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

A.
```
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)
```

2. Write a program to convert miles to kilometers ?

A.
```
miles = int(input("Please enter miles:"))
print(miles*1.6, " Kms")
```

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

A.
```
def isPalindrome(str):
if (str == str[::-1]) :
return "The string is a palindrome."
else:
return "The string is not a palindrome."
str = input ("Enter string: ")
print(isPalindrome(str))
```

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

A.
```
def find_second_largest(numbers):
first_largest = second_largest = float('-inf')
for num in numbers:
if num > first_largest:
second_largest = first_largest
first_largest = num
elif num > second_largest and num != first_largest:
second_largest = num
return second_largest
numbers = [int(x) for x in input().split()]
print(find_second_largest(numbers))
```

5. Explain what indentation means in Python ?

A. 1. Indentation can be achieved by four spaces or tab space in workspace
2. It helps Python determine the structure of the code
3. It helps Python determine the scope of various constructs like loops, conditionals, and function definitions.

Effects:
1. syntax errors
2. change the logical structure of the code
3. potentially leading to unintended behaviour.

Example:
```
If(age>=18):
Print  (“Eligible to vote”)
else:
Print(“Not Eligible to vote”)
```
(The print statement outside the if block is not indented, indicating that it is not part of the if block.)

6. Write a program to perform set difference operation ?

A.
```
def set_difference(set1, set2):
 return set1 - set2

set1 = {1, 2, 3, 4, 5}
set2 = {4, 5, 6, 7, 8}

result = set_difference(set1, set2)
print("Set difference:", result)
```

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

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

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

A.
```
def factorial(n):
      result = 1
     while n > 0:
          result *= n
          n -= 1
 return result
number = int(input("Enter a number: "))
print("Factorial:", factorial(number))
```

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

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

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

A.
```
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
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 is:", largest)
```

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

A.
```
import numpy as np
print(np.ones(int(input(" "))))
```
(or)
```
import numpy as np
i = input("Enter the shape of the array separated by spaces : ")
print(np.ones(tuple(map(int, i.split()))))
#i- input by user is "3 4".
#split()- returns a list of substrings. it returns ["3", "4"].
#map()-converts each string in the list to an integer. It becomes [3, 4].
#tuple()-converts the map object returned by map() into a tuple.(3,4).
```

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

A.
```
import numpy as np
rows = int(input("Enter the number of rows: "))
cols = int(input("Enter the number of columns: "))
start = int(input("Enter the begin value of range: "))
stop = int(input("Enter the last value of range: "))
print(np.random.randint(strat,stop,(rows, cols)))
```

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

A. Syntax: np.linspace(start,end,number of elements)-evenly spaced step size
```
import numpy as np
start = int(input("Enter the start of the range: "))
end = int(input("Enter the end of the range: "))
num= int(input("Enter the number of points: "))
print(np.linspace(start, end, num))
```

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

A.
```
import numpy as np
print(np.linspace(1, 100, 10))
```

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

A. Syntax: np.arange(stat,end,stepsize)-number of elements will depend on stepsize and end value

Note: end value should be exceed up on one by our required value
```
import numpy as np
print(np.arange(2, 21, 2))
```

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

A. using arange.

```
import numpy as np
print(np.arange(1, 11, 0.5))
```