ASSIGNMENT 1

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

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

```
def rectangle_area(length, width):
    if length < 0 or width < 0:
        return "Length and width must be non-negative values."

    area = length * width
    return area

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

result = rectangle_area(length, width)
print(result)
```

```
Enter the length of the rectangle: 10
Enter the width of the rectangle: 6
60.0
```

2. Write a program to convert miles to kilometers

```
def convert_miles_to_kilometers(miles):
  conversion_factor = 1.60934

  kilometers = miles * conversion_factor
  return kilometers

miles = float(input("Enter the number of miles: "))

kilometers = convert_miles_to_kilometers(miles)
print(f"{miles} miles is equal to {kilometers:.2f} kilometers.")
```

```
Enter the number of miles: 10
10.0 miles is equal to 16.09 kilometers.
```

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

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

```
def is_palindrome(text):
    clean_text = "".join(char.lower() for char in text if char.isalnum())

    return clean_text == clean_text[::-1]

print(is_palindrome("racecar"))
print(is_palindrome("hello"))
```

```
True
False
```

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

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

```
def second_largest(numbers):
  if len(numbers) < 2:
    return None

  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

  return second_largest

numbers = [10, 20, 5, 15, 25]
second_largest_number = second_largest(numbers)
print(f"The second largest number is: {second_largest_number}")
```

```
The second largest number is: 20
```

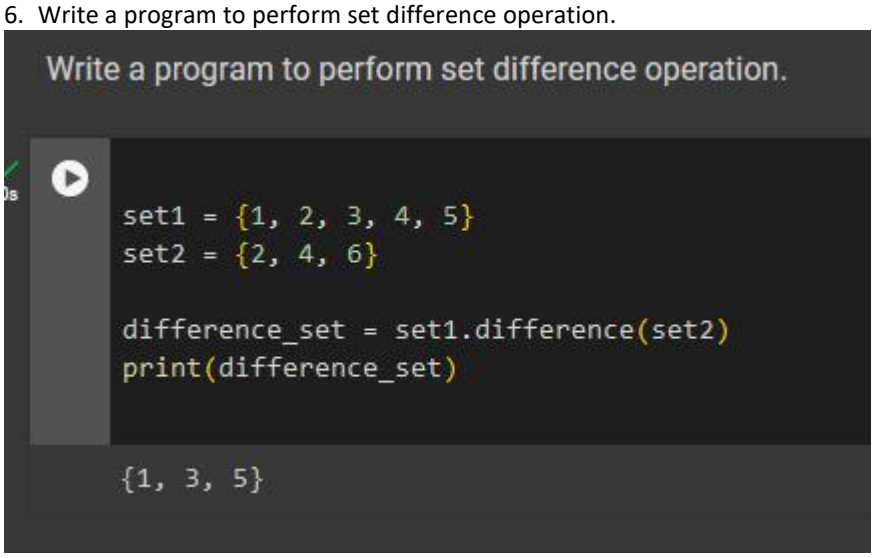
5. Explain what indentation means in Python.

A : In python, we use indentation to separate a block of code. Programming languages like c , java uses " { } " to separate a block of code from regular scope in same way in python use use 4 or 2 spaces indentation to separate the block.

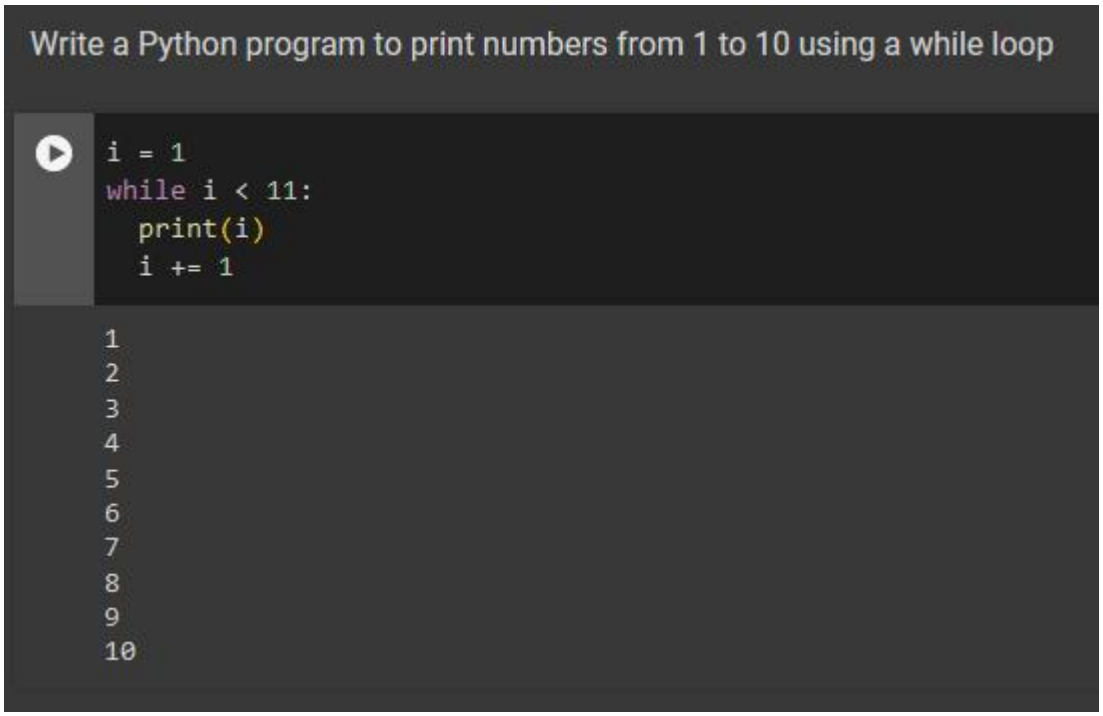
eg:

```
i = 0
while i < 10:
    print(i)
    i += 1
```

6. Write a program to perform set difference operation.



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



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

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

```
def factorial(n):
  if n < 0:
    return None

  result = 1
  i = 1
  while i <= n:
    result *= i
    i += 1

  return result

number = int(input("Enter a number :"))
fact = factorial(number)
print(f"The factorial of {number} is: {fact}")
```

```
Enter a number :10
The factorial of 10 is: 3628800
```

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

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

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

number = int(input("Enter a number: "))

result = check_number(number)
print(result)
```

```
Enter a number: 69
The number is positive.
```

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

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

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

num1 = int(input("Enter the first number: "))
num2 = int(input("Enter the second number: "))
num3 = int(input("Enter the third number: "))

largest_number = find_largest(num1, num2, num3)
print(f"The largest number among {num1}, {num2}, and {num3} is: {largest_number}")
```

```
Enter the first number: 69
Enter the second number: 150
Enter the third number: 76
The largest number among 69, 150, and 76 is: 150
```

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

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

```
import numpy as np

shape = (3, 4)

array_of_ones = np.ones(shape)

print(array_of_ones)
```

```
[[1. 1. 1. 1.]
 [1. 1. 1. 1.]
 [1. 1. 1. 1.]]
```

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

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

```
import numpy as np

shape = (3, 4)

random_array = np.random.randint(1,10, size=shape)

print(random_array)
```

```
[[7 9 4 2]
 [3 4 6 2]
 [1 4 5 7]]
```

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

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

```
import numpy as np

start = 0
end = 10

evenly_spaced_array = np.linspace(start, end)

print(evenly_spaced_array)
```

```
[ 0.         0.20408163  0.40816327  0.6122449   0.81632653  1.02040816
  1.2244898   1.42857143  1.63265306  1.83673469  2.04081633  2.24489796
  2.44897959  2.65306122  2.85714286  3.06122449  3.26530612  3.46938776
  3.67346939  3.87755102  4.08163265  4.28571429  4.48979592  4.69387755
  4.89795918  5.10204082  5.30612245  5.51020408  5.71428571  5.91836735
  6.12244898  6.32653061  6.53061224  6.73469388  6.93877551  7.14285714
  7.34693878  7.55102041  7.75510204  7.95918367  8.16326531  8.36734694
  8.57142857  8.7755102   8.97959184  9.18367347  9.3877551   9.59183673
  9.79591837 10.        ]
```

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

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

```
import numpy as np

start = 1
end = 100

num_of_elements = 10

evenly_spaced_array = np.linspace(start, end, num_of_elements)

print(evenly_spaced_array)
```

```
[  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.

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

```
import numpy as np

start = 2
end = 20
step = 2

even_numbers_array = np.arange(start, end + 1, step)

print(even_numbers_array)
```

```
[ 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 arange

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

```
import numpy as np

start = 1
end = 10

step = 0.5

array_with_step = np.arange(start, end + step, step)

print(array_with_step)
```

```
[ 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. ]
```