**Week 5 Assignment**

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Unit : ICT\_102

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**Week 5 Tutorial :**

Program :

def move\_forward(steps):

print(f"Moving forward by {steps} steps.")

def turn\_left():

print("Turning left.")

def turn\_right():

print("Turning right.")

def move\_in\_square(side\_length):

for \_ in range(4):

move\_forward(side\_length)

turn\_left()

def calculate\_area(side\_length):

area = side\_length \*\* 2

return area

def factorial(n):

if n == 0:

return 1

else:

return n \* factorial(n - 1)

power = lambda base, exponent: base \*\* exponent

def safe\_divide(x, y):

try:

result = x / y

except ZeroDivisionError:

print("Error: Division by zero!")

result = None

return result

def calculate\_total\_distance(distances):

total\_distance = 0

try:

for distance in distances:

total\_distance += float(distance)

except (TypeError, ValueError) as e:

print(f"Error: {e}")

return None

return total\_distance

def recursive\_sum(distances):

if not distances:

return 0

else:

return distances[0] + recursive\_sum(distances[1:])

if \_\_name\_\_ == "\_\_main\_\_":

move\_forward(8)

turn\_left()

move\_in\_square(4)

print("Area of square with side length 3:", calculate\_area(3))

print("Factorial of 4:", factorial(4))

print("3 to the power of 4:", power(3, 4))

print("Safe division of 12 by 3:", safe\_divide(12, 3))

print("Safe division of 15 by 0:", safe\_divide(15, 0))

distances = [1.5, 2.0, 3.2, 2.8]

print("Total distance moved:", calculate\_total\_distance(distances))

distances\_recursive = [2, 3, 4, 5, 6]

print("Recursive sum of distances:", recursive\_sum(distances\_recursive))

Output :

C:\Users\61411\PycharmProjects\pythonProject\.venv\Scripts\python.exe C:\Users\61411\PycharmProjects\pythonProject\.venv\robot\_controller.py

Moving forward by 8 steps.

Turning left.

Moving forward by 4 steps.

Turning left.

Moving forward by 4 steps.

Turning left.

Moving forward by 4 steps.

Turning left.

Moving forward by 4 steps.

Turning left.

Area of square with side length 3: 9

Factorial of 4: 24

3 to the power of 4: 81

Safe division of 12 by 3: 4.0

Error: Division by zero!

Safe division of 15 by 0: None

Total distance moved: 9.5

Recursive sum of distances: 20

Process finished with exit code 0

Explanation :

1. **Robot Movements:**

* The robot moves forward by 8 steps, turns left, and then moves in a square pattern with each side of length 4.

1. **Mathematical Calculations:**

* Calculates the area of a square with side length 3.
* Computes the factorial of 4.
* Computes 343^434 (3 to the power of 4).
* Performs safe division operations (e.g., 12 divided by 3 and 15 divided by 0).

1. **Real-World Problems:**

* Calculates the total distance moved by summing distances in the list.[ 1.5, 2.0, 3.2, 2.8].
* Recursively sums distances in the list [ 2, 3, 4, 5, 6].

**Reference :**

google.com & ChatGPT.