Python Programming @ The department of Computer Science
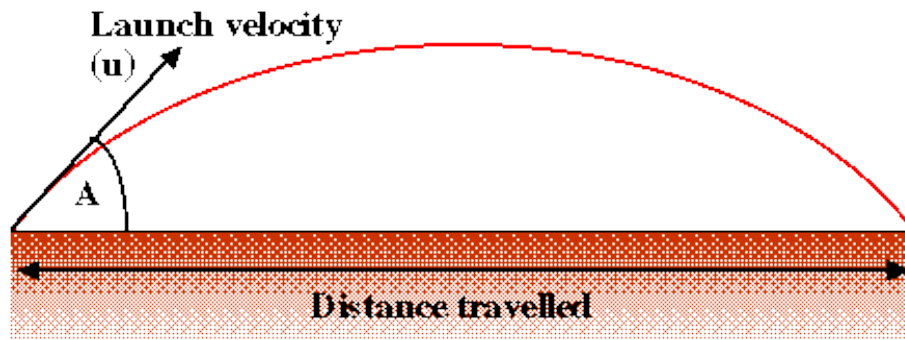

Projectiles

Requirements

Produce a computer program, written in the Python programming language, which determines the distance travelled by a projectile (projected from the ground) given:

1. Velocity at launch (u), and
2. Launch angle (angle of elevation) above the horizontal (A).

Assume the following:

1. The angle of elevation is given in degrees and is in the range of 0 to 90.
2. Start velocity is given as a positive number.
3. Acceleration due to Gravity (g) is equivalent to 10m/s^2.
4. The effect of air resistance can be ignored.

Python Programming @ The department of Computer Science

Projectiles

```python
# Calculate distance
def calculateDistance(hComponent,tm) :
    return hComponent*tm


# Calculate and output time and distance */
def calcAndOutputTimeAndDist() :
    # Calculate horizontal and vertical components
    verticalComponent = calcVerticalComponent()
    horizontalComponent = calcHorizontalComponent()
    # Calculate time
    time = calculateTime(verticalComponent)
    # Calculate distance
    distance = calculateDistance(horizontalComponent,time);
    # Output
    print 'Time      = {0:.3f}'.format(time)
    print 'Distance  = {0:.3f}'.format(distance)

# Start
calcAndOutputTimeAndDist()
```

Testing

Given the input assumptions we can test at the extremes of the input range and somewhere in the middle but no more. A suitable set of 3 test cases are presented in the Table.

TEST CASE		EXPECTED RESULT	
Launch Angle	Start Velocity	Time	Distance
0	100	0.0	0.0
45	100	14.1421	1000.0000
90	100	14.1421	0.0

Frans Coenen

March 2013