Date: February 14, 2024

SMART INTERNZ - APSCHE

AI / ML Training

Assessment 1

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

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

2. Write a program to convert miles to kilometres.

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

miles = float(input("Enter the distance in miles: "))
kilometers = miles_to_kilometers(miles)
print("Distance in kilometers:", kilometers)
```

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

```
def is_palindrome(s):
    return s == s[::-1]
string = input("Enter a string: ")
if is_palindrome(string):
    print("It's a palindrome!")
else:
    print("It's not a palindrome.")
```

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

```
def second_largest(numbers):
    sorted_numbers = sorted(set(numbers))
    if len(sorted_numbers) < 2:
        return "List doesn't have a second largest element."
    else:
        return sorted_numbers[-2]
numbers = [int(x) for x in input("Enter numbers separated by spaces: ").split()]
print("Second largest element is:", second_largest(numbers))
```

5. Explain what indentation means in Python.

Indentation in Python: Indentation refers to the spaces or tabs at the beginning of a code line. In Python, indentation is used to indicate a block of code. It's crucial for defining the structure and hierarchy of the code, particularly within control flow statements (such as if, for, while) and function definitions.

6. Write a program to perform set difference operation.

```
set1 = {1, 2, 3, 4, 5}
set2 = {4, 5, 6, 7, 8}
difference = set1 - set2
print("Set difference:", difference)
```

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

```
num = 1
while num <= 10:
    print(num)
    num += 1
```

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

```
def factorial(n):
    result = 1
    while n > 0:
        result *= n
        n -= 1
    return result

number = int(input("Enter a number: "))
print("Factorial of", number, "is", factorial(number))
```

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

```
num = float(input("Enter a number: "))

if num > 0:
    print("Positive number")
elif num == 0:
    print("Zero")
else:
    print("Negative number")
```

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

```
num1 = float(input("Enter first number: "))
num2 = float(input("Enter second number: "))
num3 = float(input("Enter third number: "))

if num1 >= num2 and num1 >= num3:
    largest = num1
elif num2 >= num1 and num2 >= num3:
    largest = num2
else:
    largest = num3

print("The largest number is", largest)
```

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

```
import numpy as np

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

shape = tuple(map(int, input("Enter the shape of the array (comma-separated): ").split(',')))
ones_array = create_ones_array(shape)
print("Array of ones:")
print(ones_array)
```

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

```
import numpy as np

def create_random_integers_array(shape, low=0, high=100):
    return np.random.randint(low, high, shape)
```

```
rows = int(input("Enter the number of rows: "))
columns = int(input("Enter the number of columns: "))
random_array = create_random_integers_array((rows, columns))
print("2D Array of random integers:")
print(random_array)
```

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

```
import numpy as np

start = float(input("Enter the start of the range: "))
end = float(input("Enter the end of the range: "))
num_values = int(input("Enter the number of values: "))

evenly_spaced_array = np.linspace(start, end, num_values)
print("Array of evenly spaced numbers:")
print(evenly_spaced_array)
```

14. Write a program to generate an array of 10 equally spaced values between 1 and 100 using linspace.

```
import numpy as np

equally_spaced_values = np.linspace(1, 100, 10)
print("Array of 10 equally spaced values between 1 and 100:")
print(equally_spaced_values)
```

15. Write a Python program to create an array containing even numbers from 2 to 20 using arange.

```
import numpy as np
even_numbers_array = np.arange(2, 21, 2)
print("Array containing even numbers from 2 to 20:")
print(even_numbers_array)
```

16. Write a program to create an array containing numbers from 1 to 10 with a step size of 0.5 using a range.

```
import numpy as np
array_with_step = np.arange(1, 10.5, 0.5)
print("Array containing numbers from 1 to 10 with a step size of 0.5:")
print(array_with_step)
```