Assignment 7

Due: 2020-05-01

1. Write a program to find the maximum of three numbers. (10 points)

```python
def max_of_three(a, b, c):
    return max(a, max(b, c))
```

2. Write a program that prompts the user to enter a sentence and then counts the number of occurrences of the letter “e”. (10 points)

```python
sentence = input("Enter a sentence: ")

num_e = sentence.count("e")

print("The letter 'e' appears", num_e, "times.")
```

3. Write a program that takes in two numbers and determines if the first number is greater than, less than, or equal to the second number. (10 points)

```python
num1 = float(input("Enter the first number: "))
num2 = float(input("Enter the second number: "))

if num1 > num2:
    print("The first number is greater.")
elif num1 < num2:
    print("The second number is greater.")
else:
    print("The numbers are equal.")
```

4. Write a program that calculates the area of a circle given its radius. (10 points)

```python
import math

radius = float(input("Enter the radius: "))

area = math.pi * radius ** 2

print("The area is", area)
```

5. Write a program that reads a list of numbers and prints out the smallest number. (10 points)

```python
numbers = [int(input("Enter a number: ")) for _ in range(5)]

print("The smallest number is", min(numbers))
```

6. Write a program that checks if a given year is a leap year. (10 points)

```python
year = int(input("Enter a year: "))

if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):
    print("The year is a leap year.")
else:
    print("The year is not a leap year.")
```

7. Write a program that takes a list of names as input and prints a dictionary mapping each name to its length. (10 points)

```python
names = input("Enter a list of names: ").split()

name_length = {name: len(name) for name in names}

print(name_length)
```

8. Write a program that converts temperatures from Celsius to Fahrenheit and vice versa. (10 points)

```python
def celsius_to_fahrenheit(celsius):
    return (celsius * 9/5) + 32

def fahrenheit_to_celsius(fahrenheit):
    return (fahrenheit - 32) * 5/9

celsius = float(input("Enter temperature in Celsius: "))

fahrenheit = celsius_to_fahrenheit(celsius)

print("Fahrenheit: ", fahrenheit)

fahrenheit = float(input("Enter temperature in Fahrenheit: "))

celsius = fahrenheit_to_celsius(fahrenheit)

print("Celsius: ", celsius)
```

9. Write a program that checks if a given number is a palindrome. (10 points)

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

original = number

reversed = 0

while number > 0:
    digit = number % 10
    reversed = reversed * 10 + digit
    number = number // 10

if original == reversed:
    print("The number is a palindrome.")
else:
    print("The number is not a palindrome.")
```

10. Write a program that generates a random password for a user. (10 points)

```python
import random
import string

length = 12

password = 
```

11. Write a program that calculates the factorial of a given number. (10 points)

```python
def factorial(n):
    if n == 0:
        return 1
    else:
        return n * factorial(n - 1)

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

print("Factorial of", number, "is", factorial(number))
```

12. Write a program that finds the greatest common divisor (GCD) of two numbers. (10 points)

```python
def gcd(a, b):
    while b:
        a, b = b, a % b
    return a

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

gcd_value = gcd(num1, num2)

print("GCD of", num1, "and", num2, "is", gcd_value)
```

13. Write a program that converts a binary number to its decimal equivalent. (10 points)

```python
binary = input("Enter a binary number: ")

decimal = int(binary, 2)

print("Decimal of", binary, "is", decimal)
```

14. Write a program that checks if a given string is a palindrome. (10 points)

```python
string = input("Enter a string: ")

if string == string[::-1]:
    print("The string is a palindrome.")
else:
    print("The string is not a palindrome.")
```

15. Write a program that calculates the power of a number. (10 points)

```python
base = float(input("Enter a base: "))

exponent = float(input("Enter an exponent: "))

result = base ** exponent

print("Result is", result)
```

16. Write a program that checks if a given number is a prime. (10 points)

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

if number < 2:
    print("The number is not a prime.")
else:
    for i in range(2, int(number ** 0.5) + 1):
        if number % i == 0:
            print("The number is not a prime.")
            break
    else:
        print("The number is a prime.")
```

17. Write a program that sorts a list of integers in ascending order. (10 points)

```python
numbers = [int(input("Enter a number: ")) for _ in range(5)]

sorted_numbers = sorted(numbers)

print(sorted_numbers)
```

18. Write a program that finds the roots of a quadratic equation. (10 points)

```python
import math

a = float(input("Enter a: "))
b = float(input("Enter b: "))
c = float(input("Enter c: "))

delta = b ** 2 - 4 * a * c

if delta < 0:
    print("The equation has no real roots.")
elif delta == 0:
    root = -b / (2 * a)
    print("The equation has one real root: ", root)
else:
    root1 = (-b + math.sqrt(delta)) / (2 * a)
    root2 = (-b - math.sqrt(delta)) / (2 * a)
    print("The equation has two real roots: ", root1, " and ", root2)
```

19. Write a program that encrypts a message using the Caesar cipher. (10 points)

```python
message = input("Enter a message: ")

shift = int(input("Enter a shift value: "))

encrypted_message = 
```

20. Write a program that calculates the area of a circle given its radius. (10 points)

```python
import math

radius = float(input("Enter the radius: "))

area = math.pi * radius ** 2

print("The area is", area)
```