Section C

Question 1.
Open the program called Question1.py from the link provided on Teams.
Enter your name in the space provided on Line 2.

This is a simple calculator program that can add and subtract two numbers. When this program is run it prompts the user to select addition or subtraction.

The user enters the letter 'a' if they wish to add the numbers or enters the letter 's' if they wish to subtract.

```
1  # Question 1(a)
2  # Name:
3
4  num1 = 9
5  num2 = 5
6
7  choice=str(input('Do you want to (a)dd or (s)ubtract?: '))
8
9  if choice == 'a':
10     print(num1+num2)
11 elif choice =='s':
12     print(num1-num2)
```

Modify the program to do the following:

(i) Add a #comment at the start of the program that states 'This calculator can only add and subtract'.

(ii) The user should be prompted to enter their name when the program runs. A **suitable variable** should be used to **store the name**:

```
Please enter your name: Martin
```

(iii) The program should **output the following to the screen**, including the **user's name**:

```
Welcome to the addition and subtraction Martin
```

(iv) The program currently adds or subtracts the two numbers stored in the variables num1 and num2. **Modify** the program so that the **user is asked** to **enter the numbers** that will be added or subtracted:

```
Please enter the first number for the calculation: 10
Please enter the second number for the calculation: 8
```

(v) Currently the program only displays the answer. In the above example, when addition is selected, the output is: 18 **Modify** the program so that it **outputs the equation and the answer**.
When the program is run the output may look as follows:

```
Do you want to (a)dd or (s)ubtract?: a
10 + 8 = 18
```

(vi) The program only works if the user enters a lowercase 'a' for addition or a lowercase 's' for subtraction. **Modify** the program so that it will still work if the user enters an **uppercase** 'A' for addition or an uppercase 'S' for subtraction.

```
Do you want to (a)dd or (s)ubtract?: A
10 + 8 = 18
```

(vii) If the user enters an invalid option (anything other than 'a', 'A', 's' or 'S') the program terminates without warning. **Modify** the program so that if the user selects any other option the program will **output a message stating: Invalid option**

```
Do you want to (a)dd or (s)ubtract?: p
Invalid Option
```

(viii) If the user enters an invalid option when prompted to select addition or subtraction the program terminates. **Modify** the program so that it will **continue to prompt** the user to select either addition or subtraction **until a valid option is selected**.
When the program is run the output may look as follows:

```
Do you want to (a)dd or (s)ubtract?: z
z
Invaid option
Do you want to (a)dd or (s)ubtract?: a
10 + 8 = 18
```

Question 2

Open the program called Question2.py from the link provided on Teams.

Enter your name in the space provided on line 2.
This file contains an empty list called **squared_numbers.**

The first squared number is 1 (1*1), the second squared number is 4 (2*2) etc.

```
1  # Question 2
2  # Name:
3
4  squared_numbers=[]
5
```

Write a Python program to do the following:

(i) Calculate the first 20 squared numbers and place them in the list **squared_numbers.** You are expected to use a loop and the **append()** method.
(ii) Print the list of **squared_numbers** to the screen.
(iii) Find the **mean and the median** of the list of numbers and output the mean and median to the user. You may use whatever method you like to find the mean and he median of the list.

When the program is run it may look something like below.

```
[1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400]
The mean is: 143.5
The median is: 110.5
```