```
program two_body_problem
    implicit none
    real::G,Ma,Mb,gravconst,t,tmax,dt   !Constants
    real::xa,xb,ya,yb                   !positions
    real::vxa,vxb,vya,vyb               !velocities
    real::rx,ry,modr3,fx,fy

    open(1,file="body1.dat");   open(2,file="body2.dat")

    G = 1; Ma = 1; Mb = 1; gravconst = G*Ma*Mb
    tmax = 2.5; dt = 0.001; t = 0
    !particle a's initial position and velocity
    xa = 0.5; ya = 0.0;     vxa = 0; vya = 0.5

    !particle b's initial position and velocity
    xb = -0.5; yb = 0.0;    vxb = 0.0; vyb = -0.5

    do while(t <= tmax)
        rx = xa - xb;   ry = ya - yb
        modr3 = (rx**2.0 + ry**2.0)**1.5

        fx = -gravconst*rx/modr3;   fy = -gravconst*ry/modr3

        vxa = vxa + fx*dt/Ma;   vya = vya + fy*dt/Ma
        vxb = vxb - fx*dt/Mb;   vyb = vyb - fy*dt/Mb

        xa = xa + vxa*dt;   ya = ya + vya*dt
        xb = xb + vxb*dt;   yb = yb + vyb*dt

        t = t + dt

        write(1,*)xa,ya;    write(2,*)xb,yb

    enddo

end program
```