# Problem 1

Write a program to solve the following problem:

The program reads from the user two arrays, the first array contains unknown number of elements while the second array (pattern) contains exactly two elements. The program searches the first array to count and record all occurrences of the second array. Then it prints how many times the second array (pattern) is found and where. The program should also ask the user to continue or not and according to the user decision the program re-ask the user to enter the arrays or to stop and say Good Bye!.

The input and output of the program should look like the shown example.

**Example:**

Enter array: 0 1 2 3 4 5 6 7 8 1 2 3 1 2 3

Enter pattern: 1 2

The pattern is found 3 time(s) at the following positions

[1 9 12]

Do you want to continue (y/n):y

Enter array: 0 1 2 3 4 5 6 7 8 1 2 3 1 2 3

Enter pattern: 1 6

The pattern is not found

Do you want to continue (y/n):y

Enter array: 0 1 2 3 4 5 6 7 8 1 2 3 1 2 3

Enter pattern: 8 1

The pattern is found 1 time(s) at the following positions

[8]

Do you want to continue (y/n):n

Good Bye!

# Problem 2

Write a program that reads from the user a vector A containing a long sequence of numbers. The program searches the vector to count and record all sign changes in the vector. If the vector does not have any sign changes, then the program asks the user to re-enter the vector. The program continues to ask the user to enter a vector till the user enters an empty vector. When the user enter a one element vector, the program prints a summary statement stating the number of entered vectors and total number of sign changes and say Good Bye!

The input and output of the program should look like the shown example.

**Example:**

Enter a vector: -1, 13, 4, -16, 8, 2, 11

3 sign changed are found

Enter a vector: 1, 2, -14, -5, -16, 8

2 sign changes are found

Enter a vector: 1, 2, 3, 4, 5, 6, 7, 8, 9

No sign changes are found! Reenter the vector: -1, -2, -3,-4, -5, -6, -7, -8,-9

No sign changes are found! Reenter the vector:1, 2, 3, 4, 5, 6, 7, 8, 9

No sign changes are found! Reenter the vector:1

You have entered 2 correct sequence(s) with 5 sign changes in total.

Good Bye!

Problem 3

Write a program to calculate area of ellipses. The input is a 3 arrays, ID, N, M where ID= the ID of the ellipse, N=minor axis, M= major axis.

Write a function called “CheckPos” to check if all elements of the arrays are positive or not. If any value is negative or zero, your function asks the user to re-enter the arrays again. Then, your program prints the ellipses information, shows the maximum area and the number of ellipses that are larger than the average in the same format shown in the following example.

**Diagram

Description automatically generatedExample**:

Input

ID= 1 1 -2

Minor axis= 2 3 4

Major axis= 0 5 6

Error:

ID = 1 2 3

Minor axis = 1 3 5

Major axis = 2 4 6

Ellipse ID       Minor Access       Major Access           Area

1                              1                              2                      6.28

2 3 4 37.7

3 5 6 94.25

Maximum eclipse area is number 3

Average is 46.08

Number of eclipses larger than the average is 1