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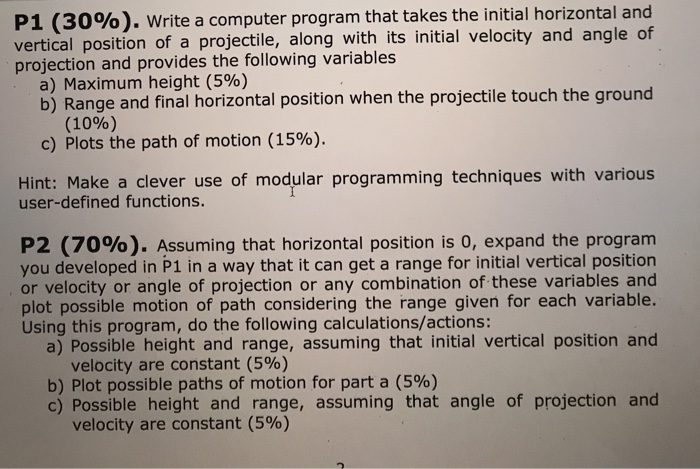
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# **Question: PI (30%). write a computer program that takes the initial horizontal and vertical position of a p...**

The answer should be written in MatLab language.  


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## Expert Answer

* Philip's Avatar

Philip Chegg expert answered this

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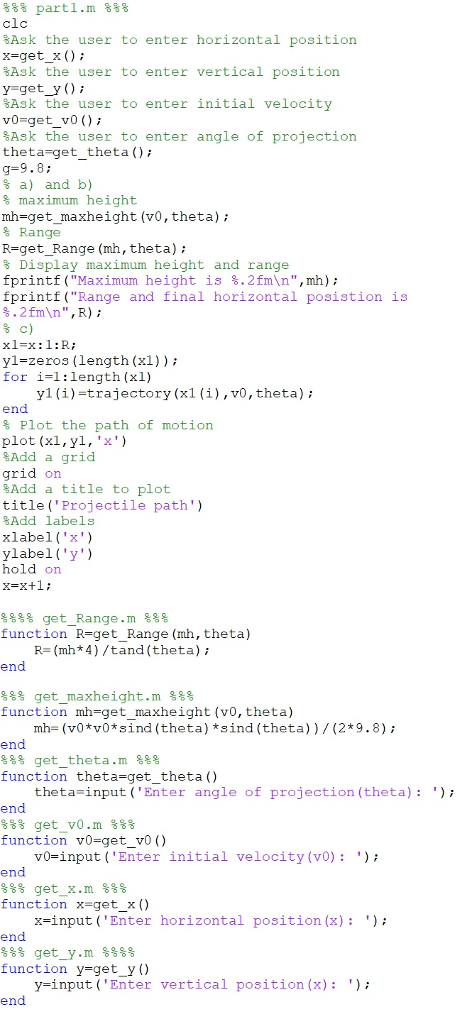
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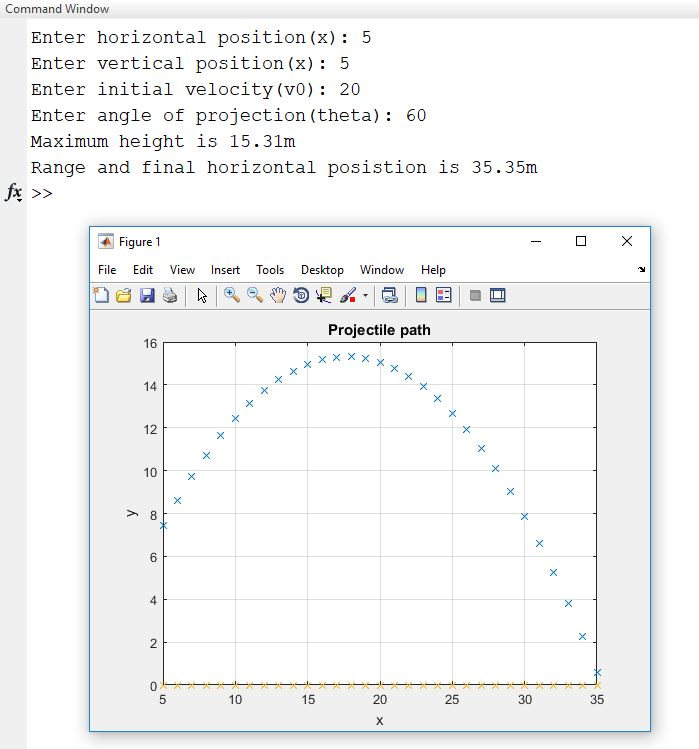
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**Part 1)**

**Program:**

****

**Sample output:**

****

**Code to copy:**

%%% part1.m %%%

clc

%Ask the user to enter horizontal position

x=get\_x();

%Ask the user to enter vertical position

y=get\_y();

%Ask the user to enter initial velocity

v0=get\_v0();

%Ask the user to enter angle of projection

theta=get\_theta();

g=9.8;

% a) and b)

% maximum height

mh=get\_maxheight(v0,theta);

% Range

R=get\_Range(mh,theta);

% Display maximum height and range

fprintf("Maximum height is %.2fm\n",mh);

fprintf("Range and final horizontal posistion is %.2fm\n",R);

% c)

x1=x:1:R;

y1=zeros(length(x1));

for i=1:length(x1)

    y1(i)=trajectory(x1(i),v0,theta);

end

% Plot the path of motion

plot(x1,y1,'x')

%Add a grid

grid on

%Add a title to plot

title('Projectile path')

%Add labels

xlabel('x')

ylabel('y')

hold on

x=x+1;

%%%% get\_Range.m %%%

function R=get\_Range(mh,theta)

    R=(mh\*4)/tand(theta);

end

%%% get\_maxheight.m %%%

function mh=get\_maxheight(v0,theta)

    mh=(v0\*v0\*sind(theta)\*sind(theta))/(2\*9.8);

end

%%% get\_theta.m %%%

function theta=get\_theta()

    theta=input('Enter angle of projection(theta): ');

end

%%% get\_v0.m %%%

function v0=get\_v0()

    v0=input('Enter initial velocity(v0): ');

end

%%% get\_x.m %%%

function x=get\_x()

    x=input('Enter horizontal position(x): ');

end

%%% get\_y.m %%%%

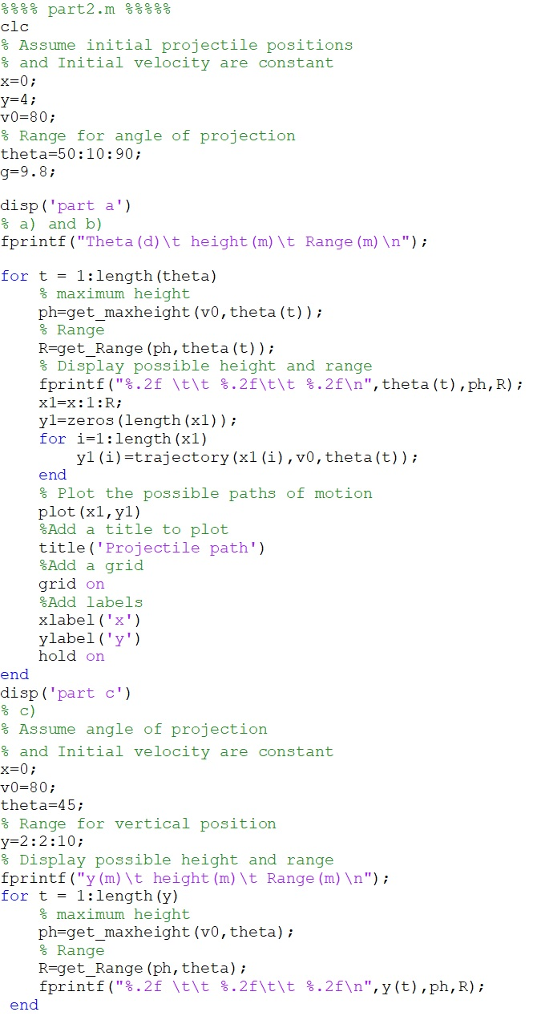
function y=get\_y()

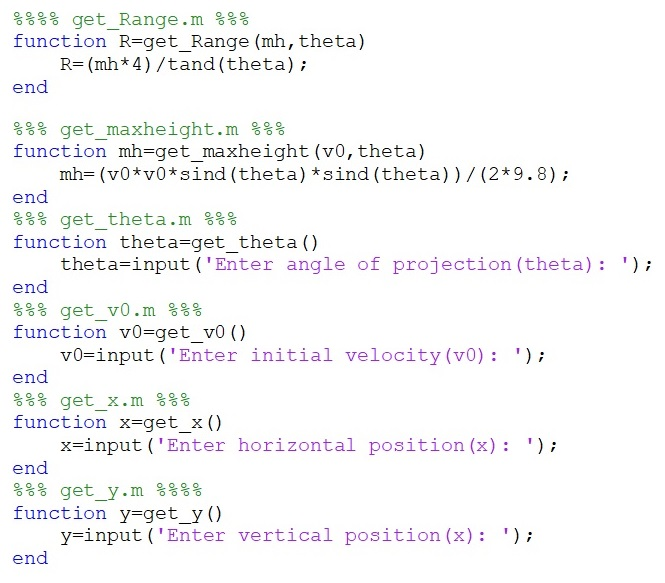
    y=input('Enter vertical position(x): ');

end

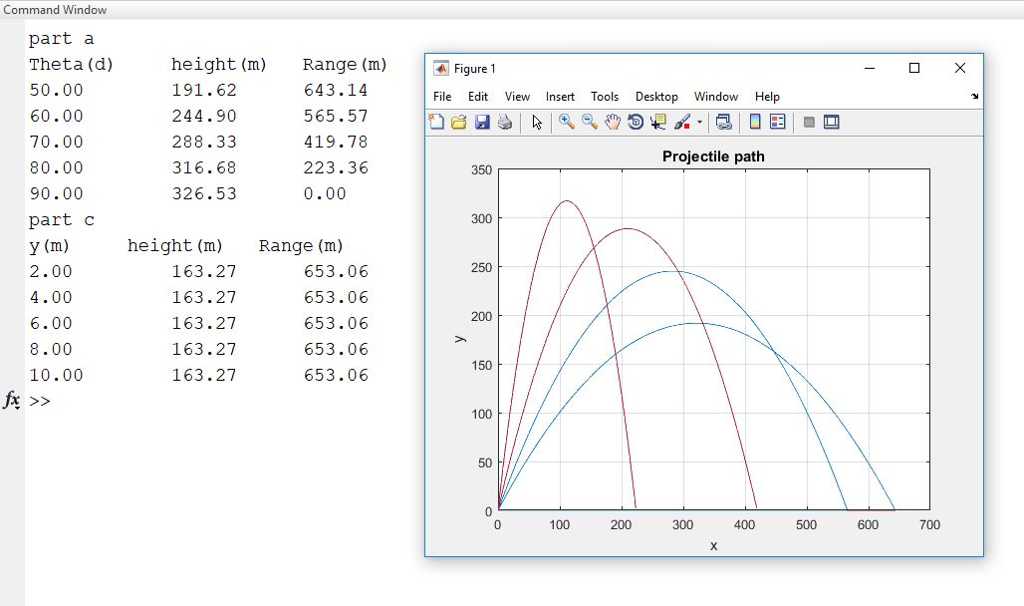
**Part 2)**

**Program:**

****

****

**Sample output:**

****

**Code to copy:**

%%%% part2.m %%%%%

clc

% Assume initial projectile positions

% and Initial velocity are constant

x=0;

y=4;

v0=80;

% Range for angle of projection

theta=50:10:90;

g=9.8;

disp('part a')

% a) and b)

fprintf("Theta(d)\t height(m)\t Range(m)\n");

for t = 1:length(theta)

    % maximum height

    ph=get\_maxheight(v0,theta(t));

    % Range

    R=get\_Range(ph,theta(t));

    % Display possible height and range

    fprintf("%.2f \t\t %.2f\t\t %.2f\n",theta(t),ph,R);

    x1=x:1:R;

    y1=zeros(length(x1));

    for i=1:length(x1)

        y1(i)=trajectory(x1(i),v0,theta(t));

    end

    % Plot the possible paths of motion

    plot(x1,y1)

    %Add a title to plot

    title('Projectile path')

    %Add a grid

    grid on

    %Add labels

    xlabel('x')

    ylabel('y')

    hold on

end

disp('part c')

% c)

% Assume angle of projection

% and Initial velocity are constant

x=0;

v0=80;

theta=45;

% Range for vertical position

y=2:2:10;

% Display possible height and range

fprintf("y(m)\t height(m)\t Range(m)\n");

for t = 1:length(y)

    % maximum height

    ph=get\_maxheight(v0,theta);

    % Range

    R=get\_Range(ph,theta);

    fprintf("%.2f \t\t %.2f\t\t %.2f\n",y(t),ph,R);

end

%%%% get\_Range.m %%%

function R=get\_Range(mh,theta)

    R=(mh\*4)/tand(theta);

end

%%% get\_maxheight.m %%%

function mh=get\_maxheight(v0,theta)

    mh=(v0\*v0\*sind(theta)\*sind(theta))/(2\*9.8);

end

%%% get\_theta.m %%%

function theta=get\_theta()

    theta=input('Enter angle of projection(theta): ');

end

%%% get\_v0.m %%%

function v0=get\_v0()

    v0=input('Enter initial velocity(v0): ');

end

%%% get\_x.m %%%

function x=get\_x()

    x=input('Enter horizontal position(x): ');

end

%%% get\_y.m %%%%

function y=get\_y()

    y=input('Enter vertical position(x): ');

end

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[Write a MATLAB Graphical User Interface (GUI) to simulate and plot the projectile motion – the motion of an object projected into the air at an angle. The object flies in the air until the projectile returns to the horizontal axis (x-axis), where y=0. This MATLAB program should allow the user to try to hit a 2-m diameter target on the x-axis (y=0) by varying conditions, including...](https://www.chegg.com/homework-help/questions-and-answers/write-matlab-graphical-user-interface-gui-simulate-plot-projectile-motion-motion-object-pr-q19460278" \t "_blank)

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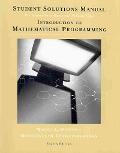
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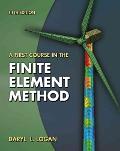
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