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Bsccs/2024/37519

Assignment 1

a) Temperature Line Graph

python

import matplotlib.pyplot as plt

# Temperature data

days = ['Mon', 'Tue', 'Wed', 'Thu', 'Fri', 'Sat', 'Sun']

temperatures = [20, 22, 19, 23, 21, 24, 20]

# Create the plot

plt.figure(figsize=(8, 4))

plt.plot(days, temperatures, marker='o', linestyle='-', color='b')

# Add titles and labels

plt.title('Weekly Temperature Readings')

plt.xlabel('Day of the Week')

plt.ylabel('Temperature (°C)')

plt.grid(True)

# Show the plot

plt.show()

b) Arithmetic Sequence

python

# Generate arithmetic sequence

start = 5

difference = 3

terms = 8

sequence = [start + i \* difference for i in range(terms)]

print("Arithmetic sequence:", sequence)

c) Volume Calculation under Surface

python

import numpy as np

def z\_function(x, y):

return x\*\*2 + y\*\*2

# Number of divisions for Riemann sum

n = 1000

# Create grid of points

x = np.linspace(0, 1, n)

y = np.linspace(0, 1, n)

X, Y = np.meshgrid(x, y)

# Calculate function values

Z = z\_function(X, Y)

# Calculate volume using Riemann sum

dx = 1/n

dy = 1/n

volume = np.sum(Z) \* dx \* dy

print(f"Approximate volume under the surface: {volume:.6f}")

d) Compiled vs Interpreted Languages

Compiled Languages:

Source code is translated to machine code entirely before execution (compilation step)

Generally faster execution as the code is already in machine language

Errors are typically caught during compilation

Examples: C, C++, Rust, Go

Interpreted Languages:

Code is executed line by line by an interpreter at runtime

More flexible as code can be modified and run immediately

Generally slower than compiled languages

Errors may only be discovered when the problematic line is executed

Examples: Python, JavaScript, Ruby

Python's Classification:

Python is primarily an interpreted language. When you run a Python script, the Python interpreter reads and executes the code line by line. However, Python does have a compilation step where source code is converted to bytecode (.pyc files), which is then interpreted by the Python Virtual Machine (PVM). This makes Python a "compiled-interpreted" language in some classifications, though it's generally considered interpreted because the bytecode is not machine code and still requires the interpreter to run.