

1.write a python program to calculate the area of a rectangle given its length and width.

Code:

```
def calculate_rectangle_area(length, width):  
    area = length * width  
    return area  
  
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(f"The area of the rectangle with length {length}  
and width {width} is: {area}")
```

2.write a program to convert miles to kilometers.

Code:

```
def miles_to_kilometers(miles):  
    kilometers = miles * 1.60934  
    return kilometers  
  
miles = float(input("Enter the distance in miles: "))  
kilometers = miles_to_kilometers(miles)  
print(f"{miles} miles is equal to {kilometers}  
kilometers")
```

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

Code:

```
def is_palindrome(s):  
    s = s.replace(" ", "").lower()  
    return s == s[::-1]  
  
input_string = input("Enter a string to check if it's a  
palindrome: ")  
  
if is_palindrome(input_string):  
    print(f"{input_string} is a palindrome.")  
else:  
    print(f"{input_string} is not a palindrome.")
```

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

Code:

```
def second_largest_element(nums):  
    if len(nums) < 2:  
        return "List should have at least two elements."  
    sorted_nums = sorted(set(nums), reverse=True)  
    return sorted_nums[1]  
  
input_list = list(map(int, input("Enter a list of numbers  
separated by space: ").split()))  
  
result = second_largest_element(input_list)  
  
print(f"The second largest element in the list is:  
{result}")
```

5.Explain what indentation means in python?

Code:

```
for i in range(5):  
    print(i)
```

6.write a program to perform set difference operation.

Code:

```
def set_difference(set_a, set_b):  
    return set_a - set_b  
  
if __name__ == "__main__":  
    set_a = {1, 2, 3, 4, 5}  
    set_b = {3, 4, 5, 6, 7}  
  
result = set_difference(set_a, set_b)  
print(f"Set A: {set_a}")  
print(f"Set B: {set_b}")  
print(f"Set A - B (Difference): {result}")
```

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

Code:

```
number = 1
while number <= 10:
    print(number)
    number += 1
```

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

Code:

```
def calculate_factorial(number):
    result = 1
    while number > 0:
        result *= number
        number -= 1
    return result

if __name__ == "__main__":
    input_number = 5
    factorial_result = calculate_factorial(input_number)
```

```
print(f"The factorial of {input_number} is:  
{factorial_result}")
```

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

Code:

```
def check_number_sign(number):  
    if number > 0:  
        return "Positive"  
    elif number < 0:  
        return "Negative"  
    else:  
        return "Zero"  
  
if __name__ == "__main__":  
    input_number = float(input("Enter a number: "))  
    sign_result = check_number_sign(input_number)  
    print(f"The number {input_number} is  
{sign_result}.")
```

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

Code:

```
def find_largest_number(num1, num2, num3):  
    if num1 >= num2 and num1 >= num3:  
        return num1  
    elif num2 >= num1 and num2 >= num3:  
        return num2  
    else:  
        return num3  
  
if __name__ == "__main__":  
    num1 = float(input("Enter the first number: "))  
    num2 = float(input("Enter the second number: "))  
    num3 = float(input("Enter the third number: "))  
    largest_number = find_largest_number(num1, num2,  
num3)  
    print(f"The largest number among {num1}, {num2},  
and {num3} is: {largest_number}")
```



11.write a python program to create a numpy array filled with ones of given shape.

Code:

```
import numpy as np

def create_ones_array(shape):
    ones_array = np.ones(shape)
    return ones_array

if __name__ == "__main__":
    array_shape = tuple(map(int, input("Enter the shape
of the array (comma-separated values): ").split(',')))
    ones_array = create_ones_array(array_shape)

    print(f"Array of ones with shape
{array_shape}:\n{ones_array}")
```

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

Code:

```
import numpy as np
rows = int(input("Enter the number of rows: "))
cols = int(input("Enter the number of columns: "))
low = int(input("Enter the lower bound (default: 0): ")
or 0)
high = int(input("Enter the upper bound (default: 100): ")
or 100)
array = np.random.randint(low, high + 1, size=(rows,
cols))
print(array)
```

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

Code:

```
import numpy as np
def generate_linspace_array(start, stop, num):
    linspace_array = np.linspace(start, stop, num)
    return linspace_array
```

```

if __name__ == "__main__":
    start_value = float(input("Enter the start value: "))
    stop_value = float(input("Enter the stop value: "))
    num_elements = int(input("Enter the number of
elements: "))

    linspace_result =
generate_linspace_array(start_value, stop_value,
num_elements)

    print(f"Array of {num_elements} evenly spaced
numbers from {start_value} to
{stop_value}:\n{np.round(linspace_result, 2)}")

```

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

Code:

```

import numpy as np

def generate_linspace_array(start, stop, num):
    linspace_array = np.linspace(start, stop, num)
    return linspace_array

```

```
if __name__ == "__main__":  
    linspace_result = generate_linspace_array(1, 100, 10)  
  
    print(f"Array of 10 equally spaced values between 1  
and 100:\n{np.round(linspace_result, 2)}")
```

15.write a program to generate an array containing even numbers from 2 to 20 using linspace.

Code:

```
import numpy as np  
  
def generate_even_numbers(start, stop, step):  
    even_numbers_array = np.arange(start, stop + 1,  
step)  
    return even_numbers_array  
  
if __name__ == "__main__":
```

```
even_numbers_result = generate_even_numbers(2,
20, 2)

print(f"Array of even numbers from 2 to
20:\n{even_numbers_result}")
```

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

Code:

```
import numpy as np

def generate_array_with_step(start, stop, step):
    result_array = np.arange(start, stop + step, step)
    return result_array

if __name__ == "__main__":
```

```
result_array = generate_array_with_step(1, 10, 0.5)
```

```
print(f"Array from 1 to 10 with a step size of  
0.5:\n{result_array}")
```