Universidad Politécnica de Yucatán
Algorithms and data structures:
"Ejercicio QUIZ UNIT II"

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I.INSTRUCTIONS

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Complemento4: INTERACTUAR CON UN VECTOR A TRAVÉS DE
OPCIONES.
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Ingrese tamaño del vector
10

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Ingrese 1 para añadir un elemento al vector
Ingrese 2 para eliminar un elemento del vector
Ingrese 3 para listar el contenido del vector
Ingrese 4 para contar las apariciones de Un número en el vector
Ingrese 5 para calcular la media y el máximo de los elementos de un vector
Ingrese 0 para terminar
Ingrese Opción: 1
IngreseEntero: 5
```

II.CODE

Code Block 1:
The first step was libraries importation

```
#import libraries
import numpy as np
import statistics
import os
```

Code Block 2:

```
#Creation of the vector
Elements = int(input("Insert the number of elements: "))#The user inserts the quantity of
values.
print(f"I am going to ask for {Elements} numbers:")#The user inserts the values.
Values =[]
value = []
for i in range(Elements):
        value = input(f"Insert the number {i + 1}: ")
        value = int(value)
        Values.append(value)
```

Explanation:
The second thing to do was, asking the user for the vector's values and we store the information in an array.

Output:

```
Insert the number of elements: 5
I am going to ask for 5 numbers:
Insert the number 1: 1
Insert the number 2: 2
Insert the number 3: 3
Insert the number 4: 4
Insert the number 5:
```

Code Block 3:

```
def menu(): #We defined a menu with the different operations.
    os.system("cls")
    print (" 1. add an element\n 2. eliminate an element \n 3. show the vector in a list
\n 4. count elements \n 5. calculate the average and total of the elements \n 6.Exit\n")
    selection = int(input("Insert the number of what you want to do with the vector: "))

    if selection == 1:
        addition()
    elif selection == 2:
        eliminate()
    elif selection == 3:
        showing()
    elif selection == 4:
        counting()
    elif selection == 5:
        calculator()
    elif selection == 6:
        salir()
    else:
        print("Error")
```

Explanation:

We create a menu showing all the options to the user and in each option we present the number to activate the function.

Output:

```
 1. add an element
 2. eliminate an element
 3. show the vector in a list
 4. count elements
 5. calculate the average and total of the elements
 6.Exit

Insert the number of what you want to do with the vector:
```

Code Block 4:

```
def return_menu():#We created the function to return to the menu and be able to work
again with the same vector.
    selection2 = (int(input("Choose an option\n 1.Back to menu\n 2.Exit\n Answer: ")))
    if selection2 == 1:
        menu()
    else:
        return 0
```

Explanation:

Every time that we select an option, and the operation is basically done, we return to the menu giving a choice to the user.

Output:

```
Choose an option
 1.Back to menu
 2.Exit
 Answer:
```

Code Block 5:

```
def addition(): #We created the addition function
    NewValue = int(input("Insert the number to add:"))
    Values.append(NewValue)
    print(Values)
    return_menu()
```

Explanation:

The user is going to select what number to add and is going to be added to the vector(array).

Output:

```
Insert the number of what you want to do with the vector: 1
Insert the number to add:2
[1, 2, 3, 4, 5, 2]
Choose an option
 1.Back to menu
 2.Exit
 Answer:
```

Code Block 6:

```
def eliminate(): #We created the elimination function
    print(Values)
    Eliminated =[]
    Eliminated = int(input("Insert the position of the value to eliminate (remember that
is 0, 1, 2...)"))
    Values.pop(Eliminated)
    print(Values)
    return_menu()
```

Explanation:

The vector is printed on the screen and the user is going to choose the position of the number that wants to eliminate and with the .pop command will be eliminated.

Output:

```
Insert the number of what you want to do with the vector: 2
[1, 2, 3, 4, 5, 2]
Insert the position of the value to eliminate (remember that is 0, 1, 2...)5
[1, 2, 3, 4, 5]
Choose an option
 1.Back to menu
 2.Exit
 Answer:
```

Code Block 7:

```
def showing(): #We created the showing function
    from pprint import pprint
    pprint(Values, width=1)
    return_menu()
```

Explanation:

The vector will be presented as a list with the command pprint.

Output:

```
Insert the number of what you want to do with the vector: 3
[1,
 2,
 3,
 4,
 5]
Choose an option
 1.Back to menu
 2.Exit
```

Code Block 8:

```
def counting(): #We created the counting function
    print(Values)
    repeticiones = {}
    for n in Values:
        if n in repeticiones :
            repeticiones[n] += 1
        else:
            repeticiones[n] = 0
    print(repeticiones)
    print(len(repeticiones))
    return_menu()
```

Explanation:

In this code block, the counter will detect with 0s and 1s if a number is repeated or if is not. Also, will present the number of different numbers that are stored in the array.

Output:

```
Insert the number of what you want to do with the vector: 4
[1, 2, 3, 4, 5]
{1: 0, 2: 0, 3: 0, 4: 0, 5: 0}
5
Choose an option
 1.Back to menu
 2.Exit
 Answer:
```

Code Block 9:

```
def calculator(): #We created the calculator function
    print(Values)
    mean = statistics.mean(Values)
    print("The mean is the following: ")
    print(mean)

    max_item = max(Values, key=int)
    print("The maximum element in the vector: ")
    print(max_item)
    return_menu()
```

Explanation:

This function selects all the elements of the vector and obtains the mean, also evaluates each element to find the maximum.

Output:

```
Insert the number of what you want to do with the vector: 5
[1, 2, 3, 4, 5]
The mean is the following:
3
The maximum element in the vector:
5
Choose an option
 1.Back to menu
 2.Exit
 Answer:
```

Code Block 10:

```
def salir():
    return 0

menu()
```

Explanation:

The last function is the exit one.

Output:

```
Insert the number of what you want to do with the vector: 6
PS C:\Users\Fatim\OneDrive\Documentos\UPY\Data structures>
```