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COMP101 – Assignment 02

Python Code –

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#201358937 Tonge_Brandon-CA02.py
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#This program will calculate the distance travelled, the
#horizonal distance, the vertical distance and the battery drain
#of a robot when the user inputs an angle and a travel time.

print("This program will calculate the distance travelled, the\n\
horizonal distance, the vertical distance and the battery drain\n\
of a robot when the user inputs an angle and a travel time.")
print()

#Define variables and libraries that are going to be used
import math
speed = 1.5

#Explain and accept inputs from the user
angle_degree = float(input("Please enter an angle in degrees: "))
travel_time = float(input("Please enter a travel time in seconds: "))

#Input conversions
angle_radian = math.radians(angle_degree)

#Calculations for the program
distance = speed * travel_time
horizontal = distance * math.sin(angle_radian)
vertical = distance * math.cos(angle_radian)
battery_estimate = travel_time * 2.7

#User Outputs
print()
print("The distance travelled is: {0:.2f}" .format(distance) ,"Meters")
print("The horizontal distance is: {0:.2f}" .format(horizontal) , "Meters")
print("The vertical distance is {0:.2f}" .format(vertical) , "Meters")
print("Estimated battery usage: {0:.2f}" .format(battery_estimate))


#TEST
#print()
#print("The robot will move at:" , str(speed) , "Meters a second")
#print("The distance travelled is: {0:.2f}" .format(distance) ,"Meters")
#print("The angle in degrees is: {0:.2f}" .format(angle_degree))
#print("The angle converted to radians is: {0:.2f}" .format(angle_radian))
#print("The horizontal distance is: {0:.2f}" .format(horizontal) , "Meters")
#print("The vertical distance is {0:.2f}" .format(vertical) , "Meters")
#print("Estimated battery usage: {0:.2f}" .format(battery_estimate))
```

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Testing Table –

Angle	Time	Expected Output	Actual Output	Comments
30	10	Distance – 15 Horizontal – 7.5 Vertical – 12.99 Battery – 27	Distance – 15 Horizontal – 7.5 Vertical – 12.99 Battery – 27	The expected output matched the actual output. There is no need for any corrections.
35.2	7.5	Distance – 11.25 Horizontal – 6.48 Vertical – 9.19 Battery – 20.25	Distance – 11.25 Horizontal – 6.48 Vertical – 9.19 Battery – 20.25	The expected output matched the actual output. There is no need for any corrections.
10	100	Distance – 150 Horizontal – 26.05 Vertical – 147.72 Battery – 270	Distance – 150 Horizontal – 26.05 Vertical – 147.72 Battery – 270	The expected output matched the actual output. There is no need for any corrections.
Twenty	15	I expect the program to crash as I have not designed it to be able to deal with strings.	The program crashed after I entered the word "Twenty".	The program crashed as it was not designed to deal with strings. This could be stopped by including exception handling during the user inputs.
46.345	43.7743	Distance – 65.66 Horizontal – 47.51 Vertical – 45.33 Battery – 118.19	Distance – 65.66 Horizontal – 47.51 Vertical – 45.33 Battery – 118.19	The expected output matched the actual output. There is no need for any corrections.

Pseudocode –

IMPORT Math library
STORE The speed variable

OUTPUT "What is the angle?"
INPUT user answer
STORE the variable "angle_degree"

OUTPUT "What is the time?"
INPUT user answer
STORE The variable "travel_time"

CONVERT variable "angle_degree" to radians
STORE answer in "angle_radian" variable

CALCULATE distance using the "speed" and "travel_time" variables
STORE distance in the "distance" variable
CALCULATE horizontal distance using the "distance" and the "angle_radian" variables
STORE horizontal distance in the "horizontal" variable
CALCULATE vertical distance using the "distance" and the "angle_radian" variables
STORE vertical distance in the "vertical" variable

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CALCULATE battery estimate using the "travel_time" variable
STORE battery estimate in the "battery_estimate" variable

OUTPUT The "distance" variable
OUTPUT The "horizontal" variable
OUTPUT The "vertical" variable
OUTPUT The "battery_estimate" variable