

```
"version 9-12-2010
"walk = ready
"follow hunt = ready
"intersept hunt = skipped
"flee = ready
"avoid = ready
"floking = in planing
"etc... = thinking about
WindowWidth = DisplayWidth
WindowHeight = DisplayHeight
global winx , winy , anim$ , dotmax
winx = WindowWidth
winy = WindowHeight
global pi , gohunt
dim st( 5 ) , speed( 5 )
pi = atn( 1 ) * 4
dotmax = 10
for i = 0 to 31
loadbmp "green" ; i , DefaultDir$ _
+ "\BMP\greenanimal" + nr$( i ) + ".bmp"
greenanim$ = greenanim$ + " green" ; i
loadbmp "red" ; i , DefaultDir$ _
+ "\BMP\redanimal" + nr$( i ) + ".bmp"
redanim$ = redanim$ + " red" ; i
next i
loadbmp "dot" , DefaultDir$ + "\BMP\wall.bmp"
global hunter , prey
hunter = 0
prey = 1
nomainwin
menu #m , "senario" _
, "walk" , [mnuWalk] _
, "hunt" , [mnuHunt] _
, "flee" , [mnuFlee] _
, "avoid" , [mnuAvoid] _
, | , "exit" , [quit]
global state , stwalk , sthunt , stflee , stavoid
stwalk = 0
sthunt = 1
stflee = 2
stavoid = 3
open "ANIMALS" for graphics as #m
#m "trapclose [quit]"
#m "fill blue"
#m "getbmp back 0 0 2 2"
#m "background back"
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for i = 0 to dotmax
#m "addsprite dot"; i ; " dot"
#m "spritexy dot"; i ; " " _
; rnd( 0 ) * winx ; " " _
; rnd( 0 ) * winy
next i
#m "addsprite animal"; prey ; " " ; greenanim$
#m "spritexy animal"; prey ; " " ; 0 _
; " " ; 100
st( prey ) = 0
speed( prey ) = 3
#m "addsprite animal"; hunter ; " " ; redanim$
#m "spritexy animal"; hunter ; " " ; winx / 2 - 32 _
; " " ; winy * 2 / 3
st( hunter ) = 0
speed( hunter ) = 0
#m "drawsprites"
gosub [mnuWalk]
timer 40 , [tmr]
wait
"simulaion flow
sub restart
for i = 0 to dotmax
#m "spritexy dot"; i ; " " _
; rnd( 0 ) * winx ; " " _
; rnd( 0 ) * winy
next i
#m "spritexy animal"; prey ; " " ; 0 _
; " " ; 100
st( prey ) = 8
speed( prey ) = 3
#m "spritexy animal"; hunter ; " " ; winx / 2 - 32 _
; " " ; winy * 2 / 3
st( hunter ) = 0
speed( hunter ) = 0
end sub
[mnuWalk]
state = stwalk
timer 0
notice "Senario 0 :"; chr$( 13 ) _
; "The animals wil"; chr$( 13 ) _
; "walk randomly"; chr$( 13 ) _
; "whitout inteaction ."
timer 40 , [tmr]
call restart
wait
```

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[mnuHunt]
state = sthunt
timer 0
notice "Senario 1 :"; chr$( 13 ) _
; "The green wil"; chr$( 13 ) _
; "walk in a line"; chr$( 13 ) _
; "while red wil"; chr$( 13 ) _
; "chase the green ."
timer 40 , [tmr]
call restart
wait
[mnuFlee]
state = stflee
timer 0
notice "Senario 2 :"; chr$( 13 ) _
; "The green wil"; chr$( 13 ) _
; "walk in a line"; chr$( 13 ) _
; "if red = colse 2 green"; chr$( 13 ) _
; "then green flees from red"; chr$( 13 ) _
; "while red wil"; chr$( 13 ) _
; "chase the green ."
timer 40 , [tmr]
call restart
wait
[mnuAvoid]
state = stavoid
timer 0
notice "Senario 3 :"; chr$( 13 ) _
; "The green wil"; chr$( 13 ) _
; "walk in a line"; chr$( 13 ) _
; "if red = close 2 green"; chr$( 13 ) _
; "then green flees from red"; chr$( 13 ) _
; "while red wil"; chr$( 13 ) _
; "chace the green"; chr$( 13 ) _
; "red and green wil"; chr$( 13 ) _
; "avoid the 'trees' ."
timer 40 , [tmr]
call restart
wait
[tmr]
select case state
case stavoid
if distance( prey , hunter ) fl = 0
for i = 0 to dotmax
if avoid( hunter , "dot" ; i , 100 ) then fl = 1
next i
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if fl = 0 then call hunt 0
end if
if distance( prey , hunter ) fl = 0
for i = 0 to dotmax
if avoid( prey , "dot" ; i , 100 ) then fl = 1
next i
if fl = 0 then call flee 0
end if
case stflee
if distance( prey , hunter ) call hunt 0
end if
if distance( prey , hunter ) call flee 0
end if
case sthunt
if distance( prey , hunter ) call hunt 0
end if
case else
call walk prey
call walk hunter
end select
if distance( prey , hunter ) call restart
end if
"update prey and hunter spot
#m "spritexy? animal" ; prey ; " x y"
x = x + sin( strad( st( prey ) ) ) * speed( prey )
y = y - cos( strad( st( prey ) ) ) * speed( prey )
x = x - sin( strad( st( hunter ) ) ) * speed( hunter )
y = y + cos( strad( st( hunter ) ) ) * speed( hunter )
#m "spritexy animal" ; prey ; " " ; x ; " " ; y
"this wil not change anymore til flocking
#m "spriteimage animal" ; prey ; " green" _
; ( st( prey ) + 16 ) mod 32
#m "spriteimage animal" ; hunter ; " red" _
; ( st( hunter ) + 16 ) mod 32
#m "spritexy? animal" ; prey ; " x y"
if x if x > winx then x = -64
if y if y > winy then y = -64
#m "spritexy animal" ; prey ; " " ; x ; " " ; y
for i = 0 to dotmax
#m "spritexy? dot" ; i ; " x y"
x = x - sin( strad( st( hunter ) ) ) * speed( hunter )
y = y + cos( strad( st( hunter ) ) ) * speed( hunter )
if x if x > winx then x = -64
if y if y > winy then y = -64
#m "spritexy dot" ; i ; " " ; x ; " " ; y
next i
```

```
#m "drawsprites"
wait
[quit]
for i = 0 to 31
unloadbmp "green" ; i
unloadbmp "red" ; i
next i
close #m
end
"movement control of animals
sub walk nr
move = int( rnd( 0 ) * 3 )
select case move
case 0
st( nr ) = st( nr ) + 1
st( nr ) = st( nr ) mod 32
speed( nr ) = 2
case 1
st( nr ) = st( nr ) - 1
st( nr ) = st( nr ) mod 32
speed( nr ) = 2
case else
speed( nr ) = 3
end select
end sub
sub hunt drunk
#m "spritexy? animal" ; prey ; " px py"
#m "spritexy? animal" ; hunter ; " hx hy"
ha = strad( st( hunter ) )
dx = hx - px
dy = hy - py
if drunk then
if abs( dx ) <= atn( dy / dx )
if da st( hunter ) = st( hunter ) + 1
st( hunter ) = st( hunter ) and 31
else
st( hunter ) = st( hunter ) - 1
st( hunter ) = st( hunter ) and 31
end if
else
call rotate dx , dy , 0-strad( st( hunter ) )
if dx st( hunter ) = st( hunter ) + 1
st( hunter ) = st( hunter ) and 31
else
st( hunter ) = st( hunter ) - 1
st( hunter ) = st( hunter ) and 31
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end if
end if
speed( hunter ) = 5
end sub
sub flee drunk
#m "spritexy? animal" ; prey ; " px py"
#m "spritexy? animal" ; hunter ; " hx hy"
ha = strad( st( prey ) )
dx = hx - px
dy = hy - py
if drunk then
if abs( dx ) da = atn( dy / dx )
if da > ha then
st( prey ) = st( prey ) + 1
st( prey ) = st( prey ) and 31
else
st( prey ) = st( prey ) - 1
st( prey ) = st( prey ) and 31
end if
else
call rotate dx , dy , 0-strad( st( prey ) )
if dx st( prey ) = st( prey ) + 1
st( prey ) = st( prey ) and 31
else
st( prey ) = st( prey ) - 1
st( prey ) = st( prey ) and 31
end if
end if
speed( prey ) = 4
end sub
function avoid( nr , obj$ , size )
uit = 0
#m "spritexy? animal" ; nr ; " ax ay"
#m "spritexy? " ; obj$ ; " ox oy"
seex = ax + sin( strad( st( nr ) ) ) * size
seey = ay - cos( strad( st( nr ) ) ) * size
if sqr( ( ox - seex ) ^ 2 + ( oy - seey ) ^ 2 ) st( nr ) = st( nr ) + 1
speed( nr ) = 0
uit = not( 0 )
else
if nr = hunter then
speed( nr ) = 4
else
speed( nr ) = 3
end if
end if
```

```
avoid = uit
end function
function atan2( y , x )
if x = 0 then
if y angle = pi * 2 - pi / 2
else
angle = pi / 2
end if
else
angle = atn( y / x )
if x angle = pi - angle
end if
if angle > pi * 2 then
angle = angle - pi * 2
end if
end if
if angle atan2 = angle
end function
"suport functions
sub rotate byref k , byref l , r
s = sin( r )
c = cos( r )
hk = k * c - l * s
hl = k * s + l * c
k = hk : l = hl
end sub
function nr$( no )
nr$ = right$( "00" + str$( no ) , 2 )
end function
function strad( st )
strad = st * pi / 16
end function
function distance( a , b )
#m "spritexy? animal" ; a ; " ax ay"
#m "spritexy? animal" ; b ; " bx by"
dx = abs( bx - ax )
dy = abs( by - ay )
distance = sqr( dx ^ 2 + dy ^ 2 )
end function
```