Smart Inters/Smart Bridge - APSCHE

Google Ai ML Long-Term Internship

Assignment - I

#1. Write a Python program to calculate the area of a rectangle given its length and width.

Code:

```
def calculate_rectangle_area(length, width):
 return length * width

def main():
  length = float(input("Enter the length of the rectangle: "))
  width = float(input("Enter the width of the rectangle: "))

  area = calculate_rectangle_area(length, width)
  print("The area of the rectangle is:", area)
if __name__ =="__main__":
  main()
```

Output:

```
Enter the length of the rectangle: 12
Enter the width of the rectangle: 12
The area of the rectangle is: 144.0
```

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#2. Write a program to convert miles to kilometers

Code:

```
def miles_to_kilometers(miles):
    kilometers = miles * 1.60934
    return kilometers

def main():
    miles = float(input("Enter the distance in miles: "))
    kilometers = miles_to_kilometers(miles)
    print(f"{miles} miles is equal to {kilometers} kilometers.")

if __name__ == "__main__":
    main()
    # Define numbers in a list
    numbers = [1,2,3,4,5]
    largest = 0
    for num in numbers:
      if num > largest:
        largest = num
        second_largest = largest
      elif num > second_largest:
        second_largest = num
```

Output:

```
Enter the distance in miles: 13
13.0 miles is equal to 20.92142 kilometers.
```

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#3. Write a function to check if a given string is a palindrome

Code:

```
def is_palindrome(s):
  # Convert the string to lowercase and remove non-alphanumeric
characters
  s = ''.join(char.lower() for char in s if char.isalnum())

  # Check if the string is equal to its reverse
  return s == s[::-1]
# Test the function
def main():
  test_string = input("Enter a string: ")
  if is_palindrome(test_string):
    print("The string is a palindrome.")
  else:
    print("The string is not a palindrome.")

if __name__ == "__main__":
  main()
```

Output:

```
Enter a string: radar
The string is a palindrome.
```

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#4. Write a Python program to find the second largest element in a list

Code:

```
def second_largest(numbers):
    if len(numbers) < 2:
        return "List must have at least two elements"

    largest = second_largest = float('-inf')

    for num in numbers:
        if num > largest:
            second_largest = largest
            largest = num
        elif num > second_largest and num != largest:
            second_largest = num

    if second_largest == float('-inf'):
        return "There is no second largest element"
    else:
        return second_largest

# Test the function
def main():
    nums = [int(x) for x in input("Enter elements of the list separated
by space: ").split()]
    result = second_largest(nums)
    print("The second largest element in the list is:", result)

if __name__ == "__main__":
    main()
```

Output:

```
Enter elements of the list separated by space: 1 3 4 6 8
The second largest element in the list is: 6
```

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Assignment - I

#5. Explain what indentation means in Python

Code:

```
x=15
if x > 5:
  print("x is greater than 5")
  print("This line is also part of the if block")

print("This line is not indented, so it's not part of the if block")
```

Output:

```
x is greater than 5
This line is also part of the if block
This line is not indented, so it's not part of the if block
```

#6. Write a program to perform set difference operation

Code:

```
def set_difference_using_operator(set1, set2):
    return set1 - set2

def set_difference_using_method(set1, set2):
    return set1.difference(set2)

# Test the functions
def main():
    set1 = {9,8,5,4,3,2}
    set2 = {2,4,7,5,8,9}

    difference_operator = set_difference_using_operator(set1, set2)
    difference_method = set_difference_using_method(set1, set2)

    print("Set difference using operator:", difference_operator)
    print("Set difference using method:", difference_method)

if __name__ == "__main__":
    main()
```

Output:

```
Set difference using operator: {3}
Set difference using method: {3}
```

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#7. Write a Python program to print numbers from 1 to 10 using a while loop

Code:

```
def print_numbers():
  num = 1
  while num <= 5:
    print(num)
    num += 1

# Test the function

def main():
  print("Numbers from 1 to 10:")
  print_numbers()


if __name__ == "__main__":
  main()
```

Output:

```
Numbers from 1 to 10:
1
2
3
4
5
```

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#8. Write a program to calculate the factorial of a number using a while loop

Code:

```
def factorial(n):
    if n < 0:
        return "Factorial is not defined for negative numbers"
    elif n == 0:
        return 1
    else:
        result = 1
        while n > 0:
            result *= n
            n -= 1
        return result

# Test the function
def main():
    num = int(input("Enter a number to calculate its factorial: "))
    print("Factorial of", num, "is", factorial(num))

if __name__ == "__main__":
    main()
```

Output:

```
Enter a number to calculate its factorial: 15
Factorial of 15 is 1307674368000
```

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#9. Write a Python program to check if a number is positive, negative, or zero using if-elif-else

Code:

```
def check_number(num):
    if num > 0:
        print("The number is positive.")
    elif num < 0:
        print("The number is negative.")
    else:
        print("The number is zero.")

# Test the function
def main():
    num = float(input("Enter a number: "))
    check_number(num)

if __name__ == "__main__":
    main()
```

Output:

```
Enter a number: -23
The number is negative.
```

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#10. Write a program to determine the largest among three numbers using conditional

Code:

```
def find_largest(num1, num2, num3):
    if num1 >= num2 and num1 >= num3:
        return num1
    elif num2 >= num1 and num2 >= num3:
        return num2
    else:
        return num3

# Test the function
def main():
    num1 = float(input("Enter the first number: "))
    num2 = float(input("Enter the second number: "))
    num3 = float(input("Enter the third number: "))
    largest = find_largest(num1, num2, num3)
    print("The largest number among", num1, ",", num2, ", and", num3,
"is", largest)

if __name__ == "__main__":
    main()
```

Output:

```
Enter the first number: 25
Enter the second number: 32
Enter the third number: 51
The largest number among 25.0 , 32.0 , and 51.0 is 51.0
```

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#11. Write a Python program to create a numpy array filled with ones of given shape

Code:

```
import numpy as np

def create_ones_array(shape):
    return np.ones(shape)

# Test the function
def main():
    shape = tuple(map(int, input("Enter the shape of the array
(separated by spaces): ").split()))
    ones_array = create_ones_array(shape)
    print("Array of ones with shape", shape, ":\n", ones_array)

if __name__ == "__main__":
    main()
```

Output:

```
Enter the shape of the array (separated by spaces): 3 2
Array of ones with shape (3, 2) :
 [[1. 1.]
 [1. 1.]
 [1. 1.]]
```

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Assignment - I

#12. Write a program to create a 2D numpy array initialized with random integers

Code:

```
import numpy as np

def create_random_array(rows, cols):
    return np.random.randint(0, 100, size=(rows, cols))

# Test the function
def main():
    rows = int(input("Enter the number of rows: "))
    cols = int(input("Enter the number of columns: "))
    random_array = create_random_array(rows, cols)
    print("Random array:\n", random_array)

if __name__ == "__main__":
    main()
```

Output:

```
Enter the number of rows: 4
Enter the number of columns: 2
Random array:
 [[92  0]
 [92 21]
 [17 77]
 [12 27]]
```

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#13. Write a Python program to generate an array of evenly spaced numbers over a specified

Code:

```
import numpy as np

def generate_evenly_spaced(start, stop, num):
    return np.linspace(start, stop, num)

# Test the function
def main():
    start = float(input("Enter the start value: "))
    stop = float(input("Enter the stop value: "))
    num = int(input("Enter the number of elements: "))
    evenly_spaced_array = generate_evenly_spaced(start, stop, num)
    print("Array of evenly spaced numbers:\n", evenly_spaced_array)

if __name__ == "__main__":
    main()
```

Output:

```
Enter the start value: 2
Enter the stop value: 26
Enter the number of elements: 6
Array of evenly spaced numbers:
 [ 2.   6.8 11.6 16.4 21.2 26. ]
```