

Question 1:

1. This code is saved in q1.py
2.
 - a) This program allows the user to enter final account value, annual interest rate in percent, and the number of years.
 - b) These numbers should be positive real numbers.
 - c) The output would be the initial deposit amount to obtain the final account value.
3. Execute as followings:

```
PS C:\Users\FlorenCE\Desktop\2020-2021 Term 2\CSC code\csc1001\Assignment1> python q1.py
Please enter the final account value: 1000
Please enter the annual interest rate: 2.3
Please enter the number of years: 5
The initial value is: 892.5279628922431
```

Question 2:

1. This code is saved in q2.py
2.
 - a) This program allows the user to enter a positive integer.
 - b) The output would be each of its digits one by one per line.
3. Execute as followings:

```
PS C:\Users\FlorenCE\Desktop\2020-2021 Term 2\CSC code\csc1001\Assignment1> python q2.py
Input number m: 10
n = 4
```

Question 3:

1. This code is saved in q3.py
2.
 - a) This program allows the user to enter a number.
 - b) The number should be a positive real number.
 - c) The output would be the smallest integer n such that n^2 is greater than m .
3. Execute as followings:

```
PS C:\Users\FlorenCE\Desktop\2020-2021 Term 2\CSC code\csc1001\Assignment1> python q3.py
Enter an integer: 3125
3
1
2
5
```

Question 4:

1. This code is saved in q4.py

2.

- a) This program allows the user to enter a number N .
- b) The number should be a positive integer. If not, the program will give corresponding hints.
- c) The output would be a table with N rows and 3 columns. In the m^{th} row, there would be 3 numbers: m , $m + 1$, and m^{m+1} .

3. Execute as followings:

```
PS C:\Users\FlorenCE\Desktop\2020-2021 Term 2\CSC code\csc1001\Assignment1> python q4.py
Input your row: 5
m      m + 1      m ** (m + 1)
1       2         1
2       3         8
3       4        81
4       5       1024
5       6      15625
```

Question 5:

1. This code is saved in q5.py

2.

- a) This program allows the user to enter an integer N .
- b) When the input is invalid, the program will give corresponding hints.
- c) The output would be all the prime numbers which are smaller than N . And there would be at most 8 prime numbers in each line.

3. Execute as followings:

```
PS C:\Users\FlorenCE\Desktop\2020-2021 Term 2\CSC code\csc1001\Assignment1> python q5.py
Number: 10
The prime numbers smaller than 10 include:
2       3       5       7
```

Question 6:

1. This code is saved in q6.py

2.

- a) This program allows the user to enter a function $f(x)$, the left endpoint a and the right endpoint b of the interval, and the number of sub-intervals n .
- b) The input $f(x)$ should be one of \sin , \cos and \tan . The endpoints of the interval should be numbers, and the left endpoint a should be smaller than the right endpoint b . The number n should be a positive integer. If not valid, the program will give corresponding hints.
- c) The output would be the calculation result of the numerical integration of $f(x)$ over interval $[a, b]$ divided into n sub-intervals, using the formula as follow:

$$\int_a^b f(x)dx \approx \sum_{i=1}^n \frac{b-a}{n} f\left(a + \frac{(b-a)}{n} \times (i - 1/2)\right)$$

3. Execute as followings:

```
PS C:\Users\FlorenCE\Desktop\2020-2021 Term 2\CSC code\csc1001\Assignment1> python q6.py
Enter the function name: sin
Enter left end point a: 2
Enter right end point b: 3
Enter number n: 17
The answer is: 0.5739284027838973
```