**DATA ENGINEERING**

**Python Assignment**

**1. Number Categorizer**

**Write a Python program that prompts the user to enter a number between 1 and 100.**

**o If the number is less than 50, print "The number is small."**

**o If the number is between 50 and 75 (inclusive), print "The number is medium."**

**o If the number is greater than 75, print "The number is large."**

**o If the input is not a valid number or not in the range 1 to 100, print "Invalid**

**input."**

**o After printing the message, ask the user if they want to input another number. If**

**yes, repeat the process; if no, end the program with a message "Thank you for**

**using the program."**

**o Ensure that the program continues to prompt for new numbers until the user**

**decides to stop.**

**Ans:**

def categorize\_number(number):

if number < 50:

print("The number is small.")

elif 50 <= number <= 75:

print("The number is medium.")

else:

print("The number is large.")

def main():

while True:

try:

user\_input = input("Enter a number between 1 and 100: ")

if isinstance(user\_input, str):

number = int(user\_input)

if 1 <= number <= 100:

categorize\_number(number)

else:

print("Invalid input.")

else:

print("Invalid input.")

except ValueError:

print("Invalid input.")

except TypeError:

print("Invalid input.")

repeat = input("Do you want to input another number? (yes/no): ").strip().lower()

if repeat != 'yes':

print("Thank you for using the program.")

break

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

main()

**2. Even or Odd Checker**

**Write a program that asks the user to enter a number.**

**o Check if the number is even or odd.**

**o Print "The number is even" if the number is even, otherwise print "The number**

**is odd."**

**Ans:**

def check\_even\_or\_odd(number):

if number % 2 == 0:

print("The number is even.")

else:

print("The number is odd.")

def main():

try:

user\_input = input("Enter a number: ")

number = int(user\_input)

check\_even\_or\_odd(number)

except ValueError:

print("Invalid input. Please enter a valid number.")

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

main()

**3. Simple Calculator**

**Write a program that performs basic arithmetic operations (addition, subtraction,**

**multiplication, and division).**

**o Prompt the user to enter two numbers and choose an operation (+, -, \*, /).**

**o Perform the chosen operation and display the result.**

**o Handle division by zero errors with a suitable message.**

**Ans:**

def perform\_operation(num1, num2, operation):

if operation == '+':

return num1 + num2

elif operation == '-':

return num1 - num2

elif operation == '\*':

return num1 \* num2

elif operation == '/':

if num2 == 0:

raise ZeroDivisionError("Division by zero is not allowed.")

return num1 / num2

else:

raise ValueError("Invalid operation. Please choose from +, -, \*, /.")

def main():

try:

num1 = float(input("Enter the first number: "))

num2 = float(input("Enter the second number: "))

operation = input("Enter the operation (+, -, \*, /): ").strip()

result = perform\_operation(num1, num2, operation)

print(f"The result of {num1} {operation} {num2} is: {result:.2f}")

except ValueError as e:

print(f"Error: {e}")

except ZeroDivisionError as e:

print(f"Error: {e}")

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

main()

**4. Number Guessing Game**

**Write a program that randomly selects a number between 1 and 10.**

**o Prompt the user to guess the number.**

**o Provide feedback if the guess is too high or too low.**

**o Allow the user to guess again until they ϐind the correct number.**

**o Print a congratulatory message when the correct number is guessed.**

**Ans:**

import random

def number\_guessing\_game():

secret\_number = random.randint(1, 10)

while True:

try:

guess = int(input("Guess the number between 1 and 10: "))

if guess < 1 or guess > 10:

print("Please guess a number between 1 and 10.")

continue

if guess < secret\_number:

print("Too low! Try again.")

elif guess > secret\_number:

print("Too high! Try again.")

else:

print(f"Congratulations! You've guessed the correct number: {secret\_number}.")

break5

except ValueError:

print("Invalid input. Please enter a number.")

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

number\_guessing\_game()

**5. Multiplication Table**

**Write a program that prompts the user to enter a number.**

**o Generate and display the multiplication table for that number (from 1 to 10).**

**Ans:**

def print\_multiplication\_table(number):

print(f"Multiplication Table for {number}:")

for i in range(1, 11):

print(f"{number} x {i} = {number \* i}")

def main():

try:

number = int(input("Enter a number to generate its multiplication table: "))

print\_multiplication\_table(number)

except ValueError:

print("Invalid input. Please enter a valid number.")

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

main()

**6. Factorial Calculator**

**Write a program that prompts the user to enter a non-negative integer.**

**o Calculate the factorial of the number (n!) using a loop.**

**o Display the result.**

**Ans:**

def calculate\_factorial(n):

if n < 0:

raise ValueError("Factorial is not defined for negative numbers.")

factorial = 1

for i in range(1, n + 1):

factorial \*= i

return factorial

def main():

try:

number = int(input("Enter a non-negative integer to calculate its factorial: "))

if number < 0:

print("Invalid input. Please enter a non-negative integer.")

else:

result = calculate\_factorial(number)

print(f"The factorial of {number} is {result}.")

except ValueError:

print("Invalid input. Please enter a valid integer.")

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

main()

**7. Palindrome Checker**

**Write a program that prompts the user to enter a word or phrase.**

**o Check if the entered text is a palindrome (reads the same forwards and**

**backwards).**

**o Print "The text is a palindrome" or "The text is not a palindrome" based on the**

**result.**

**Ans:**

import string

def is\_palindrome(text):

text = text.lower()

text = ''.join(char for char in text if char.isalnum())

return text == text[::-1]

def main():

user\_input = input("Enter a word or phrase: ")

if is\_palindrome(user\_input):

print("The text is a palindrome.")

else:

print("The text is not a palindrome.")

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

main()

**8. List Sum Calculator**

**Write a program that initializes a list of numbers.**

**o Calculate and print the sum of all numbers in the list.**

**o Prompt the user to enter a number to add to the list.**

**o Update the list and print the new sum.**

**Ans:**

def main():

numbers = [10, 20, 30, 40, 50]

initial\_sum = sum(numbers)

print(f"Initial list: {numbers}")

print(f"Initial sum of the list: {initial\_sum}")

try:

new\_number = float(input("Enter a number to add to the list: "))

numbers.append(new\_number)

new\_sum = sum(numbers)

print(f"Updated list: {numbers}")

print(f"New sum of the list: {new\_sum}")

except ValueError:

print("Invalid input. Please enter a valid number.")

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

main()