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.
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.

<table>
<thead>
<tr>
<th>TEST CASE</th>
<th>EXPECTED RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch Angle</td>
<td>Start Velocity</td>
</tr>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>45</td>
<td>100</td>
</tr>
<tr>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

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