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!- ======================================
!- Project   : Ships!
!- Target    : Commodore 128
!- Comments  :
!- Author    : Zoltan Szoke, 2018
!- ======================================


!- Compact code

0reada$,b$,g$(0),v$,w$,g$(1),q$,h$,g,n,n$,t$,r,f,c$,r$,s$(0),s$(1):y=g:h=g+n:printv$w$:fori=.to7:a=peek(y)*256+peek(y+1):b=peek
(y+2):y=y+3:forj=atoa+b:d=peek(y+h)and15:fork=.tod:pokej+k,.:next:j=j+d:pokej,peek(y):y=y+1:next:next:dimr(3),d(3):deffnd(i)
=360+i*45:deffnr(f)=int(9-fnm(r(f))*9)
1l$=n$+n$:deffnm(i)=i-int(i):print"{clear}hi sc:"hs"{down*2}"TAB(34)a$:PRINTb$:print" "l$q$l$l$n$:printTAB(12)"{reverse on}{orange}
{169}{160}":print"{up*2}"tab(31)"{reverse on}{light gray}{187}{gray}{172}{left*2}
{down}";:fori=0to18:printh$;:next:t=1599:b=0:l=3:deffnp(i)=((822.4+peek(r+i+i)/8+int(peek(4567+i+i)/8)*40)andg-1)+g:m=5:deffnx(z)=int
((r(1)+r(2)-2)*r(0)):fori=0to2:r(i)=1:next
2deffnu(i)=int(rnd(1)*i):t=int(t)+1.01:u=-(t<1605):l=l*u:on-(l=0)goto8:print"{home}{home}":SYS65520,0,fnu(9)+11,fnu
(24):print"{reverse on}{gray}"mid$(r$,fnu(15)+1,10):window33,5,39,24:print"{clear}":m=m+fnx(.):movspr2,20,99:movspr1,230,230:z=bump
(1):fori=.to3:s(i)=1:d(i)=i:on-(i<2)gosub9:next:q=fnu(3)+2:sprite2,1,q:sprite1,1,1
3d(1)=d(1)+(fnu(3)-1)*fnu(2):i=1:gosub9:re=.:de=.:print"{down}{home}{black}{reverse off}"mid$(str$(t),2,7)"{down} {red}
S";l:print" {yellow}Q{white}"m:print"{light gray} +"fnx(.):print:forj=0to2:print:printmid$(c$,j*10+1,10)"{reverse off} Q"fnr
(j):printmid$(t$,1,r(j)):next:data"{reverse on}{light gray}{169}{gray}{127}{reverse off} {reverse on}{169}{dark gray}M"," {green}{094}
{094} {094}  {orange}..{172}{172} {reverse on}{brown}P{160}O{reverse off} {orange}{187}{187}..  {green}{094} {094}{094} {094}
{094} {reverse on}{light gray}{169}{gray}{127}{light gray}{169}MN{gray}{127} {dark gray}{163}","{home}{home}retired, "
4onregoto3:z=bump(1):c=fnp(.):pc=peek(c):on-(pc<>32orz=3orz=6)gosub7:ondegoto2:px=n:fori=.to1:x=peek(px):y=peek(px+1):w=
(x<26orx>248ory<92ory>228):on-wgosub9:px=px+2:next:getk$:poke198,0:k=asc(k$):da=(k$="d")-(k$="a"):i=.:d=d(.)-da:d(.)=dand7:s=s(.):ws=
(k$="w"ands<3)-(k$="s"ands.)
5s(.)=s-ws:w=.:i=.:on(da=.andws=.)+1gosub9:sprite3,(b<t)+1:t=t+.5/g:on-(fnm(t)>.129)goto2:on-(k$="")goto4:pokef,.:k0=-
(k$>"0"andk$<"4"):onk0goto6:qe=(k$="q")-(k$="e"):on-(qe=.orv(4)>.)goto3:movspr3,peek(n),peek(n+1):movspr3,fnd(d+(18/(s+9)*qe))
#1:b=t+.7/g*r(1):sprite3,1:goto4
6a=k-49:p=fnr(a):bu=(r(a)<6andm>=p):m=m+p*bu:r(a)=int(r(a)-bu):print"{down}{clear}":goto3:data"{clear}{black}{reverse on}P{reverse off}
u@a{reverse on}P{reverse off}{pound}k{reverse on}{191}{cyan}{reverse off}f{black}n{cyan}h{black}i@g{reverse on}{248}{reverse off}b88<n
{reverse on}a{reverse off}%h{red}(.{reverse on}*nl{black} {reverse off}b{reverse on}. {reverse off}b{reverse on}.({reverse off}@
{reverse on}*{reverse off}h={reverse on}*{reverse off}<oU{252}oU{240}cU{reverse on}{192}{reverse off}n{192}?@({red}.{reverse on}*n,
{black}@{reverse off}@{reverse on}.@{reverse off}@{reverse on}n{pound}{reverse off}@{reverse on}.{reverse off}{pound}@.{240}@*
{reverse on}{240}{reverse off}@W{reverse on}{192}{reverse off}c{191}{reverse on}{192}{reverse off}c{reverse on}{252}{reverse off}@c
{reverse on}{192}{light gray}{reverse off}@{blue}@na${black}h{red}*{reverse on}*({reverse off}l0{reverse on}*n*{reverse off}
({reverse on}W{191}{reverse off}<n{reverse on}{192}"
7pokec,32:if(z=0orz=5orz>9)and(pc=32)thenreturn:elseo=.:on-(z=9orz=3)goto8:v=peek(c+h)and15:on-(v>3andpc>32)goto8:o=1:on-(z=6)
goto8:m=m+int(r(2)):return:data"{reverse off}>{white} {red}({reverse on}8*2{white}{reverse off}b{black}:@b{reverse on}:{reverse off}@6
{reverse on}2{reverse off}@4{reverse on}:{reverse off}@m{reverse on}8{reverse off}@o{reverse on}({reverse off}@c{reverse on}U
{reverse off}@c{reverse on}{253}{192}{reverse off}@?{reverse on}{192}{reverse off}@c{reverse on}{192}{light gray}{reverse off}@{white}
@o{pound}f{black}l{red}7l","{home}{home}died, ","{gray}{185}{185}{164}{164}{164}{164}{164}{185}{185}","{reverse on}{light gray}{161}
{reverse off}{gray}{161}{left*2}{down}"
8sprite3,.:fori=1to16:spriteo+1,1,i:next:c=fnp(o):pokec,81:pokeh+c,o:fori=.to2:r(i)=r(i)-.1*(q-2<>i):next:q=fnu(3)
+2:sprite2,1,q:poke4568,(peek(r)+128)and255:z=bump(1):l=l+(o=0):de=-(o=0):ifl>0thenre=1:return:elses=m+fnx(.)*5:a=hs<s:hs=(a+1)*hs-
a*s:printg$(u)s$(-a)s:sprite1,0:sprite2,0:pokef,.:waitf,1:goto1
9d(i)=d(i)*(w+1)-(2*sgn(x-150)+sgn(x-150)*sgn(y-150)+4)*w:movspri+1,fnd(d(i))#s(i):j=4482+i*11:pokej,peek(j)/4:pokej+2,peek
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```
(j+2)/4:poke2040+i,56+(d(i)and3):return:data1024,53248,"{reverse on}{light gray}{162}{162}{162}{162}","{reverse on}Z{161}{161}{161}
{161}",4566,208,"{white}fr ttl {reverse on}1{red}en gun {reverse on}2{cyan}sp trs {reverse on}3","{light gray}{169}{gray}{127}{up}
{left}{light gray}{169}{gray}{127}{gray}{169}{dark gray}{127}{up}{left}{light gray}{169}{gray}{127}{gray}{169}{dark gray}
{127}","sc:","hi sc:"
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!- Detailed code

0reada$,b$,g$(0),v$,w$,g$(1),q$,h$,g,n,n$,t$,r,f,c$,r$,s$(0),s$(1):y=g:h=g+n:printv$w$:fori=.to7:a=peek(y)*256+peek(y+1):b=peek
(y+2):y=y+3:forj=atoa+b:d=peek(y+h)and15:fork=.tod:pokej+k,.:next:j=j+d:pokej,peek(y):y=y+1:next:next:dimr(3),d(3):deffnd(i)
=360+i*45:deffnr(f)=int(9-fnm(r(f))*9)
!------------------------------------------------------
!- Line 0 - Game initialization
!------------------------------------------------------
!- Read values from data blocks
!-      v$, w$                         sprite data
!-      a$, b$, q$, n$, h$             graphics (port, line drawing)
!-      t$                             titles
!-      r$                             rocks
!-      g$(0/1)                        you retired / died
!-      s$(0/1)                        sc / hi sc
!-      g                              1024 screen start
!-      n                              53248 sprites
!-
!- Compressed sprite reader
!-      y=g                            read start at upper left screen code
!-      h=g+n                          color map offset (55296-1024=54272)
!-      printv$w$                      print compressed data
!-
!-      fori=.to7                      8 blocks (5 sprites + VIC poke data)
!-        a=peek(y)*256+peek(y+1)      read target code
!-        b=peek(y+2)                  read number of bytes to put
!-        y=y+3                        increase screen pointer
!-
!-        forj=atoa+b                  put bytes from a..a+b
!-          d=peek(y+h)and15           read color of screen character
!-          fork=.tod                  put 0s based on the color (black: no additional zeroes, white: +1 zero)
!-            pokej+k,.
!-          next
!-          j=j+d
!-          pokej,peek(y)              copy the screen code to target memory
!-          y=y+1
!-        next
!-      next
!-
!- Arrays
!-      dimr(3),                       Ranks
!-        d(3)                         Directions of ships
!-
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!-      deffnd(i)=360+i*45            Calculate degree from direction 'i'
!-      deffnr(f)=int(9-fnm(r(f))*9)  Price to buy rank of nation f

1l$=n$+n$:deffnm(i)=i-int(i):print"{clear}hi sc:"hs"{down*2}"TAB(34)a$:PRINTb$:print" "l$q$l$l$n$:printTAB(12)"{reverse on}{orange}
{169}{160}":print"{up*2}"tab(31)"{reverse on}{light gray}{187}{gray}{172}{left*2}
{down}";:fori=0to18:printh$;:next:t=1599:b=0:l=3:deffnp(i)=((822.4+peek(r+i+i)/8+int(peek(4567+i+i)/8)*40)andg-1)+g:m=5:deffnx(z)=int
((r(1)+r(2)-2)*r(0)):fori=0to2:r(i)=1:next
!-------------------------------------------------
!- Line 1 - Draw port, a few other inits
!-------------------------------------------------
!-      l$=n$+n$                      Screen drawing
!-      deffnm(i)=i-int(i)            Fractional part
!-
!-      print...                      Screen drawing, high score
!-      fori=0to18:printh$;:next      Draw vertical line
!-
!-      t=1599                        Starting year init (+1 later)
!-      b=0                           Gun life cycle management
!-      l=3                           Remaining lives
!-      m=5                           Actual money
!-      fori=0to2:r(i)=1:next         Staring ranks
!-      deffnx(z)=int((r(1)+r(2)-2)*r(0))
!-                                    Annual income
!-      deffnp(i)=((822.4+peek(r+i+i)/8+int(peek(4567+i+i)/8)*40)andg-1)+g
!-                                    Character under sprite i


2deffnu(i)=int(rnd(1)*i):t=int(t)+1.01:u=-(t<1605):l=l*u:on-(l=0)goto8:print"{home}{home}":SYS65520,0,fnu(9)+11,fnu
(24):print"{reverse on}{gray}"mid$(r$,fnu(15)+1,10):window33,5,39,24:print"{clear}":m=m+fnx(.):movspr2,20,99:movspr1,230,230:z=bump
(1):fori=.to3:s(i)=1:d(i)=i:on-(i<2)gosub9:next:q=fnu(3)+2:sprite2,1,q:sprite1,1,1
!-------------------------------------------------
!- Line 2 - New year init
!-------------------------------------------------
!-      deffnu(i)=int(rnd(1)*i)       random function
!-      t=int(t)+1.01                 add 1 year and first month
!-      u=-(t<1605)                   retirment needed?
!-      l=l*u                         if year is 1605, no more 'lives'
!-      on-(l=0)goto8                 if no more lives, go to ship sink management
!-      print"{home}{home}"           leave defined window
!-      SYS65520,0,fnu(9)+11,fnu(24)  random position for rocks
!-      print...r$...                 show random rock
!-      window33,5,39,24:print"{clear}" clear status window
!-      m=m+fnx(.)                    add anual income
!-      movspr2,20,99:movspr1,230,230 position sprites
!-      z=bump(1)                     clear collision flag (to avoid double death)
!-
!-      fori=.to3
!-            s(i)=1:d(i)=i           set ship speed and direction
!-            on-(i<2)gosub9          set ship into motion (on part not needed -
 3 enemy ships was too slow, too much problem with collision detection)
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!-      next
!-      q=fnu(3)+2                  random color for enemy ship
!-      sprite2,1,q:sprite1,1,1     show sprites, set colors

3d(1)=d(1)+(fnu(3)-1)*fnu(2):i=1:gosub9:re=.:de=.:print"{down}{home}{black}{reverse off}"mid$(str$(t),2,7)"{down} {red}
S";l:print" {yellow}Q{white}"m:print"{light gray} "+"fnx(.):print:forj=0to2:print:printmid$(c$,j*10+1,10)"{reverse off} Q"fnr
(j):printmid$(t$,1,r(j)):next:data"{reverse on}{light gray}{169}{gray}{127}{reverse off} {reverse on}{169}{dark gray}M"," {green}{094}
{094} {094}  {orange}..{172}{172} {reverse on}{brown}P{160}O{reverse off} {orange}{187}{187}..  {green}{094} {094}{094} {094}
{094} {reverse on}{light gray}{169}{gray}{127}{light gray}{169}MN{gray}{127} {dark gray}{163}","{home}{home}retired, "
!------------------------------------------------------
!- Line 3 - Status box
!------------------------------------------------------
!-
!-      d(1)=d(1)+(fnu(3)-1)*fnu(2)     randomize enemy movement with a 33% chance
!-      i=1:gosub9                      set enemy ship into movement
!-      re=.:de=.                       no repaint needed, not died yet
!-      print...mid$(str$(t),2,7)...    convert float to date string
!-      print...                        show money, income, lives, ranks
!-      data...                         data for line0 read

4onregoto3:z=bump(1):c=fnp(.):pc=peek(c):on-(pc<>32orz=3orz=6)gosub7:ondegoto2:px=n:fori=.to1:x=peek(px):y=peek(px+1):w=
(x<26orx>248ory<92ory>228):on-wgosub9:px=px+2:next:getk$:poke198,0:k=asc(k$):da=(k$="d")-(k$="a"):i=.:d=d(.)-da:d(.)=dand7:s=s(.):ws=
(k$="w"ands<3)-(k$="s"ands>.)
5s(.)=s-ws:w=.:i=.:on(da=.andws=.)+1gosub9:sprite3,(b<t)+1:t=t+.5/g:on-(fnm(t)>.129)goto2:on-(k$="")goto4:pokef,.:k0=-
(k$>"0"andk$<"4"):onk0goto6:qe=(k$="q")-(k$="e"):on-(qe=.orv(4)>.)goto3:movspr3,peek(n),peek(n+1):movspr3,fnd(d+(18/(s+9)*qe))
#1:b=t+.7/g*r(1):sprite3,1:goto4
!------------------------------------------------------
!- Line 4-5 - Ship navigation, fire
!------------------------------------------------------
!-      onregoto3                   repaint needed?
!-      z=bump(1):c=fnp(.):pc=peek(c)  z: collision, c: screen code under hero, pc: character under hero
!-      on-(pc<>32orz=3orz=6)gosub7  if character is not space, or ship collision, or ship hit by gun, call collision sub
!-      ondegoto2                   if player died, go to next year
!-
!-      px=n                        sprite positions
!-      fori=.to1
!-        x=peek(px):y=peek(px+1)   get coords of sprite i
!-        w=(x<26orx>248ory<92ory>228) edge of playfield detected
!-        on-wgosub9                position, using w
!-        px=px+2
!-      next
!-      getk$:poke198,0:k=asc(k$)   read key, clear key buffer
!-
!-      da=(k$="d")-(k$="a")        navigate left or right
!-      d=d(.)-da:d(.)=dand7        set direction
!-
!-      s=s(.)                      get speed
!-      ws=(k$="w"ands<3)-(k$="s"ands>.)speed change needed?
!-      s(.)=s-ws:w=.               set speed
```

```
!-
!-      i=.:on(da=.andws=.)+1gosub9      change player motion
!-
!-      sprite3,(b<t)+1                   hide gun if time is up (b<t)
!-      t=t+.5/g                          increase date by cca 1 day
!-      on-(fnm(t)>.129)goto2             year is over
!-      on-(k$="")goto4                   no key pressed, go back to navigation
!-      pokef,.                           clear buffer
!-      k0=-(k$>"0"andk$<"4"):onk0goto6   call rank buying sub
!-      qe=(k$="q")-(k$="e")              guns fired?
!-      on-(qe=.orv(4)>.)goto3            go back to line 3 if no Q or E pressed
!-
!-   Fire guns
!-      movspr3,peek(n),peek(n+1)         starting is at player's ship
!-      movspr3,fnd(d+(18/(s+9)*qe))#1    set direction, using player's speed
!-      b=t+.7/g*r(1)                     set lifetime
!-      sprite3,1:goto4                   show sprite, and restart navigation


6a=k-49:p=fnr(a):bu=(r(a)<6andm>=p):m=m+p*bu:r(a)=int(r(a)-bu):print"{down}{clear}":goto3:data"{clear}{black}{reverse on}P{reverse off}
u@a{reverse on}P{reverse off}{pound}k{reverse on}{191}{cyan}{reverse off}f{black}n{cyan}h{black}i@g{reverse on}{248}{reverse off}b88<n
{reverse on}a{reverse off}%h{red}(.{reverse on}*nl{black} {reverse off}b{reverse on}. {reverse off}b{reverse on}.({reverse off}@
{reverse on}*{reverse off}h={reverse on}*{reverse off}<oU{252}oU{240}cU{reverse on}{192}{reverse off}n{192}?@({red}.{reverse on}*n,
{black}@{reverse off}@{reverse on}.@{reverse off}@{reverse on}n{pound}{reverse off}@{reverse on}.{reverse off}{pound}@.{240}@*
{reverse on}{240}{reverse off}@W{reverse on}{192}{reverse off}c{191}{reverse on}{192}{reverse off}c{reverse on}{252}{reverse off}@c
{reverse on}{192}{light gray}{reverse off}@{blue}@na${black}h{red}*{reverse on}*({reverse off}l0{reverse on}*n*{reverse off}
({reverse on}W{191}{reverse off}<n{reverse on}{192}"
!-------------------------------------------------------
!- Line 6 - Rank buying
!-------------------------------------------------------
!-
!-      a=k-49                            get rank index from keycode (key 1..3->0..2)
!-      p=fnr(a)                          get rank price
!-      bu=(r(a)<6andm>=p)                higher rank exists and it is affordable
!-      m=m+p*bu                          decrease money if it is possible to buy
!-      r(a)=int(r(a)-bu)                 set new rank
!-      print"{down}{clear}":goto3        show status
!-      data...                           sprite data


7pokec,32:if(z=0orz=5orz>9)and(pc=32)thenreturn:elseo=.:on-(z=9orz=3)goto8:v=peek(c+h)and15:on-(v>3andpc>32)goto8:o=1:on-(z=6)
goto8:m=m+int(r(2)):return:data"{reverse off}>{white} {red}({reverse on}8*2{white}{reverse off}b{black}:@b{reverse on}:{reverse off}@6
{reverse on}2{reverse off}@4{reverse on}:{reverse off}@m{reverse on}8{reverse off}@o{reverse on}({reverse off}@c{reverse on}U
{reverse off}@c{reverse on}{253}{192}{reverse off}@?{reverse on}{192}{reverse off}@c{reverse on}{192}{light gray}{reverse off}@{white}
@o{pound}f{black}l{red}7l","{home}{home}died, ","{gray}{185}{185}{164}{164}{164}{164}{164}{185}{185}","{reverse on}{light gray}{161}
{reverse off}{gray}{161}{left*2}{down}"
!-------------------------------------------------------
!- Line 7 - Collision detection
!-------------------------------------------------------
!-      pokec,32                          clear character under player
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!-      if(z=0orz=5orz>9)and(pc=32)...  if no relevant collision, return
!-      else
!-      o=.:on-(z=9orz=3)goto8          ship hit by enemy ship or enemy gun (removed due to 10 line limit)
!-      v=peek(c+h)and15                screen color of current char
!-      on-(v>3andpc>32)goto8           if hit by a rock, go to collision
!-      o=1:on-(z=6)goto8               if enemy ship hit
!-      m=m+int(r(2)):return            coin collected, increase money
!-      data...                         sprite and other data for line 0

8sprite3,.:fori=1to16:spriteo+1,1,i:next:c=fnp(o):pokec,81:pokeh+c,o:fori=.to2:r(i)=r(i)-.1*(q-2<>i):next:q=fnu(3)
+2:sprite2,1,q:poke4568,(peek(r)+128)and255:z=bump(1):l=l+(o=0):de=-(o=0):ifl>0thenre=1:return:elses=m+fnx(.)*5:a=hs<s:hs=(a+1)*hs-
a*s:printg$(u)s$(-a)s:sprite1,0:sprite2,0:pokef,.:waitf,1:goto1
!----------------------------------------------------
!- Line 8 - Destroy player/enemy ship
!----------------------------------------------------
!-
!-      sprite3,.                       hide weapons
!-      fori=1to16:spriteo+1,1,i:next   blinking
!-      c=fnp(o):pokec,81:pokeh+c,o     create a coin
!-      fori=.to2:r(i)=r(i)-.1*(q-2<>i):next  increase ranks for the other countries
!-      q=fnu(3)+2:sprite2,1,q          new ship color
!-      poke4568,(peek(r)+128)and255    move enemy ship far away to avoid double collisions
!-      z=bump(1)                       reset collision
!-      l=l+(o=0):de=-(o=0)             if player collided, decrease lives, set death flag
!-      ifl>0thenre=1:return            if player has remaining lives, return, status refresh needed
!-      else
!-      s=m+fnx(.)*5                    final score=current money+5*annual income
!-      a=hs<s:hs=(a+1)*hs-a*s          hs=max(hs,s)
!-      printg$(u)s$(-a)s               you retired/died with a score/high score
!-      sprite1,0:sprite2,0             hide sprites
!-      pokef,.:waitf,1:goto1           clear buffer, restart

9d(i)=d(i)*(w+1)-(2*sgn(x-150)+sgn(x-150)*sgn(y-150)+4)*w:movspri+1,fnd(d(i))#s(i):j=4482+i*11:pokej,peek(j)/4:pokej+2,peek
(j+2)/4:poke2040+i,56+(d(i)and3):return:data1024,53248,"{reverse on}{light gray}{162}{162}{162}{162}","{reverse on}Z{161}{161}{161}
{161}",4566,208,"{white}fr ttl {reverse on}1{red}en gun {reverse on}2{cyan}sp trs {reverse on}3","{light gray}{169}{gray}{127}{up}
{left}{light gray}{169}{gray}{127}{gray}{169}{dark gray}{127}{up}{left}{light gray}{169}{gray}{127}{gray}{169}{dark gray}
{127}","sc:","hi sc:"
!----------------------------------------------------
!- Line 9 - Set ship movement
!----------------------------------------------------
!-      d(i)=d(i)*(w+1)-(2*sgn(x-150)+sgn(x-150)*sgn(y-150)+4)*w
!-                                      if edge of playfield detected, move towards centre
!-
!-      movspri+1,fnd(d(i))#s(i)        set direction with speed s(i). However, even speed 1 is way to fast!
!-
!-      j=4482+i*11:pokej,peek(j)/4:pokej+2,peek(j+2)/4
!-                                      hack sprite movement routine of c128, divide calculated speed by 4 (horizontal and vertical)
!-
!-      poke2040+i,56+(d(i)and3)        set sprite shape according to direction
```

```
!-      return
!-      data...
```