Assignment - 1

1) Write a python program to calculate the area of a rectangle given its length & width

Ans:- The area of a rectangle with a length of 5 units and a width of 10 units is calculated to be 50 square units ~~is~~ calculated using formula.

($\text{Area} = \text{length} \times \text{width}$)

2] write a program to convert miles to kilometers

Ans:- To convert 5 miles to kilometers, we use the conversion factor (1 mile = 1.60934 kilometers).
thus, 5 miles is equivalent to approximately 8.0467 kilometers

3] write a function to check if a given string is a plaindrome.

Ans:- The function to check if a given string is a palindrome returns.
* True for the string "racecar".

indicating it is a palindrome.

* False for the string "hello", indicating it is not a palindrome

4] write a python program to find the second largest element in a list

Ans: The second largest element in the example list ([10, 20, 4, 45, 99, 45, 99]) is found to be (45), after removing duplicates and sorting the unique elements.

5] Explain what indentation means in python

Ans: In python, indentation refers to the use of whitespace (spaces or tabs) at the beginning of a line to define the level of grouping of statements. It is a critical aspect of python syntax that differentiates it from many other programming languages which use braces ({}) or keywords to define blocks or code. Indentation in python serves two primary purposes.

1. To indicate a block of code
Python uses indentation to define the blocks of code associated with control each new block of back to the previous level when the block ends.

2. To enhance readability:
Consistent use of indentation makes Python code very readable. Since the blocks of code are visually separated by indentation levels, it becomes easier to understand the flow of a program & the relationships between different parts of the code.
Failure to properly indent code in Python results in a indentation Error, making the code unable to run. This strict enforcement encourages a uniform coding style & contributes to the readability & maintainability Python code.

6] write a program to perform set difference operation.

Ans: The program performs a set difference operation on two example.

sets ({1, 2, 3, 4, 5}) & ({4, 5, 6, 7, 8}), resulting in ({1, 2, 3}). This represents the elements that are in the first set but not in the second set.

7] write a python program to print numbers from 1 to 10 using a while loop.

Ans: The python program successfully printed 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.

Ans The program calculated the factorial of the number 5 using a while loop, resulting in (120). The factorial of a number (n) is the product of all positive integers less than equal to (n), denoted as (n!).

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

```
        result *= n
        n -= 1
    return result
```

9] write a python program to check if a number is positive negative, or zero using if-elif-else statements.

Ay:- the python program checks if a number is positive, negative, or zero using if-elif-else statements & returns.

* for the number 10, it returns "positive"
* For the number -5, it returns "Negative"
* For the number 0, it returns "zero"

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

Ay:- the program determines the largest among three numbers (10), (14), & (12) using conditional statements, & identifies (14) as the largest number.

```
num1 = float(input("Enter first number:"))
num2 = float(input("Enter second number:"))
num3 = float(input("Enter third number:"))
if num1 >= num2 & num1 >= num3:
    largest = num1
elif num2 >= num1 & 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.

Ans:- the python program created a Numpy array filled with ones leaving the shape of 3 rows and 4 columns, as specified.

12] write a program to create a 2D numpy array initialized with random integers.

Ans:- the program created a 2D Numpy array with the shape of 3 raws & 4 columns, initialized with random integers ranging from 1 to 9 (inclusive)

13] write a python program to generate an array of evenly spaced numbers over a specified range using linspace.

Ans:- the python program generated an array of evenly spaced numbers over the specified range from

0 to 10.

```
import numpy as np
# Define the range and the number
of elements
    start = 0
    stop = 10
    num - elements = 5
# Generate the array
result = np. linspace (start, stop, num
                        - elements)
# print the result
print (result).
```

14] write a program to generate an array of 10 equally spaced values between 1 & 100 using linspace.

Ans: the program generated an array of 10 equally spaced values between 1 & 100, resulting in the array ([1, 12, 23, 34, 45, 56, 67, 78, 89, 100])

```
import numpy as np
# Generate the array
result = np . linspace (1, 100, 10)
# print the result
print (result)
```

15] write a python program to create an array containing even numbers from 0 to 20 using arrange

Ans: We can use Numpy's arange function to create an array containing even numbers from 2 to 20. Here's the python program:

```
import numpy as np
# Generate the array
result = np.arange(2,21,2)
# print the result
print(result)
```

In this program, np.arange(2,21,2) generates an array starting from 2, ending at 20 (exclusive), with a step size of 2. The result is an array [2, 4, 6, 8, 10, 12, 14, 16, 18, 20], which contains the even numbers from 2 to 20.

[6] write a program to create an array containing numbers from 1 to 10 with a step size of 0.5 using arange.

Ans: The program created an array containing numbers from 1 to 10 with a step size of 0.5, resulting in the array ([1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10]) using np

```
# print the result.
print result.
```