ASSIGNMENT-1

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

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

# Get length and width from user
length = float(input("Enter the length of the rectangle: "))
width = float(input("Enter the width of the rectangle: "))

# Calculate and print the area
area = area_of_rectangle(length, width)
print(f"The area of the rectangle is: {area}")
```

2. Write a program to convert miles to kilometers

```
def convert_distance(miles):
    km = miles * 1.6
     # approximately 1.6 km in 1 mile

    return km

result = convert_distance(55)
print("The distance in kilometers is " + str(result))
print("The round-trip in kilometers is " + str(result*2))
```

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

```
    def is_palindrome(s):

    s = s.lower()
    s = ''.join(c for c in s if c.isalnum())
    return s == s[::-1]
```

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

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

    first, second = (float('-inf'), float('-inf')) if numbers[0] < numbers[1] else (numbers[1], numbers[0])

    for number in numbers[2:]:
        if number > first:
            second = first
            first = number
        elif first > number > second:
            second = number

    return second
```

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5. Explain what indentation means in Python.

```
# In Python, indentation is crucial for the correct interpretation of the code. It is used to define the scope
of the code blocks. Indentation is typically done using spaces or tabs. The number of spaces or tabs used for
indentation is not fixed, but it is recommended to use 4 spaces per indentation level for better readability.
```

```
def function():
    print("This is the first line of the function.")
    print("This is the second line of the function.")

function()
```

6. Write a program to perform set difference operation.

```
# Define two sets
set1 = {1, 2, 3, 4, 5}
set2 = {4, 5, 6, 7, 8}

# Find the set difference between set1 and set2
diff_set = set1.difference(set2)

# Print the result
print("Set1 - Set2 =", diff_set)

# Find the set difference between set2 and set1
diff_set = set2.difference(set1)

# Print the result
print("Set2 - Set1 =", diff_set)
```

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

```
# Initialize the counter variable to 1
counter = 1

# Continue printing numbers while the counter is less than or equal to 10
while counter <= 10:
    print(counter)
    counter += 1
```

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

```
# Get the number from the user
num = int(input("Enter a number: "))

# Initialize the factorial to 1
factorial = 1

# Continue calculating the factorial while the number is greater than 0
while num > 0:
    factorial *= num
    num -= 1

# Print the result
print("The factorial of", num, "is", factorial)
```

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

```
# Get the number from the user
num = float(input("Enter a number: "))
# Check if the number is positive, negative, or zero
if num > 0:
    print("The number is positive.")
elif num < 0:
    print("The number is negative.")
else:
    print("The number is zero.")
```

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

```
# Get the three numbers from the user
num1 = float(input("Enter the first number: "))
num2 = float(input("Enter the second number: "))
num3 = float(input("Enter the third number: "))

# Determine the largest among the three numbers
if num1 >= num2 and num1 >= num3:
    largest = num1
elif num2 >= num1 and num2 >= num3:
    largest = num2
else:
    largest = num3

# Print the result
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

# Get the shape of the array from the user
rows = int(input("Enter the number of rows: "))
cols = int(input("Enter the number of columns: "))

# Create a NumPy array filled with ones of the given shape
arr = np.ones((rows, cols))

# Print the resulting array
print(arr)
```

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

```
import numpy as np

# Get the shape of the array from the user
rows = int(input("Enter the number of rows: "))
cols = int(input("Enter the number of columns: "))

# Create a NumPy array initialized with random integers of the given shape
arr = np.random.randint(10, size=(rows, cols))

# Print the resulting array
print(arr)
```

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

```
import numpy as np

# Get the start, end, and number of elements from the user
start = float(input("Enter the start of the range: "))
end = float(input("Enter the end of the range: "))
num_elements = int(input("Enter the number of elements: "))

# Generate an array of evenly spaced numbers over the specified range
arr = np.linspace(start, end, num_elements)

# Print the resulting array
print(arr)
```

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

```
import numpy as np

# Generate an array of 10 equally spaced values between 1 and 100
arr = np.linspace(1, 100, 10)

# Print the resulting array
print(arr)
```

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

```
import numpy as np

start = 2
stop = 21
step = 2

arr = np.arange(start, stop, step)

print(arr)
```

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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

start = 1
stop = 10.5
step = 0.5

arr = np.arange(start, stop, step)

print(arr)
```
