SMART INTERNZ ASSESSMENT 1

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

```
[1] length = float(input("Enter the l of the rectangle: "))
    width = float(input("Enter the w of the rectangle: "))
    area = length * width
    print("The area of the rectangle is:", area)
```

```
Enter the l of the rectangle: 5
Enter the w of the rectangle: 2
The area of the rectangle is: 10.0
```

2. Write a program to convert miles to kilometers

```
[2] miles = float(input("Enter the distance in miles: "))
    kilometers = miles * 1.60934
    print("The distance in kilometers is:", kilometers)
```

```
Enter the distance in miles: 5
The distance in kilometers is: 8.0467
```

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

```
[3] def is_palindrome(s):
        return s == s[::-1]
    input_string = input("Enter a string: ")
    if is_palindrome(input_string):
        print("The string is a palindrome.")
    else:
        print("The string is not a palindrome.")
```

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

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

```
[4] nums = [int(x) for x in input("Enter the list of numbers: ").split()]
    if len(nums) < 2:
        print("List must have at least two elements")
    else:
        nums.sort()
        print("The second largest element is:", nums[-2])
```

```
Enter the list of numbers: 1 25 86 02 3 40 5
The second largest element is: 40
```

5. Explain what indentation means in Python.

Indentation refers to the spaces at the beginning of a code line.Where in other programming languages the indentation in code is for readability only, the indentation in Python is very important.

Python uses indentation to indicate a block of code.

Python indentation refers to adding white space before a statement to a particular block of code. In another word, all the statements with the same space to the right, belong to the same code block.

if 5 > 2:

print("Five is greater than two!")

if 5 > 2:

print("Five is greater than two!") **ERROR!!!**

6. Write a program to perform set difference operation

```
[5]  set1 = {14, 28, 31, 40, 55}
     set2 = {31, 14, 55, 60, 71}
     difference = set1 - set2
     print("Set difference:", difference)
```

```
Set difference: {40, 28}
```

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
```

```
1
2
3
4
5
6
7
8
9
10
```

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

```
number = int(input("Enter a number: "))
factorial = 1
while number > 0:
    factorial *= number
    number -= 1
print("Factorial is:", factorial)
```

```
Enter a number: 5
Factorial is: 120
```

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

```
number = float(input("Enter a number: "))
if number > 0:
    print("The number is positive.")
elif number < 0:
    print("The number is negative.")
else:
    print("The number is zero.")
```

```
Enter a number: 6
The number is positive.
```

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

```
num1 = float(input("Enter the first number: "))
num2 = float(input("Enter the second number: "))
num3 = float(input("Enter the 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 among", num1, ",", num2, ", and", num3, "is:", largest)
```

```
Enter the first number: 23
Enter the second number: 45
Enter the third number: 1
The largest number among 23.0 , 45.0 , and 1.0 is: 45.0
```

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

```
import numpy as np
rows = 2
cols = 2
min_val = 1
max_val = 10
random_array = np.random.randint(min_val, max_val + 1, size=(rows, cols))
print("Random 2D array with shape", (rows, cols), "and values between", min_val, "and", max_val, ":\n", random_array)
```

```
Random 2D array with shape (2, 2) and values between 1 and 10 :
 [[ 6 10]
 [ 3  7]]
```

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

```
[12] import numpy as np
     start = 1
     stop = 5
     num_points = 3
     result_array = np.linspace(start, stop, num_points)
     print("Array of", num_points, "evenly spaced numbers from", start, "to", stop, ":\n", result_array)
```

```
Array of 3 evenly spaced numbers from 1 to 5 :
 [1. 3. 5.]
```

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

```
import numpy as np
start = 1
stop = 100
num_points = 10
result_array = np.linspace(start, stop, num_points)
print("Array of", num_points, "equally spaced numbers from", start, "to", stop, ":\n", result_array)
```

```
Array of 10 equally spaced numbers from 1 to 100 :
 [  1.  12.  23.  34.  45.  56.  67.  78.  89. 100.]
```

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

```
[14] import numpy as np
     result_array = np.arange(2, 21, 2)
     print("Array of even numbers from 2 to 20:\n", result_array)
```

```
Array of even numbers from 2 to 20:
 [ 2  4  6  8 10 12 14 16 18 20]
```

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

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

```
Array of numbers from 1 to 10 with a step size of 0.5:
 [ 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. ]
```