
3 GO SUB 1020: PRINT #0;AT 1,24; FLASH 1;"
  ENTER": PRINT AT 5,0;"    Za prikaz
  pojedinih funkcija pritisnemo brojke
  koje stoje ispred pojedinih naredbi."
4 PRINT '"S ENTER nestaje lista naredbi
  i digitalni sat. Da bi ih opet
  prikazali, pritisnemo bilo koju tipku.
  "''
5 GO SUB 1100: PRINT AT 5,0;z$;z$;"  Za
  namjestanje tocnog vremena na satu ili
  novog vremena zvonjenja pritisnemo tipku
  5 odnosno 1 ili 2. ";z$;z$;"Vrijeme
  namjestamo u 24 satnoj podjeli bez
  sekundi."'': GO SUB 1020: PRINT AT 21,
  0; FLASH 1;"1";AT 21,22;"2";#0;AT 1,
  0; FLASH 1;"5": PRINT AT 16,0: GO SUB
  1100
6 GO SUB 1020: PRINT AT 5,0;" Da bi sat
  zvonio u namjesteno vrijeme, moraju se
  na ekranu vidjeti nacrtana zvona. To
  postizemo pritiskom na tipku 3 ili 4."
  ;z$;"    Zvonjenje prekidamo bilo ko-
  jom tipkom!"'z$;z$;"Funkcijske tipke
  su aktivne i kod iskjucenog prikaza
  funkcija."
7 PRINT #0;AT 0,0; FLASH 1;"3";AT 0,22;"4"
  PRINT AT 17,0: LET x=20: LET y=170: GO
  SUB 910: LET x=235: GO SUB 910
```



```
  20 LET ret=0: DIM s(61,2): FOR n=1 TO 61:
     LET s(n,1)=SIN ((n-1)*PI/30): LET s(n,2)
     =COS ((n-1)*PI/30): NEXT n
  30 GO SUB 1100: DIM A(16): LET OWIH=0: LET
     OWIM=0: LET OWIS=0: LET sat=1: LET
     zvono=0: BORDER 0: PAPER 0: INK 7: CLS
     LET alarm1=0: LET alarm2=0: LET Beep=0:
     LET budilnik1=0: LET budilnik2=0: LET
     n=INT ((65536*PEEK 23674+256*PEEK 23673+
     PEEK 23672)/50): LET a$=STR$ INT (n/
     3600): LET b$=STR$ INT ((n-VAL a$*3600)/
     60)
  40 IF LEN a$=1 THEN LET a$="0"+a$
  50 IF LEN b$=1 THEN LET b$="0"+b$
  60 LET r$="00": LET t$="00": LET h$="00":
     LET m$="00"

  80 PLOT 0,87: DRAW 25,12,-1: DRAW -6,25,-1:
     DRAW 28,-5,2.5: PLOT 0,87: DRAW 25,-12,
     1: DRAW -6,-25,1: DRAW 28,5,-2.5: PLOT
     3,87: DRAW 27,10,-1: DRAW -10,20,-.8:
     DRAW 26,-3,1.8: PLOT 3,87: DRAW 27,-10,
     1: DRAW -10,-20,.8: DRAW 26,3,-1.8:
     PLOT 255,87: DRAW -25,12,1: DRAW 6,25,1:
     DRAW -28,-5,-2.5: PLOT 255,87: DRAW -25,
     -12,-1: DRAW 6,-25,-1: DRAW -28,5,2.5:
     PLOT 252,87: DRAW -27,10,1: DRAW 10,20,.
     8: DRAW -26,-3,-1.8: PLOT 252,87: DRAW -
     27,-10,-1: DRAW 10,-20,-.8: DRAW -26,3,
     1.8
  90 CIRCLE 127,87,87
 100 CIRCLE 127,87,85
 110 LET m=-1: FOR n=1 TO 60
 120 LET m=m+1: PLOT 127+62*s(n,1),87+62*s(n,
     2)
 130 IF m=0 THEN LET m=-5: DRAW -5*s(n,1),-5*
     s(n,2): NEXT n
 140 DRAW -2*s(n,1),-2*s(n,2)
 150 NEXT n
 160 GO TO 200
 170 PLOT a,b: DRAW 4,0: DRAW -2,2: DRAW -2,-
     2: DRAW 2,0: DRAW 0,6: DRAW 2,2: DRAW -
     4,0: DRAW 2,-2: DRAW 0,1: RETURN
```

```
180 PLOT a,b+8: DRAW 2,0: DRAW -2,0: DRAW 4,
    -8: DRAW 4,8: DRAW 1,0: DRAW -2,0:
    RETURN
190 PLOT a,b: DRAW 1,0: DRAW 0,1: DRAW -1,0:
    DRAW 7,7: DRAW -1,0: DRAW 0,-0: DRAW 1,
    0: DRAW 0,-1: PLOT a,b+8: DRAW 1,0:
    DRAW 0,-1: DRAW -1,0: DRAW 7,-7: DRAW -
    1,0: DRAW 0,1: DRAW 1,0: RETURN
200 LET a=117: LET b=158: GO SUB 190: LET
    a=a+10: GO SUB 170: LET a=a+7: GO SUB
    170
210 LET a=162: LET b=146: GO SUB 170
220 LET a=186: LET b=118: GO SUB 170: LET
    a=a+7: GO SUB 170
230 LET a=192: LET b=83: GO SUB 170: LET
    a=a+7: GO SUB 170: LET a=a+7: GO SUB
    170
240 LET a=184: LET b=50: GO SUB 170: LET
    a=a+7: GO SUB 180
250 LET a=161: LET b=21: GO SUB 180
260 LET a=120: LET b=10: GO SUB 180: LET
    a=a+11: GO SUB 170
270 LET a=79: LET b=20: GO SUB 180: LET a=a+
    11: GO SUB 170: LET a=a+7: GO SUB 170
280 LET a=54: LET b=46: GO SUB 170: LET a=a+
    7: GO SUB 170: LET a=a+7: GO SUB 190
290 LET a=46: LET b=84: GO SUB 170: LET a=a+
    7: GO SUB 190
300 LET a=58: LET b=117: GO SUB 190
310 LET a=79: LET b=143: GO SUB 190: LET
    a=a+9: GO SUB 170
320 INPUT "Sati je:(npr. 15.30)";g$
330 IF LEN g$<>5 THEN GO TO 320
340 IF g$(1 TO 2)>"24" OR g$(1 TO 2)<"00"
    OR g$(4 TO 5)>"60" OR g$(4 TO 5)<"00"
    THEN GO TO 320
350 PRINT #0;AT 1,0;" Za start pritisni
    tipku "
360 LET Beep=0: LET n=VAL g$(1 TO 2)*180000+
    VAL g$(4 TO 5)*3000: LET a=INT (n/65536)
    LET n=n-65536*a: LET b=INT (n/256): LET
    c=n-256*b
380 PAUSE 0: POKE 23672,c: POKE 23673,b:
```



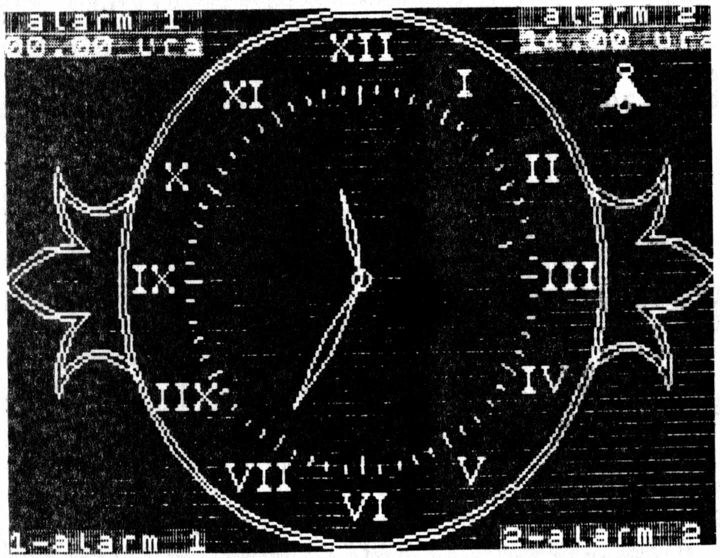
```
    POKE 23674,a: LET t0=((a*65536+b*256+c)/
    50): LET tl=t0: LET t1=t0: PRINT #0;AT
    1,0;"                                  "
390 LET h=INT (t1/3600): LET m=INT ((t1-h*
    3600)/60): LET s=INT (t1-60*m-3600*h)
400 GO SUB 990
410 POKE 23560,0: GO TO 770
420 INPUT "1.vrijeme zvonjenja:";g$
430 IF LEN g$<>5 THEN GO TO 420
440 IF g$(1 TO 2)>"24" OR g$(1 TO 2)<"00"
    OR g$(4 TO 5)>"60" OR g$(4 TO 5)<"00"
    THEN GO TO 420
450 LET h$=g$(1 TO 2): LET m$=g$(4 TO 5)
460 RETURN
470 INPUT "2.vrijeme zvonjenja:";g$
480 IF LEN g$<>5 THEN GO TO 420
490 IF g$(1 TO 2)>"24" OR g$(1 TO 2)<"00"
    OR g$(4 TO 5)>"60" OR g$(4 TO 5)<"00"
    THEN GO TO 420
500 LET r$=g$(1 TO 2): LET t$=g$(4 TO 5)
510 RETURN
520 LET ton=1: IF budilnik1 THEN PRINT
    FLASH 1;AT 0,0;" alarm 1 ";AT 1,0;h$;"."
    ;m$;" sat"
530 IF budilnik2 THEN PRINT  FLASH 1;AT 0,
    23;" alarm 2 ";AT 1,23;r$;".";t$;" sat"
540 LET a$(3-LEN STR$ h TO 2)=STR$ h: LET b$
    (3-LEN STR$ m TO 2)=STR$ m: IF sat THEN
    PRINT #0;AT 1,12; PAPER 3; INK 7;a$;"."
    ;b$;".00"
550 LET a=PEEK 23560: IF a<>0 AND (a>53 OR
    a<49) THEN POKE 23560,0: LET budilnik1=0:
    LET budilnik2=0: GO SUB 990: GO TO 610
600 RETURN
610 LET tt1=65536*PEEK 23674+256*PEEK 23673+
    PEEK 23672: LET tt2=65536*PEEK 23674+
    256*PEEK 23673+PEEK 23672: LET t1=INT ((
    tt1+tt2+ABS (tt1-tt2))/100+Beep): IF
    t1=tl THEN GO TO 610
620 IF t1<>tl THEN LET tl=t1: PLOT  INVERSE
    1;54*s(s+1,1)+127,87+54*s(s+1,2): DRAW
    INVERSE 1;-4*s(s+1,1),-4*s(s+1,2)
630 LET h=INT (t1/3600): LET m=INT ((t1-h*
```

```
     3600)/60): LET s=INT (t1-60*m-3600*h):
     LET s$="00": LET s$(3-LEN STR$ s TO 2)
     =STR$ s: IF sat AND s THEN PRINT #0;AT
     1,12; PAPER 5; INK 0;a$;".";b$;".";s$
640  PLOT 54*s(s+1,1)+127,87+54*s(s+1,2):
     DRAW -4*s(s+1,1),-4*s(s+1,2)
650  IF t1>86399.5 THEN LET Beep=0: LET t0=0:
     LET t1=0: POKE 23674,0: POKE 23673,0:
     POKE 23672,0
660  IF PEEK 23560=0 THEN GO TO 740
670  IF budilnik1 OR budilnik2 THEN IF PEEK
     23560<>0 THEN LET budilnik1=0: LET
     budilnik2=0: GO SUB 990: GO TO 610
680  IF NOT sat AND ((PEEK 23560<49 OR PEEK
     23560>53) AND PEEK 23560<>0) THEN LET
     Beep=Beep+.1: BEEP .1,-10: POKE 23560,0:
     LET sat=1: GO SUB 990: GO TO 610
690  IF PEEK 23560=13 THEN BEEP .1,-10: LET
     Beep=Beep+.1: POKE 23560,0: LET sat=0:
     GO SUB 990: LET g$="": GO TO 610
700  IF PEEK 23560=49 OR PEEK 23560=50 THEN
     LET Beep=Beep+.1: BEEP .1,-10: GO SUB
     420+50*(VAL CHR$ PEEK 23560=2): POKE
     23560,0: GO SUB 990: GO TO 610
710  IF PEEK 23560=53 THEN LET Beep=Beep+.1:
     BEEP .1,-10: POKE 23560,0: PLOT
     INVERSE 1;127+54*s(s+1,1),87+54*s(s+1,2)
     DRAW  INVERSE 1;-4*s(s+1,1),-4*s(s+1,2):
     GO TO 320
720  IF PEEK 23560=51 THEN LET Beep=Beep+.1:
     BEEP .1,-10: POKE 23560,0: LET
     alarm1=NOT alarm1: GO SUB 1050: GO TO
     610
730  IF PEEK 23560=52 THEN LET Beep=Beep+.1:
     BEEP .1,-10: POKE 23560,0: LET
     alarm2=NOT alarm2: GO SUB 1070: GO TO
     610
740  IF (VAL h$=h AND VAL m$=m AND s<1 AND
     alarm1) THEN LET budilnik1=1: LET ret=1:
     GO SUB 770: GO SUB 520: GO TO 610
742  IF budilnik1 OR budilnik2 THEN BEEP .1,30:
     LET Beep=Beep+.1
750  IF (VAL r$=h AND VAL t$=m AND s<1 AND
```



```
     alarm2) THEN LET budilnik2=2: LET ret=1:
     GO SUB 770: GO SUB 520
760  IF t1/60<>INT (t1/60) THEN GO TO 610
770  LET s$="00": LET a$="00": LET b$="00"
780  LET a$(3-LEN STR$ h TO 2)=(STR$ h AND
     h<>24)+("00" AND h=24): LET b$(3-LEN
     STR$ m TO 2)=STR$ m: IF sat AND NOT (
     budilnik1 OR budilnik2) THEN PRINT #0;AT
     1,12; PAPER 3; INK 7;a$;".";b$;".00"
790  FOR n=1 TO 8: LET A(n+8)=A(n): NEXT n
800  LET WIH=VAL A$: LET WIH=WIH+VAL B$/60:
     IF WIH>12 THEN LET WIH=WIH-12
810  LET WIH=WIH*PI/6: LET WIM=VAL B$: LET
     WIM=WIM*PI/30
814  IF OWIM=WIM THEN GO TO 890
816  LET OWIM=WIM
820  RESTORE : FOR N=1 TO 8: READ A(N): NEXT
     N: INVERSE 1: PLOT 127,141: DRAW 0,-4:
     INVERSE 0: PLOT 54*s(2,1)+127,87+54*s(2,
     2): DRAW -4*s(2,1),-4*s(2,2): LET s=1:
     IF sat AND NOT (budilnik1 OR budilnik2)
     THEN PRINT #0;AT 1,12; PAPER 5; INK 0;a$
     ;".";b$;".01"
830  INVERSE 1
840  PLOT 127,87: DRAW A(9),A(10): DRAW A(11)
     ,A(12): DRAW -A(9),-A(10): DRAW -A(11),-
     A(12)
850  PLOT 127,87: DRAW A(13),A(14): DRAW A(
     15),A(16): DRAW -A(13),-A(14): DRAW -A(
     15),-A(16)
860  INVERSE 0
870  PLOT 127,87: DRAW A(1),A(2): DRAW A(3),
     A(4): DRAW -A(1),-A(2): DRAW -A(3),-A(4)
880  PLOT 127,87: DRAW A(5),A(6): DRAW A(7),
     A(8): DRAW -A(5),-A(6): DRAW -A(7),-A(8)
890  CIRCLE 127,87,3: IF ret THEN LET ret=0:
     RETURN
900  GO TO 610
910  PLOT x,y: DRAW 3,0: PLOT x+4,y-1: DRAW
     0,-1: PLOT x-1,y-1: DRAW 0,-1: DRAW 1,-
     1: DRAW 3,0:
920  PLOT x+1,y-4: DRAW 1,0
930  PLOT x,y-5: DRAW 3,0: DRAW 1,-1: DRAW -
```

```
    5,0: DRAW 0,-1: DRAW 5,0
940 DRAW 1,-1: DRAW -7,0: DRAW 0,-1: DRAW 7,
    0:: DRAW 1,-1: DRAW -9,0: DRAW -1,-1:
    DRAW 11,0
950 PLOT x+3,y-12: DRAW 5,0: DRAW 2,-1:
    PLOT x+6,y-13: DRAW 2,0
960 PLOT x-5,y-12:: DRAW 5,0: PLOT x-7,y-13:
    DRAW 4,0
970 CIRCLE x+1,y-13,2
980 RETURN
990 IF sat THEN GO TO 1010
```




```
1000 PRINT AT 0,0;"            ";AT 0,23;"
     ";AT 1,0;"               ";AT 1,23;"
     ;AT 21,0;"               ";AT 21,22;"
     ";#0;AT 0,0;"
     ": RETURN
1010 PRINT AT 0,0; PAPER 2;" alarm 1 ";AT 0,
     23;" alarm 2 "; PAPER 3;AT 1,0;h$;".";m$
     ;" sat";AT 1,23;r$;".";t$;" sat"
```



```
1020 PRINT  PAPER 2;AT 21,0;"1-alarm 1";AT
     21,22;"2-alarm 2";#0;AT 0,0; INK 4;"3-
     zvono1                 4-zvono2";AT 1,0;"
     5-sat                    <<"; INVERSE 1;"
     ENTER"; INVERSE 0;">>": RETURN
1030 PRINT AT 0,0; PAPER 2;" alarm 1 ";AT 0,
     23;" alarm 2 "; PAPER 3;AT 1,0;h$;".";m$
     ;" sat";AT 1,23;r$;".";t$;" sat"
1040 RETURN
1050 IF alarm1 THEN LET x=30: LET y=155: GO
     SUB 910: RETURN
1060 IF NOT alarm1 THEN LET x=30: LET y=155:
     INVERSE 1: GO SUB 910: INVERSE 0:
     RETURN
1070 IF alarm2 THEN LET x=220: LET y=155: GO
     SUB 910: RETURN
1080 IF NOT alarm2 THEN LET x=220: LET y=155:
     INVERSE 1: GO SUB 910: INVERSE 0:
     RETURN
1090 DATA 15*SIN (WIH+.1),15*COS (WIH+.1),15*
     SIN (WIH-.1),15*COS (WIH-.1),24*SIN (
     WIM+.1),24*COS (WIM+.1),24*SIN (WIM-.1),
     24*COS (WIM-.1)
1100 PRINT TAB 7;"Pritisni jednu tipku"
1110 PAUSE 0: POKE 23689,PEEK 23689+1: PRINT
     TAB 31: RETURN
```

Brojevi

Poznajete li brojeve od 1 do 9? U tom slučaju možete igrati ovu igru. Morate skupiti sve brojeve od 0 do 9, ali samo po redu. Najprije 0, zatim 1, pa 2, itd. Svoga sakupljača, koji se stalno pomiče, vodimo od broja do broja pritiskom na bilo koju tipku. Kod svakog pritiska promijenit će smjer za 90 stupnjeva. Da igra ne bi bila suviše lagana, pobrinuli su se dobro izmiješani brojevi i njeno ograničeno trajanje. Mnogo sreće!

```
 10 PAPER 7: INK 9: BORDER 7: CLS
 20 PRINT AT 5,0;"◊◊◊◊◊◊◊◊B◊R◊O◊J◊E◊V◊I◊◊◊
    ◊◊◊◊◊◊"
 30 PRINT ''"◊U◊ogranicenom◊vremenu◊
    morate pokupiti"''"sve◊brojeve◊u◊
    redoslijedu."''"Za◊promjenu◊smjera◊
    mozete "''"koristiti◊bilo◊koju◊tip-
    ku."''''"◊◊◊◊◊◊◊◊Mnogo srece!"
 40 PRINT #0;"Pritisni◊bilo◊sto◊za◊
    pocetak◊igre": PAUSE 0
 50 LET Y=200: GO SUB 410
 60 CLS : PLOT 0,0: DRAW y,0:
 70 INK 0: PAPER 0: FOR x=1 TO 31: PRINT AT
    0,x;"A";AT 20,x;"A"
 80 NEXT x
 90 FOR x=0 TO 20: PRINT AT x,0;"A";AT x,
    31;"A": NEXT x
100 PAPER 7
110 FOR e=0 TO 9
120 LET a=INT (RND*16)+2: LET b=INT (RND*28)
    +2
130 IF SCREEN$ (a,b)<>"◊" THEN GO TO 120
140 PRINT AT a,b;e
150 BEEP .1,E
160 NEXT e
170 LET POX=1: LET POY=1
180 LET smjer=1: LET j=0
190 LET d$=SCREEN$ (poy,pox+1)
200 LET y=y-.5: IF y=INT y THEN OVER 1:
    PLOT y,0: OVER 0: IF y=1 THEN PRINT AT
    10,10;"KRAJ": BEEP 2,-10: PRINT ''"
```



```
    PRITISNI◊TIPKU◊ZA◊NOVU◊IGRU": PAUSE 0:
    RUN
210 LET l$=SCREEN$ (poy,pox-1)
220 LET g$=SCREEN$ (poy-1,pox)
230 LET c$=SCREEN$ (poy+1,pox)
240 LET r$="◊"
250 IF j=10 THEN LET y=y-20: GO TO 60: IF
    y<=0 THEN PRINT "Suvise◊si◊dobar": STOP
260 IF j=10 THEN GO TO 40
270 IF smjer=1 AND d$="A" THEN LET smjer=2
280 IF smjer=2 AND c$="A" THEN LET smjer=3
290 IF smjer=3 AND l$="A" THEN LET smjer=4
300 IF smjer=4 AND g$="A" THEN LET smjer=1
310 IF smjer=1 THEN LET pox=pox+1: PRINT AT
    poy,pox-1;r$
320 IF smjer=2 THEN LET poy=poy+1: PRINT AT
    poy-1,pox;r$
330 IF smjer=3 THEN LET pox=pox-1: PRINT AT
    poy,pox+1;r$
340 IF smjer=4 THEN LET poy=poy-1: PRINT AT
    poy+1,pox;r$
350 LET h$=SCREEN$ (poy,pox): IF (h$<>STR$ (
    j) AND h$<>"◊" AND h$<>"A") THEN LET r$
    =h$: GO TO 310
360 IF h$=STR$ (j) THEN BEEP .05,J: LET j=j+
    1
370 PRINT AT poy,pox;"A"
380 IF INKEY$<>"" THEN LET smjer=smjer+1
390 IF smjer=5 THEN LET smjer=1
400 GO TO 190
410 FOR C=USR "A" TO USR "A"+6: READ A:
    POKE C,A: NEXT C
420 RETURN
430 DATA BIN 00010000,BIN 00111000,BIN
    01111100,BIN 11111110,BIN 01111100,BIN
    00111000,BIN 00010000
```

Mačka-miš

Poput zle mačke pokušavate uloviti miša koji se želi vratiti u svoju rupu. Vaša uspješnost ovisi o stupnju složenosti kojeg ste već na početku odabrali.

```
 10 PAPER 7: INK 9: BORDER 7: CLS
 20 PRINT AT 5,0;"◇◇◇◇◇◇◇◇M◇A◇C◇K◇-◇M◇I◇S◇◇◇
    ◇◇◇◇◇◇"
 30 PRINT '''◇◇Cilj◇igre◇je◇uhvatiti◇misa,◇
    koji"''"zeli◇pobjeci◇kroz◇rupu."''"
    Pomices◇se◇cursorima(5,6,7,8)."
 40 PRINT #0;"Pritisni◇bilo◇sto◇za◇pocetak◇
    igre": PAUSE 0
 50 RESTORE : CLS
 60 INPUT "stupanj◇(5-najteze,1-najlakse)"
    ;s
 70 IF s<1 OR s>5 THEN GO TO 60
 80 INK 0: PAPER 0: FOR x=0 TO 20: PRINT AT
    x,0;"A";AT 0,x;"A";AT 20,x;"A";AT x,20;"
    A": NEXT x
 90 PAPER 7
100 PRINT AT 15,20;"◇"
110 LET a=2: LET b=2: LET a1=a: LET b =3:
    LET x=10: LET y=10: LET x1=x: LET y1=11
120 LET a$=INKEY$
130 LET x=x+(a$="8" AND x+1<20)-(a$="5" AND
    x-1>0)
140 LET y=y+(a$="6" AND y+1<20)-(a$="7" AND
    y-1>0)
150 FOR r=1 TO s
160 LET t=INT (RND*4)
170 IF t=0 THEN LET a=a+(a<20)-(a>20)
180 IF t=2 THEN LET b=b+(b<15)-(b>15)
190 IF t=1 THEN LET a=a+(a>=x)-(a<x)
200 IF t=3 THEN LET b=b+(b>=y)-(b<y)
210 IF a>19 AND b<>15 THEN LET a=19
220 IF a<1 THEN LET a=1
230 IF b>19 THEN LET b=19
240 IF b<1 THEN LET b=1
```



```
250 IF a=20 AND b=15 THEN GO TO 340
260 PRINT AT y,x;"A";AT b,a;"B"
270 IF a<>a1 OR b<>b1 THEN PRINT AT b1,a1;"◇
    "
280 IF x<>x1 OR y<>y1 THEN PRINT AT y1,x1;"◇
    "
290 IF a=x AND b=y THEN PRINT #0; FLASH 1;"
    ULOVIO◇SI◇GA!!": FOR g=1 TO 50: BEEP .01,
    g: BEEP .01,50-g: NEXT g: PAUSE 0: RUN
300 LET x1=x: LET y1=y
310 LET a1=a: LET b1=b
320 NEXT r
330 GO TO 120
340 FOR a=20 TO 25: PRINT AT b,a-2;"◇◇◇B":
    NEXT a
350 PRINT #0;"Pobjegao◇sam◇ti◇Ha◇Ha◇Ha◇!":
    BEEP 1.5,-10: PAUSE 0: PAUSE 0: RUN
360 FOR f=USR "a" TO USR "a"+15: READ a:
    POKE f,a: NEXT f
370 RETURN
380 DATA BIN 10000001,BIN 11011011,BIN
    11111110,BIN 01101010,BIN 01111100,BIN
    00110100,BIN 00011000,0
390 DATA BIN 0,BIN 0,BIN 10000000,BIN
    01000000,BIN 01011010,BIN 01111110,BIN
    00111111,BIN 00100100
```

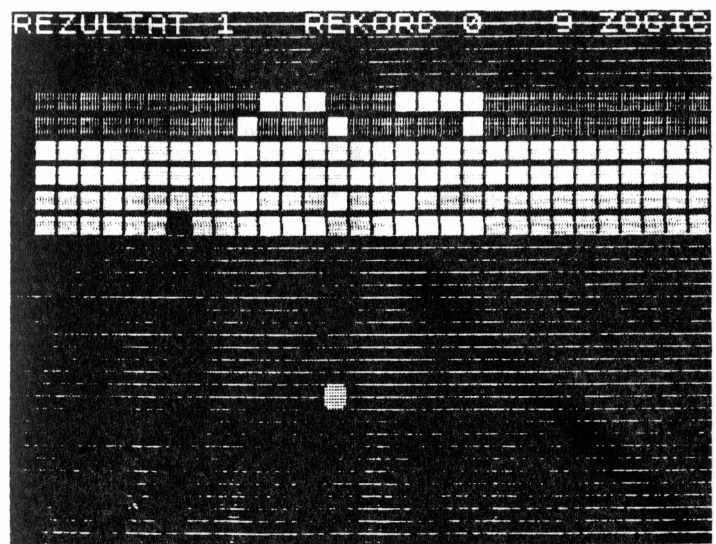
Glava-zid

Reketom morate odbijati lopticu u zid. Zbog toga ispadaju opeke iz zida. Cilj igre je srušiti zid, ali primijetit ćete da bijeli znak Cankarjeve založbe ne možete izbiti. Reket pomičete tipkama 5 i 8.

```
  1◇REM◇GLAVA-ZID
 10 LET mk=0
 20 LET HS=0: OVER 0
 30 LET SC=0: RESTORE : BORDER 0: PAPER 0:
    INK 1: BRIGHT 1: CLS : LET S=INT (RND*5+
    16): LET X=10: LET Y=5: LET A1=-1: LET
    B1=1: LET N=9
 40 FOR B=USR "A" TO USR "A"+15: READ C:
    POKE B,C: NEXT B
 50 PRINT  INK 6;"REZULTAT◇";SC;TAB 13;"
    REKORD◇";HS;TAB 24;"9◇LOPTICA"''''
 60 FOR A=1 TO 6: READ B: INK B
 70 PRINT "◇BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB"
 80 NEXT A
 90 GO SUB 380
100 INK 1
110 LET Z=ATTR (X,Y)<>71 AND ATTR (X,Y)<>65
    AND ATTR (X,Y)<>67
120 IF ATTR (X,Y)=71 THEN LET MK=1
130 PRINT AT X,Y; INK 5;"A"
140 LET S=S+(INKEY$="8")-(INKEY$="5"): LET
    S=S+(S=-1)-(S=26): PRINT AT 21,S; INK
    3;"◇____◇"
150 LET A1=A1-2*A1*Z-2*(X=21)+2*(X=2): LET
    B1=B1+2*(Y=1)-2*(Y=30): IF Z THEN LET
    SC=SC+1: BEEP .01,45-2*x: PRINT AT 0,9;
    INK 6;SC
160 LET S=S+(INKEY$="8")-(INKEY$="5"): LET
    S=S+(S=-1)-(S=26): PRINT AT 21,S; INK
    3;"◇____◇"
170 IF MK<>1 THEN PRINT AT X,Y; PAPER 0;
    INK 1;"◇"
180 IF MK=1 THEN PRINT AT X,Y; PAPER 0; INK
    7; BRIGHT 1;"B"
```



```
190 LET MK=0
200 LET X=X+A1: LET Y=Y+B1: IF (Y<S+1 OR
    Y>S+4) AND X=21 THEN GO TO 230
210 IF SC<>0 AND SC/156=INT (SC/156) THEN
    PRINT AT 3,0;: RESTORE 370: GO TO 60
220 GO TO 110
230 PRINT AT 10,11; INK 2; PAPER 7;"◇
    PROMASIO! ";AT X,Y; INK 2
240 LET N=N-1
250 IF N=0 THEN GO TO 300
260 PRINT AT 0,24; INK 6;N
270 FOR Q=1 TO 250: NEXT Q: PRINT AT 10,11;"
    ◇◇◇◇◇◇◇◇◇◇";AT X,Y;"◇"
280 LET X=10
290 GO TO 110
300 PRINT AT 10,7; INK 6; PAPER 1;"TVOJ◇
    REZULTAT◇JE ";SC
310 IF SC>HS THEN LET HS=SC
320 PRINT AT 0,18; INK 6;HS;AT 12,3; INK 3;
    PAPER 7; FLASH 1;"PRITISNI◇BILO◇KOJU◇
    TIPKU"
```



```
330 IF INKEY$<>"" THEN GO TO 330
340 IF INKEY$="" THEN GO TO 340
350 GO TO 30
360 DATA 126,255,255,255,255,255,255,126,0,
    0,127,127,127,127,127,127
370 DATA 2,2,6,6,4,4
380 RESTORE 380
390 FOR A=1 TO 24
400 READ B,C
410 PRINT AT B+1,C; BRIGHT 1; OVER 1; PAPER
    0; INK 7;"◇"
420 NEXT A
430 DATA 2,11,2,12,2,13,2,17,2,18,2,19,2,20,
    3,10,3,14,3,20,4,10,4,19,5,10,5,18,6,10,
    6,14,6,17,7,11,7,12,7,13,7,17,7,18,7,19,
    7,20
440 RETURN
```


Meta

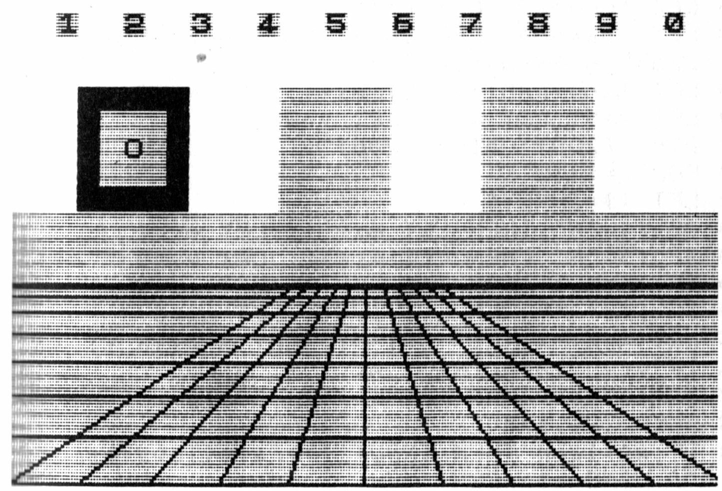
Koliko uspješno gađate pomične mete? Ne znate? Upišite prikazani program i na temelju deset pokusa dobit ćete odgovor. Ako vam baš najbolje ne polazi za rukom, kod natpisa »Pritisni tipku za start« pritisnite tipku h i iznad mete bit će ispisani brojevi od 1 do 0. Kada se pojavi meta, pritisnite broj iznad nje. Kad naučite, pokušajte bez brojeva. Mnogo sreće!

```
10 PAPER 5: BORDER 5: INK 9: CLS
20 PRINT AT 5,10; PAPER 6;" M E T A "
30 GO TO 540

40 REM slika1(n)
50 BRIGHT 1
60 PRINT AT 3,n;"█████"
70 PRINT AT 6,n;"█   █"
80 PRINT AT 5,n;"█ O █"
90 PRINT AT 4,n;"█   █"
100 PRINT AT 7,n;"█████"
110 BRIGHT 0
120 RETURN

130 REM slika2(n)
140 BRIGHT 1
150 PRINT AT 3,n;"▚   ▞"
160 PRINT AT 4,n;" ▚ ▞ "
170 PRINT AT 5,n;"  █  "
180 PRINT AT 6,n;" ▞ ▚ "
190 PRINT AT 7,n;"▞   ▚"
200 BRIGHT 0
210 RETURN

220 REM pozadina
230 FOR i=0 TO 8
240 LET y=88-i 2
250 PLOT 0,y: DRAW 255,0
260 NEXT i
270 PLOT 127,88: DRAW 0,-64
280 FOR i=11 TO 60 STEP 10
290 PLOT 127-i/2,88: DRAW -2*i,-64
```

```
300 PLOT 127+i/2,88: DRAW 2*i,-64
310 NEXT i
320 RETURN

330 REM brisanje
340 DIM e$(32)
350 FOR i=0 TO 7
360 PRINT  BRIGHT 1; PAPER 7;AT i,0;e$
370 NEXT i
380 RETURN

390 REM kiks
400 OVER 1
410 GO SUB 40
420 OVER 0
430 RETURN

440 REM pogodak
450 LET pog=pog+1
460 BEEP .1,10
470 GO SUB 130
480 PAUSE 20
490 BEEP .05,30
500 OVER 1
510 GO SUB 130
520 OVER 0
530 RETURN

540 REM glavni program
550 GO SUB 220
560 PRINT AT 5,10; PAPER 6;" M E T A "
570 PRINT AT 7,3; PAPER 8;"Pritisni tipku
    za start"
580 PAUSE 0: LET a$=INKEY$
590 GO SUB 330: IF a$="h" THEN FOR i=0 TO 9:
    LET a$=STR$ (i+1): PRINT AT 0,2+3*i;a$(
    LEN a$): NEXT i
600 LET pog=0
610 FOR i=1 TO 10
620 PRINT AT 20,0;"Br. meta  :";i;" "
630 IF i=1 THEN PRINT AT 21,0;e$
640 BEEP .05,1
650 LET v=1+INT (.5+RND*9)
```



```
660 LET n=3*(v-1)
670 PAUSE 10+RND*50
680 GO SUB 40
690 LET a$=""
700 PAUSE 40+RND*30
710 LET a$=INKEY$
720 IF a$="0" THEN LET a$="10"
730 IF a$<>STR$ v THEN GO SUB 390
740 IF a$=STR$ v THEN GO SUB 440
750 LET us=INT (100*pog/i)
760 PRINT AT 21,0;"Br. pogod.:";pog
770 PRINT AT 21,15;"Uspjeh  :";us;"%  "
780 FOR j=1 TO 300: NEXT j
790 NEXT i
800 GO SUB 330
810 GO TO 560
```



Zmija

Kako ćete se snaći u ulozi zmije koja mora pojesti što više hrane i pritom izbjegavati umnogostručavajuće hridi i stijene. Da bi stvar bila još teža, zmija postaje sve duža i duža.

```
  1◇REM◇ZMIJA
 10 FOR a=USR "a" TO USR "a"+6
 20 POKE a,62: NEXT a
 40 LET i=0: LET p=7: : INK i: PAPER p: CLS :
    GO SUB 500
 50 LET b=6: BORDER b: PAPER b: PRINT "◇◇◇◇◇
    ◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇";
 60 FOR n=1 TO 20: PRINT AT n,31;"◇◇";:
    NEXT n: PRINT AT 21,31;"◇": PAPER p
 70 LET foodc=2: LET rock=1
 80 LET snake=4: LET food=p*8+foodc: POKE
    23658,8:◇REM◇capslock
100 LET land=p*8+i: LET mx=1: LET my=0
110 LET s=5: LET x=2: LET y=8
120 DIM x(200): DIM y(200)
130 FOR n=1 TO S
140 LET i$=INKEY$
150 IF i$="N" THEN LET mx=-1: LET my=0
160 IF i$="M" THEN LET mx=+1: LET my=0
170 IF i$="Q" THEN LET my=-1: LET mx=0
180 IF i$="A" THEN LET my=1: LET mx=0
185 LET X=X+MX: LET Y=Y+MY: LET A=ATTR (Y,X)
186 IF y<22 THEN PRINT AT y,x;"A̲"
187 IF a=food THEN LET s=s+1: GO TO 200
188 BEEP .01,s/4
190 IF a<>land THEN INPUT "◇◇Zaletio◇si◇se◇!
    "; LINE a$: RUN
200 PRINT AT 0,0; PAPER b;"◇REZULTAT◇=◇"
    ;INT s*10
210 PRINT AT y(n),x(n); INK i; PAPER p;"◇"
220 LET x(n)=x: LET y(n)=y
230 PRINT AT y,x; INK snake;"A̲"
240 NEXT n
245 PRINT AT RND*10+5,RND*20+5; INK foodc;"■"
246 PRINT AT RND*21+.5,RND*25+.5; INK rock;"
    ▄█▄"
260 GO TO 130
500 PRINT AT 1,9;"ZMIJA_______"
510 PRINT ''"Mala◇si◇zmija◇i◇moras◇jesti"'"
    hranu◇a◇da◇se◇ne◇zaletis◇u"'"bilo◇sto."
520 PRINT '"◇▄█▄◇-◇Stijene◇◇,◇■◇-◇Hrana"
530 PRINT ''"Za◇pomicanje◇pritisni◇:"''"Q◇
    =◇gore","A◇=◇dolje"'"N◇=◇lijevo","M◇◇=◇
    desno"
600 INPUT LINE a$: CLS : RETURN
```

Bombarder

U ulozi pilota bojnog aviona pokušavate pogoditi bojni cilj — lađu. Avion se diže pritiskom tipke 7, spušta pritiskom tipke 6, a bombu bacate pritiskom tipke 0. Probajte da li vam uspjeva!

```
 1◇REM◇BOMBARDER
 10 BORDER 6: INK 0: PAPER 5
 20 CLS
 30 RESTORE 420
 40 FOR a=0 TO 15: READ a$
 50 FOR b=0 TO 7: READ c
 60 POKE b+USR a$,c
 70 NEXT b
 80 NEXT a
 90 FOR a=20 TO 21: PRINT AT a,0; PAPER 1;"◇
    ◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇◇": NEXT
    a
100 LET p=0: LET x=19: LET y=0: LET u=2:
    LET v=29: LET a=0: LET b=0: LET s=0
110 LET p=p+1
120 PRINT AT x,y; INK 5;"◇"; INK 2;"◇BCD"
    ;AT x+1,y; PAPER 1; INK 2;"◇EFEH"
130 LET u=u+(INKEY$="6" AND U<10)-(INKEY$="
    7" AND u>2): LET v=v-1
140 IF v=0 THEN GO SUB 220
150 LET y=y+1: IF y=27 THEN GO SUB 240
160 IF INKEY$="0" THEN GO SUB 260
170 IF b<>0 THEN GO SUB 290
180 PRINT AT u-1,v;"◇◇◇◇";AT u+2,v;"◇◇◇◇"
    ;AT u,v;"IJK◇";AT u+1,v;"LMN◇"
190 PRINT AT 0,0; FLASH 1; PAPER 3; INK 6;"
    REZULTAT=";s
200 IF p<600 THEN GO TO 110
210 GO TO 400
220 PRINT AT u-1,v+1;"◇◇◇◇";AT u+2,v+1;"◇◇◇◇
    ";AT u,v+1;"◇◇◇";AT u+1,v+1;"◇◇◇"
230 LET v=29: LET u=2: RETURN
240 PRINT AT 19,y-1; PAPER 5;"◇◇◇◇◇";AT 20,
    y-1; PAPER 1;"◇◇◇◇◇"
```



```
250 LET y=0: RETURN
260 IF b<>0 THEN PRINT AT a,b;"◇"
270 LET d=u
280 LET a=u: LET b=v+1: RETURN
290 LET a=a+1: IF a=21 THEN LET b=0: RETURN
300 PRINT AT a-1,b;"◇": IF a=20 AND ATTR (a,
    b<>15 THEN RETURN
310 IF ATTR (a,b)=42 THEN GO TO 350
320 PRINT AT a,b; INK 7;"P"
330 BEEP .05,-a/10
340 RETURN
350 PRINT AT a,b;".": FOR z=0 TO 20: NEXT z:
    PRINT AT a,b;"R": FOR z=0 TO 20: NEXT z:
    PRINT AT a,b;"S": FOR z=0 TO 20: NEXT z
360 RESTORE 410: FOR z=0 TO 5: READ c: BEEP
    .5,c: NEXT z
370 PRINT AT x,y; PAPER 5;"◇◇◇◇◇";AT x+1,y;
    PAPER 1;"◇◇◇◇◇": LET y=0
380 RESTORE
390 LET b=0: LET s=s+(10*(11-d)): RETURN
400 FOR a=0 TO 2: PAUSE 25: BEEP .5,-5:
    NEXT a: INPUT "PRITISNI◇ENTER◇ZA◇NOVU◇
    IGRU!◇"; LINE a$: CLS : GO TO 90
410 DATA 35,20,35,20,35,20
420 DATA "b",0,0,0,0,0,63,63,63
430 DATA "c",32,48,48,118,118,255,255,255
440 DATA "d",0,0,0,0,0,224,9,255
450 DATA "e",63,63,31,31,15,0,0,0
460 DATA "f",255,255,255,255,255,0,0,0
470 DATA "h",254,252,248,240,224,0,0,0
480 DATA "i",0,0,0,0,0,3,15,255
490 DATA "j",0,3,15,63,255,254,255,255
500 DATA "k",64,192,0,0,0,24,248,252
510 DATA "l",255,15,3,0,0,0,0,0
520 DATA "m",255,255,254,255,63,15,3,0
530 DATA "n",252,248,24,0,0,0,192,64
540 DATA "p",0,56,16,56,56,56,56,16
550 DATA "q",0,0,0,24,24,0,0,0
560 DATA "r",0,0,16,56,28,8,0,0
570 DATA "s",0,144,86,60,60,88,16,0
```

Motorist

Poput kaskadera na motoru trebate proći kroz vatreni tunel. Pritom morate paziti da ne udarite glavom u vatreni tunel. Zatim morate preskočiti sve postavljene autobuse. Za svaki uspješno prevezen krug dobivate dodatni poen. Motor ubrzavate i usporavate tipkama 9, odnosno 0.

```
  1◇REM◇MOTORIST
 10 FOR A=0 TO 95
 20 READ B: POKE USR "A"+A,B
 30 NEXT A
 40 FOR B=1 TO 9
 50 LET V=0: LET R=0: LET X=4: LET Y=1
 60 BORDER 0: PAPER 0: INK 7: BRIGHT 1: CLS
 70 PRINT AT 0,0;"REZULTAT◇";B-1;TAB 10;
    PAPER 1; INK 6;"◇MOTORIST◇"
 80 FOR A=0 TO 31
 90 PRINT AT 5,A; INK 4;"▀▀";AT 13,A;"▀▀";AT
    21,A;"▀▀"
100 NEXT A
105 FOR A=0 TO B+4: PRINT AT 9,A*2+2; INK
    2;"KL": NEXT A
110 PRINT AT 20,6; INK 4;"G█◇";
120 FOR A=1 TO B+5
130 PRINT  INK 5;"F";
140 NEXT A
150 PRINT  INK 4;"◇██H"
155 IF R>.7 THEN PRINT AT X-2,Y; INK 6;"◇CE"
    ;AT X-1,Y-1;"◇JIA";AT X;Y-1;"◇B◇◇": GO
    TO 170+130*(X=12 AND Y<B*2+10.5)
160 PRINT AT X-1,Y-1; INK 6;"◇◇CE";AT X,Y-
    1;"◇BDA";AT X-2,Y;"◇◇◇"
170 LET R=R+.2*(INKEY$="0")-.1*(INKEY$="1"
    AND V>0)-.12*(V>0): LET V=V+R: IF V>10
    THEN LET V=10
175 IF V<0 THEN LET V=0
180 LET Y=Y+V/10: IF INT Y=28 THEN PRINT AT
    X-2,Y;"◇◇◇";AT X-1,Y-1;"◇◇◇◇";AT X,Y-1;"
    ◇◇◇◇": LET X=X+8: LET Y=1
190 BEEP .01,V*3-20: IF INT (Y+.5)=4 AND
    X=20 THEN GO TO 220
200 IF X<27 THEN GO TO 155
210 NEXT B: CLS : PRINT "CESTITAM!"''"
    UPRAVO◇SI◇USPIO◇PRESKOCITI"''"SVIH◇15◇
    AUTOBUSA◇I◇OSIGURAO"''"SI◇MJESTO◇U◇
    GUINESSOVOJ"''"KNJIZI◇REKORDA.": STOP
220 PRINT AT 18,3;"◇◇◇"''"◇◇◇◇◇◇◇"''"◇◇◇◇◇◇":
    IF R<.2 THEN LET R=.2
225 LET X=X-V/7: IF X<16 THEN LET X=16
230 LET V=V-R/2-.42: LET Y=Y+1: LET X=X+.3
235 IF X>=20 THEN GO TO 270
240 PRINT AT X-1,Y-1; INK 6;"◇◇CE";AT X,Y-
    1;"◇BDA";AT X-2,Y;"◇◇◇"
245 BEEP .03,10-3*(X-15)
250 PRINT AT X-1,Y-1;"◇◇◇◇";AT X,Y-1;"◇◇◇◇"
    ;AT X-2,Y;"◇◇◇"
260 GO TO 225
270 IF Y>B+17 THEN GO TO 210
272 PRINT #1; PAPER 2;"Upravo◇si◇se◇
    zaletio◇u◇autobuse"''"i◇ubio◇se.◇
    Pritisni◇ENTER"
280 IF INKEY$=CHR$ 13 THEN RUN
290 GO TO 305
300 PRINT #1; PAPER 2;"Udario◇si◇u◇
    vatreni◇tunel."''"Pritisni◇ENTER◇za◇
    novu◇igru"
305 IF INKEY$=CHR$ 13 THEN RUN
310 GO TO 305
1000 DATA 60,66,152,164,66,66,36,24
1010 DATA 60,66,25,37,66,66,36,24
1020 DATA 56,124,224,252,124,120,48,127
1030 DATA 120,124,255,255,252,24,24,0
1040 DATA 0,0,0,0,0,120,152,24
1050 DATA 62,66,127,127,65,127,127,34
1060 DATA 1,3,7,15,31,63,127,255
1070 DATA 128,192,224,240,248,252,254,255
1080 DATA 63,127,254,252,248,252,236,192
1090 DATA 0,0,0,1,3,7,15,31
1100 DATA 8,8,40,61,189,191,255,255
1110 DATA 4,4,36,109,109,127,255,255
```

Slikar

Pomoću ovoga programa možemo na zaslonu risati slike, a računalo pamti redoslijed vašeg risanja, pa vam to može kasnije ponoviti. Podatke o slici možete pohraniti na vrpcu i kasnije koristiti. Detaljne upute za korištenje programa nalaze se u njemu samom. Najprije upišite prvi program, snimite ga (SAVE »slikar« LINE 9990), provjerite ga (VERIFY »slikar«), a zatim ga obrišite. Nakon toga upišite drugi kratki program za unos kodova, pokrenite ga i u njega unesite kodove iz tabele (redoslijed je s lijeva na desno). Kada to napravite, program će sam snimiti umetnute kodove (pazite samo da ih snimite iza programa slikar). Kad sve to napravite, napunite prvi dio programa, a ovaj će sam napuniti drugi dio. Ako niste pogriješili prilikom unošenja, program će raditi.

```
   2 PRINT : GO TO 6000
  10 FOR k=1 TO 20: PRINT t(k,l),p(k): NEXT
     k
 999 GO TO 1080

1010 REM
1021 PLOT  OVER 1; INK 8;0,y
1030 DRAW  OVER 1; INK 8;255,0
1040 RETURN
1050 PLOT  OVER 1; INK 8;x,0
1060 DRAW  OVER 1; INK 8;0,175
1070 RETURN

1080 REM PROGRAM SLIKAR
1090 LET x=125: LET y=80
1100 LET xn=x: LET yn=y
1110 LET n=0: LET m=1: LET t=0
1120 INPUT "Koliko poteza ocekujes ?"'ll
1125 INPUT "Koliko stringova (MAX LEN=15)
     ocekujes ?";tt
1130 DIM t(ll,2): DIM p(ll*1.3)
1131 DIM t$(tt,21)
1140 POKE 23693,sss: BORDER bdr: CLS
1150 GO SUB 5000: GO SUB 1000: GO SUB 1050
2000 PAUSE 0
2010 LET c=CODE INKEY$
```



```
2020 IF c>95 THEN GO TO 2121
2050 IF c=53 THEN LET xn=x-1*(x>0): GO TO
     2160
2060 IF c=8 THEN LET xn=x-10*(x>9): GO TO
     2160
2070 IF c=56 THEN LET xn=x+1*(x<255): GO TO
     2160
2080 IF c=9 THEN LET xn=x+10*(x<246): GO TO
     2160
2090 IF c=54 THEN LET yn=y-1*(y>0): GO TO
     2150
2100 IF c=10 THEN LET yn=y-10*(y>9): GO TO
     2150
2110 IF c=55 THEN LET yn=y+1*(y<175): GO TO
     2150
2120 IF c=11 THEN LET yn=y+10*(y<166): GO TO
     2150

2121 REM kraj cross
2122 IF c=113 THEN LET n=n+1: LET m=m+1: GO
     TO 3060
2124 IF c=119 THEN LET n=n+1: LET m=m+1: GO
     TO 3000
2126 IF c=101 THEN RETURN
2128 IF c=98 THEN GO SUB 5100: IF m=1 THEN
     BEEP 3,30: PRINT "SVE OBRISANO"
2129 IF c=105 THEN INPUT  BRIGHT 1;"Potez:";(
     ll-n)," $tr:";(tt-t); LINE b$
2130 IF c=114 THEN CLS : GO SUB 4000: PAUSE
     0: GO TO 1150
2132 IF c=116 THEN LET t=t+1: LET m=m+1: LET
     p(m)=-2: LET p(m+1)=-1: GO SUB 5200
2140 IF c=104 THEN LET yn=0: LET xn=0: GO
     SUB 1050: LET x=xn: GO SUB 1050: GO SUB
     1000: LET y=yn: GO SUB 1000: GO TO
2149 GO TO 2000
2150 GO SUB 1000: LET y=yn: PRINT AT 0,0;y;"
     ": GO SUB 1000: GO TO 2000
2160 GO SUB 1050: LET x=xn: PRINT AT 21,
     28;x;"  ": GO SUB 1050: GO TO 2000
2170 GO TO 2000: REM endloop

3000 REM draw input
```

```
3001 LET t(n,1)=x: LET t(n,2)=y
3010 LET p(m)=n: LET p(m+1)=-1
3020 LET rx=x-xs: LET ry=y-ys
3030 PLOT  INK 8;xs,ys: DRAW  OVER 1; INK
     8;rx,ry: BEEP .1,0
3040 LET xs=x: LET ys=y
3050 GO TO 2000
3060 LET t(n,1)=x: LET t(n,2)=y
3070 LET p(m)=0: LET m=m+1: LET p(m)=n
3080 PLOT x,y: LET xs=x: LET ys=y: BEEP .1,
     30
3090 LET p(m+1)=-1
3100 GO TO 2000

3110 REM

4000 REM DRAW ROUTINE
4010 CLS : LET t=0: LET m=2: LET l$="!!"
4020 IF p(m)=-1 THEN LET m=m-1: RETURN
4030 IF p(m)=0 THEN LET l$="!!": GO TO 4120
4040 IF p(m)=-2 THEN LET t=t+1: GO SUB 5250:
     GO TO 4120
4041 LET xi=t(p(m),1)
4050 LET yi=t(p(m),2)
4060 IF xi<0 OR xi>255 OR yi<0 OR yi>175
     THEN LET l$="!!": BEEP .01,30: GO TO
     4120
4070 IF l$="!!" THEN GO TO 4090
4080 DRAW xi-xsi,yi-ysi
4090 LET xsi=xi: LET ysi=yi
4100 PLOT xi,yi
4110 LET l$="ok"
4120 LET m=m+1: GO TO 4020
4130 RETURN
4140 INPUT "Ime slike: ";b$: IF LEN b$>10
     THEN GO TO 4140
4150 RETURN

5000 REM SCALE
5010 PLOT 0,0: DRAW 255,0: DRAW 0,175: DRAW -
     255,0: DRAW 0,-175
5020 LET step=10: LET py=1: GO SUB 5070: LET
     step=8: LET py=174: GO SUB 5070
```



```
5030 LET steo=10: LET px=1: GO SUB 5080: LET
     step=8: LET px=254: GO SUB 5080
5040 RETURN
5070 FOR i=255 TO 0 STEP -step
5075 PLOT i,py
5079 NEXT i: RETURN
5080 FOR i=0 TO 175 STEP step
5084 PLOT px,i
5088 NEXT i: RETURN
5090 RETURN

5100 REM BRISANJE POSLJEDNJEG POTEZA
5104 IF p(m-1)=0 AND p(m)>0 THEN PLOT OVER
     1; t(p(m),1),t(p(m),2): LET p(m-1)=-1:
     LET m=m-2: LET n=n-1: BEEP .05,0:
     RETURN
5105 IF p(m)>0 AND p(m-1)>0 THEN LET m=m-1:
     LET l$="!!": OVER 1: GO SUB 4040: OVER
     0: LET p(m)=-1: LET m=m-1: LET n=n-1:
     BEEP .1,-20: RETURN
5110 IF p(m)=-2 THEN LET t=t-1: LET p(m)=-1:
     LET m=m-1
5190 BEEP .2,30: RETURN

5200 REM    TEXT
5210 INPUT "Text:";e$: IF LEN e$>15 THEN GO
     TO 5210
5220 INPUT "Visina slova(karaktera):";ly
5230 INPUT "Sirina slova(karaktera):";lx
5232 GO SUB 5330
5240 LET t$(t,1)=CHR$ (xn+1)
5241 LET t$(t,2)=CHR$ (176-yn)
5243 LET t$(t,3)=CHR$ lx
5244 LET t$(t,4)=CHR$ ly
5245 LET t$(t,5)=CHR$ (5+LEN e$)
5246 LET t$(t,6 TO (5+LEN e$))=e$
5247 LET t$(t,21)=CHR$ sss

5250 REM pisi
5251 LET s$=t$(t,6 TO CODE (t$(t,5)))
5252 LET sss=CODE t$(t,21)
5253 LET sto=PEEK 23693
5255 POKE 23693,sss
```

```
5260 LET sxx=CODE t$(t,1)
5261 LET syy=CODE t$(t,2)
5262 LET sxs=CODE t$(t,3)
5263 LET sys=CODE t$(t,4)
5280 GO SUB 9600
5285 POKE 23693,sto
5290 OVER 0: RETURN

5300 REM COLOR
5301 INPUT "BORDER ";bdr
5332 INPUT " INK :";ink
5333 INPUT " PAPER :";pap
5334 INPUT " BRIGHT :";br
5335 INPUT " FLASH :";fl
5336 LET sto=PEEK 23693
5337 LET sss=ink+8*pap+64*br+128*fl: IF
     sss>255 THEN GO TO 5232
5340 RETURN

6000 REM MENU ROUTINE
6005 LET sss=120: LET bdr=5
6010 BORDER 5: PAPER 5: INK 9
6020 LET c=0
6030 PRINT AT 0,7; PAPER 2;"  S L I K A R  "
6040 PAPER 6
6050 PRINT '"RUN program 'slikar' ";TAB 28;"-
     r"
6055 PRINT "NASTAVAK unosa";TAB 28;"-c"
6056 PRINT "RISANJE po memoriji";TAB 28;"-d"
6060 PRINT "LOADanje podataka";TAB 28;"-l"
6070 PRINT "SAVEanje podataka";TAB 28;"-s"
6080 PRINT "COPY na ZX stampac";TAB 28;"-z"
6085 PRINT "SAVE SCREEN$";TAB 28;"-t"
6090 PRINT "BORDER, ink,paper postavljanje"
     ;TAB 28;"-b"
6110 PAPER 7: BRIGHT 1:
6120 PRINT  INVERSE 1; BRIGHT 1;'"'SLIKAR'
     IMA SLIJEDECE NAREDBE :"
6130 PRINT '"q-PLOT"'"w-DRAW"'"r-OBNAVLJANJE
     SLIKE"'"h-KRIZ NA 0,0"'"t-TEKST"'"b-
     BRISANJE POSLJEDNJEG POTEZA"'"i-
     INFORMACIJA O SLOBODNOJ MEMORIJI"'"
     e-IZLAZ U MENU"'"KURSORI s/bez caps
```

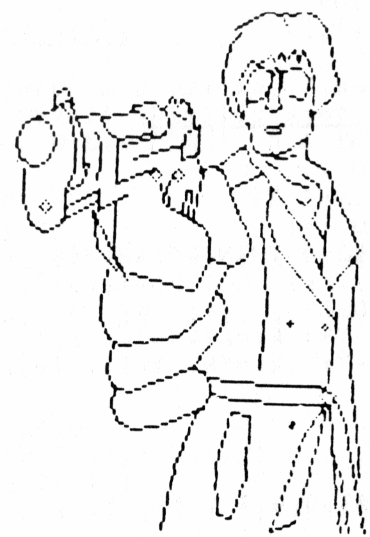


```
     shift"
6150 PAUSE 0: LET a$=INKEY$
6155 POKE 23693,sss: BORDER bdr
6160 IF a$="c" THEN CLS : GO SUB 4000: GO
     SUB 1150
6170 IF a$="d" THEN CLS : GO SUB 4000: PAUSE
     0
6180 IF a$="z" THEN GO SUB 4000: COPY
6185 IF a$="b" THEN GO SUB 5300: CLS
6190 IF a$="l" THEN GO SUB 4140: LOAD b$
     DATA p(): LOAD b$ DATA t(): LOAD b$
     DATA t$()
6200 IF a$="s" THEN GO SUB 4140: SAVE b$
     DATA p(): SAVE b$ DATA t(): SAVE b$
     DATA t$()
6203 IF a$="t" THEN GO SUB 4140: GO SUB 4000:
     SAVE b$SCREEN$
6210 IF a$="r" THEN GO SUB 1080
6220 IF c=101 THEN LET c=100: GO TO 6020
6230 PAUSE 200: GO TO 6010
9599 CLEAR 64959: LOAD ""CODE
9600 REM big letter

9601 REM sxx,syy,sxs,sys,s$

9605 REM  LET sxx=(32-sxs*LEN s$)*4
9610 LET si=23306: POKE si,sxx: POKE si+1,
     syy: POKE si+2,sxs: POKE si+3,sys: POKE
     si+4,8: LET si=si+4: LET sw=LEN s$: FOR
     s=1 TO sw: POKE si+s,CODE s$(s): NEXT s:
     POKE si+sw+1,255: LET sw=USR 65060:
     RETURN
9615 REM scroll

9616 REM  RESTORE : REM  READ syy,sny,stx,
     snt
9617 POKE 64971,syy: POKE 65002,sny+8*(sny<8)
     POKE 65011,stx: POKE 64989,snt
9620 LET sw=USR 64960
9621 RETURN
9990 LOAD ""CODE : PRINT AT 21,0; FLASH 1;"
     PRITISNI BILO KOJU TIPKU !": PAUSE 0:
     RUN 6000
```

```
10 FOR a=64960 TO 65365
20 INPUT x
30 POKE a,x
40 NEXT a
50 SAVE "slova,scr"CODE 64960,406
```

0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	237	91	30	254
34	30	254	237	176	209	62
50	187	194	212	253	201	6
64	14	2	122	31	48	2
203	192	31	48	2	203	200
31	48	2	203	208	31	48
2	203	233	31	48	2	203
241	31	48	2	203	249	31
48	2	203	216	31	48	2
203	224	201	194	66	0	0
0	0	33	15	91	126	35
34	0	91	111	60	200	38
0	41	41	41	237	75	54
92	9	62	8	50	4	91
58	11	91	50	9	91	58
10	91	50	8	91	62	9
50	5	91	126	35	34	2
91	7	50	6	91	58	5
91	61	32	50	58	4	91
61	32	24	58	14	91	71
58	12	91	79	58	10	91
129	5	32	252	50	10	91
42	0	91	195	39	254	50
4	91	58	13	91	71	58
9	91	128	50	9	91	42
2	91	195	68	254	50	5
91	58	12	91	71	58	9
91	50	7	91	58	13	91
79	197	205	200	254	193	58
7	91	60	50	7	91	13
32	241	58	8	91	60	50
8	91	5	32	221	58	6
91	195	84	254	128	64	32

16	8	4	2	1	58	142
92	238	255	71	58	141	92
160	71	58	8	91	230	248
111	58	7	91	254	192	208
31	31	31	230	31	103	203
28	203	29	203	28	203	29
203	28	203	29	62	88	180
103	58	142	92	166	176	119
58	7	91	71	230	7	246
64	103	120	31	31	31	230
24	180	103	120	23	23	230
224	111	58	8	91	71	31
31	31	230	31	181	111	235
33	192	254	120	230	7	79
6	0	9	70	26	33	6
91	203	70	40	3	176	18
201	47	176	47	18	201	0
0	0	0	0	0	0	0
0	0	0	0	0	0	23
220	10	206	11	231	80	26
23	232	253	118	27	3	19



Međuslike

Pomoću dviju zadanih slika (početne i konačne) možete dobiti proizvoljan broj međuslika. Treba naglasiti da obje slike moraju imati isti broj točaka. Ovo ograničenje možete izbjeći ako donekle izmijenite program. Način na koji se to postiže prikazan je potprogramom »racun tock zvijezde« gdje možete zadati samo 10 točaka, iako druga slika ima 70 točaka. Odaberete li 70 točaka slike, za ime prve slike »zvijezda« (napisano malim slovima) umetnite 10 parova točaka zvijezde, koje su zadane ispod, a za drugu sliku »YU« umetnite 70 parova točaka obrisa YU; nakon toga se kao rezultat dobiva prikazana slika.

```
  1 REM MEDJUSLIKE
 10 BORDER 1: PAPER 1: INK 9: CLS
 20 INPUT "Br. tocaka slike:";tsl

 30 REM definicije
 40 DEF FN a$(n)=e$( TO 3-LEN STR$ n)+STR$
    n
 50 DIM e$(3)
 60 DIM i$(2,10)
 70 DIM t(3,tsl,2)
 80 GO TO 250

 90 REM racun tock zvijezde
100 PRINT #0;AT 0,0; FLASH 1;"racunam"
110 FOR k=1 TO 2
120 LET a=t(1,tsl,k)
130 FOR i=1 TO tsl
140 IF t(1,i,k)=0 THEN GO TO 210
150 LET b=t(1,i,k): LET ko=(b-a)/7
160 FOR j=1 TO 6
170 LET t(1,i-7+j,k)=a+ko*j
180 LET t(1,i-7+j,k)=INT t(1,i-7+j,k)
190 NEXT j
200 LET a=b
210 NEXT i
220 NEXT k
230 PRINT #0;AT 0,0;"          "
240 RETURN
```



```
250 REM umetanje tocaka
260 FOR i=1 TO 2
270 INPUT "Ime ";(i);". slike:";i$(i)
280 LET zvijezda=0: IF tsl=70 AND i$(1, TO 6)
    ="zvijezda" AND i=1 THEN LET zvijezda=1
290 PRINT  INVERSE 1'"TOCKE SLIKE ";i$(i)''
300 FOR j=1 TO tsl
310 IF zvijezda THEN LET j=j+6
320 INPUT (j);".tocka:","x:";t(i,j,1);TAB
    25;"y:";t(i,j,2)
330 IF NOT (t(i,j,1)>255 OR t(i,j,2)>175)
    THEN GO TO 380
340 BEEP .1,10
350 PRINT #0;"Prevelike koordinate!"
360 PAUSE 40
370 GO TO 320
380 LET t(i,j,1)=INT t(i,j,1)
390 LET t(i,j,2)=INT t(i,j,2)
400 PRINT FN a$(j);".tocka:","x:";FN a$(t(i,
    j,1));TAB 25;"y:";FN a$(t(i,j,2))
410 NEXT j
420 IF zvijezda THEN GO SUB 90
430 NEXT i

440 REM medjuslike
450 CLS
460 INPUT "Broj medjuslika :";bms
470 LET bms=bms+1
480 FOR i=0 TO bms

490 REM racun
500 FOR j=1 TO tsl
510 LET t(3,j,1)=INT (t(1,j,1)+i/bms*(t(2,j,
    1)-t(1,j,1)))
520 LET t(3,j,2)=INT (t(1,j,2)+i/bms*(t(2,j,
    2)-t(1,j,2)))
530 NEXT j

540 REM risanje
550 PLOT t(3,1,1),t(3,1,2)
560 FOR j=2 TO tsl
570 DRAW t(3,j,1)-t(3,j-1,1),t(3,j,2)-t(3,j-
    1,2)
```

```
580 NEXT j
590 DRAW t(3,1,1)-t(3,tsl,1),t(3,1,2)-t(3,
    tsl,2)
600 NEXT i
610 PRINT #0;i$(1);" prelazi u ";i$(2)
620 PAUSE 0
630 GO TO 440
```

TOCKE ZVIJEZDE

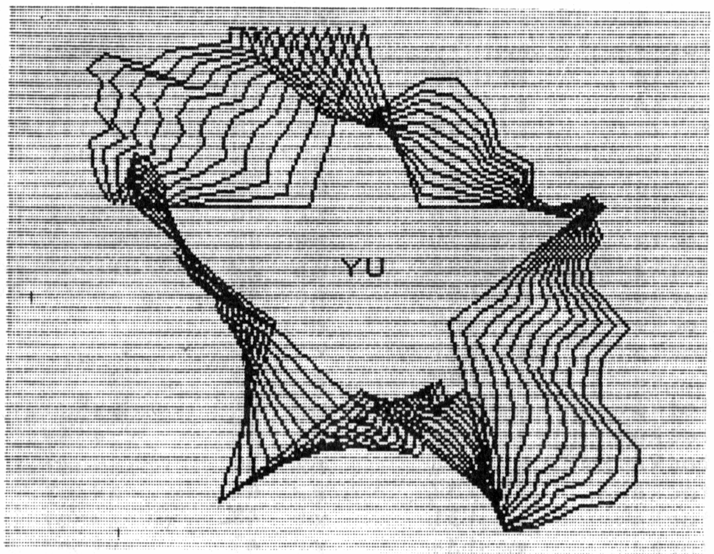
7.tocka:	x: 127	y: 169
14.tocka:	x: 147	y: 111
21.tocka:	x: 207	y: 111
28.tocka:	x: 158	y: 74
35.tocka:	x: 176	y: 16
42.tocka:	x: 127	y: 52
49.tocka:	x: 77	y: 16
56.tocka:	x: 96	y: 74
63.tocka:	x: 46	y: 111
70.tocka:	x: 108	y: 111

TOCKE YU

1.tocka:	x: 28	y: 155
2.tocka:	x: 34	y: 160
3.tocka:	x: 50	y: 156
4.tocka:	x: 56	y: 161
5.tocka:	x: 79	y: 164
6.tocka:	x: 79	y: 168
7.tocka:	x: 84	y: 168
8.tocka:	x: 90	y: 157
9.tocka:	x: 102	y: 149
10.tocka:	x: 114	y: 140
11.tocka:	x: 126	y: 139
12.tocka:	x: 137	y: 145
13.tocka:	x: 149	y: 152
14.tocka:	x: 160	y: 152
15.tocka:	x: 172	y: 141
16.tocka:	x: 175	y: 131
17.tocka:	x: 187	y: 125
18.tocka:	x: 187	y: 114
19.tocka:	x: 201	y: 108
20.tocka:	x: 207	y: 115

21.tocka:	x: 213	y: 111
22.tocka:	x: 209	y: 107
23.tocka:	x: 212	y: 101
24.tocka:	x: 207	y: 94
25.tocka:	x: 208	y: 86
26.tocka:	x: 222	y: 72
27.tocka:	x: 212	y: 62
28.tocka:	x: 212	y: 48
29.tocka:	x: 226	y: 33
30.tocka:	x: 225	y: 23
31.tocka:	x: 217	y: 16
32.tocka:	x: 205	y: 15
33.tocka:	x: 202	y: 13
34.tocka:	x: 189	y: 8
35.tocka:	x: 179	y: 7
36.tocka:	x: 172	y: 25
37.tocka:	x: 174	y: 36
38.tocka:	x: 171	y: 45
39.tocka:	x: 163	y: 52
40.tocka:	x: 157	y: 49
41.tocka:	x: 155	y: 55
42.tocka:	x: 147	y: 42
43.tocka:	x: 149	y: 33
44.tocka:	x: 147	y: 31
45.tocka:	x: 142	y: 33
46.tocka:	x: 142	y: 36
47.tocka:	x: 137	y: 42
48.tocka:	x: 131	y: 45
49.tocka:	x: 134	y: 47
50.tocka:	x: 129	y: 45
51.tocka:	x: 110	y: 60
52.tocka:	x: 95	y: 73
53.tocka:	x: 86	y: 77
54.tocka:	x: 79	y: 75
55.tocka:	x: 76	y: 77
56.tocka:	x: 75	y: 81
57.tocka:	x: 67	y: 87
58.tocka:	x: 60	y: 96
59.tocka:	x: 62	y: 98
60.tocka:	x: 56	y: 109
61.tocka:	x: 56	y: 118
62.tocka:	x: 50	y: 126
63.tocka:	x: 45	y: 128

64.tocka:	x:	42		y:	119
65.tocka:	x:	36		y:	113
66.tocka:	x:	31		y:	121
67.tocka:	x:	29		y:	132
68.tocka:	x:	37		y:	136
69.tocka:	x:	31		y:	142
70.tocka:	x:	33		y:	151



Projektor

Pomoću ovoga programa možemo u memoriji vašeg spectruma 48 K pohraniti 6 slika koje kasnije možete prikazivati proizvoljnim redom, a da ne čekate snimanje u računalo.

```
 1◇REM◇PROJEKTOR
 10◇REM◇◇strojni◇kod
 20 RESTORE 20: DATA 33,0,64,17,1,64,1,0,24,
    237,176,201,PI
 30 CLEAR 65299: LET n=65299
 40 LET n=n+1: READ cc: POKE n,cc: IF
    cc<>PI THEN GO TO 40
 50 GO TO 250
 60 INPUT "◇INK◇◇PAPER◇◇BORDER◇◇BRIGHT◇";i;"
    -";p;"-";b;"-";br: INK i: PAPER p:
    BORDER b: BRIGHT br: CLS
 70 INPUT "Slika◇No◇(or 0◇to◇STOP)";n: IF
    n<0 OR n>6 THEN GO TO 70
 80 IF n=0 THEN RETURN
 90 INPUT "Pohrani◇(s)◇/◇Pozovi◇(r)◇>";A$
100 IF a$="r" THEN LET de=16384: LET hl=(n-
    1)*6144+28000
110 IF a$="s" THEN LET hl=16384: LET de=(n-
    1)*6144+28000
120 GO SUB 130: GO TO 70
130 POKE 65302,INT (hl/256): POKE 65301,hl-
    256*PEEK 65302
140 POKE 65305,INT (de/256): POKE 65304,de-
    256*PEEK 65305
150 RANDOMIZE USR 65300: RETURN
160◇REM◇rutina◇LOAD◇SCREEN$◇◇◇◇◇◇ s◇trake◇
    i◇pohrani
170 FOR n=1 TO 6
180 LET de=(n-1)*6144+28000
190 LET hl=16384: GO SUB 120
200 LOAD ""SCREEN$
210 RANDOMIZE USR 65300
220 NEXT n: RETURN
230 SAVE "slike"CODE 28000,6144*6: RETURN
```

```
240 LOAD  ""CODE 28000,6144*6: RETURN
250 RESTORE 250: DATA "◊◊◊◊◀b1▶PROJEKTOR◀b0▶
    ◊:","Pokazi◊slike","Ispuni◊memoriju","
    SAVE◊6◊slika","LOAD◊6◊slika": CLS : READ
    a$: PRINT ''a$:
260 FOR i=1 TO 4: READ a$: PRINT 'TAB 2;i,a$
    NEXT i
270 INPUT i
280 IF i=1 THEN GO SUB 60
290 IF i=2 THEN GO SUB 160
300 IF i=3 THEN INPUT "name";b$: GO SUB 230
310 IF i=4 THEN INPUT "name";b$: GO SUB 240
320 GO TO 250
```


Misionari i kanibali

Poznati problem, ovoga puta prikazan pomoću računala. Morate prevesti tri misionara i tri kanibala s lijeve na desnu obalu rijeke čamcem koji može prevesti samo dvije osobe odjednom. Ako se na jednoj strani nađe više kanibala od misionara, to naravno znači kraj igre. Naravno, možete pokušati ponovno.

```
10◊REM◊misionari◊i◊kanibali
20 CLS
30 PRINT '''"TRI◊MISIONARA◊I◊TRI"''
   KANIBALA◊STIGLI◊SU◊SKUPA◊DO"''"RIJEKE◊
   PREKO◊KOJE◊MORAJU◊PRECI."''"IMAJU◊SAMO◊
   JEDAN◊CAMAC◊U◊KOME"''"SE◊MOGU◊VOZITI◊
   SAMO◊DVOJICA"''"ODJEDNOM. AKO◊SE◊NA◊
   JEDNOJ◊OBALI"''"NALAZI◊VISE◊KANIBALA◊
   NEGO◊MISIONARA"''"TADA◊..."''''"m◊=◊
   misionar◊u◊camcu"''"k◊=◊kanibal◊u◊camcu
   "''"n◊=◊prazno◊mjesto"'',TAB 11;"PUNO◊
   SRECE"
40 PAUSE 1000: BORDER 4
50 PAPER 6: LET y=1: LET op=(1)
60 CLS : FOR i=23040 TO 23296: POKE i,45:
   NEXT i
70 POKE 23039,35: POKE 23038,35: POKE
   23008,35: POKE 23009,35
80 LET m1=3: LET m2=0: LET ic1=3: LET
   ic2=0
90 LET x=5: LET j=0
100 GO SUB 810
110 DIM a$(1,4): LET a$(1,1)="(": LET a$(1,
    4)=")"
120 GO SUB 650
130 PRINT AT 15,2;a$(1,1 TO )
140 GO SUB 660
150 GO SUB 990
160 GO SUB 870
170 GO SUB 340
180 GO SUB 810
190 GO SUB 560
```

```
200 LET op=op*(-1)
210 LET x=5: LET j=0
220 GO SUB 810
230 GO SUB 650
240 LET a$(1,2)="": LET a$(1,3)=""
250 PRINT AT 15,26;a$(1,1 TO )
260 GO SUB 660: GO SUB 990
270 GO SUB 930
280 GO SUB 340
290 GO SUB 810
300 GO SUB 560
310 LET op=op*(-1)
320 GO TO 90

330◇REM◇ALGORITAM◇PROGRAMA
340 LET c=op
350 IF ipot=9 THEN GO TO 400
360 IF ipot=4 THEN GO TO 430
370 IF ipot=3 THEN GO TO 460
380 IF ipot=2 THEN GO TO 490
390 IF ipot=6 THEN GO TO 510
400 LET m1=m1-c*2
410 LET m2=m2+c*2
420 GO TO 550
430 LET ic1=ic1-(c*2)
440 LET ic2=ic2+(c*2)
450 GO TO 550
460 LET m1=m1-(c*1)
470 LET m2=m2+(c*1)
480 GO TO 550
490 LET ic1=ic1-(c*1): LET ic2=ic2+(c*1)
500 GO TO 550
510 LET m1=m1-(c*1)
520 LET ic1=ic1-(c*1)
530 LET m2=m2+(c*1)
540 LET ic2=ic2+(c*1)
550 IF m1>3 OR m1<0 OR ic1>3 OR ic1<0 THEN
    CLS : PRINT AT 12,2;"NE VARAJ":
    PAUSE 200: GO TO 50
560 LET l=(m1-ic1+4)
570 IF l=1 AND l=7 THEN GO TO 640
580 IF l=2 AND l=3 AND l=5 AND l=6 THEN GO
    TO 600
```



```
590 IF l=4 THEN GO TO 630
600 IF m1<ic1 AND m1<>0 THEN GO TO 820
610 IF m2<ic2 AND m2<>0 THEN GO TO 820
620 GO TO 640
630 IF m1=0 AND ic1=0 THEN GO TO 830
640 RETURN
650 PRINT AT y,5;"MISA";AT y,11;"KANA";AT y,
    19;"MISB";AT y,25;"KANB";: RETURN
660 LET j=j+1
670 PAUSE 0

680◇REM◇PREGLEDAVANJE◇TASTATURE
690 LET b$=INKEY$: IF b$<>"m" AND b$<>"k"
    AND b$<>"n" THEN GO TO 690
700 LET x=x+1
710 IF b$<>"" THEN LET n=1: LET a$(1,j+1)="◇
    "
720 IF b$="m" THEN LET m=3: LET a$(1,j+1)="
    m"
730 IF b$="k" THEN LET k=2: LET a$(1,j+1)="
    k"
740 IF op=-1 THEN PRINT AT 15,27;a$(1,j+1):
    GO TO 760
750 PRINT AT 15,3;a$(1,j+1)
760 IF j=2 THEN GO TO 790
770 LET q=VAL b$
780 GO TO 660
790 LET ipot=q*(VAL b$)
800 RETURN
810 PRINT AT y+1,6;m1;AT y+1,12;ic1;AT y+1,
    20;m2;AT y+1,26;ic2: RETURN
820 CLS : PRINT AT 12,9;"H◇H◇A◇A◇A◇M":
    PAUSE 200: CLS : PRINT AT 12,4;"POKUSAJ◇
    PONOVNO": PAUSE 200: GO TO 50
830 CLS : PRINT AT 12,3;"CESTITAM.◇USPIO◇SI"
840 PAUSE 200: CLS : PRINT AT 12,2;"ZELIS◇LI◇
    IGRATI◇JOS◇JEDNOM◇◇(d,n)": PAUSE 0: IF
    INKEY$="d" THEN GO TO 50
850 STOP
870 FOR o=3 TO 26
880 PRINT AT 15,o;a$(1,1 TO )
890 PRINT AT 15,o-1; OVER 1;"<"
900 IF o=26 THEN RETURN
```

```
 910 NEXT o
 920 RETURN
 930 FOR o=25 TO 2 STEP -1
 940 PRINT AT 15,o;a$(1,1 TO )
 950 PRINT AT 15,(o+4); OVER 1;">"
 960 IF o=2 THEN RETURN
 970 NEXT o
 980 RETURN
 990 IF a$(1,2)="◇" AND a$(1,3)="◇" THEN CLS
     PRINT AT 12,2;"NE◇VARAJ": PAUSE 200:
     GO TO 50
1000 RETURN
```


Tablica

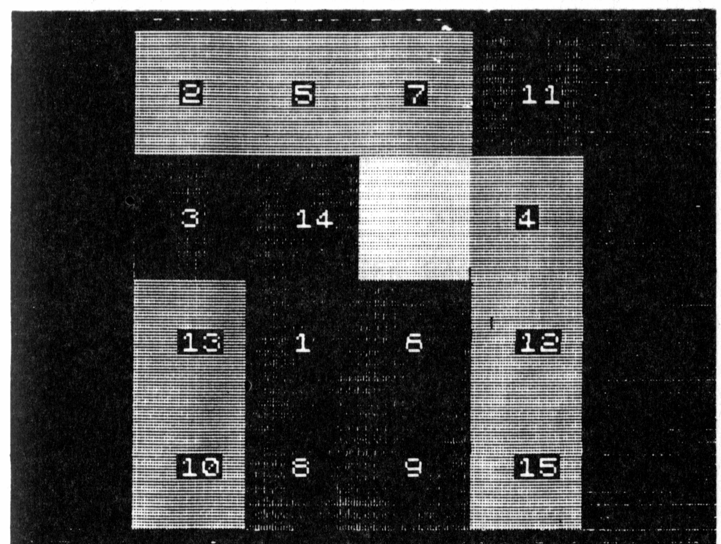
Igra koju ste nekad igrali pod klupom za vrijeme nastave sad je prilagođena i za računalo. Na zaslonu dobivate nacrtanu tablicu s poljima označenim brojevima koji su, naravno, izmiješani. Vaš je cilj srediti brojeve po redoslijedu s lijeva na desno i odozgo prema dolje. Prazno polje znači treptajući kvadrat. Brojeve uz njega pomičite pomoću tipki 5, 6, 7 i 8.

```
  1◇REM◇TABLICA
 10 REM GLAVNI PROGRAM
 20 PAPER 1: INK 9: BORDER 1: CLS
 30 PRINT #0;AT 1,6;"Pricekaj malo molim!"
 40 FOR i=22534 TO 22554: POKE i,0: NEXT i
 50 FOR i=22554 TO 23194 STEP 32: POKE i,0:
    NEXT i
 60 FOR i=22533 TO 23173 STEP 32: POKE i,0:
    NEXT i
 70 FOR i=23205 TO 23226: POKE i,0: NEXT i
 80 BORDER 1
 90 DIM a(16)
100 FOR i=1 TO 16
110 LET a(i)=i
120 NEXT i
130 LET o=16
140 FOR i=1 TO 200
150 LET r=1+INT (RND*4)
160 IF r=1 AND (o>4) THEN LET a(o)=a(o-4):
    LET a(o-4)=16: LET o=o-4
170 IF r=2 AND ((o<>4) AND (o<>8) AND (
    o<>12) AND (o<>16)) THEN LET a(o)=a(o+1)
    LET a(o+1)=16: LET o=o+1
180 IF r=3 AND (o<13) THEN LET a(o)=a(o+4):
    LET a(o+4)=16: LET o=o+4
190 IF r=4 AND ((o<>1) AND (o<>5) AND (o<>9)
    AND (o<>13)) THEN LET a(o)=a(o-1): LET
    a(o-1)=16: LET o=o-1
200 NEXT i
210 LET n=3: LET v=8
220 FOR i=1 TO 16
230 IF a(i)=16 THEN LET zx=v-2: LET zy=n-2:
```

```
    LET l=i: GO TO 320
240 LET k=i
250 GO SUB 980
260 FOR j=0 TO 4
270 PRINT AT n-2+j,v-2;
280 PRINT "█████"
290 NEXT j
300 INK 9
310 PRINT AT n,v;a(i)
320 LET v=v+5
330 IF v>24 THEN LET n=n+5: LET v=8
340 NEXT i
350 LET k=l
360 GO SUB 980
370 GO SUB 920: FLASH 0: BRIGHT 0
380 DIM e$(21): PRINT #0;AT 1,6;e$: PAUSE 0

390 REM PREGLEDAVANJE TASTATURE
400 LET h$=INKEY$
410 IF h$="5" AND zx<>21 THEN GO SUB 460
420 IF h$="6" AND zy<>1 THEN GO SUB 580
430 IF h$="7" AND zy<>16 THEN GO SUB 690
440 f0  IF h$="8" AND zx<>6 THEN GO SUB 800
450 GO TO 370
460 LET a(k)=a(k+1): LET a(k+1)=16
470 GO SUB 980
490 FOR i=0 TO 4
500 PRINT AT zy+i,zx;
510 PRINT "█████"
520 NEXT i
530 INK 0
540 PRINT AT zy+2,zx+2;a(k)
550 PRINT AT zy+2,zx+7;"  "
560 LET zx=zx+5: LET k=k+1
570 RETURN
580 LET a(k)=a(k-4): LET a(k-4)=16
590 GO SUB 980
600 FOR i=0 TO 4
610 PRINT AT zy+i,zx;
620 PRINT "█████"
630 NEXT i
640 INK 0
650 PRINT AT zy+2,zx+2;a(k)
```



```
660 PRINT AT zy-3,zx+2;"  "
670 LET zy=zy-5: LET k=k-4
680 RETURN
690 LET a(k)=a(k+4): LET a(k+4)=16
700 GO SUB 980
710 FOR i=0 TO 4
720 PRINT AT zy+i,zx;
730 PRINT "█████"
740 NEXT i
750 INK 0
760 PRINT AT zy+2,zx+2;a(k)
770 PRINT AT zy+7,zx+2;"  "
780 LET zy=zy+5: LET k=k+4
790 RETURN
800 LET a(k)=a(k-1): LET a(k-1)=16
810 GO SUB 980
820 FOR i=0 TO 4
830 PRINT AT zy+i,zx;
840 PRINT "█████"
850 NEXT i
860 INK 0
```



```
870 PRINT AT zy+2,zx+2;a(k)
880 PRINT AT zy+2,zx-3;"  "
890 LET zx=zx-5: LET k=k-1
900 RETURN

910 REM TREPTAJUCI KVADRAT
920 FOR i=0 TO 4
930 INK 6: PAPER 7: FLASH 1: BRIGHT 1
940 PRINT AT zy+i,zx;
950 PRINT "█████"
960 NEXT i
970 RETURN
980 INK 5
990 IF (a(k)/2-INT (a(k)/2))=0 THEN INK 2
1000 IF a(k)<=4 OR (a(k)>=9 AND a(k)<=12)
     THEN INK 2: IF (a(k)/2-INT (a(k)/2)=0)
     THEN INK 5
1010 RETURN
```


Labirint

Program proizvodi labirint željene veličine. Možete igrati na slijepo ili tako da pred sobom stalno imate čitav labirint. Vaš je cilj u što kraćem vremenu izaći iz labirinta, jer vam na putu kroz labirint računalo mjeri vrijeme i broj napravljenih poteza.

```
1 REM LABIRINT
2 REM UDG
3 PRINT #0;TAB 7;"Pricekaj malo !"
4 RESTORE : FOR a=USR "a" TO USR "a"+167:
  READ x: POKE a,x: NEXT a
5 DATA 255,128,128,128,128,128,128,255,
  255,129,129,129,129,129,129,129,255,128,
  128,128,128,128,128,128,255,1,1,1,1,1,1,
  255,255,0,0,0,0,0,0,255,255,1,1,1,1,1,1,
  1,255,0,0,0,0,0,0,0,129,129
6 DATA 129,129,129,129,129,255,128,128,
  128,128,128,128,128,255,129,129,129,129,
  129,129,129,129,128,128,128,128,128,128,
  128,128,1,1,1,1,1,1,1,255,0,0,0,0,0,0,0,
  255,1,1,1,1,1,1,1,1,0,0,0,0,0,0
7 DATA 0,0,0,124,66,66,124,64,64,0,0,60,
  66,66,82,74,60,0,0,124,66,66,124,68,66,
  0,0,60,64,60,2,66,60,0,0,254,16,16,16,
  16,16,0,0,66,66,66,66,66,60,0

9 REM uvod
10 PAPER 7: INK 9: CLS
15 DEF FN t()=(65536*PEEK 23674+256*PEEK
   23 73+PEEK 23672)/50
16 DEF FN m(t)=INT (t/60)
17 DEF FN s(t)=INT ((t-60*INT (t/60)))
99 GO TO 9000

100 REM NOVI LABIRINT
101 CLS
110 INPUT  INK 9;"U koliki labirint se
    usudis uci; REDAKA ";rx;" STUPACA
    ";cx
```

```
111 REM  LET rx=20: LET cx=30
115 IF rx>20 OR cx>30 THEN GO TO 0110
117 PRINT  FLASH 1; BRIGHT 1;AT 10,0;"
    LABIRINT U IZGRADNJI !  "
120 LET px=2/3*rx*cx: REM max zatvorenih
    soba
130 DIM m(rx,cx): DIM r(px): DIM c(px): DIM
    v(4): DIM d(4)
150 FOR n=1 TO 4: LET d(n)=2 (n-1): NEXT n
160 LET n=0
200 LET r=INT (RND*rx+1): LET c=INT (RND*cx+
    1)
204 LET co=c
206 LET ro=r
210 LET m(r,c)=16
300 GO SUB 1000
310 IF v(1)=0 THEN LET n=n+1: LET r(n)=r:
    LET c(n)=c+1: LET m(r,c+1)=-1
320 IF v(2)=0 THEN LET n=n+1: LET r(n)=r+1:
    LET c(n)=c: LET m(r+1,c)=-1
330 IF v(3)=0 THEN LET n=n+1: LET r(n)=r:
    LET c(n)=c-1: LET m(r,c-1)=-1
340 IF v(4)=0 THEN LET n=n+1: LET r(n)=r-1:
    LET c(n)=c: LET m(r-1,c)=-1
400 IF n=0 THEN GO TO 700

499 REM odaberi granicnu celiju
500 LET f=INT (RND*n+1)
501 LET r=r(f): LET c=c(f)
510 GO SUB 1000
520 LET p=INT (RND*4+1)
521 IF v(p)<=0 THEN GO TO 520
530 LET m(r,c)=d(p)
535 PRINT  BRIGHT 1; OVER 1;AT r,c;" "
540 LET r(f)=r(n): LET c(f)=c(n): LET n=n-
550 GO TO 550+10*p
560 LET m(r,c+1)=m(r,c+1)+4: GO TO 300
570 LET m(r+1,c)=m(r+1,c)+8: GO TO 300
580 LET m(r,c-1)=m(r,c-1)+1: GO TO 300
590 LET m(r-1,c)=m(r-1,c)+2: GO TO 300

699 REM prva soba
700 LET m(ro,co)=m(ro,co)-16
```



```
709 REM ulaz izlaz
710 LET er=INT (RND*rx+1)
711 LET sr=INT (RND*rx+1)
720 LET m(sr,1)=m(sr,1)+4
730 LET m(er,cx)=m(er,cx)+1
740 BEEP 2,0
750 RETURN
800 REM  POKE-anje
810 FOR v=1 TO 20: FOR s=1 TO 30: POKE
    50000+(v-1)*30+(s-1)+(maze-1)*601,m(v,s)
    NEXT s: NEXT v
815 POKE 49999+601*(maze),sr
820 RETURN

999 REM susjedne sobe
1000 IF c=cx THEN LET v(1)=-1: GO TO 1010
1005 LET v(1)=m(r,c+1)
1010 IF r=rx THEN LET v(2)=-1: GO TO 1020
1015 LET v(2)=m(r+1,c)
1020 IF c=1 THEN LET v(3)=-1: GO TO 1030
1025 LET v(3)=m(r,c-1)
1030 IF r=1 THEN LET v(4)=-1: GO TO 1040
1035 LET v(4)=m(r-1,c)
1041 RETURN

1099 REM ATTR
1105 OVER 1: INK 9: PAPER 8
1107 FOR v=1 TO rx
1109 FOR s=1 TO cx
1110 PRINT AT v,s;" "
1120 NEXT s
1125 NEXT v
1130 OVER 0: INK 9
1140 RETURN

1300 REM PEEK-anje
1400 FOR v=1 TO 20: FOR s=1 TO 30: LET m(v,s)
     =PEEK (50000+(v-1)*30+(s-1)+(maze-1)*
     601): NEXT s: NEXT v
1410 LET sr=PEEK (49999+601*(maze))
1420 RETURN

1500 REM ______I G R A______
```

```
1505 POKE 23674,0
1506 POKE 23673,0
1507 POKE 23672,0
1508 LET put=0
1550 LET xx=0: LET yy=sr
1554 PRINT AT 21,1;"BROJ POTEZA : "
1555 LET x=3: LET y=(21-sr)*8+3
1556 PRINT  PAPER 7; OVER 1;AT yy,xx;"*"

1559 REM p e t l j a
1561 LET t=FN t(): PRINT AT 21,22;"VRIJEME
     ";INT (t/60);AT 21,28;":";INT (t-60*INT
     (t/60));" "
1565 IF INKEY$="" THEN GO TO 1560
1566 IF INKEY$="h" THEN GO SUB 1100: GO TO
     1561
1570 LET s=POINT (x,y-3)
1571 LET g=POINT (x,y+4)
1572 LET l=POINT (x-3,y)
1573 LET d=POINT (x+4,y)
1600 LET i$=INKEY$
1610 IF i$="8" AND d=1 THEN BEEP .1,-30: GO
     TO 1560
1612 IF i$="5" AND l=1 THEN BEEP .2,-30: GO
     TO 1560
1614 IF i$="7" AND g=1 THEN BEEP .2,-30: GO
     TO 1560
1616 IF i$="6" AND s=1 THEN BEEP .2,-30: GO
     TO 1560
1617 PRINT  PAPER 7; OVER 1;AT yy,xx;"*"
1620 LET xx=xx+(i$="8")-(i$="5")
1622 LET yy=yy+(i$="6")-(i$="7")
1630 LET x=x+8*((i$="8")-(i$="5"))
1632 LET y=y+8*((i$="7")-(i$="6"))
1660 LET put=put+1: PRINT AT 21,16;put
1670 PRINT  PAPER 7; OVER 1;AT yy,xx;"*"
1700 IF xx<=cx THEN GO TO 1560
1800 BEEP 5,10: GO SUB 1100: PAUSE 100:
     PAUSE 100
2000 RETURN

2999 REM risanje maze
3000 CLS
```



```
3002 PRINT " LABIRINT ";maze
3005 FOR r=1 TO rx
3010 FOR c=1 TO cx
3020 PRINT  PAPER 5; INK ink;AT r,c;CHR$ (
     143+m(r,c))
3030 NEXT c
3040 NEXT r
3040 PRINT AT sr,0;"E"
3050 RETURN

9000 REM K O N T R O L N I  D I O
9001 PAPER 6: INK 9: BORDER 3: CLS
9010 PRINT  BRIGHT 1; PAPER 7;''''"
     L A B I R I N T        "
9013 PRINT ''''"  0 ...... Potpuno
     originalan             labirintposebno
     za tebe        proizvoljne velicine -
     do ( 20x30 )"
9015 PRINT ''"  9 ...... Kraj"
9020 PRINT AT 20,8;"P.S. 'H' = help"
9030 INPUT "UPISI BROJ ! > ";maze: IF
     maze=9 THEN STOP
9031 IF maze<>0 AND maze<>9 THEN GO TO 9000
9032 INPUT "USUDIS LI SE NASLIJEPO ? ( d/n
     ) >";a$: IF a$="d" THEN LET ink=5
9033 IF a$="n" THEN LET ink=9
9050 IF maze<>0 THEN GO TO 9060
9051 GO SUB 100
9052 GO SUB 3000
9053 GO SUB 1500
9059 PAUSE 0: GO TO 9000

9060 REM stari
9061 LET rx=20: LET cx=30: DIM m(rx,cx)
9062 GO SUB 1300
9064 GO SUB 3000
9066 GO SUB 1500
9070 PAUSE 0: GO TO 9000
9988 STOP
9989 REM  SAVE
9990 CLEAR : SAVE "labirint" LINE 2
```

Cjevovod

Igra CJEVOVOD predstavlja jednostavan primjer računalne inteligencije. Ugodno zapošljava igrača kako na početnoj tako i na majstorskoj razini. Cilj igre je natjerati suigrača, prijatelja ili program, dakle računalo, odnosno završiti polaganje cjevovoda na rubu polja. Program na početku pita za način igre. Kod prvog načina odgovor 1 — prvi potez igra suigrač, inače ti — igrač.
Zatim program pita za razinu igre. Na prvoj razini nije ga teško pobijediti, dok na drugoj pokazuje pravo umijeće. Ako igraš s prijateljem, treba na pitanje »Igra solo?« odgovoriti potvrdno. U tom slučaju računalo ne sudjeluje.
Iz samog ispisa vidljivo je kako računalo razmišlja na prvoj razini (line 1040). Inteligencija druge, majstorske razine skriva se u redovima DATA (line 5000 i dalje).

```
 10◇REM◇cjevovod
 20 INK 1
 30 PAPER 6
 40 BRIGHT 1
 50 CLS
 60 BORDER 3
 70 FOR a=1 TO 30
 80 BEEP .03,.5*a
 90 NEXT a
100 PRINT  FLASH 1;AT 1,10;"◇CJEVOVOD◇";AT
    0,10;"◇◇◇◇◇◇◇◇◇◇◇"AT 2,10;"◇◇◇◇◇◇◇◇◇◇◇"
110 PRINT  INK 2; INVERSE 1;AT 5,0;"◇◇'
    Cjevovod'je◇igra◇u◇kojoj◇◇◇◇treba◇
    poloziti◇cjevovod◇tako◇◇◇◇da◇ga◇
    suigrac◇zakljucuje◇u◇◇◇◇◇◇gornjem◇
    desnom◇kutu◇ili◇na◇◇◇◇◇rubu◇polja.◇
    Suigrac◇mogu◇biti◇ja,SPECTRUM,ili◇
    bilo◇tko◇drugi◇u◇'solo'◇igri.◇◇"
120 PRINT AT 13,0;"◇◇Izborom◇nacina◇igre◇
    odredjuje◇se◇tko◇ima◇prvi◇potez,a◇◇
    ◇◇◇razinom◇igre◇stupanj◇tezire.
    Paznja!Na◇razini◇2◇sam◇◇◇vrlo◇
    dobar◇igrac!!!!!!!!!!◇◇"
130 PAUSE 200
```



```
140 FOR b=80 TO 1 STEP -1
150 BEEP .03,.5*b
160 NEXT b
170 PRINT  INK 3; PAPER 7;AT 20,0;"◇◇Za◇
    pocetak◇igre◇pritisni◇neku◇tipku.
    Mnogo◇srece!◇◇◇◇◇◇◇◇◇◇◇"
180 PAUSE 0
190 CLS
200 PAUSE 50
210 DIM d(4,3)
220 DIM e(13,13)
230 RESTORE 2020
240 FOR i=1 TO 4
250 FOR j=1 TO 3
260 READ d(i,j)
270 NEXT j
280 NEXT i
290 BORDER 5
300 PRINT  INK 3; INVERSE 1;"CJEVOVOD"
310 INPUT "NACIN◇IGRE?(1◇ili◇2)";nai;'"
    RAZINA◇IGRE?(1◇ili◇2)";nii
320 PRINT  PAPER 5;AT 0,24;"MAJSTOR◇"
330 IF nii=1 THEN PRINT  INK 3; INVERSE
    1;AT 0,24;"POCETNIK"
340 INK 4
350 INVERSE 1
360 PRINT AT 18,26;"CEKAJ◇"
370 PRINT AT 19,26;"NA◇◇◇◇"
380 PRINT AT 20,26;"MOJ◇◇◇"
390 PRINT AT 21,26;"POTEZ◇"
400 INK 1
410 INVERSE 0
420 PLOT 49,0
430 DRAW 157,0
440 DRAW 0,157
450 DRAW -157,0
460 DRAW 0,-157
470 LET nn=12+(nii<>nai)
480 LET lw=4+(nii<>nai)
490 LET bd=12+(nii=nai)
500 LET jj=1
510 LET ii=1
520 GO SUB 840
```

```
530 LET n=(nn-1)
540 LET hs=nn*(bd-1)
550 PLOT 50+hs,hs+1
560 DRAW 0,n
570 DRAW n,0
580 DRAW 0,-n
590 DRAW -n,0
600 PRINT  INVERSE 1;AT 4,0;"CIJEV◊1◊"
610 LET jj=bd-3
620 LET ii=-2
630 GO SUB 840
640 PRINT  INVERSE 1;AT 10,0;"CIJEV◊2◊"
650 LET jj=6
660 GO SUB 1140
670 PRINT  INVERSE 1;AT 16,0;"CIJEV◊3◊"
680 LET jj=2
690 GO SUB 1370
700 LET ii=1
710 LET jj=1
720 DIM b(15,15)
730 FOR i=1 TO bd+2
740 FOR j=1 TO bd+2
750 LET b(i,j)=-(i=1)-(j=1)-(i=bd+2)-(j=bd+
    2)
760 NEXT j
770 NEXT i
780 INPUT "IGRA◊SOLO?◊Da(d)◊ili◊ne(n)?";s$
790 LET b(2,2)=1
800 LET put=1
810 LET put=put+1
820 IF (nai=1 AND (put/2=INT (put/2))) OR (
    nai=2 AND (put/2<>INT (put/2))) THEN GO
    TO 980
830 GO TO 1280

840 REM cijev=1
850 LET iii=nn*(ii-1)+50
860 LET jjj=nn*(jj-1)+1
870 FOR i=1 TO 4
880 PLOT iii+i-1,jjj
890 DRAW 0,4
900 PLOT iii+i-1,jjj+lw+4
910 DRAW 0,4
```



```
 920 PLOT iii+lw+3+i,jjj
 930 DRAW 0,4
 940 PLOT iii+lw+3+i,jjj+lw+4
 950 DRAW 0,4
 960 NEXT i
 970 RETURN
 980 IF s$="d" THEN GO TO 1080
 990 IF nii=2 THEN GO TO 1820
1000 IF put<>2 THEN GO TO 1040
1010 LET ii=1+(RND>0.5)
1020 LET jj=3-ii
1030 LET eg=3-2*(jj=2)
1040 LET cijev=((ii=1)*(eg=4)+(ii=bd)*(
     eg=3)+(jj=1)*(eg=2)+(jj=bd)*(eg=1))*(
     2+(RND<0.5))+((ii=1)*(eg=1)+(jj=1)*(
     eg=3)+(ii=bd)*(eg=2)+(jj=bd)*(eg=4))
     *(1+(RND<0.5))+((ii=1)*(eg=2)+(jj=1)*(
     eg=4)+(ii=bd)*(eg=1)+(jj=bd)*(eg=3))*(
     1+2*(RND<0.5))
1050 IF (ii<>1) AND (ii<>bd) AND jj<>1 AND
     jj<>bd THEN LET cijev=INT (1+RND*2.999)
1060 GO SUB 1510
1070 GO TO 810
1080 INPUT "MOJ◊POTEZ!◊Cijev◊1,2◊ili◊3?";
     cijev
1090 IF put<>2 THEN GO TO 1060
1100 LET ii=1+(RND>0.5)
1110 LET jj=3-ii
1120 LET eg=3-2*(jj=2)
1130 GO TO 1060

1140◊REM◊cijev=2
1150 LET iii=nn*(ii-1)+50
1160 LET jjj=nn*(jj-1)+1
1170 FOR i=1 TO 4
1180 PLOT iii+i-1,jjj
1190 DRAW nn-i,nn-i
1200 PLOT iii+i-1,jjj+nn
1210 DRAW 1-i,1-i
1220 PLOT iii+lw+3+i,jjj
1230 DRAW 4-i,4-i
1240 PLOT iii+lw+3+i,jjj+nn
1250 DRAW -(nn-5+i),-(nn-5+i)
```

```
1260 NEXT i
1270 RETURN
1280 IF put<>2 THEN GO TO 1340
1290 INPUT "Udesno(d)◆ili◆prema◆gore
     (g)?";r$;
1300 LET ii=2
1310 IF r$="g" THEN LET ii=1
1320 LET jj=3-ii
1330 LET eg=3-2*(jj=2)
1340 INPUT "TVOJ◆POTEZ!◆Cijev◆1,2◆ili◆3?"
     ;cijev
1350 GO SUB 1510
1360 GO TO 810

1370◆REM◆cijev=3
1380 LET iii=nn*(ii-1)+50
1390 LET jjj=nn*(jj-1)+1
1400 FOR i=1 TO 4
1410 PLOT iii+i-1,jjj
1420 DRAW 1-i,i-1
1430 PLOT iii+i-1,jjj+nn
1440 DRAW (nn-i),-(nn-i)
1450 PLOT iii+lw+3+i,jjj
1460 DRAW 5-nn-i,-(5-nn-i)
1470 PLOT iii+lw+3+i,jjj+nn
1480 DRAW 4-i,i-4
1490 NEXT i
1500 RETURN
1510 LET b(jj+1,ii+1)=cijev
1520 IF cijev=1 THEN GO SUB 840
1530 IF cijev=2 THEN GO SUB 1140
1540 IF cijev=3 THEN GO SUB 1370
1550 LET eg=d(eg,cijev)
1560 LET jj=jj+(eg=1)-(eg=2)
1570 LET ii=ii+(eg=3)-(eg=4)
1580 IF b(jj+1,ii+1)=0 THEN GO TO 1750
1590 IF b(jj+1,ii+1)<0 THEN GO TO 1620
1600 LET cijev=b(jj+1,ii+1)
1610 GO TO 1550
1620 IF (((put/2)=INT (put/2)) AND (nai=1))
     OR (put/2<>INT (put/2) AND nai=2) THEN
     GO TO 1690
1630 PRINT  INK 2;AT 1,0; FLASH 1;"◆◆◆NEMAS◆
```



```
     SRECE, IZGUBIO◇SI!◇◇◇◇"
1640 FOR a=45 TO 10 STEP -1
1650 BEEP .02,a
1660 NEXT A
1670 PRINT  INK 4; INVERSE 1;AT 18,26;"ONDA◇
     ";AT 19,26;"CES◇◇◇";AT 20,26;"BOLJE◇"
     ;AT 21,26;"IGRATI"
1680 GO TO 1780
1690 PRINT AT 1,0; FLASH 1;"◇◇◇◇◇◇CESTITAM,
     POBIJEDIO◇SI!◇◇◇◇"
1700 FOR a=1 TO 4
1710 BEEP .1,10
1720 BEEP .3,15
1730 NEXT a
1740 GO TO 1780
1750 IF jj<>bd OR ii<>bd THEN RETURN
1760 IF (((put/2)=INT (put/2)) AND (nai=1))
     OR (put/2<>INT (put/2) AND nai=2) THEN
     GO TO 1690
1770 GO TO 1630
1780 INPUT "ZELIS◇LI◇IGRATI?◇Da(d),◇ne(n)?;f$
1790 IF f$="n" THEN GO TO 2020
1800 CLS
1810 GO TO 300
1820 IF put=2 THEN GO TO 1960
1830 IF put<>3 AND put<>4 THEN GO TO 1920
1840 LET rest=5300+100*(b(3,3)=2)+200*(b(3,3)
     =3)
1850 IF put=3 THEN LET rest=5100+100*(b(3,2)
     =0)
1860 RESTORE rest
1870 FOR i=1 TO bd
1880 FOR j=1 TO bd
1890 READ e(i,j)
1900 NEXT j
1910 NEXT i
1920 LET cijev=1
1930 IF d(eg,cijev)=e(jj,ii) THEN GO TO 2000
1940 LET cijev=cijev+1
1950 GO TO 1930
1960 LET ii=1
1970 LET jj=2
1980 LET eg=1
```

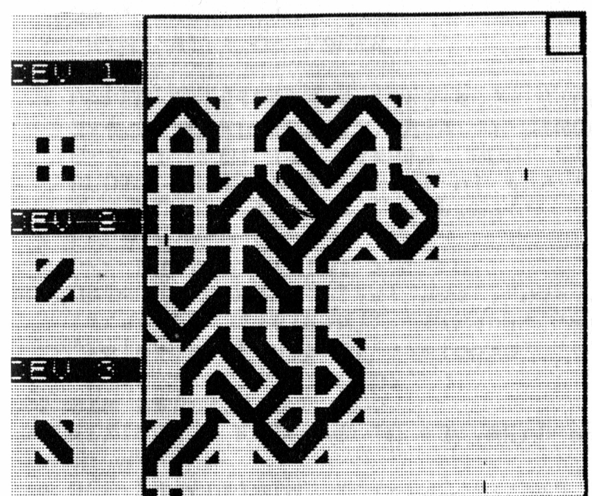
```
1990 LET cijev=2
2000 GO SUB 1510
2010 GO TO 810
2020 CLS
2030 PRINT  INK 1; PAPER 6; FLASH 1; BRIGHT
     1;AT 4,8;"◇◇DOVIDJENJA◇◇";AT 3,8;"◇◇◇◇◇
     ◇◇◇◇◇◇◇◇◇";AT 5,8;"◇◇◇◇◇◇◇◇◇◇◇◇◇◇";AT
     18,20;"SPECTRUM◇■"
2040 FOR z=1 TO 100
2050 BEEP .008,.4*z
2060 NEXT z
2070 PAUSE 300
2080 CLS
5000 DATA 1,3,4,2,4,3,3,1,2,4,2,1
5100 DATA 1,1,1,1,1,1,1,1,1,1,1,1
5101 DATA 2,2,2,2,2,2,2,2,2,2,2,2
5102 DATA 1,1,1,1,1,1,1,1,1,1,1,1
5103 DATA 2,2,2,2,2,2,2,2,2,2,2,2
5104 DATA 1,1,1,1,1,1,1,1,1,1,1,1
5105 DATA 2,2,2,2,2,2,2,2,2,2,2,2
5106 DATA 1,1,1,1,1,1,1,1,1,1,1,1
5107 DATA 2,2,2,2,2,2,2,2,2,2,2,2
5108 DATA 1,1,1,1,1,1,1,1,1,1,1,1
5109 DATA 2,2,2,2,2,2,2,2,2,2,2,2
5110 DATA 1,1,1,1,1,1,1,1,1,1,1,1
5111 DATA 2,2,2,2,2,2,2,2,2,2,2,2
5112 DATA 3,4,3,4,3,4,3,4,3,4,3,4,3
5201 DATA 3,4,3,4,3,4,3,4,3,4,3,4,1
5202 DATA 3,4,3,4,3,4,3,4,3,4,3,4,2
5203 DATA 3,4,3,4,3,4,3,4,3,4,3,4,1
5204 DATA 3,4,3,4,3,4,3,4,3,4,3,4,2
5205 DATA 3,4,3,4,3,4,3,4,3,4,3,4,1
5206 DATA 3,4,3,4,3,4,3,4,3,4,3,4,2
5207 DATA 3,4,3,4,3,4,3,4,3,4,3,4,1
5208 DATA 3,4,3,4,3,4,3,4,3,4,3,4,2
5209 DATA 3,4,3,4,3,4,3,4,3,4,3,4,1
5210 DATA 3,4,3,4,3,4,3,4,3,4,3,4,2
5211 DATA 3,4,3,4,3,4,3,4,3,4,3,4,1
5212 DATA 3,4,3,4,3,4,3,4,3,4,3,4,2
5213 DATA 3,4,3,4,3,4,3,4,3,4,3,4,1
5301 DATA 1,1,1,1,1,1,1,1,1,1,1,1
5302 DATA 2,2,2,2,2,2,2,2,2,2,2,2
5303 DATA 1,2,1,1,1,1,1,1,1,1,1,1
```



```
5304 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5305 DATA 1,2,1,1,1,1,1,1,1,1,1,1
5306 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5307 DATA 1,2,1,1,1,1,1,1,1,1,1,1
5308 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5309 DATA 1,2,1,1,1,1,1,1,1,1,1,1
5310 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5311 DATA 1,2,3,4,3,4,3,4,3,4,3,4
5312 DATA 2,3,4,3,4,3,4,3,4,3,4,3
5313 DATA 1,1,3,4,3,4,3,4,3,4,3,4
5401 DATA 1,1,3,4,3,4,3,4,3,4,3,4
5402 DATA 2,1,4,3,4,3,4,3,4,3,4,1
5403 DATA 1,1,1,1,1,1,1,1,1,1,1,2
5404 DATA 2,2,2,2,2,2,2,2,2,2,2,1
5405 DATA 1,1,1,1,1,1,1,1,1,1,1,2
5406 DATA 2,2,2,2,2,2,2,2,2,2,2,1
5407 DATA 1,1,1,1,1,1,1,1,1,1,1,2
5408 DATA 2,2,2,2,2,2,2,2,2,2,2,1
5409 DATA 1,1,1,1,1,1,1,1,1,1,1,2
5410 DATA 2,2,2,2,2,2,2,2,2,2,2,1
5411 DATA 1,1,1,1,1,1,1,1,1,1,1,2
5412 DATA 2,2,2,2,2,2,2,2,2,2,2,1
```

CJEVOVOD MAJSTOR

NEMAŠ SREĆE, IZGUBIO SI!



ČEKAJ
MOJ
POTEZ

```
5501 DATA 1,3,4,1,1,1,1,1,1,1,1,1
5502 DATA 2,1,4,2,2,2,2,2,2,2,2,2
5503 DATA 1,2,1,1,1,1,1,1,1,1,1,1
5504 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5505 DATA 1,2,1,1,1,1,1,1,1,1,1,1
5506 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5507 DATA 1,2,1,1,1,1,1,1,1,1,1,1
5508 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5509 DATA 1,2,1,1,1,1,1,1,1,1,1,1
5510 DATA 2,1,2,2,2,2,2,2,2,2,2,2
5511 DATA 1,2,3,4,3,4,3,4,3,4,3,4
5512 DATA 2,3,4,3,4,3,4,3,4,3,4,3
```


Bioritam

Kažu da ljudi imaju svoje kritične dane i da se ti dani mogu čak izračunati. Kao osnova proračuna služi vaš datum rođenja i tekući datum. Vjerujete li u to? Možete provjeriti svoj bioritam i vidjet ćete kako se mijenjaju vaše fiziološke, emocionalne i umne sposobnosti tijekom određenog razdoblja. Treba se čuvati dana kod kojih se krivulje sijeku s vodoravnom crtom. Izračunati primjer možete vidjeti na donjoj slici.

```
  1◇REM◇BIORITAM
  2 CLEAR 64959: PRINT #0;"      Molim
    pricekaj malo !     ": GO SUB 9700
  5 BRIGHT 0: BORDER 5: PAPER 7: CLEAR
  6 POKE 23609,80
  7 LET www=0
 10 LET a=0
 40 PAPER 5
 50 LET s$="BIORITAM": LET sxx=0: LET syy=0:
    LET sxs=3: LET sys=4: GO SUB 9610
 55 PAPER 7: INK 9
 56 PRINT  PAPER 5;AT 0,24;"        ";AT 1,
    24;"        ";AT 2,24;"        ";AT 3,
    24;"        "
 57 PRINT AT 4,0; PAPER 5;"
    "
 60 PAPER 5: CIRCLE 4,17*8+4,2: CIRCLE 8,17*
    8+4,2: CIRCLE 64,17*8+4,1: CIRCLE 66,17*
    8+4,1: PLOT 146,17*8+4: PLOT 147,17*8+4:
    PLOT 148,17*8+4: PRINT AT 4,2;"moE";AT
    4,9;"Eustva";AT 4,19;"pamet"
 61 PAPER 7
100 DEF FN f(a)=a-INT a
101 DATA "sijecanj","veljaca","ozujak",
    "travanj","svibanj","lipanj","srpanj",
    "kolovoz","rujan","listopad","studeni",
    "prosinac","sijecanj"
102 DIM m$(13,9)
103 RESTORE : FOR n=1 TO 13: READ m$(n,1 TO
    ): NEXT n
104 DEF FN y(t)=INT ((t-122.1)/365.25): DEF
```

```
     FN m(t,y)=INT ((t-INT (365.25*y))/30.
     6001)
105 LET x$="NPTSEPS"
110 INPUT "Danas je [d m gggg] >"; LINE d$
111 IF LEN d$>10 OR LEN d$<8 THEN GO TO
     0110
115 LET g=VAL d$(LEN d$-3 TO LEN d$)
120 LET m=VAL d$(LEN d$-5): IF d$(LEN d$-6)
     ="1" THEN LET m=m+10*VAL d$( LEN d$-6)
130 LET d=VAL d$(1): IF CODE d$(2)>47 THEN
     LET d=d*10+VAL d$(2)
141 PLOT 0,135: DRAW 255,0: INK 0
142 LET y=g: IF m=1 OR m=2 THEN LET y=g-1
143 LET m=m+1: IF m=2 OR m=3 THEN LET m=m+
     12
144 LET yd=INT (365.25*y)+INT (30.6001*m)+
145 FOR n=5 TO 15: PRINT AT n,0; BRIGHT 1;"
     ": NEXT n: FOR n=20 TO 21: PRINT AT n,
     0; BRIGHT 1;"
     ": NEXT n
146 PLOT 0,135: DRAW 0,-87: DRAW 255,0:
     DRAW 0,87: DRAW -255,0
150 DIM i$ (15)
151 INPUT "Ime :";i$: INPUT "datum rodjenja "
     ;d$: IF LEN  i$>16 THEN GO TO 151
152 IF LEN d$>10 OR LEN d$<8 THEN GO TO
     0151
155 BRIGHT 1: INK 0: LET syy=20*8: LET
     sxs=1: LET sys=2: LET sxx=0: LET s$=i$+"
     rod. "+d$: GO SUB 9600: BRIGHT 0: INK 0:
     PLOT 0,0: DRAW 255,0: DRAW 0,16: DRAW -
     255,0: DRAW 0,-16
156 LET g=VAL d$(LEN d$-3 TO LEN d$)
157 LET m=VAL d$(LEN d$-5): IF d$(LEN d$-6)
     ="1" THEN LET m=m+10*VAL d$( LEN d$-6)
158 LET d=VAL d$(1): IF CODE d$(2)>47 THEN
     LET d=d*10+VAL d$(2)
162 LET y=g: IF m=1 OR m=2 THEN LET y=g-1
163 LET m=m+1: IF m=2 OR m=3 THEN LET m=m+
     12
164 LET yr=INT (365.25*y)+INT (30.6001*m)+
170 IF www=1 THEN GO TO 240
190 LET y=FN y(yd-7): LET m=FN m(yd-7,y)
```



```
191 LET m=m-1
192 IF m=13 OR m=14 THEN LET m=m-12
193 PRINT AT 19,0; INVERSE 1; INK 1; PAPER
     6;m$(m);TAB 14;y;TAB 23;m$(m+1): PAPER
     7: INK 9
200 FOR n=yd-7 TO yd+24
205 LET y=INT ((n-122.1)/365.25)
206 LET m=INT ((n-INT (365.25*y))/30.6001)
210 LET d=n-INT (365.25*y)-INT (30.6001*m)
220 LET y$=STR$ (100+d)
221 INK 9
222 LET dan=0.1+7*FN f((n+1720983)/7)
223 IF INT (dan)=0 THEN INVERSE 1
224 IF n=yd THEN FLASH 1
225 PRINT  PAPER 2;AT 17,(n-yd+7);CHR$ (
     CODE y$(2)+96)
226 PRINT  PAPER 2;AT 16,(n-yd+7);CHR$ (
     CODE y$(3)+96)
227 PRINT  PAPER 3;AT 18,(n-yd+7);x$(dan+1)
228 INVERSE 0: FLASH 0
230 NEXT n
240 INK 0: PLOT 2,90: DRAW 251,0
255 LET r=((yd-yr)-7)*8-2
256 FOR n=2 TO 253 STEP 2
260 IF n/4=INT (n/4) THEN CIRCLE n,90+35*
     SIN (PI*r/92),2
265 CIRCLE n,90+35*SIN (PI*r/112),1
270 PLOT n,90+35*SIN (PI*r/132)
271 PLOT n-1,90+35*SIN (PI*r/132)
275 LET r=r+2
280 NEXT n
290 INK 0
291 BRIGHT 0
300 INPUT "z=COPY >";s$: IF s$="z" THEN
     COPY
305 INPUT "Pritisni ENTER >";s$
310 LET www=1: GO TO 0145
9600 REM velika slova

9601 REM sxx,syy,sxs,sys,s$
9605 LET sxx=(32-sxs*LEN s$)*4
9610 LET si=23306: POKE si,sxx: POKE si+1,
     syy: POKE si+2,sxs: POKE si+3,sys: POKE
```

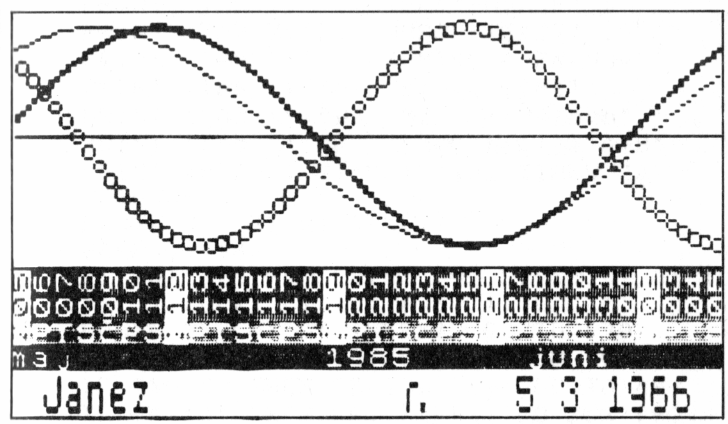
```
     si+4,8: LET si=si+4: LET sw=LEN s$: FOR
     s=1 TO sw: POKE si+s,CODE s$(s): NEXT s:
     POKE si+sw+1,255: LET sw=USR 65060:
     RETURN
9615 REM scroll

9616 REM  RESTORE : REM  READ syy,sny,stx,
     snt
9617 POKE 64971,syy: POKE 65002,sny+8*(sny<8)
     POKE 65011,stx: POKE 64989,snt
9620 LET sw=USR 64960
9621 RETURN
9699 REM UDG i ms
9700 RESTORE 9700
9750 LET v=0
9800 FOR a=64960 TO 65535
9810 READ x: POKE a,x: LET v=v+x
9820 NEXT a
9825 IF v<>44639 THEN PRINT "Greska u DATA
     naredbama": STOP
9827 RETURN
9830 DATA 6,8,197,205,202,253,193,16,249,201,
     30,8,83,205,240,253,237,67,30,254,19,83,
     205,240,253,197,225,213,1,10,0,237,91,
     30,254,34,30,254,237,176
9840 DATA 209,62,50,187,194,212,253,201,6,64,
     14,2,122,31,48,2,203,192,31,48,2,203,
     200,31,48,2,203,208,31,48,2,203,233,31,
     48,2,203,241,31,48,2,203,249,31,48,2,
     203,216,31,48,2,203,224,201,194,66,0,0
     0,0
9850 DATA 33,15,91,126,35,34,0,91,111,60,200,
     38,0,41,41,41,237,75,54,92,9,62,8,50,4,
     91,58,11,91,50,9,91,58,10,91,50,8,91,62,
     9,50,5,91,126,35,34,2,91,7,50,6,91,58,5,
     91,61,32,50,58,4
9860 DATA 91,61,32,24,58,14,91,71,58,12,91,
     79,58,10,91,129,5,32,252,50,10,91,42,0,
     91,195,39,254,50,4,91,58,13,91,71,58,9,
     91,128,50,9,91,42,2,91,195,68,254,50,5,
     91,58,12,91,71,58,9,91,50
9870 DATA 7,91,58,13,91,79,197,205,200,254,
     193,58,7,91,60,50,7,91,13,32,241,58,8,
```



```
     91,60,50,8,91,5,32,221,58,6,91,195,84,
     254,128,64,32,16,8,4,2,1,58,142,92,238,
     255,71,58,141,92,160,71,58,8,91,230
9880 DATA 248,111,58,7,91,254,192,208,31,31,
     31,230,31,103,203,28,203,29,203,28,203,
     29,203,28,203,29,62,88,180,103,58,142,
     92,166,176,119,58,7,91,71,230,7,246,64,
     103,120,31,31,31,230,24,180,103,120,23,
     23,230,224,111,58
9890 DATA 8,91,71,31,31,31,230,31,181,111,
     235,33,192,254,120,230,7,79,6,0,9,70,26,
     33,6,91,203,70,40,3,176,18,201,47,176,
     47,18,201,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
     23,220,10,206,11,231,80,26
```

BIORITAM

□□ SNAGA ■ ČUVSTVA — PAMET




```
9900 DATA 23,232,253,118,27,3,19,0,62,0,60,
     98,82,74,70,60,0,0,2,2,126,66,34,0,0,0,
     50,74,74,74,74,38,0,0,44,82,82,66,66,36,
     0,0,4,4,126,36,20,12,0,0,76,82,82,82,82,
     116,0,0,12,82
```

```
9910 DATA 82,82,82,60,0,0,96,80,72,70,64,64,
     0,0,44,82,82,82,82,44,0,0,60,74,74,74,
     74,48,0,170,85,170,85,170,85,170,85,0,0,
     24,36,66,129,0,0,0,66,102,90,66,66,66,0,
     0,66,98,82,74,70,66
9920 DATA 0,0,60,66,66,66,66,60,0,56,0,60,64,
     64,64,60,0,28,0,62,4,8,16,62,0,0,124,66,
     66,124,68,66,0,56,0,60,64,60,2,124,0,0,
     254,16,16,16,16,16,0,0,66,66,66,66,66,
     60,0
```


Morse

Zadaje li vam morzeova abeceda muke ili želite provjeriti svoje znanje, upišite donji program u svoje računalo.
Pomoću njega moći ćete prekodirati tekst u skup točkica i crtica ili ga dekodirati. Kad budete pomislili kako ste taj problem donekle savladali, možete svoje znanje provjeriti pomoću testa.

```
  10 REM  M O R S E
  20 POKE 23658,8
  30 LET a$="
     ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890.,?-
     +/="

  40 REM  m e n u
  50 CLS
  60 PRINT AT 4,0; INK 1; PAPER 6;"          M
     E   N   U          "
  70 PRINT 'TAB 7;"1.  TEKST-MORSE"
  80 PRINT 'TAB 7;"2.  MORSE-TEKST"
  90 PRINT 'TAB 7;"3.  KONTROLA ZNANJA"
 100 PRINT 'TAB 11;"A   slovo  -?MZ"
 110 PRINT 'TAB 11;"B   MZ     -?slovo"
 120 PRINT 'TAB 11;"C   kombinacija A+B"
 130 PRINT #0;AT 1,3;"PRITISNI TIPKU ZA
     ODGOVOR"
 140 PAUSE 0: LET Q$=INKEY$
 150 BEEP .1,10
 160 IF Q$="3" THEN PRINT #0; FLASH 1;;AT 1,
     3;"  ZELIS LI tip A,B ili C:  ":
     PAUSE 0: LET Q$=INKEY$: GO TO 190
 170 IF Q$="1" THEN GO SUB 590: GO TO 40
 180 IF Q$="2" THEN GO SUB 760: GO TO 40
 190 IF Q$="A" THEN LET TIP=1: GO SUB 990:
     GO TO 40
 200 IF Q$="B" THEN LET TIP=2: GO SUB 990:
     GO TO 40
 210 IF Q$="C" THEN LET TIP=3: GO SUB 990:
     GO TO 40
 220 GO TO 130
```

```
230 IF b$(1)="." OR b$(1)="-" THEN GO TO
    430

240 REM tekst-morseB$(1)-C$
250 FOR a=1 TO 44
260 IF b$(1)=a$(a) THEN GO TO 300
270 NEXT a
280 LET c$=b$(1)+"=UH?"
290 GO TO 350
300 RESTORE 1280
310 FOR j=1 TO a
320 READ c$
330 NEXT j
340 RETURN

350 REM  BEEP C$
360 FOR k=1 TO LEN c$
370 PAUSE 1+10*(C$(K)=" ")
380 BEEP .07*(C$(K)=".")+.2*(C$(K)="-"),10
390 NEXT k
400 RETURN

410 REM morse-tekstB$-O$
420 LET O$=""
430 LET n=1
440 LET c$=""
450 FOR j=n TO LEN b$
460 IF b$(j)=" " THEN GO TO 490
470 LET c$=c$+b$(j)
480 NEXT j
490 IF c$="" THEN LET c$=" "
500 LET n=j+1
510 RESTORE 1280
520 FOR i=1 TO 44
530 READ d$
540 IF c$=d$ THEN LET O$=O$+a$(i): GO TO
    570
550 NEXT i
560 LET O$=O$+"{"+c$+"=???}"
570 IF n<=LEN b$ THEN GO TO 440
580 RETURN

590 REM  TOCKA 1
```



```
600 CLS
610 INPUT "UPISI RIJEC:";I$
620 PRINT "UPISANA RIJEC,"' INVERSE 1;I$'
    INVERSE 0;"U MORZEOVOJ ABECEDI:"
630 LET P$=""
640 FOR I=1 TO LEN I$
650 LET B$=I$(I)
660 GO SUB 240
670 PRINT  PAPER 4;C$; PAPER 6;" ";
680 GO SUB 350
690 LET P$=P$+C$+" "
700 NEXT I
710 PRINT #1;AT 0,0;"Odigram ponovno Nova
    rijec Menu": PAUSE 0
720 LET Q$=INKEY$
730 IF Q$="O" THEN LET C$=P$: GO SUB 350:
    GO TO 710
740 IF Q$="N" THEN POKE 23692,255: PRINT :
    PRINT : GO TO 610
750 RETURN

760 REM  TOCKA 2
770 CLS
780 INPUT "ZADAJ M RIJEC:";I$
790 PRINT "DANA RIJEC U MORZEOVOJ ABECEDI,"
    'I$: LET C$=I$: GO SUB 350
800 LET B$=I$
810 GO SUB 410
820 PRINT "ZNACI:"' PAPER 6;O$
830 PRINT #1;AT 0,0;"Odigram ponovno Nova
    rijec Menu": PAUSE 0
840 LET Q$=INKEY$
850 IF Q$="O" THEN LET C$=I$: GO SUB 350:
    GO TO 830
860 IF Q$="N" THEN POKE 23692,255: PRINT :
    PRINT : GO TO 780
870 RETURN

880 REM  ZNAK+RJESENJE
890 LET Z$=A$(2+INT 42*RND)
900 LET B$=Z$
910 GO SUB 240
920 LET X$=C$
```

```
 930 RETURN
 940 REM ZAMJENA
 950 LET B$=Z$
 960 LET Z$=X$
 970 LET X$=B$
 980 RETURN

 990 REM  TOCKA 3
1000 CLS
1010 PRINT  INVERSE 1;"TEST ZNANJA MORZEOVE ABECEDE:"
1020 PRINT "TIP TESTA:",TIP
1030 LET R=0
1040 PRINT ''"No PIT. ODGOV. REZ. PRAVILNO"
1050 PLOT 0,131: DRAW 255,0
1060 FOR I=1 TO 10
1070 GO SUB 880
1080 IF TIP=2 THEN GO SUB 940
1090 IF TIP=3 AND RND>0.5 THEN GO SUB 940
1100 PRINT AT 5+I,0;I;TAB 3;Z$;
1110 INPUT "ODGOVOR ZA ~";(Z$);"~ JE:"; LINE Q$
1120 PRINT TAB 10;Q$;
1130 IF Q$=X$ THEN BEEP .1,20: LET R=R+1: PRINT TAB 18;"DA";
1140 IF Q$<>X$ THEN PRINT TAB 18;"NE";: BEEP .1,-9: BEEP .5,-20
1150 PRINT TAB 25;X$
1160 PRINT AT 2,0;"TRENUTNI USPJEH:",INT (R/I*100);"%     "
1170 NEXT I
1180 PRINT AT 1,0;"
                                "
1190 LET I=R*10
1200 PRINT AT 18,0;"U ODNOSU NA VAS PROSJECNI USPJEH"' INVERSE 1;I;"%"
1210 PRINT "RIJESILI STE TEST ";
1220 IF I<60 THEN PRINT  INVERSE 1;" NEGATIVNO."
1230 IF I>=60 AND I<94 THEN PRINT  INVERSE 1;"POZITIVNO."
```



```
1240 IF I>=94 THEN PRINT  INVERSE 1;"ODLICNO.
 "
1250 PRINT #0;AT 1,0;"PRITISNI BILO STO ZA GLAVNI MENU ": PAUSE 0
1260 RETURN

1270 REM   DATA
1280 DATA " ",".-","-...","-.-.","-..",".","..-.","--.","....",".."
1290 DATA ".---","-.-",".-..","--","-.","---",".--.","--.-",".-.","..."
1300 DATA "-","..-","...-",".--","-..-","-.--","--..",".----","..---"
1310 DATA "...--","....-",".....","-....","--...","---..","----."
1320 DATA "-----","......",".-.-.-","..--..","-....-",".--."
1330 DATA "-..-.","-...-"
```

Odziv

Mjerenje odziva, vremena reakcije ili refleksa može predstavljati vrlo privlačnu igru. Program mjeri vrijeme odziva na slušnu i vidnu reakciju. Grafikon, koji se nariše prema izboru načina mjerenja odziva, grafički i brojčano bilježi rezultate na zaslonu, izračunava prosjek odziva i uspoređuje ga s najboljim rezultatom do toga trenutka. Odzivi različitih trzina obojeni su na grafikonu različitim bojama. Zanimljivo je promatrati kako se koncentracija mijenja s vremenom. Odziv na zvuk brži je od odziva na promjenu boje, odnosno osvetljenje, itd... Suviše rano pritiskivanje tipke program ignorira, dok zakašnjele odzive, nakon 0.35 sek, označava repićem na zelenom stupcu. Ako igrač »zaspe«, pokušaj ga probuditi zvučnim signalom. Odzive kraće od 0.1 sek postižu samo vrlo »živi« igrači.

```
10◊REM◊ ◁p4▷ MJERENJE◊ODZIVA ◁p7▷
30 GO TO 800
40 PRINT  INK 2; BRIGHT 1; PAPER 6; FLASH
   1;AT 0,0;"◊POZOR!START!◊"
50 PAUSE 10
60 PAUSE 10
70 PAUSE 10+RND*200
80 IF n=11 THEN GO TO 190
90 IF INKEY$<>"" THEN BEEP .1,-40: GO TO
   40
100 IF i=1 THEN BEEP .04,40: GO TO 130
110 IF i=2 THEN PRINT  PAPER 2; BRIGHT 1;AT
    0,19;"◊◊◊◊◊◊◊◊◊◊◊◊": PAUSE 2: GO TO 130
120 IF i=3 THEN PRINT  PAPER 4; BRIGHT 1;AT
    0,19;"◊◊◊◊◊◊◊◊◊◊◊◊": PAUSE 2: GO TO 130
130 FOR a=4 TO 220
140 IF INKEY$<>"" THEN LET t=.001*INT (a*9+.
    5): LET s=s+t: LET p=.001*INT (1000*s/n+
    .5): PRINT AT 5,0; BRIGHT 1;"◊◊◊◊◊◊◊◊◊◊◊
    ◊◊◊◊◊◊◊◊◊◊◊◊◊◊◊◊◊◊◊◊◊";AT 5,1;t;" sek","
    ◊";p;"◊sek": GO SUB 610: LET n=n+1: GO
    TO 40
150 NEXT a
160 IF i>1 THEN PRINT AT 0,19;"◊◊◊◊◊◊◊◊◊◊◊◊"
170 BEEP .8,10
180 GO TO 40
```



```
190 FOR r=0 TO 5
200 FOR e=0 TO 31 STEP 4
210 PRINT AT r,e;"◊◊◊◊";
220 NEXT e
230 NEXT r
240 PRINT AT 0,0; BRIGHT 1;"◊◊◊◊Prosjecno◊
    odzivno◊vrijeme◊◊◊◊◊◊◊";
250 IF i=1 THEN PRINT '' BRIGHT 1;"◊◊◊◊za◊
    zvuk◊je◊"; PAPER 6; INK 0; FLASH 1;p;"◊
    sek"
260 IF i=2 THEN PRINT  BRIGHT 1;''"◊za◊
    crvenu◊boju◊je"; INK 2; FLASH 1; BRIGHT
    1;p;"◊sek"
270 IF i=3 THEN PRINT  BRIGHT 1;''"◊◊za◊
    zelenu◊boju◊je"; INK 4; FLASH 1;p;"◊
    sek"
280 IF p<=f(i) THEN LET f(i)=p: PRINT '';
    BRIGHT 1; INK 7; PAPER 2;"◊REKORDAN◊
    PROSJEK◊ODZIVA◊!!!◊"
290 FOR b=1 TO 20
300 BEEP .02,b
310 NEXT b
320 PRINT #1;AT 1,0; PAPER 6; INK 0;"ZA◊
    PONOVNI◊TEST◊PRITISNI◊TIPKU◊!"
330 PAUSE 0
340 GO SUB 1160
350 PAUSE 0
360 GO SUB 1080
370 GO TO 890
380 FOR b=1 TO 10
390 PRINT  INVERSE 1;AT 21,2+b*2;b
400 NEXT b
410 PRINT  INK 7; PAPER 2;AT 21,26;"PO";AT
    21,30; INK 7; PAPER 1;"RE"
420 LET a$="vrijeme◊odziva◊sek"
430 FOR v=7 TO 20
440 PRINT  INVERSE 1;AT v,0;a$(v-6)
450 NEXT v
460 FOR p=0 TO 3
470 PRINT AT 20-4*p,1;".";p
480 NEXT p
490 PLOT 241+x,10
500 IF INT (y*f(i))>=112 THEN DRAW  INK 1;0,
```

```
     112: GO TO 520
510 DRAW  INK 1;0,INT (y*f(i))
520 IF f(i)>=.35 AND x=7 THEN DRAW  INK 1;5,
     0
530 IF x<=6 THEN LET x=x+1: GO TO 490
540 LET x=0
550 FOR c=10 TO (10+.31*y) STEP .1*y
560 FOR d=28 TO 255 STEP 4
570 PLOT  INK 1;d,c
580 NEXT d
590 NEXT c
600 RETURN
610 PLOT x+16*(n+1),10
620 IF t>=.35 AND x<=6 THEN DRAW  INK 4;0,
     112: GO TO 690
630 IF t>=.35 AND x=7 THEN DRAW  INK 4;0,
     112: DRAW  INK 4;5,0: GO TO 690
640 IF t>=.3 THEN DRAW  INK 6;0,INT (y*t):
     GO TO 690
650 IF t>=.2 THEN DRAW  INK 3;0,INT (y*t):
     GO TO 690
660 IF t>=.15 THEN DRAW  INK 2;0,INT (y*t):
     GO TO 690
670 IF t>=.1 THEN DRAW  INK 1;0,INT (y*t):
     GO TO 690
680 DRAW  INK 0;0,INT (y*t)
690 PLOT 209+x,10
700 DRAW  INVERSE 1;0,112
710 IF x=7 THEN DRAW  INVERSE 1;5,0
720 PLOT 209+x,10
730 IF INT (y*p)>=112 AND x<=6 THEN DRAW
     INK 2;0,112: GO TO 760
740 IF INT (y*p)>=112 AND x=7 THEN DRAW
     INK 2;0,112: DRAW  INK 2;5,0: GO TO 760
750 DRAW  INK 2;0,INT (y*p)
760 IF x<=6 THEN LET x=x+1: GO TO 610
770 IF i>1 THEN PRINT AT 0,19;"◇◇◇◇◇◇◇◇◇◇◇"
780 LET x=0
790 RETURN
800 PAPER 7: INK 0: CLEAR
810 DIM f(5)
820 LET u=0
830 LET x=0
```



```
 840 LET y=320
 850 GO SUB 1050
 860 FOR w=1 TO 5
 870 LET f(w)=1
 880 NEXT w
 890 PAPER 7
 900 BORDER 7
 910 BRIGHT 0
 920 CLS
 930 IF i>1 THEN PRINT AT 0,19: BRIGHT 1;"
      ODZIV◇NA◇"; PAPER (i-1)*2;"◇◇◇◇"
 940 IF i=1 THEN PRINT AT 0,19; BRIGHT 1;"
      ODZIV◇NA◇ZVUK"
 950 LET u=u+1
 960 LET s=0
 970 LET n=1
 980 PRINT AT 2,0; INK 7; PAPER 1; FLASH 0;
      BRIGHT 1;"REKORD:";f(i);"◇sek";AT 2,25;
      PAPER 1; INK 7; BRIGHT 1;"◇◇◇◇◇◇◇";AT 2,
      19;"◇BR.TESTA:";u
 990 GO SUB 380
1000 PRINT AT 4,0; INVERSE 1; BRIGHT 1;"◇
      Vrijeme◇odziva◇◇", INK 7; PAPER 2;"◇
      Prosjecan◇odziv"
1010 PRINT #1; PAPER 1; INK 6; BRIGHT 1;"
      PRITISNI◇TIPKU◇KAD◇DOBIJES◇SIGNAL!◇"
1020 PAUSE 100
1030 BEEP 1,10
1040 GO TO 40
1050 PAPER 0
1060 BORDER 0
1070 CLS
1080 PRINT  PAPER 7''  INK 0;"IZBOR:"'' INK
      3;"Mjerenje◇vremena◇odziva◇na:"'' INK 1;
      "◇ZVUK","tipka◇1◇"'' INK 2;"◇CRVENU◇BOJU
      ","tipka◇2◇"'' INK 4;"◇ZELENU◇BOJU","
      tipka◇3 "'' INVERSE 1;"◇Kraj, pocetak","
      tipka◇4◇"
1090 PAUSE 0
1100 IF INKEY$="1" THEN LET i=1: RETURN
1110 IF INKEY$="2" THEN LET i=2: RETURN
1120 IF INKEY$="3" THEN LET i=3: RETURN
1130 IF INKEY$="4" THEN RUN
```

```
1140 BEEP .8,-40
1150 GO TO 1090
1160 PAPER 0: INK 0: BORDER 0: CLS
1170 PRINT  PAPER 6; FLASH 1;"SLUZBENI◇
     REZULTATI◇MJERENJA:"
1180 PRINT  INK 1; PAPER 7'"ODZIV◇NA◇ZVUK:◇"
     ;f(1);"◇sek";'' INK 2;"ODZIV◇NA◇CRVENO:
     ";f(2);"◇sek"'' INK 4;"ODZIV◇NA◇ZELENO:
     ";f(3);"◇sek"
1190 LET f(4)=.001*INT (1000*(f(1)+f(2)+f(3))
     /3+.5)
1200 PRINT  PAPER 2; INK 6''"PROSJECNI◇ODZIV:"
     ; BRIGHT 1; FLASH 1;F(4);"◇sec"
1210 RETURN
```


Pregled definiranih varijabli

Često ste razbijali glavu zbog nepoznavanja imena varijabli koje su definirane u basicu. Pomoću ovog programa problem je riješen, pošto vam ispisuje sva imena trenutno definiranih varijabli. Ukoliko vas način rada programa podrobnije zanima, pogledajte poglavlje 24 u knjizi ZX SPECTRUM basic programming.

```
9000◇REM◇PREGLED◇DEF.◇VARIJABLI
9001 DEF FN b(n)=PEEK n+256*PEEK (n+1)
9002 LET byt=FN b(23627)
9003 GO TO 9048

9004 REM one letter only
9005 LET z=PEEK byt
9006 LET i$=CHR$ z
9007 LET byt=byt+6
9008 RETURN

9009 REM longer then one letter
9010 LET z=PEEK byt
9011 LET i$=CHR$ (z-128-32+96)
9012 LET byt=byt+1
9013 LET z=PEEK byt
9014 IF NOT (z>=225 AND z<=250) THEN LET i$
     =i$+CHR$ z: GO TO 9012
9015 LET i$=i$+CHR$ (z-128): LET byt=byt+6
9016 RETURN

9017 REM array of numbers
9018 LET z=PEEK byt
9019 LET i$=CHR$ (z-32)+"()"
9020 LET byt=byt+1
9021 LET byt=byt+FN b(byt)+2
9022 RETURN

9023 REM for-next
9024 LET z=PEEK byt
9025 LET byt=byt+19
9026 LET i$=CHR$ (z-128)+" FOR-NEXT"
```

```
9027 RETURN

9028 REM string
9029 LET z=PEEK byt
9030 LET i$=CHR$ (z+32)+"$"
9031 LET byt=byt+1
9032 LET byt=byt+FN b(byt)+2
9033 RETURN

9034 REM array of character
9035 LET z=PEEK byt
9036 LET i$=CHR$ (z-128-64+96)+"$()"
9037 LET byt=byt+1
9038 LET byt=byt+FN b(byt)+2
9039 RETURN

9040 REM ******
9041 IF z>= 97 AND z<=122 THEN GO SUB  9004:
     RETURN
9042 IF z>=161 AND z<=186 THEN GO SUB  9009:
     RETURN
9043 IF z>=129 AND z<=154 THEN GO SUB  9017:
     RETURN
9044 IF z>=225 AND z<=250 THEN GO SUB  9023:
     RETURN
9045 IF z>= 65 AND z<= 90 THEN GO SUB  9028:
     RETURN
9046 IF z>=193 AND z<=218 THEN GO SUB  9034:
     RETURN
9047 STOP

9048 REM  G L A V N I   P R O G R A M
9049 BORDER 5: PAPER 5: INK 9: CLS
9050 PRINT  INVERSE 1'''Definirane
     varijable:          "'
9051 PRINT  BRIGHT 1;" ime","pocetna adresa
     "
9052 LET z=PEEK byt
9053 LET start=byt
9054 GO SUB 9040
9055 PRINT "  ";i$,start
9056 LET edl=FN b(23641)-1
9057 IF byt<edl THEN GO TO 9052
```


Brisanje dijela programa

Kada ste željeli obrisati samo dio programa, naišli ste na nesavladivu prepreku. Naredbom NEW brišete cijeli program, dok brisanje svakoga pojedinog retka predstavlja veliki posao. Ovaj program rješava te probleme, samo što retci staroga programa ne smiju sadržavati brojeve između 9500 i 9524. Želite li koristiti program, napunite ga naredbom MERGE" " i startajte naredbom GOTO 9500. Kad vam više nije potreban, naprosto ga prebrišite njime samim.

```
9499◇REM◇BRISANJE◇DIJELA◇PROGRAMA
9500 INPUT "od◇retka◇◇";start
9501 INPUT "do◇retka◇◇";stop
9502 LET suma=0
9503 LET h=INT (stop/256): LET l=stop-(h*256)
9504 LET poc=PEEK 23635+256*PEEK 23636
9505 LET w=INT (start/256): LET y=start-(w*
     256)
9506 IF PEEK poc>=w ◁i0▷ AND PEEK (poc+1)>=y
     THEN GO TO 9509
9507 LET poc=PEEK (poc+2)+256*PEEK (poc+3)+
     poc+4
9508 GO TO 9506
9509 LET po=poc+2: LET ke=poc+3
9510 LET suma=PEEK (poc+2)+256*PEEK (poc+3)+
     suma+4
9511 IF PEEK poc>=h AND PEEK (poc+1)>=1 THEN
     GO TO 9514
9512 LET poc=PEEK (poc+2)+256*PEEK (poc+3)+
     poc+4
9513 GO TO 9510
9514 LET suma=suma-4
9515 LET ni=INT (suma/256)
9516 POKE ke,ni: POKE po,suma-(ni*256)
9517 CLS : PRINT "utipkaj◇◇◇◇";start''"zatim◇
     pritisni◇ENTER"
9518 PRINT AT 16,1;"NAKON◇STO◇SI◇PRITISNUO◇
     ENTER◇NASTAVI◇S◇CONTINUE"
9519 STOP
9520 CLS : INPUT "Zelis◇li◇me◇jos◇koristiti◇
```

```
      ?";d$
9521 IF d$="d" OR d$="D" THEN GO TO 9500
9522 LET poc=PEEK (poc+2)+256*PEEK (poc+3)+
     poc+4
9523 CLS : PRINT "posto◊si◊odlucio◊da◊me◊
     vise◊ne◊◊◊◊koristis,◊utipkaj◊◊◊◊◊◊◊◊◊
     ◊◊◊◊od◊9499◊do◊9524"
9524 GO TO 9500
```


Premetanje

Program vam omogućava prijenos dijelova slika s jednog dijela zaslona na drugi. Najprije se treptajućim kvadratom, pokazivačem i tipkom ENTER određuju granice dijela zaslona kojeg želite preslikati. Prije no što izvedemo preslikavanje, uvjerite se ima li za to dovoljno mjesta.

```
  1◊REM◊PREMETANJE

 10 PAPER 7: INK 9: BORDER 7: CLS

 20◊REM◊definicije
 30 DIM p(4)
 40 DIM q(4)
 50 DIM q$(6,32)
 60 LET q$(1)="Gornji◊lijevi◊ugao"
 70 LET q$(2)="Gornji◊desni◊◊ugao"
 80 LET q$(3)="Donji◊◊lijevi◊ugao"
 90 LET q$(4)="Gornji◊lijevi◊preslikani◊
    ugao"
100 LET q$(5)="Pritisni◊bilo◊koju◊tipku....
    "
110 LET q$(6)="Kraj◊ili◊Jos◊?"
120 PRINT #0;AT 0,0; INVERSE 1;"Cekam◊na◊
    SCREEN$..."
130 LOAD ""SCREEN$

140◊REM◊start
150 PRINT #0;AT 0,0;q$(1)
160 LET q=1: LET v=0: LET s=v: LET
    key=23560
170 POKE key,255
180 DEF FN a(s,v)=22528+32*v+s
190 POKE 22528,(PEEK 22528)+128

200◊REM◊glavni program
210 LET c=PEEK key
220 IF c=53 THEN GO SUB 280: GO TO 200
230 IF c=54 THEN GO SUB 300: GO TO 200
240 IF c=55 THEN GO SUB 320: GO TO 200
```

```
250 IF c=56 THEN GO SUB 340: GO TO 200
260 IF c=13 THEN GO SUB 360: GO TO 200
270 GO TO 200

280◊REM◊Lijevo
290 GO SUB 410: LET s=s-1: GO SUB 430:
    RETURN

300◊REM◊dolje
310 GO SUB 410: LET v=v+1: GO SUB 430:
    RETURN

320◊REM◊gore
330 GO SUB 410: LET v=v-1: GO SUB 430:
    RETURN

340◊REM◊Lijevo
350 GO SUB 410: LET s=s+1: GO SUB 430:
    RETURN

360◊REM◊enter
370 LET p(q)=v: LET q(q)=s: LET q=q+1: IF
    q<5 THEN PRINT #0;AT 0,0;q$(q)
380 IF q>=5 THEN POKE FN a(s,v),PEEK FN a(s,
    v)-128: GO TO 500
390 POKE key,255
400 RETURN

410◊REM◊cursor
420 POKE FN a(s,v),PEEK FN a(s,v)-128:
    RETURN
430 IF v>21 THEN LET v=21
440 IF v<0 THEN LET v=0
450 IF s>31 THEN LET s=31
460 IF s<0 THEN LET s=0
470 POKE FN a(s,v),PEEK FN a(s,v)+128
480 POKE key,255
490 RETURN

500◊REM◊pomak
510 LET a=30000
520 FOR x=p(2) TO p(3)
530 FOR y=q(1) TO q(2)
```



```
540 GO SUB 740
550 FOR z=pbyt TO pbyt+1792 STEP 256
560 POKE a,PEEK z
570 LET a=a+1
580 NEXT z
590 NEXT y
600 NEXT x
610 PRINT #0;AT 0,0;q$(5): PAUSE 0
620 LET a=30000
630 FOR x=p(4) TO p(4)+p(3)-p(2)
640 FOR y=q(4) TO q(2)-q(1)+q(4)
650 GO SUB 740
660 FOR z=pbyt TO pbyt+1792 STEP 256
670 POKE z,PEEK a
680 LET a=a+1
690 NEXT z
700 NEXT y
710 NEXT x
720 PRINT #0;AT 0,0;q$(6): PAUSE 0: LET a$
    =INKEY$: IF a$="k" OR a$="K" THEN STOP
730 GO TO 150
740 IF x<=7 THEN LET t=0
750 IF x<=7 THEN LET mk=x
760 IF x>7 AND x<=15 THEN LET t=1
770 IF x>7 AND x<=15 THEN LET mk=x-8
780 IF x>15 AND x<=23 THEN LET t=2
790 IF x>15 AND x<=23 THEN LET mk=x-16
800 LET pbyt=16384+t*2048+32*mk+y
810 RETURN
```

Datoteka

DATOTEKA je univerzalni korisnički program namijenjen čuvanju (arhiviranju) podataka. Na izbor imamo 9 potprograma, zaštitu unešenih podataka lozinkom i upute za ponovni start programa u slučaju da dođe do prekida kod unošenja. Svaki podatak je određen s 8 različito nazvanih polja, svako polje može imati do 20 alfanumeričkih znakova, najveći broj podataka na »Spectrumu« od 48 K je 196, što je dovoljno za pohranjivanje na kazetu najvažnijih podataka o svojim prijateljima, arhivu najboljih programa, itd.

Program je jednostavan za upravljanje, dok se namjena može izborom »0« mijenjati u najrazličitije datoteke.

Bez lozinke podatke ne možemo unositi ili mijenjati, što neovlaštenim omogućava samo gledanje, čitanje podataka.

```
 10◆REM◆◂p2▸PROGRAM:◆DATOTEKA◆■◆◆◆◆◂p7▸
 30 CLEAR
 40 POKE 23609,30
 50 LET K=1
 60 DIM G$(3)
 70 DIM B$(3)
 80 INPUT "UNESI◆GLAVNI◆KLJUC!◆TRI◆POLJA◆'
    XXX'◆!";G$
 90 LET B$=G$
100 GO TO 2920

110◆REM◆POCETAK
120 INPUT "UNESI◆KLJUC!";B$
130 IF K=5 THEN GO TO 170
140 IF B$<>G$ THEN LET K=K+1: BEEP .8,-40:
    GO TO 120
150 IF K=2 AND B$=G$ THEN LET K=1: GO TO I
160 IF B$=G$ THEN LET K=1: GO TO I
170 IF B$<>G$ THEN LET K=0: GO TO 2970

180◆REM◆NAZIVANJE POLJA
190 INPUT AT 0,0;"ZELIS◆LI◆NAZIVATI◆POLJA◆
    PODATAKA◆?"; FLASH 1;"D/N";P$
200 IF P$<>"D" THEN GO SUB 3210: GO TO 240
210 PRINT AT 0,5;"IMENA◆POLJA◆PODATAKA"
220 IF P$="D" THEN CLS : FOR W=1 TO 8:
```



```
    PRINT AT 20,0;"NAZOVI◆POLJE◆PODATAKA◆
    BROJ", FLASH 1;W;":": INPUT "DO◆11◆
    MJESTA◆!:"; FLASH 0;D$(W): PRINT  FLASH
    1;AT W*2,0;W; PAPER 2; FLASH 0;D$(W)
230 NEXT W
240 FOR M=-30 TO 15 STEP 5
250 BEEP .01,M
260 NEXT M

270◆REM◆IZBOR
280 CLS
290 PRINT  FLASH 1; PAPER 6; INK 2;"◆IZBOR◆"
    ;AT 0,17; FLASH 0; PAPER 4; INK 0;S$
300 IF K=1 THEN PRINT AT 0,8;"KLJUC"; PAPER
    4; INK 0; FLASH 1;"◆■◆"
310 PRINT '"0◆POLJA◆DATOTEKE◆■"
320 PRINT "1◆UNOS◆PODATAKA◆■"
330 PRINT "2◆TRAZENJE◆PODATAKA"
340 PRINT "3◆PREGLED◆DATOTEKA"
350 PRINT "4◆PRIJENOS◆NA◆TRAKU◆■"
360 PRINT "5◆TISKANJE"
370 PRINT "6◆LISTANJE"
380 PRINT "7◆IZMJENA◆PODATAKA◆■"
390 PRINT "8◆RACUNANJE◆■"
400 PRINT "9◆ZATVARANJE,OTVARANJE"
410 PRINT  INVERSE 1'"'GOTO◆I'"; INVERSE 0;"
    ◆VRACA◆PROGRAM◆NA◆IZBOR!◆"
420 PRINT ''"POZOR!UPOTREBA◆'RUN'◆KOD◆
    RESTARTA"''"INICIJALIZIRA◆DATOTEKU◆I◆NA◆
    TAJ"''"NACIN◆BRISE◆UNESENE◆PODATKE!"
430 PRINT '"S◆■◆OZNACENI◆PROGRAMI◆MOGU◆SE"'
    "KORISTITI◆SAMO◆S◆GLAVNIM◆KLJUCEM!"
440 INPUT "ODABERI◆!(0/9)";C
450 IF C=0 THEN GO TO 2680
460 IF C=1 THEN GO TO 570
470 IF C=2 THEN GO TO 840
480 IF C=3 THEN GO TO 1340
490 IF C=4 THEN GO TO 1500
500 IF C=5 THEN GO TO 1650
510 IF C=6 THEN GO TO 1850
520 IF C=7 THEN GO TO 2050
530 IF C=8 THEN GO TO 2320
540 IF C=9 THEN GO TO 2260
```

```
550 GO TO 440

560◆REM◆UNOS
570 CLS
580 IF K<>1 THEN GO TO I
590 IF ZSD>196 THEN BEEP .1,4: PRINT '',
    "NEMA◆VISE◆MJESTA": GO TO 690
600 LET A$(ZSD,1)=STR$ ZSD
610 PRINT AT 19,3;"NOVI◆PODATAK,RED.◆BR.◆"
    ;ZSD
620 PRINT AT 21,17; PAPER 4; INK 0;S$
630 FOR X=1 TO 8
640 INPUT (D$(X));A$(ZSD,X)
650 PRINT  FLASH 1;'X; FLASH 0; PAPER 2;
    INK 7;D$(X); PAPER 7; INK 0; BRIGHT 1;
    A$(ZSD,X)
660 BEEP .05,X*5
670 NEXT X
680 LET ZSD=ZSD+1
690 PRINT #1;"TIPKA◆"; FLASH 1;"I"; FLASH
    0;"◆ZA◆IZBOR,"; FLASH 1;"N"; FLASH 0;"◆
    ZA◆SLIJEDECU!"
700 PAUSE 0
710 IF INKEY$="I" THEN GO TO I
720 BEEP .6,-10
730 PRINT
740 PAUSE 15
750 BEEP .1,-35
760 PRINT
770 PAUSE 15
780 BEEP .1,-15
790 PRINT
800 PAUSE 0
810 IF INKEY$="I" THEN GO TO I
820 GO TO 570

830◆REM◆TRAZENJE
840 CLS
850 IF K>1 THEN GO TO I
860 PRINT  PAPER 2; INK 7;"◆TRAZENJE◆
    DATOTEKE◆S◆PODATKOM◆◆◆◆"
870 PRINT '"TIPKA◆0,ZA◆TRAZENI◆PODATAK"
880 FOR Q=1 TO 8
```



```
 890 PRINT "TIPKA◆";Q;",AKO◆ZNAS◆";D$(Q)
 900 NEXT Q
 910 PRINT '"TIPKA◆I;ZA◆IZBOR"
 920 PAUSE 0
 930 LET V$=INKEY$
 940 LET V=CODE V$-48
 950 IF V=0 THEN INPUT "TRAZENI◆PODATAK◆?";I$
     GO TO 1240
 960 FOR M=1 TO 8
 970 IF V=M THEN INPUT "UNESI◆";(D$(M));":"
     ;F$: GO TO 1010
 980 NEXT M
 990 IF V$="I" THEN GO TO I
1000 GO TO 840
1010 FOR X=LEN F$+1 TO 20
1020 LET F$=F$+"◆"
1030 NEXT X
1040 FOR X=1 TO ZSD-1
1050 IF A$(X,V)=F$ THEN LET Z=X: GO SUB 1110
1060 NEXT X
1070 CLS
1080 PRINT  FLASH 1;"◆NIJE◆U◆DATOTEKAMA◆DO◆
     RED.◆BR.";ZSD-1;"!"
1090 BEEP .4,-30
1100 GO TO 870
1110 CLS
1120 PRINT "DATOTEKA◆BR.◆";Z
1130 FOR Y=1 TO 8
1140 PRINT  INK 6;'D$(Y);"◆";
1150 BEEP .01,Y*2
1160 PRINT  INK 0; PAPER 7;A$(Z,Y)
1170 BEEP .01,Y*3
1180 NEXT Y
1190 PRINT #1;"TIPKA◆"; FLASH 1;"I"; FLASH
     0;"◆ZA◆IZBOR,"; FLASH 1;"N"; FLASH 0;"
     ZA◆SLIJEDECU!"
1200 PAUSE 0
1210 IF INKEY$="I" THEN GO TO I
1220 RETURN
1230 GO TO I
1240 FOR X=LEN I$+1 TO 20
1250 LET I$=I$+"◆"
1260 NEXT X
```

```
1270 FOR X=1 TO ZSD-1
1280 FOR V=1 TO 8
1290 IF A$(X,V)=I$ THEN LET Z=X: LET V=8: GO
     SUB 1110
1300 NEXT V
1310 NEXT X
1320 GO TO 1070

1330◆REM◆PREGLED
1340 CLS
1350 IF K>1 THEN GO TO I
1360 FOR A=0 TO 31
1370 PRINT  PAPER 2;AT 0,A;"◆";
1380 NEXT A
1390 PRINT  FLASH 1; PAPER 2; INK 7;AT 0,0;"
     BR.";D$(2);AT 0,18;D$(1)
1400 LET E=0
1410 FOR X=1 TO ZSD-1
1420 BEEP .02,E+X
1430 PRINT AT E+X+1,0;X;AT E+X+1,3;A$(X,2)
     ;AT E+X+1,18;A$(X,1)( TO 3)
1440 IF E+X+1=21 THEN LET E=E-20: PAUSE 0
1450 NEXT X
1460 BEEP .2,-20
1470 PAUSE 0
1480 GO TO I

1490◆REM◆PRIJENOS NA TRAKU
1500 CLS
1510 IF K<>1 THEN GO TO I
1520 PRINT AT 0,5;"PRIJENOS◆NA◆TRAKU"
1530 PRINT ''"POSTAVI◆PRAZNU◆TRAKU"
1540 PRINT '"I◆PRITISNI◆TIPKU"
1550 PAUSE 0
1560 SAVE "DATOTEKA◆■" LINE 120
1570 BEEP .3,-10
1580 PRINT '"PREMOTAJ◆KAZETU◆NATRAG◆ZBOG◆
     KONTROLE"
1590 PRINT '"I◆PRITISNI◆TIPKU"
1600 PAUSE 0
1610 VERIFY ""
1620 BEEP 1,30
1630 GO TO I
```



```
1640◆REM◆TISKANJE
1650 CLS
1660 IF K>1 THEN GO TO I
1670 PRINT  PAPER 2;"◆TISKANJE◆"
1680 PRINT ''"PRITISNI◆TIPKU◆'P'◆ZA◆TISKANJE"
1690 PRINT ''"PRITISNI◆TIPKU◆'I'◆ZA◆IZBOR"
1700 PRINT '''"ZA◆ODREDJIVANJE◆RED.BR.◆KORISTI
     "'"IZBOR◆3!"
1710 IF ZSD=1 THEN GO TO I
1720 PAUSE 0
1730 IF INKEY$<>"P" AND INKEY$<>"I" THEN GO
     TO 1720
1740 IF INKEY$="I" THEN GO TO I
1750 INPUT "UPISI◆RED.BR.";Z
1760 GO SUB 3300
1770 IF Z>ZSD-1 THEN  GO TO 1650
1780 LPRINT 'S$
1790 FOR X=1 TO 8
1800 LPRINT 'D$(X);"◆";A$(Z,X)
1810 NEXT X
1820 LPRINT "
     ----------------------------------------"
1830 GO TO 1650

1840◆REM◆LISTANJE
1850 CLS
1860 PRINT "LISTANJE"
1870 IF K>1 THEN GO TO I
1880 INPUT "OD◆KOJEG◆BR.◆DATOTEKE◆DALJE?"
     ;Y
1890 IF Y>ZSD-1 THEN GO SUB 3300: GO TO I
1900 FOR X=Y TO ZSD-1
1910 CLS
1920 PRINT "DATOTEKA◆BR.◆";X
1930 FOR L=1 TO 8
1940 BEEP .01,2*L
1950 PRINT  PAPER 2;'D$(L);"◆"; PAPER 7; INK
     1;A$(X,L)
1960 NEXT L
1970 PRINT #1;"TIPKA◆"; FLASH 1;"I"; FLASH
     0;"◆ZA◆IZBOR,"; FLASH 1;"N"; FLASH 0;"◆
     ZA◆SLIJEDECU!"
1980 PAUSE 0
```

```
1990 IF INKEY$="I" THEN GO TO I
2000 NEXT X
2010 PRINT #1;AT 0,0;"POSLJEDNJA◆DATOTEKA!◆
     JOS◆";(197-ZSD);"◆STRANA."
2020 PAUSE 0
2030 GO TO I

2040◆REM◆IZMJENE
2050 CLS
2060 IF K<>1 THEN GO TO I
2070 INPUT "U◆KOJOJ◆DATOTECI◆ZELIS"''"
     IZMJENU?◆◆";Z
2080 GO SUB 3300
2090 IF Z>ZSD THEN GO TO 2050
2100 CLS : PRINT  PAPER 5; INK 0;"STO◆ZELIS◆
     PROMIJENITI?","DATOTEKA◆RED.BR.◆";Z;"◆◆◆
     ◆◆◆◆◆◆◆◆"
2110 PRINT AT 1,30; PAPER 5;"◆◆"
2120 FOR C=1 TO 8
2130 PRINT  FLASH 1;'C; FLASH 0; PAPER 2;
     INK 7;D$(C); PAPER 7; INK 1;A$(Z,C)
2140 NEXT C
2150 INPUT ;"BR.IZMJENE◆1/8,9◆ZA◆IZBOR◆";D
2160 IF D=9 THEN GO TO I
2170 PRINT AT 18,0; INK 0; PAPER 4;"◆SADA:◆"
2180 PRINT AT 19,0;D; PAPER 2; INK 7;D$(D);
     PAPER 7; INK 1;A$(Z,D)
2190 PRINT AT 20,0; INK 0; PAPER 3;"◆NOVO◆:◆"
2200 INPUT "NOVA◆VERZIJA";A$(Z,D)
2210 PRINT AT 21,0;D; PAPER 2; INK 7;D$(D);
     PAPER 7; INK 1;A$(Z,D)
2220 PAUSE 0
2230 CLS
2240 GO TO 2100

2250◆REM◆ZATVARANJE,OTVARANJE
2260 CLS
2270 DIM B$(3)
2280 PRINT AT 10,3; FLASH 1;"◆DATOTEKA◆";S$
     ;AT 12,10; PAPER 6; INK 2;"◆ZATVORENA◆"
2290 LET K=2
2300 GO TO 120
```



```
2310◆REM◆RACUNANJE
2320 IF K<>1 THEN GO TO I
2330 CLS
2340 PRINT  INK 6; PAPER 2;"◆RACUNANJE◆"
2350 PRINT '"MOGUCE◆RACUNSKE◆OPERACIJE◆SU:◆"
2360 PRINT "*(1),◆/(2),◆+(3),◆-(4)"''"TE◆
     NJIHOVE◆KOMBINACIJE"
2370 FOR C=1 TO 8
2380 PRINT  PAPER 6; INK 0;AT 6+C,5;C;"◆";D$(
     C)
2390 NEXT C
2400 INPUT "PRVI◆NUM.◆PODATAK◆(1/8)◆";Y1
2410 PRINT '"PRVI◆NUM.◆PODATAK◆◆◆:◆"; PAPER
     6; INK 0;Y1
2420 INPUT "DRUGI◆NUM.◆PODATAK(1/8)◆";Y2
2430 PRINT "DRUGI◆NUM.◆PODATAK◆◆:  "; PAPER
     6; INK 0;Y2
2440 INPUT "REZULTAT◆U◆POLJE(1/8)◆";Y3
2450 PRINT "REZULTAT◆U◆POLJE◆◆◆◆:◆";PAPER
     6; INK 0;Y3
2460 PRINT "RACUNSKA◆OPERACIJA...◆";
2470 INPUT "KOJA◆RACUNSKA◆OPERACIJA?◆";R
2480 PAPER 2
2490 FLASH 1
2500 IF R=1 THEN PRINT "*"
2510 IF R=2 THEN PRINT "/"
2520 IF R=3 THEN PRINT "+"
2530 IF R=4 THEN PRINT "-"
2540 IF R>4 THEN GO TO 2470
2550 PRINT #1; FLASH 0; PAPER 3; BRIGHT 1;"
     DA◆LI◆JE◆SVE◆U◆REDU?"; FLASH 1;"D/N"
2560 PAUSE 0
2570 PAPER 1
2580 FLASH 0
2590 IF INKEY$="N" THEN CLS : GO TO 2320
2600 FOR X=1 TO ZSD-1
2610 IF R=1 THEN LET A$(X,Y3)=STR$ (VAL A$(X,
     Y1)*VAL A$(X,Y2))
2620 IF R=2 THEN LET A$(X,Y3)=STR$ (VAL A$(X,
     Y1)/VAL A$(X,Y2))
2630 IF R=3 THEN LET A$(X,Y3)=STR$ (VAL A$(X,
     Y1)+VAL A$(X,Y2))
2640 IF R=4 THEN LET A$(X,Y3)=STR$ (VAL A$(X,
```

```
      Y1)-VAL A$(X,Y2))
2650 NEXT X
2660 GO TO I

2670◆REM◆POLJA◆DATOTEKE
2680 CLS
2690 IF K<>1 THEN GO TO I
2700 PRINT "◆POLJA◆◆DATOTEKE";AT 0,17; PAPER
     4; INK 0;S$
2710 FOR P=1 TO 8
2720 PRINT  PAPER 6; INK 1;'P; PAPER 2; INK
     7;D$(P); PAPER 7;"◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆"
2730 BEEP .01,2*P
2740 NEXT P
2750 PRINT #1;AT 0,0;"ZELIS◆LI◆PROMIJENITI◆
     POLJE◆U"''DATOTECI?"; FLASH 1;"D/N"
2760 PAUSE 0
2770 IF INKEY$="N" THEN GO TO I
2780 IF INKEY$="D" THEN GO TO 2800
2790 GO TO 2750
2800 INPUT ;"KOJE◆POLJE? (1/8)";P
2810 IF P>8 OR P<1 THEN GO TO 2800
2820 PRINT AT 18,0;"STARO:"; PAPER 3;"◆";D$(
     P)
2830 INPUT ;"NOVO◆:(DO◆11◆SLOVA)";D$(P)
2840 PRINT AT 19,0;"NOVO◆:"; PAPER 2;"◆";D$(
     P)
2850 PRINT #1;AT 1,0;"JE◆LI◆U◆REDU?"; FLASH
     1;"D/N"
2860 PAUSE 0
2870 IF INKEY$="N" THEN GO TO 2830
2880 IF INKEY$="D" THEN GO TO 2680
2890 GO TO 2850
2900 IF LEN A$(ZSD,X)>20 THEN GO TO 640

2910◆REM◆INICIJALIZACIJA
2920 LET ZSD=1
2930 LET I=240
2940 DIM D$(8,11)
2950 DIM A$(196,8,20)
2960 DIM S$(15)
2970 BORDER 1
2980 PAPER 1
```



```
2990 INK 7
3000 BRIGHT 1
3010 CLS
3020 IF K=1 THEN INPUT "UNESI◆IME◆DATOTEKE";
     PAPER 2; BRIGHT 1; INK 7;AT 3,8;"◆◆◆◆◆◆◆
     ◆◆◆◆◆◆◆◆";AT 5,7;S$.
3030 POKE 23658,8
3040 PRINT AT 5,11; FLASH 1;"◆DATOTEKA◆"
3050 PRINT AT 8,8; PAPER 2; INK 7;S$
3060 FOR M=-40 TO +50 STEP 3
3070 BEEP .01,M
3080 NEXT M
3090 FOR M=0 TO 31
3100 PRINT  PAPER 4;AT 0,M;"◆";AT 21,M;"◆";
3110 NEXT M
3120 FOR M=0 TO 21
3130 PRINT  PAPER 4;AT M,0;"◆";AT M,31;"◆";
3140 NEXT M
3150 FOR M=+50 TO -40 STEP -3
3160 BEEP .01,M
3170 NEXT M
3180 IF K=1 THEN GO TO 180
3190 GO TO I

3200◆REM◆PRIMJER◆ZA◆POLJA
3210 LET D$(1)="RED.◆BR."
3220 LET D$(2)="PREZIME◆IME"
3230 LET D$(3)="DATUM◆RODJ."
3240 LET D$(4)="MJESTO"
3250 LET D$(5)="ULICA"
3260 LET D$(6)="BR.◆POSTE"
3270 LET D$(7)="TELEFON"
3280 LET D$(8)="RAZNO"
3290 RETURN
3300 PRINT AT 20,2;"BR.◆POSLJEDNJE◆DATOTEKE◆
     JE◆";ZSD-1;"!"
3310 BEEP .6,10
3320 PAUSE 50
3330 RETURN
```

Matrice

Ako ste imali posla s programiranjem matričnih računa na ZX Spectrumu, vjerojatno ste mogli samo zamišljati program poput ovog. U memoriju možete po želji birati matrične operacije kao što su: zbrajanje matrica, transponiranje matrica, produkt matrica, skalarni produkt i izračunavanje inverzne matrice. Sve ove operacije, međutim, možete izvoditi između proizvoljnih (tu nema greške!) matrica koje možete definirati na ZX Spectrumu. Program vam, pored toga, omogućava i ispis rezultata na pisaču preko kanala za ispis (zaslon = 2, pisač = 3), kao i pregled već definiranih matrica s ispisom imena i dimenzija. Kod upisivanja programa u računalo morate biti izuzetno pažljivi i morate ga prepisati doslovno, bez ikakvih popravaka, dodataka ili izmjena, želite li da program radi. Razlog za apsolutnu točnost leži u mijenjanju programa za vrijeme izvođenja i promijeni li se sadržaj memorijskih mjesta, program neće ispravno završiti.

```
1◆REM◆©◆Andrej◆VIHTELIC◆1985
2 DEF FN b(n)=PEEK n+256*PEEK (n+1): GO
  TO 232

3◆REM◆mprint◆(a$,jedinica)
4 RESTORE 150: READ i,y$: POKE FN b(23635)
  +i,CODE y$
5 LET z$=a$(1)
6 GO SUB 168
7 IF greska THEN PRINT '"mprint◆error":
  GO TO 15
8 PRINT #jedinica'"Matrica◆";z$;"(";pd;","
  ;dd;")"
9 FOR i=1 TO pd
10 PRINT #jedinica
11 FOR j=1 TO dd
12 PRINT #jedinica;"◆◆◆◆";z$;"(";i;",";j;")
   =";a(i,j)
13 NEXT j
14 NEXT i
15 RETURN

16◆REM◆minput◆(a$,pd,dd)
17 RESTORE 151: FOR j=1 TO 3: READ i,y$:
   POKE FN b(23635)+i,CODE y$ NEXT j
18 LET z$=a$(1)
19 DIM a(pd,dd)
20 PRINT '"Matrica◆";z$;"(";pd;",";dd;")"
21 FOR i=1 TO pd
22 PRINT
23 FOR j=1 TO dd
24 INPUT (z$;"(";i;",";j;")=");a(i,j)
25 PRINT "◆◆◆◆";z$;"(";i;",";j;")=";a(i,j)
26 NEXT j
27 NEXT i
28 RETURN

29◆REM◆sum◆(a$=(c=a+b))
30 RESTORE 152: FOR j=1 TO 4: READ i,y$:
   POKE FN b(23635)+i,CODE y$ NEXT j
31 LET z$=a$(3)
32 GO SUB 168
33 LET pdf=pd: LET ddf=dd
34 LET z$=a$(5)
35 GO SUB 168
36 IF pdf<>pd OR ddf<>dd THEN PRINT '"sum◆
   error": GO TO 43
37 DIM c(pd,dd)
38 FOR i=1 TO pd
39 FOR j=1 TO dd
40 LET c(i,j)=a(i,j)+b(i,j)
41 NEXT j
42 NEXT i
43 RETURN

44◆REM◆prod◆(a$=(c=a*b))
45 RESTORE 153: FOR j=1 TO 5: READ i,y$:
   POKE FN b(23635)+i,CODE y$ NEXT j
46 LET z$=a$(3)
47 GO SUB 168
48 LET pdf=pd: LET ddf=dd
49 LET z$=a$(5)
50 GO SUB 168
51 IF ddf<>pd THEN PRINT '"prod◆error": GO
   TO 60
52 DIM r(pdf,dd)
53 FOR i=1 TO pdf
```

```
54 FOR j=1 TO dd
55 FOR k=1 TO ddf
56 LET r(i,j)=r(i,j)+s(i,k)*w(k,j)
57 NEXT k
58 NEXT j
59 NEXT i
60 RETURN

61◆REM◆sprod◆a$,sk
62 RESTORE 154: FOR j=1 TO 2: READ i,y$:
   POKE FN b(23635)+i,CODE y$ NEXT j
63 LET z$=a$(1)
64 GO SUB 168
65 IF greska THEN PRINT '"sprod◆error": GO
   TO 71
66 FOR i=1 TO pd
67 FOR j=1 TO dd
68 LET a(i,j)=sk*a(i,j)
69 NEXT j
70 NEXT i
71 RETURN

72◆REM◆trans◆a$=(b=at)
73 RESTORE 155: FOR j=1 TO 3: READ i,y$:
   POKE FN b(23635)+i,CODE y$ NEXT j
74 LET z$=a$(3)
75 GO SUB 168
76 IF greska THEN PRINT '"trans◆error": GO
   TO 83
77 DIM b(dd,pd)
78 FOR i=1 TO pd
79 FOR j=1 TO dd
80 LET b(j,i)=a(i,j)
81 NEXT j
82 NEXT i
83 RETURN

84◆REM◆invm◆(a$=(a=inv b)
85 RESTORE 156: FOR j=1 TO 3: READ i,y$:
   POKE FN b(23635)+i,CODE y$ NEXT j
86 LET z$=a$(7)
87 GO SUB 168
88 IF greska OR pd<>dd THEN PRINT "inv◆
```



```
   error": GO TO 147
89 DIM z(pd,2*pd)

90◆REM◆prijepis
91 FOR i=1 TO pd
92 FOR j=1 TO pd
93 LET z(i,j)=a(i,j)
94 NEXT j
95 NEXT i

96◆REM◆jedinice
97 FOR i=1 TO pd
98 LET z(i,pd+i)=1
99 NEXT i

100◆REM◆donji◆trokut
101 FOR k=1 TO pd
102 FOR i=pd TO k+1 STEP -1
103 IF z(i,k)=0 THEN GO TO 110
104 LET l=i
105 IF z(l-1,k)=0 THEN LET l=l-1: GO TO 105
106 LET kon=-z(i,k)/z(l-1,k)
107 FOR j=1 TO 2*pd
108 LET z(i,j)=kon*(z(l-1,j)+z(i,j)/kon)
109 NEXT j
110 NEXT i
111 NEXT k

112◆REM◆gornji◆trokut
113 FOR k=pd TO 2 STEP -1
114 FOR i=1 TO k-1
115 IF z(i,k)=0 THEN GO TO 122
116 LET l=i
117 IF z(l+1,k)=0 THEN LET l=l+1: GO TO 117
118 LET kon=-z(i,k)/z(l+1,k)
119 FOR j=1 TO 2*pd
120 LET z(i,j)=kon*(z(l+1,j)+z(i,j)/kon)
121 NEXT j
122 NEXT i
123 NEXT k

124◆REM◆izracun◆determinante
125 LET det=1
```

```
126 FOR i=1 TO pd
127 LET det=det*z(i,i)
128 NEXT i
129 IF det=0 THEN PRINT "inv◇error◇◇◇(det=0)
    ": GO TO 146

130◇REM◇jedinicna◇dijagonala
131 FOR i=1 TO pd
132 LET kon=1/z(i,i)
133 LET z(i,i)=kon*z(i,i)

134◇REM◇inverzni◇dio
135 FOR j=pd+1 TO 2*pd
136 LET z(i,j)=z(i,j)*kon
137 NEXT j
138 NEXT i

139◇REM◇prijepis◇inverznog◇dijela
140 DIM m(pd,pd)
141 FOR i=1 TO pd
142 FOR j=1 TO pd
143 LET m(i,j)=z(i,pd+j)
144 NEXT j
145 NEXT i
146 DIM z(1,1)
147 RETURN

149◇REM◇◇DATA◇◇DATA◇◇DATA◇◇DATA◇
150 DATA 357,a$(1)
151 DATA 502,a$(1),618,a$(1),657,a$(1)
152 DATA 914,a$(1),964,a$(1),971,a$(3),978,
    a$(5)
153 DATA 1230,a$(1),1301,a$(1),1308,a$(1),
    1315,a$(3),1322,a$(5)
154 DATA 1557,a$(1),1567,a$(1)
155 DATA 1763,a$(1),1813,a$(1),1820,a$(3)
156 DATA 2101,a$(7),3096,a$(1),3146,a$(1)

157◇REM◇end◇DATA

159◇REM◇u◇v◇o◇d
160 LET byt=FN b(23627)
161 LET greska=0
```



```
162 LET pd=0
163 LET dd=0
164 LET dim=0
165 RETURN

166◇REM◇endsub◇uvod

168◇REM◇SUB◇redm(z$),pd,dd,greska
169 GO SUB 159
170 LET z=PEEK byt
171 LET i$=""
172 GO SUB 194
173 IF i$=z$ THEN GO TO 179
174 LET edl=FN b(23641)-1
175 IF byt<edl THEN GO TO 170
176 LET greska=1
177 PRINT "Matrica◇";z$;"◇nije◇
    definirana"
178 GO TO 180
179 IF dim<>2 THEN LET greska=1: PRINT "
    Neispravna◇definicija◇";z$;"()"
180 RETURN

181◇REM◇endsub◇redm

183◇REM◇pregled
184 GO SUB 159
185 LET edl=FN b(23641)-1
186 LET z=PEEK byt
187 LET i$=""
188 GO SUB 194
189 IF i$<>"" THEN PRINT ‡jedinica;"◇◇◇◇";
    i$;"(";pd;",";dd;")"
190 IF byt<edl THEN GO TO 186
191 RETURN

192◇REM◇endsub◇pregled

194◇REM◇trazi
195 IF z>= 97 AND z<=122 THEN GO SUB  202:
    RETURN
196 IF z>=161 AND z<=186 THEN GO SUB  205:
    RETURN
```

```
197 IF z>=129 AND z<=154 THEN GO SUB 211:
    RETURN
198 IF z>=225 AND z<=250 THEN GO SUB 219:
    RETURN
199 IF z>= 65 AND z<= 90 THEN GO SUB 222:
    RETURN
200 IF z>=193 AND z<=218 THEN GO SUB 226:
    RETURN

202◆REM◆one◆letter◆only
203 LET byt=byt+6
204 RETURN

205◆REM◆longer◆than◆one◆letter
206 LET byt=byt+1
207 LET z=PEEK byt
208 IF NOT (z>=175 AND z<=250) THEN GO TO
    206
209 LET byt=byt+6
210 RETURN

211◆REM◆array◆of◆numbers
212 LET i$=CHR$ (z-32)
213 LET byt=byt+1
214 LET dim=PEEK (byt+2)
215 LET pd=FN b(byt+3)
216 LET dd=FN b(byt+5)
217 LET byt=byt+FN b(byt)+2
218 RETURN

219◆REM◆for-next
220 LET byt=byt+19
221 RETURN

222◆REM◆string
223 LET byt=byt+1
224 LET byt=byt+FN b(byt)+2
225 RETURN

226◆REM◆array◆of◆character
227 LET byt=byt+1
228 LET byt=byt+FN b(byt)+2
229 RETURN
```



```
230◆REM◆endsub◆trazi

231◆REM◆**********************
233 LET jedinica=2
234 GO TO 321
235 PRINT INVERSE 1'"Unos◆matrice:◆◆◆◆◆◆◆◆◆
    ◆◆◆◆◆◆◆◆◆"''
236 INPUT "Ime◆matrice◆(1◆znak):";a$',"br:◆
    redaka:◆◆";pd',"br:◆stupaca:";dd
237 IF LEN a$<>1 THEN GO TO 236
238 GO SUB 16
239 RETURN
241 PRINT  INVERSE 1'"Ispis◆matrice:◆◆◆◆◆◆◆◆
    ◆◆◆◆◆◆◆◆◆◆"''
242 INPUT "Ime◆matrice◆(1◆znak):";a$
243 IF LEN a$<>1 THEN GO TO 242
244 GO SUB 3
245 RETURN
247 PRINT  INVERSE 1'"Zbrajanje◆matrica:◆◆◆◆
    ◆◆◆◆◆◆◆◆◆◆"''

248◆REM◆a$="_=_+_"
249 INPUT "Ime◆1.◆matrice◆(1◆znak):";q$
250 IF LEN q$<>1 THEN GO TO 249
251 INPUT "Ime◆2.◆matrice◆(1◆znak):";w$
252 IF LEN w$<>1 THEN GO TO 251
253 INPUT "Rezultat◆spremiti◆u◆matricu"
    '"ime◆matrice◆(1◆znak):";e$
254 IF LEN e$<>1 THEN GO TO 253
255 LET a$="_=_+_"
256 LET a$(3)=q$
257 LET a$(5)=w$
258 LET a$(1)=e$
259 IF a$(1)=a$(3) OR a$(1)=a$(5) THEN BEEP
    .1,10: GO TO 247
260 PRINT a$'
261 GO SUB 29
262 RETURN
264 PRINT  INVERSE 1'"Transformiranje◆
    matrice:◆◆◆◆◆◆◆◆"''
265 INPUT "Ime◆matrice◆(1◆znak):";q$
266 IF LEN q$<>1 THEN GO TO 265
267 INPUT "Rezultat◆spremiti◆u◆matricu"
```

```
    '"ime◇matrice◇(1◇znak):";w$
268 IF LEN w$<>1 THEN GO TO 267
269 LET a$="_=_t"
270 LET a$(3)=q$
271 LET a$(1)=w$
272 IF a$(1)=a$(3) THEN BEEP .1,10: GO TO
    264
273 PRINT a$'
274 GO SUB 72
275 RETURN
277 PRINT  INVERSE 1'"Produkt◇matrica:◇◇◇◇◇
    ◇◇◇◇◇◇◇◇◇◇"''

278◇REM◇a$="_=_*_"
279 INPUT "Ime◇1.◇matrice◇(1◇znak):";q$
280 IF LEN q$<>1 THEN GO TO 279
281 INPUT "Ime◇2.◇matrice◇(1◇znak):";w$
282 IF LEN w$<>1 THEN GO TO 281
283 INPUT "Rezultat spremiti u matricu"
    '"ime matrice (1 znak):";e$
284 IF LEN e$<>1 THEN GO TO 283
285 LET e$="_=_*_"
286 LET a$(3)=q$
287 LET a$(5)=w$
288 LET a$(1)=e$
289 IF a$(1)=a$(3) OR a$(1)=a$(5) THEN BEEP
    .1,10: GO TO 277
290 PRINT a$'
291 GO SUB 44
292 RETURN
294 PRINT  INVERSE 1'"Skalarni produkt:
              "''
295 INPUT "Vrijednost skalara:";sk'"Ime
    matrice (1 znak):";a$
296 IF LEN a$<>1 THEN GO TO 295
297 PRINT a$;"=";sk;"*";a$'
298 GO SUB 61
299 RETURN
301 PRINT  INVERSE 1'"Inverzna matrica:
              "''
302 INPUT "Ime matrice (1 znak):";q$
303 IF LEN q$<>1 OR q$="z" OR q$="Z" THEN
    GO TO 302
304 INPUT "Rezultat spremiti u matricu"
    '"ime matrice (1 znak):";w$
305 IF LEN w$<>1 OR w$=q$ OR w$="z" OR w$="
    Z" THEN GO TO 304
306 LET a$="_=inv _"
307 LET a$(7)=q$
308 LET a$(1)=w$
309 PRINT a$'
310 GO SUB 84
311 RETURN
313 PRINT  INVERSE 1'"Pregled definiranih
    matrica:          "''
314 GO SUB 183
315 RETURN

317 REM
318 INPUT "Br. jedinice za ispis:";jedinica
319 RETURN

321 REM M E N U
322 BORDER 5: PAPER 5: INK 9: CLS
323 PRINT  PAPER 6;"Matricne operacije v1:
     AV 1985"
324 PLOT 0,167: DRAW 255,0: PLOT 0,164:
    DRAW 255,0
325 PRINT ' INVERSE 1;"          M E N U
              "
326 PRINT 'TAB 6;"1. UNOS"
327 PRINT 'TAB 6;"2. ISPIS"
328 PRINT 'TAB 6;"3. ZBRAJANJE"
329 PRINT 'TAB 6;"4. TRANSPONIRANJE"
330 PRINT 'TAB 6;"5. PRODUKT MATRICA"
331 PRINT 'TAB 6;"6. SKALARNI PRODUKT"
332 PRINT 'TAB 6;"7. INVERZNA MATRICA"
333 PRINT 'TAB 6;"8. PREGLED DEF. MATRICA"
334 PRINT 'TAB 6;"9. ISPIS NA JEDINICU: "
    ;jedinica
335 BEEP .1,30
336 PRINT #1;AT 0,0; PAPER 6;"Slobodno: "
    ;65536-USR 7962;" bajtova "; PAPER 5;AT 0,
    30; FLASH 1;"L"
337 PAUSE 0: LET x$=INKEY$
338 BEEP .05,10
```

```
339 PRINT #1;AT 0,30;x$: PAUSE 50
340 IF x$<"1" OR x$>"9" THEN GO TO 336
341 CLS
342 IF x$="1" THEN GO SUB 235
343 IF x$="2" THEN GO SUB 241
344 IF x$="3" THEN GO SUB 247
345 IF x$="4" THEN GO SUB 264
346 IF x$="5" THEN GO SUB 277
347 IF x$="6" THEN GO SUB 294
348 IF x$="7" THEN GO SUB 301
349 IF x$="8" THEN GO SUB 313
350 IF x$="9" THEN GO SUB 317
351 PRINT #1;AT 0,30; FLASH 1;"*"
352 BEEP .1,30: BEEP .2,10: BEEP .1,30
353 PAUSE 6000
354 GO TO 321
```


Kubna jednadžba

Rješavanje ništica kubnog polinoma. Ako nema realnih rješenja, ispisuje kompleksna. Program možete koristiti i za rješavanje kvadratne jednadžbe, upišete li da je koeficijent kod kubnog člana jednak 0.

```
 10 REM KUBNA JEDNADZBA
 20 BORDER 5: PAPER 5: INK 9: CLS
 30 GO TO 270

 40 REM kubni dio
 50 LET qq=(3*k1-k2*k2/k3)/(9*k3)
 60 LET qq=qq*(ABS qq)=1e-7)
 70 LET rr=((9*k2*k1/k3)-27*k0-2*k2*k2*k2/(
    k3*k3))/(54*k3)
 80 LET rr=rr*(ABS rr)=1e-7)
 90 LET pp=(qq*qq*qq+rr*rr)
100 IF pp<= THEN GO TO 150
110 LET ss=SGN (rr+SQR pp)*(ABS (rr+SQR pp))
    ^(1/3)
120 LET tt=(SGN (rr-SQR pp))*((ABS (rr-SQR
    pp))^(1/3))
130 LET x3=ss+tt-k2/(3*k3)
140 GO TO 160
150 LET x3=(2*SQR (-qq))*COS ((1/3)*ACS (rr/
    SQR ((-qq)^3)))-k2/(3*k3)
160 LET k0=x3*(x3+k2/k3)+k1/k3
170 LET k1=(x3+k2/k3)
180 LET k2=1

190 REM kvad dio
200 LET dd=(k1*k1-4*k2*k0)
210 LET dd=dd*(ABS dd)=1e-6)
220 ID dd<0 THEN RETURN
230 LET x2=(-k1+SQR dd)/2/k2
240 LET x1=(-k1-SQR dd)/2/k2
250 RETURN

260 REM glavni prog
270 PRINT  INVERSE 1''"Rjesavanje kubne
```

```
     jednadzbe       ©AV"
280 PRINT "oblika:"
290 PRINT  BRIGHT 1''"A * x^3 + B * x^2 + C *
    x + D =0"'
300 INPUT "Koeficijenti","A=";k3',"B=";k2',"
    C=";k1',"D=";k0
310 PRINT '"Koeficijenti su:"'" A=";k3'" B="
    ;k2'" C=";k1'" D=";k0
320 IF k3<>0 THEN GO SUB 40
330 IF k3=0 THEN LET x3=0: GO SUB 190
340 PRINT  BRIGHT 1''Rjesenja su:"
350 IF dd<0 THEN PRINT "(I^2=-1)"
360 PRINT 'TAB 4;"X1=";x3
370 IF dd>=0 THEN PRINT TAB 4;"X2=";x2;TAB
    4;"X3=";x1
380 IF dd<0 THEN PRINT TAB 4;"X2=";-k1/2/
    k2;"+I*";SQR (-dd)/(2*k2)
390 IF dd<0 THEN PRINT TAB 4;"X3=";-k1/2/
    k2;"-I*";SQR (-dd)/(2*k2)
```


Integral

Rješavanje određenog integrala po Simpsonovoj metodi. Podatak za izračunavanje je integralna funkcija u ovisnosti od parametra x (npr.: x*sin (2*x + 3)) u granicama od a = 2 do b = 4, te tražena točnost. Program sam povećava broj koraka i uspoređuje rezultate dok se ne dobije tražena točnost.

```
 10 REM INTEGRAL - SIMPSONOV obrazac
 20 BORDER 5: PAPER 5: INK 9: CLS
 30 PRINT  INVERSE 1;''"RACUN INTEGRALA
    ©AV 1984"
 40 PRINT "Simpsonov obrazac"
 50 PRINT AT 8,0;"I(x)=";AT 8,6;"f(x)dx";AT
    10,5;"a";AT 6,6;"b"
 60 PLOT 37,92: DRAW 5,15,1: DRAW 5,15,-1
 70 DEF FN f(x)=VAL f$
 80 INPUT "Zadaj integralnu funkciju:"'"f(
    x)=";f$
 90 IF f$="" THEN LET f$="1"
100 PRINT AT 8,6;f$;" dx    "
110 INPUT "U intervalu:"'" od: a=";a'" do:
    b=";b
120 PRINT AT 10,5;a;AT 6,6;b
130 INPUT "Dopustena greska:";gres
140 IF gres=0 THEN LET gres=1e-6
150 PRINT AT 13,0;"Dopustena greska:";gres''
160 LET ss=6e6
170 LET n=2
180 LET n=2*n
190 LET h=(b-a)/n
200 LET g=4
210 LET s=FN f(a)+FN f(b)
220 FOR i=1 TO n-1
230 LET s=s+g*FN f(a+i*h)
240 LET g=6-g
250 NEXT i
260 LET s=s*h/3
270 PRINT TAB 7;"n=";n;TAB 15;"I=";s
280 IF n>4 AND ABS (ss-s)<gres THEN STOP
```

```
 290 LET ss=s
 300 GO TO 180
9999 SAVE "simpson" LINE 10
```


Traženje ništice u intervalu

Ako ste dobili za domaću zadaću potražiti ništicu funkcije koja sadrži logaritam i eksponent parametra, mogli ste ubrzo utvrditi da analitičko rješenje nije moguće. Ako ste tada očajavali, možete se ovog puta, zabave radi, prihvatiti rješavanja sličnih zadataka. Da bi mogli riješiti zadatak, morate kvalitativno poznavati tok funkcije tako da možete odrediti granice intervala u kojem ćete tražiti ništicu funkcije. Na rubovima intervala funkcija mora imati različiti predznak.

```
 1♦REM♦TRAZENJE♦NISTICE♦U♦INTERVALU
 10 REM Bisekcija
 20 BORDER 5: PAPER 5: INK 9: CLS
 30 GO TO 230

 40 REM nistica(xz,xk:real):real;
 50 LET na=1e-6
 60 LET sz=SGN FN f(xz)
 70 LET sk=SGN FN f(xk)
 80 LET i=0
 90 LET d2=0
100 IF sz=sk THEN PRINT "GRESKA: isti
    predznak!": STOP

110 REM repeat
120 IF i THEN LET d2=d1
130 IF NOT i THEN LET i=NOT i
140 LET xv=xz+(xk-xz)/2
150 LET d1=FN f(xv)
160 LET sv=SGN (d1)
170 IF sv=sz THEN LET xz=xv
180 IF sv=sk THEN LET xk=xv
190 LET d0=ABS (d1-d2)
200 IF NOT (d0<na) THEN GO TO 110
210 LET nistica=xv
220 RETURN
230 PRINT  INVERSE 1''"TRAZENJE NISTICE
    FJE U INTERVALU  "
240 PRINT "Bisekcija"
250 INPUT "Zadaj veznu funkciju x-sa:"'"f(
```

```
    x)=";f$
260 IF f$="" THEN LET f$="1"
270 DEF FN f(x)=VAL f$
280 PRINT '''Funkcija:"'''  f(x)=";f$
290 INPUT "Pocetak intervala:";xz'"Kraj
    intervala  :";xk
300 PRINT ''Interval:  od:";xz'TAB 11;"do:"
    ;xk
310 GO SUB 40
320 PRINT '''Ima nisticu kod x=";nistica
```


Linearne jednadžbe

Pomoću ovoga programa postaje rješavanje sustava linearnih jednadžbi rutinski posao zadavanja podataka. Spectrum 48 K može riješiti sustav 88 jednadžbi.

```
  1◇REM◇LINEARNE◇JEDNADZBE
 10 BORDER 1: PAPER 1: INK 9: CLEAR 65535
 20 PRINT AT 5,0; INVERSE 1;"RJESAVANJE
    SISTEMA LINEAR. JEDNADZBI "
 30 PRINT '''[A(mm,mm)]*{x(mm)}={A(mm+1)}"
 40 PRINT ''[A(mm,mm)]  Matrica
    koeficijenata"
 50 PRINT "{X(mm)}        Stupac nepoznanica"
 60 PRINT "{A(mm+1)}      Stupac rjesenja"
 70 PRINT '''Rjesavate mozete sistem od 88
    jedn."
 80 INPUT "Imas simetricnu matricu:(d/n)";a$
 90 IF LEN a$=0 THEN GO TO 80
100 IF a$<>"n" AND a$<>"d" THEN GO TO 80
110 CLS

120 REM uvrstavanje podataka
130 POKE 23609,10
140 INPUT "Broj nepoznanica i jednadzbi=";mm
150 LET mm=INT mm: DIM a(mm,mm+1)
160 PRINT  INVERSE 1;"Matrica koeficijenata
    sistema"''
170 FOR m=1 TO mm
180 FOR n=1 TO mm+1
190 IF m>n AND a$="d" THEN LET a(m,n)=a(n,m)
    GO TO 210
200 INPUT "a(";(m);",";(n);")=";a(m,n)
210 PRINT  INVERSE (n=mm+1);"a(";(m);",";(n)
    ;")=",a(m,n)
220 NEXT n
230 PRINT '': NEXT m
240 POKE 23609,0

250 REM odredjivanje nistica pod dijagonalom
```

```
260 FOR m=1 TO mm-1
270 LET r=1
280 IF ABS a(m,m)>1E-6 THEN GO TO 320
290 DIM x(n+2-m): FOR p=m TO mm+1: LET x(p)
    =a(m,p): LET a(m,p)=a(m+r,p): LET a(m+r,
    p)=x(p): NEXT p: LET r=r+1
300 IF r+m>mm THEN GO TO 320
310 GO TO 280
320 FOR o=m+1 TO mm
330 IF a(o,m)=0 THEN GO TO 380
340 LET k=a(m,m)/a(o,m)
350 FOR n=m TO mm+1
360 LET a(o,n)=a(m,n)-k*a(o,n)
370 NEXT n
380 NEXT o
390 NEXT m
400 LET ned=0: FOR n=1 TO mm: LET ned=ned+(
    a(n,n)=0): NEXT n

410 REM izracunavanje rezultata
420 IF ned<>0 AND ned<>mm THEN PRINT
    FLASH 1;"sistem je ";ned;"x neodredjen
    ": GO TO 480
430 IF ned=0 THEN GO TO 480
440 LET ned=0: FOR n=1 TO mm: LET ned=ned+(
    a(n,mm+1)=0): NEXT n
450 IF ned=mm THEN PRINT  FLASH 1;"sistem
    je rjesiv samo TRIVIJALNO  f0 "
460 IF ned<>mm THEN PRINT  FLASH 1;"SISTEM
    NIJE RJESIV             f0 "
470 GO TO 590
480 DIM x(mm)
490 FOR n=mm TO 1 STEP -1
500 LET x=0
510 FOR m=n+1 TO mm
520 LET x=x+a(n,m)*x(m)
530 NEXT m
540 IF a(n,n)=0 THEN PRINT "nepoznanicu x";
    n;"mozes odabrati": INPUT "X";(n);"=";x
    (n): GO TO 560
550 LET x(n)=(a(n,mm+1)-x)/a(n,n)
560 NEXT n
570 PRINT '"stupac rjesenja:"
```



```
580 FOR n=1 TO mm: PRINT TAB 6;"X";n;"= ";x
    (n): NEXT n
```

Diferencijalne jednadžbe

Program omogućava rješavanje diferencijalnih jednadžbi 1. i 2. reda po metodi Runge Kutta. Sva uputstva za upotrebu upisana su u samom programu.
Za slike u programu se koristi samo gornja trećina zaslona. U retcima od 120 do 200 rišu se slike u ovisnosti o parametru n. U retcima od 200 do 220 pohranjujemo sliku rutinom koja započinje na mjestu 65344. U retcima od 250 do 360 slijedi brzo prikazivanje slika pomoću strojne rutine koja započinje na mjestu 65356.

```
 10◆REM◆DIFERENCIJALNE◆JEDNADZBE◆◆R&N◆1985
 20 PAPER 5: BORDER 5: INK 9: CLS

 30◆REM◆UPUTE
 40 PRINT AT 1,0; PAPER 6;"◆◆***◆
    DIFERENCIJALNA◆JEDNADZBA◆***◆◆"
 50 PLOT 0,168: DRAW 255,0: PLOT 0,170:
    DRAW 255,0: PLOT 0,159: DRAW 255,0:
    PLOT 0,157: DRAW 255,0
 60 PRINT AT 4,0;"Program◆numericki◆rjesava◆
    nehomo-gene◆diferencijalne◆jednadzbe◆I.◆
    i II.◆reda◆po◆metodi◆Runge◆Kutta."
 70 PRINT AT 7,0;"Moramo◆znati:◆"
 80 PRINT AT 8,2;"-◆pocetne◆uvjete:◆x0,y(x0)
    ,a◆◆◆kod◆jednadzbe◆II.reda◆jos◆y'(x0)"
 90 PRINT AT 10,2;"-◆korak:◆mora◆biti◆takav◆
    da◆pomocu◆◆◆◆◆njegovog◆visekratnika◆mo-◆◆
    ◆◆zemo◆doci◆do◆trazenog◆x"
100 PRINT AT 13,0;"Rezultat◆je◆vrijednost◆
    funkcije◆y(x),◆te◆prva◆derivacija◆y'(x).
    "
110 PRINT AT 17,0; PAPER 6;"MENU:"
120 PLOT 0,31: DRAW 40,0
130 PRINT AT 19,0;"1.diferencijalna◆jednadzba
    ◆I. reda"
140 PRINT AT 20,0;"2.diferencijalna◆jednadzba
    ◆II. reda"
150 PLOT 0,1: DRAW 255,0:◆REM◆◆PLOT◆0,2:◆
    DRAW◆255,0
```



```
160 PRINT #0; PAPER 4;"◆◆◆◆PRITISNI◆1◆ili◆2◆
    ZA◆IZRACUNAVANJE◆◆◆"
170 PAUSE 0: LET x$=INKEY$
180 IF x$<>"1" AND x$<>"2" THEN GO TO 180
190 LET a=VAL x$
200 CLS

210◆REM◆glavni◆program
220 DIM x(4): DIM y(4): DIM z(4): DIM k(4):
    DIM l(4)
230 IF a=1 THEN GO SUB 360
240 IF a=2 THEN GO SUB 400
250 INPUT "Upisi◆pocetni◆uvjet:◆x0,◆y(x0)"''
    "x0=◆";x(1),"y(x0)=◆";y(1)
260 LET x=x(1): LET y=y(1)
270 IF a=2 THEN INPUT "Vrijednost◆derivacije◆
    u◆tocki◆x0:"''"y'(x0)=◆";z(1): LET z=z(1)
280 INPUT "Za◆koji◆x◆zelis◆y(x)?"''"
    x=◆";xz
290 INPUT "Upisi◆vrijednost◆za◆korak◆h:"''"
    h=◆";h
300 IF a=1 AND x(1)-xz>0 OR a=2 AND x-xz>0
    THEN LET h=-h
310 CLS : PRINT AT 10,7; FLASH 1;"◆R◆A◆C◆U◆
    N◆A◆M◆"
320 IF a=1 THEN GO SUB 440: GO TO 340
330 GO SUB 540
340 GO SUB 730
350 STOP

360◆REM◆definiranje◆dif.◆jednadzbe
370 DEF FN f(x,y)=VAL f$
380 INPUT "Zadaj◆jednadzbu◆u◆obliku◆
    y'=f(x,y):"''"y'=◆";f$
390 RETURN

400◆REM◆definiranje dif.◆j.◆2.◆reda
410 DEF FN g(x,y,z)=VAL g$
420 INPUT ("Zadaj◆jednadzbu◆u◆obliku:"'
    TAB 5;"y''=◆g(x,y,z)◆;◆(z=y')")''"
    y''=◆";g$
430 RETURN
```

```
440◆REM◆racunanje◆dif.◆j.◆I.◆reda
450 LET x=x(1): LET y=y(1)
460 LET k1=h*FN f(x,y)
470 LET k2=h*FN f(x+h/2,y+k1/2)
480 LET k3=h*FN f(x+h/2,y+k2/2)
490 LET k4=h*FN f(x+h,y+k3)
500 LET y=y+(k1+2*k2+2*k3+k4)/6
510 LET x=x+h
520 IF INT ((x-xz)*1e6)=0 THEN RETURN
530 GO TO 460

540◆REM◆racunanje◆dif.◆j.◆II.◆reda
550 LET x(1)=x: LET y(1)=y: LET z(1)=z
560 FOR i=1 TO 4
570 LET k(i)=h*z(i)
580 LET l(i)=h*FN g(x(i),y(i),z(i))
590 IF i>2 THEN GO TO 630
600 LET x(i+1)=x(1)+h/2
610 LET y(i+1)=y(1)+k(i)/2
620 LET z(i+1)=z(1)+l(i)/2
630 IF i=4 OR i<3 THEN GO TO 670
640 LET x(i+1)=x(1)+h
650 LET y(i+1)=y(1)+k(i)
660 LET z(i+1)=z(1)+l(i)
670 NEXT i
680 LET y(1)=y(1)+(k(1)+2*k(2)+2*k(3)+k(4))/
    6
690 LET z(1)=z(1)+(l(1)+2*l(2)+2*l(3)+l(4))/
    6
700 LET x(1)=x(1)+h
710 IF INT ((x(1)-xz)*1e6)=0 THEN RETURN
720 GO TO 560

730◆REM◆ispis
740 CLS : PRINT AT 1,0; PAPER 4;"◆◆◆◆◆◆◆R◆E◆
    Z◆U◆L◆T◆A◆T◆I◆◆◆◆◆◆◆◆"
750 PLOT 0,168: DRAW 255,0: PLOT 0,159:
    DRAW 255,0: PLOT 0,0: DRAW 255,0
760 PRINT AT 5,1;"Za◆zadanu◆jednadzbu:"
770 IF a=1 THEN PRINT 'TAB 5; PAPER 6;"y'=◆"
    ;f$: GO TO 790
780 PRINT AT 5,25;"(z=y')"; PAPER 6;AT 7,5;"
    y''=◆";g$
```



```
790 PRINT '"◆i pocetne◆uvjete:"
800 IF a=1 THEN PRINT AT 11,10;"x0◆=◆";x(1)
    ;AT 12,8;"y(x0)=◆";y(1): GO TO 820
810 PRINT AT 11,11;"x0◆=◆";x;AT 12,8;"y◆(x0)
    =◆";y;AT 13,8;"y'(x0)=◆";z
820 PRINT '"◆je◆za◆x=◆";xz;"◆:"''
830 IF a=1 THEN PRINT TAB 7;"◆y(x)=◆";y: GO
    TO 850
840 PRINT TAB 8;"y◆(x)=◆";y(1)'TAB 8;"y'(x)
    =◆";z(1)
850 PRINT #0; PAPER 4;"◆◆X◆za◆novi◆x,◆N◆za◆
    novu◆jednadzbu◆◆"
860 PAUSE 0: LET d$=INKEY$
870 IF d$="X" OR d$="x" THEN CLS : GO TO
    280
880 IF d$="N" OR d$="n" THEN GO TO 10
890 GO TO 860
```

Geometrijske karakteristike

Pomoću ovoga programa možete odrediti geometrijske karakteristike (površina, težište, moment inercije i statički moment u odnosu na ishodište koordinatnoga sustava, na težište i u odnosu na glavne osi inercije) presjeka ravnine, kojeg morate zadati u obliku koordinata vršnih točaka koordinata presjeka i to u obrnutom smjeru kazaljke na satu (za proračun plošnog integrala koristi se prevođenje na linijski integral po zatvorenoj krivulji).

```
2000 CLS : BORDER 5
2010 PRINT "I Z R A C U N  geometrijskih  "
     ; PAPER 5;"karakteristika presjeka y-z
     ravn."
2015 PRINT  PAPER 6;"Opseg presjeka u
     smjeru obrnutom kazaljki na satu";
     FLASH 1;"'"
2020 INPUT "Br. svih tocaka:";n
2040 DIM y(n+1)
2050 DIM z(n+1)
2060 FOR i=1 TO n
2070 INPUT "Koordinate ";(i);".tocke:"'"Y(";(
     i);")=";y(i),"Z(";(i);")=";z(i)
2075 PRINT i;TAB 3;"Y(";(i);")=";y(i)," Z(";(
     i);")=";z(i)
2080 NEXT i
2090 LET y(n+1)=y(1)
2100 LET z(n+1)=z(1)
2160 DEF FN S(a,b,c,d)=-1/6*(b-a)*(d*d+d*c+c*
     c)
2170 DEF FN I(a,b,c,d)=-1/12*(b-a)*(d*d*d+d*
     d*c+d*c*c+c*c*c)
2180 DEF FN d(a,b,c,d)=-1/24*(d-c)*(d*(3*b*b+
     2*b*a+a*a)+c*(3*a*a+2*a*b+b*b))
2200 LET Ax=0
2210 LET Sy=0
2220 LET Sz=0
2230 LET Iy=0
2240 LET Iz=0
2250 LET Iyz=0
```



```
2300 FOR i=1 TO n
2310 LET Ax=Ax+1/2*(y(i+1)+y(i))*(z(i+1)-z(i)
     )
2320 LET Sy=Sy+FN S(y(i),y(i+1),z(i),z(i+1))
2330 LET Sz=Sz-FN S(z(i),z(i+1),y(i),y(i+1))
2340 LET Iy=Iy+FN I(y(i),y(i+1),z(i),z(i+1))
2350 LET Iz=Iz-FN I(z(i),z(i+1),y(i),y(i+1))
2360 LET Iyz=Iyz+FN d(y(i),y(i+1),z(i),z(i+1)
     )
2390 NEXT i
2400 REM ispis
2410 PRINT "Geometrijske karakteristike      "
2420 PRINT "Povrsina Ax:"',ax
2430 PRINT "Staticki moment:"',"Sy=";sy',"
     Sz=";sz
2440 PRINT "Momenti inercije:"'"aksijalni:
     "',"Iy=";iy',"Iz=";iz'"devijacijski:"'
     "Iyz=";Iyz
2450 LET yt=Sz/Ax
2460 LET zt=Sy/Ax
2470 LET Iyt=Iy-zt*zt*Ax
2480 LET Izt=Iz-yt*yt*Ax
2490 LET Iyzt=Iyz+yt*zt*Ax
2500 PRINT "Koordinate tezista:"',"yt=";yt',"
     zt=";zt
2510 PRINT "Momenti inercije na teziste:"
     '"aksijalni:"',"Iyt=";Iyt',"Izt=";Izt'"
     devijacijski:"',"Iyzt=";Iyzt
2530 IF Iyt-Izt=0 THEN BEEP .3,1: LET al2=PI/
     2: GO TO 2550
2540 LET al2=ATN (2*Iyzt/(Iyt-Izt))
2550 LET Ieta=(Iyt+Izt)/2+(Iyt-Izt)/2*COS
     al2+Iyzt*SIN al2
2560 LET Icet=(Iyt+Izt)/2-(Iyt-Izt)/2*COS
     al2-Iyzt*SIN al2
2570 LET Iec=-(Iyt-Izt)/2*SIN al2+Iyzt*COS
     al2
2600 PRINT "Glavni Momenti inercije na
     teziste:"' PAPER 7;"rotacija k.s.     +
     smjer=y u os z "'" radijani:","alfa="
     ;al2/2'" stupnjevi:","alfa=";al2/2*180
     /PI'"aksijalni:"',"Ieta=";Ieta',"Icet=
     ";Icet'"devijacijski:"',"Iec=";Iec
```

Vlastite vrijednosti

Program je namijenjen izračunavanju vlastitih vrijednosti i vlastitih vektora realne simetrične matrice po Jacobijevoj metodi.

```
  1 REM VLASTITE VRIJEDNOSTI
 10 PAPER 5: BORDER 5: INK 9: CLS
 20 GO TO 1040

 30 REM Iv(n,ndim,a(ndim,n))
 40 LET nsmax=50
 50 DIM v(n): DIM x(ndim,n)
 60 DIM b(n): DIM z(n)
 70 FOR i=1 TO n
 80 LET x(i,i)=1
 90 LET b(i)=a(i,i)
100 LET v(i)=a(i,i)
110 NEXT i
120 LET nm1=n-1
130 FOR w=1 TO nsmax
140 LET sm=0
150 FOR i=1 TO nm1
160 LET ip1=i+1
170 FOR j=ip1 TO n
180 LET sm=sm+ABS a(i,j)
190 NEXT j
200 NEXT i
210 IF sm>0 THEN GO TO 380
220 FOR i=1 TO nm1
230 LET t=v(n)
240 FOR j=1 TO n
250 IF v(j)>t THEN GO TO 280
260 LET k=j
270 LET t=v(j)
280 NEXT j
290 LET v(k)=v(i)
300 LET v(i)=t
310 FOR j=1 TO n
320 LET t=x(j,k)
330 LET x(j,k)=x(j,i)
```



```
340 LET x(j,i)=t
350 NEXT j
360 NEXT i
370 GO TO 1020
380 LET tresh=0
390 IF w<4 THEN LET tresh=0.2*sm/n^2
400 FOR i=1 TO nm1
410 LET im1=i-1
420 LET ip1=i+1
430 FOR j=ip1 TO n
440 LET jm1=j-1
450 LET jp1=j+1
460 LET g=100*ABS a(i,j)
470 IF w>4 AND ABS v(i)+g=ABS v(i) AND ABS
    v(j)+g=ABS v(j) THEN GO TO 930
480 IF ABS a(i,j)<=tresh THEN GO TO 940
490 LET h=v(j)-v(i)
500 IF ABS h+g=ABS h THEN GO TO 550
510 LET theta=0.5*h/a(i,j)
520 LET t=1/(ABS theta+SQR (1+theta*theta))
530 IF theta<0 THEN LET t=-t
540 GO TO 560
550 LET t=a(i,j)/h
560 LET c=1/SQR (1+t*t)
570 LET s=t*c
580 LET tau=s/(1+c)
590 LET h=t*a(i,j)
600 LET z(i)=z(i)-h
610 LET z(j)=z(j)+h
620 LET v(i)=v(i)-h
630 LET v(j)=v(j)+h
640 LET a(i,j)=0
650 IF im1<=0 THEN GO TO 720
660 FOR l=1 TO im1
670 LET g=a(l,i)
680 LET h=a(l,j)
690 LET a(l,i)=g-s*(h+g*tau)
700 LET a(l,j)=h+s*(g-h*tau)
710 NEXT l
720 IF jm1<ip1 THEN GO TO 790
730 FOR l=ip1 TO jm1
740 LET g=a(i,l)
750 LET h=a(l,j)
```

```
 760 LET a(i,l)=g-s*(h+g*tau)
 770 LET a(l,j)=h+s*(g-h*tau)
 780 NEXT l
 790 IF jp1>n THEN GO TO 860
 800 FOR l=jp1 TO n
 810 LET g=a(i,l)
 820 LET h=a(j,l)
 830 LET a(i,l)=g-s*(h+g*tau)
 840 LET a(j,l)=h+s*(g-h*tau)
 850 NEXT l
 860 FOR l=1 TO n
 870 LET g=x(l,i)
 880 LET h=x(l,j)
 890 LET x(l,i)=g-s*(h+g*tau)
 900 LET x(l,j)=h+s*(g-h*tau)
 910 NEXT l
 920 GO TO 940
 930 LET a(i,j)=0
 940 NEXT j
 950 NEXT i
 960 FOR i=1 TO n
 970 LET v(i)=b(i)+z(i)
 980 LET b(i)=v(i)
 990 LET z(i)=0
1000 NEXT i
1010 NEXT w
1020 RETURN

1030 REM end

1040 REM izracun vlastitih vrijednosti
1050 PRINT  PAPER 4'"Izracunavanje vlastitih
     vrijednosti   {v}   "''   i vlastitih
     vektora   [e]   "
1060 PRINT  PAPER 4; BRIGHT 1;"realne
     simetricne matrice [a]    "
1070 PRINT  BRIGHT 1;"po JAKOBIJEVOJ metodi
     "

1080 REM input
1090 INPUT "Dimenzija simetricne matrice [a] :
     ";n
1100 LET ndim=n
```



```
1110 DIM a(ndim,n)
1120 PRINT  BRIGHT 1'"Matrica  [a] :"''
1130 FOR i=1 TO ndim
1140 FOR j=1 TO n
1150 INPUT "a(";(i);",";(j);")=";a(i,j)
1160 PRINT TAB 5;"a(";(i);",";(j);")=";a(i,j)
1170 NEXT j
1180 PRINT
1190 NEXT i
1200 PRINT

1210 REM izracunavanje
1220 GO SUB 30
1230 CLS
1240 PRINT  INVERSE 1'"Vektor vlastitih
     vrijednosti {v}:"
1250 FOR i=1 TO n
1260 PRINT TAB 5;"v(";i;")=";v(i)
1270 NEXT i
1280 PRINT
1290 PRINT  INVERSE 1'"Matrica vlastitih
     vektora [x]:"
1300 PRINT "(ispisana po stupcima)"''
1310 FOR i=1 TO ndim
1320 FOR j=1 TO n
1330 PRINT TAB 5;"x(";j;",";i;")=";x(j,i)
1340 NEXT j
1350 PRINT
1360 NEXT i
9999 SAVE "jvv" LINE 10
```

1400

PROGRAMI ZA ZX SPECTRUM

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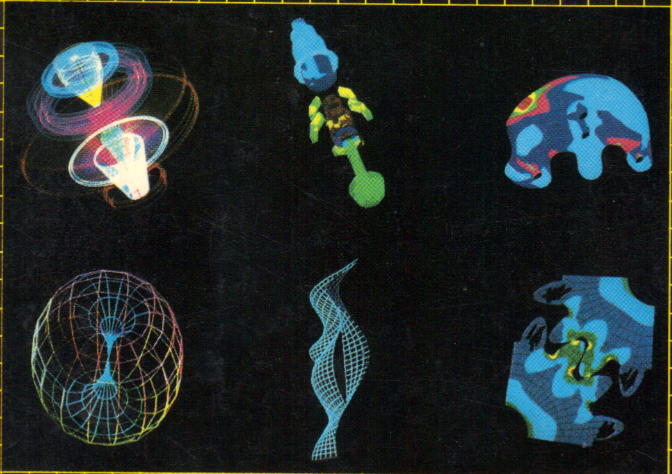
MATJAŽ GAMS



umijeće dobrog programiranja

ZALOŽBA