Report 3

Question 1

1. this code is saved in q1.py

2. this code will allow the user to enter the name, number of pedals, and price. By the set methods concerned, this program will set the input in the private data field and print automatically the three elements the user inputted, using the methods with regard to get.

3. this program needs the user to input the flower's name, which is a string type; input the flower's number of pedals, which is an int type; and input the flower's price, which is a float type. For price and number of pedals, if inputting the wrong type, it will remind you and ask you to reinput until you make it right.

4. sample executions:

When improper inputting:

```
C:\Users\surface\Desktop\CSC1001ASS3>c:/users/surface/appdata/local/programs/python/
python38/python.exe c:/Users/surface/Desktop/CSC1001ASS3/q1.py
Enter the name: Rose
enter the pedals: 7.8
invalid input, try again!
enter the pedals: -7
invalid input, try again!
enter the pedals: 7
enter the price: -3
invalid input, try again!
```

When proper inputting:

```
C:\Users\surface\Desktop\CSC1001ASS3>c:/users/surface/appdata/local/programs/python/python38/python.exe c:/Users/
surface/Desktop/CSC1001ASS3/q1.py
Enter the name: Rose
enter the pedals: 5
enter the price: 48.8
the name is Rose the number of pedal is 5 the price is 48.8
```

Question 2:

1. the code is saved in q2.py

2. this program will allow the user to input a polynomial in standard algebraic notation and out puts the first derivative of that polynomial.

3. the program will need the user to input a string. This string must be in the standard algebraic notation, which means that the string must be contain only the following notations: "* + - = ^ ." and digits. The coefficient must be in the front of the variable (an alpha, not necessarily x) and the order must be in the right of '^". If the coefficient =+1or -1, it can be neglected (e.g. 3*x^1 can be replaced by 3*x, 1*x^1 can be replaced by x, 1*x^3 can be replaced by x^3). All the inputs may not be in order.

4. sample executions

```
C:\Users\surface\Desktop\CSC1001ASS3>c:/users/surface/appdata/local/programs/python/p
ython38/python.exe c:/Users/surface/Desktop/CSC1001ASS3/q2.py
Enter a polynomial: 5*x^6-4*x^5+x^4-x^3-2*x^2+x-7
30*x^5-20*x^4+4*x^3-3*x^2-4*x+1
```

Question 3

1. the code is saved in q3.py

2. this code will simulate a simple ecosystem. This ecosystem contains bears and fishes. When the bears encounter the fish, the fish will be eaten. When the bear meets the bear or the fish meet the fish, they will create a new type of their own randomly into an empty position. The user will input numbers stand for the length, number of fish and number of bears. Moreover, the simulation process will repeat several times. In each simulation, the animals will move from the left to the right one by one. For the specific moving times, it is up to the input of the user.

3. this program will ask the user to input 4 integers, respectively representing the river's length, the number of bears, the number of fish, the number of bears, and the repeating times. Any invalid input will be asked to reinput.

4. sample executions:

1. The first fish doesn't move, the first Bear doesn't move, the second fish moves rightward, the third fish move rightward or stay still, the last bear move leftward.

```
C:\Users\surface\Desktop\CSC1001ASS3>c:/users/surface/appdata/local/programs/python/python38/python.exe c:/Users/sur
face/Desktop/CSC1001ASS3/q3.py
Enter the number of bear: 2
Enter the number of fish: 3
Enter the length of the river: 12
Enter the number for N: 1
the initial river is       ['N', 'N', 'F', 'N', 'N', 'N', 'B', 'F', 'N', 'N', 'F', 'B']
after 1 moves, the river is ['N', 'N', 'F', 'N', 'N', 'N', 'B', 'N', 'F', 'N', 'B', 'N']
```

2. the first bear moves rightward, the fishes all stay still, the second and third bears give birth to another bear (in the 5th position of the after-move.) the third bear moves rightward, the last bear stay still. Or could be the second bear stay still, the third bear moves right ward and the third and fourth bear give birth to the bear in position 5.

```
C:\Users\surface\Desktop\CSC1001ASS3>c:/users/surface/appdata/local/programs/python/python38/python.exe c:/Users/sur
face/Desktop/CSC1001ASS3/q3.py
Enter the number of bear: 4
Enter the number of fish: 2
Enter the length of the river: 10
Enter the number for N: 1
the initial river is       ['B', 'N', 'F', 'F', 'N', 'N', 'B', 'B', 'N', 'B']
after 1 moves, the river is ['N', 'B', 'F', 'F', 'B', 'N', 'B', 'N', 'B', 'B']
```

3. multiple moves:

```
C:\Users\surface\Desktop\CSC1001ASS3>c:/users/surface/appdata/local/programs/python/python38/python.exe c:/Users/sur
face/Desktop/CSC1001ASS3/q3.py
Enter the number of bear: 4
Enter the number of fish: 3
Enter the length of the river: 11
Enter the number for N: 3
the initial river is       ['F', 'N', 'N', 'N', 'B', 'B', 'F', 'B', 'B', 'N', 'F']
after 3 moves, the river is ['N', 'N', 'B', 'N', 'N', 'B', 'B', 'N', 'B', 'F', 'N']
```