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10 RANDOMIZE TIME:MODE 1:INK 0,0:IM
K 1,26:BORDER 0
20 DIM morph(4,12),parent(4),gi(5,2)
,px(12),py(12),x(50),y(50),d(50),t
h(50),c(50),cZ(50)
30 c1=26:c2=23:c3=6
40 MEMORY &3FFF:FOR adr=&0000 TO &8
00F:READ b:POKE adr,b:c=c+b+adr:N
EXT
50 IF c<>-522724 THEN PRINT "Por f
avor compruebe estas linea":LIST 60
60 DATA &21,0,&c0,&11,0,&40,1,0,&40
,&b7,&28,1,&b6,&ed,&b0,&c9
70 :
80 REM Lectura de los genes
90 FOR aZ=0 TO 2:FOR bZ=0 TO 4
100 READ gi(bZ,aZ):NEXT:NEXT
110 REM Incrementos de los genes
120 DATA 1,2,0.16,0.16,0.1
130 REM Valores minios
140 DATA 1,-15,-3.14,-3.14,0
150 REM Valores maxios
160 DATA 9,15,3.14,3.14,1
170 :
180 REM Parte Principal
190 GOSUB 600:REM Define Comienzo
200 GOSUB 280:REM Inicializacim.
210 gnZ=0:CLS
220 WHILE 1:gnZ=gnZ+1
230 GOSUB 390:REM Mutacion
240 GOSUB 500:REM Display
250 GOSUB 1110:REM Eleccion
260 WEND
270 :
280 REM Inicializacion
290 IF a$="C" THEN RETURN
300 parent(0)=5:parent(1)=-10:paren
t(2)=2:parent(3)=2:parent(4)=0.8
310 IF a$="A" THEN RETURN
320 FOR aZ=0 TO 4
330 q=gi(aZ,2)-gi(aZ,1):q=q/gi(aZ,0)
)
340 r=INT(RND*q):r=r*gi(aZ,0)
350 parent(aZ)=r+gi(aZ,1)
360 NEXT
370 RETURN
380 :
390 REM Mutacion
400 FOR bZ=1 TO 12:FOR aZ=0 TO 4

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410 morph(aZ,bZ)=parent(aZ)
420 NEXT:NEXT
430 n=1:FOR aZ=0 TO 4
440 morph(aZ,n)=morph(aZ,n)+gi(aZ,0)
):n=n+1
450 morph(aZ,n)=morph(aZ,n)-gi(aZ,0)
):n=n+1
460 NEXT
470 c3=15+ROUND(RND*11)
480 RETURN
490 :
500 REM Display
510 GOSUB 920:REM Lineas
520 d=parent(0):l=parent(1):da=pare
nt(2):dt=parent(3):dc=parent(4):x=3
20:y=200
530 GOSUB 1350:REM Arbol
540 FOR aZ=1 TO 12
550 d=morph(0,aZ):l=morph(1,aZ):da=
morph(2,aZ):dt=morph(3,aZ):dc=morph
(4,aZ):x=px(aZ):y=py(aZ)
560 GOSUB 1350:REM Arbol
570 NEXT
580 RETURN
590 :
600 REM Define comienzo
610 FOR aZ=1 TO 12
620 READ px(aZ),py(aZ)
630 NEXT
640 CLS
650 LOCATE 10,2:PRINT "BIOMORFOS"

660 LOCATE 10,3:PRINT "-----"
670 PRINT:PRINT
680 PRINT "Opciones evolutivas"
690 PRINT
700 PRINT "A - Alienigena."
710 PRINT "B - Comienzo al azar"
720 PRINT "C - Definir comienzo"
730 PRINT
740 PRINT "Pulse A,B o C: ";
750 A$="":WHILE A$=""
760 A$=UPPER$(INKEY$):WEND
770 PRINT A$
780 IF A$<>"A" AND A$<>"B" AND A$<>
"C" THEN 740
790 IF A$<>"C" THEN RETURN
800 CLS
810 FOR a=0 TO 4
820 PRINT "Numero de gen ";a; " = ";

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830 INPUT "",b
840 IF b>gi(a,2) OR b<gi(a,1) THEN
PRINT "Valore entre ";gi(a,1);" y "
gi(a,2):GOTO 820
850 parent(a)=b
860 NEXT
870 RETURN
880 DATA 80,350,240,350,400,350,560
,350
890 DATA 80,250,560,250,80,150,560,
150
900 DATA 80,50,240,50,400,50,560,50
910 :
920 REM lineas
930 PLOT 1000,1000,1
940 CLS:MOVE 0,0
950 DRAW 0,399:DRAW 639,399
960 DRAW 639,0:DRAW 0,0
970 MOVE 0,300:DRAW 639,300
980 MOVE 0,200:DRAW 160,200
990 MOVE 480,200:DRAW 639,200
1000 MOVE 0,100:DRAW 639,100
1010 MOVE 160,399:DRAW 160,0
1020 MOVE 320,399:DRAW 320,300
1030 MOVE 320,100:DRAW 320,0
1040 MOVE 480,399:DRAW 480,0
1050 TAG
1060 FOR a=1 TO 12:MOVE px(a)-76,py
(a)-32:PRINT CHR$(&40+a);:NEXT
1070 MOVE 196,296:PRINT "GENERACION
":gnZ;
1080 MOVE 178,136:PRINT "PADRE DEL
BIOMORFO";
1090 TAGOFF:RETURN
1100 :
1110 REM Eleccion
1120 PLOT 1000,1000,1:TAG
1130 MOVE 180,280:PRINT "TAB para v
er genes";
1140 MOVE 180,116:PRINT "Pulse (A-L
)";
1150 WHILE INKEY$<>"":WEND
1160 A$="":WHILE A$=""
1170 A$=UPPER$(INKEY$)
1180 WEND
1190 IF A$=CHR$(9) THEN GOSUB 1290:
REM ver genes
1200 c=ASC(A$)-&40
1210 IF c<0 OR c>12 THEN 1160

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1220 FOR a=0 TO 4
1230 parent(a)=morph(a,c)
1240 NEXT
1250 IF c=11 THEN c1=c3
1260 IF c=12 THEN c2=c3
1270 TAGOFF:RETURN
1280 :
1290 REM ver genes
1300 TAGOFF:CALL &8000:CLS:PRINT "V
alor del gen":PRINT
1310 FOR i=0 TO 4:PRINT "  i pare
nt(i):NEXT
1320 LOCATE 1,25:PRINT "Pulse una t
ecla":CALL &8B19:CALL &8000,1
1330 TAG:RETURN
1340 :
1350 REM arbol
1360 s=0:INK 1,c1:INK 2,c2
1370 IF aZ>10 THEN INK 3,c3
1380 PLOT 1000,1000,2:MOVE x,y:DRAW
x,y-1
1390 th=PI/2:c=dc+l:GOSUB 1420
1400 PLOT 1000,1000,3
1410 RETURN
1420 IF d=0 THEN 1620
1430 c=INT(c) AND 1:cZ=cZ+1
1440 IF aZ=11 AND cZ=1 THEN cZ=3
1450 IF aZ=12 AND cZ=2 THEN cZ=3
1460 PLOT 1000,1000,cZ:MOVE x,y
1470 dx=1+cos(th+da):dy=1+sin(th+da)
)
1480 DRAWW dx,dy
1490 s=s+1:th(s)=th(c):c=c1:s=s
1500 y(s)=y:d(s)=d:cZ(s)=cZ
1510 th=th+da+dt:c=c+dc
1520 x=x+dx:y=y+dy:d=d-d-1
1530 GOSUB 1420
1540 PLOT 1000,1000,cZ:MOVE x,y
1550 dx=1+cos(th-da):dy=1+sin(th-da)
)
1560 DRAWW dx,dy:MOVE x,y
1570 s=s+1:th(s)=th(c):c=c1:s=s
1580 y(s)=y:d(s)=d:cZ(s)=cZ
1590 th=th-da-dt:c=c+dc
1600 x=x+dx:y=y+dy:d=d-d-1
1610 GOSUB 1420
1620 th=th(s):c=c(s):x=x(s):y=y(s)
1630 d=d(s):cZ=cZ(s):s=s-1
1640 RETURN

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