

Homework #3

Due: 2 March, 1994

Write a "game" in which the player is given three chances to land a projectile within 5 feet of a target that is 500 feet away. On each attempt your program should prompt the player for the angle and velocity at which the projectile is fired and should plot the projectile on its way toward the target.

The following **Pascal** procedure will print the (x,y)-coordinates of the projectile as it travels from launch point to landing point. The procedure takes the initial angle (expressed in degrees) and velocity (expressed in feet per second) as its arguments. You'll have to modify this procedure to use it in your solution; *but* it does contain all the math you'll need to know. Of course, you will need to rewrite the procedure into C. To make life easy for yourself, I suggest you plot one foot as one pixel.

Unless you get fancy, the only Turbo C graphics routines you'll need are `moveto`, `lineto`, and possibly `cleardevice`.

```

procedure PlotTrajectory(velocity: real; angle: real) ;
var
  x, y: integer ;
  delta, xdelta: real ;
  sinangV, cosangV: real ;
begin
  { Position of projectile at time t is
    (cos(angle)*velocity*t, sin(angle)*velocity*t - 16.1*t^2 )
  }
  sinangV := sin(angle*3.14159/180.0) * velocity ;
  cosangV := cos(angle*3.14159/180.0) * velocity ;
  { delta is the time required for projectile to
    travel one foot horizontally. }
  delta := 1/cosangV ;
  { x is the distance projectile has travelled horizontally. }
  x := 0 ;
  y := 0 ;
  while (y >= 0) do
    begin
      x := x + 1 ;
      { xdelta is the time projectile has been in flight. }
      xdelta := x * delta ;
      y := round(sinangV * xdelta - 16.1 * xdelta * xdelta) ;
      writeln(output, 'Position is (' , x, ', ' , y, ')')
    end
  end { PlotTrajectory } ;

```