

Exp-3.1

Title:

Finding Maximum and Minimum Values in an Array

Aim:

To design and implement a program to find both the maximum and minimum values in a given array using Python.

Algorithm

1. Start.
2. Take input for the size of the array, N.
3. Take input for the array elements.
4. Initialize `max` and `min` with the first element of the array.
5. Traverse the array:
 - If the current element is greater than `max`, update `max`.
 - If the current element is less than `min`, update `min`.
6. Print the maximum and minimum values.
7. Stop.

Input:

Enter number of elements: 8

Enter the array elements: 5 7 3 4 9 12 6 2

Output:

Min = 2, Max = 12

Program:

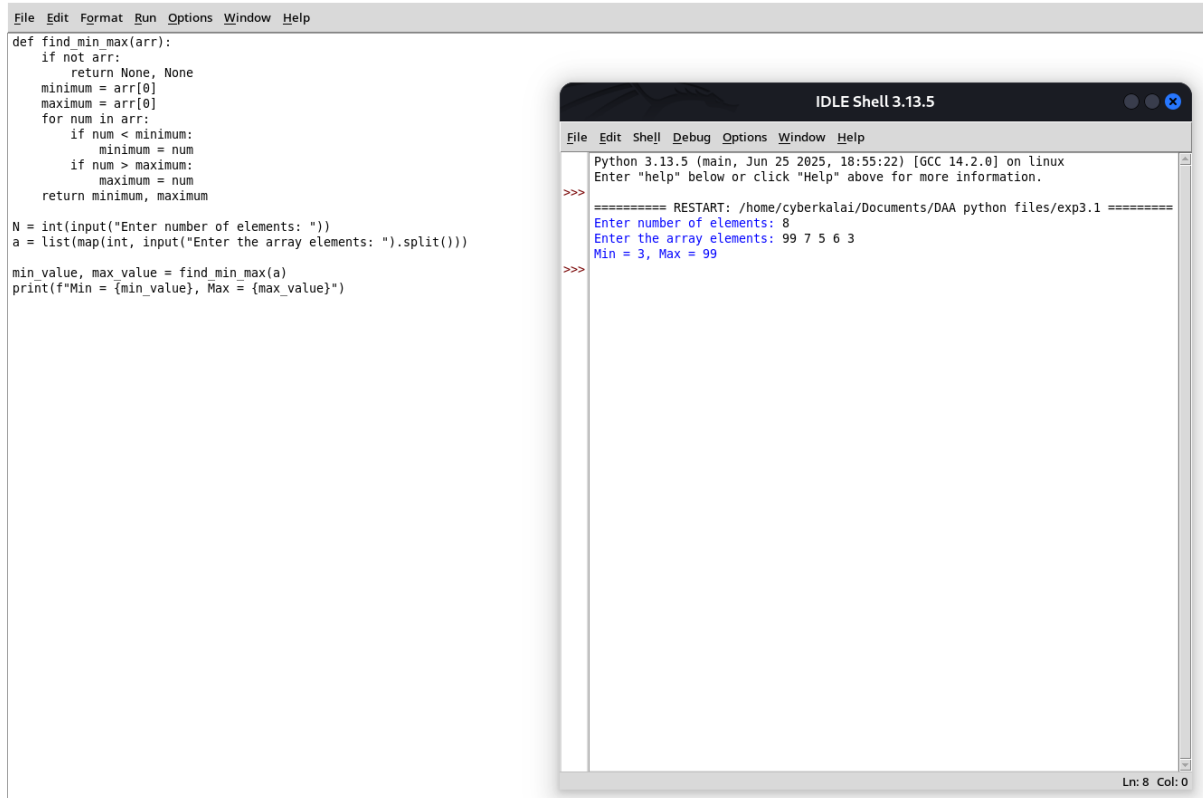
```
def find_min_max(arr):  
    if not arr:  
        return None, None  
    minimum = arr[0]  
    maximum = arr  
    for num in arr:  
        if num < minimum:  
            minimum = num  
        if num > maximum:  
            maximum = num  
    return minimum, maximum  
  
N = int(input("Enter number of elements: "))  
a = list(map(int, input("Enter the array elements: ").split()))  
  
min_value, max_value = find_min_max(a)  
print(f"Min = {min_value}, Max = {max_value}")
```

Performance Analysis:

Time Complexity: $O(n)$

Space Complexity: $O(1)$

Program Output:



The image shows a Python IDE with a script editor on the left and a shell window on the right. The script editor contains a Python program that defines a function `find_min_max` to find the minimum and maximum values in an array. It then takes user input for the number of elements and the array elements, and prints the results.

```
def find_min_max(arr):  
    if not arr:  
        return None, None  
    minimum = arr[0]  
    maximum = arr[0]  
    for num in arr:  
        if num < minimum:  
            minimum = num  
        if num > maximum:  
            maximum = num  
    return minimum, maximum  
  
N = int(input("Enter number of elements: "))  
a = list(map(int, input("Enter the array elements: ").split()))  
  
min_value, max_value = find_min_max(a)  
print(f"Min = {min_value}, Max = {max_value}")
```

The shell window shows the execution of the program. It displays the prompt `Python 3.13.5 (main, Jun 25 2025, 18:55:22) [GCC 14.2.0] on linux` and the instruction to enter "help" for more information. The user input is shown in blue text, and the output is shown in green text.

```
>>>  
===== RESTART: /home/cyberkalai/Documents/DAA python files/exp3.1 =====  
Enter number of elements: 8  
Enter the array elements: 99 7 5 6 3  
Min = 3, Max = 99  
>>>
```

Result:

Thus, the given program to find both the maximum and minimum values in the array is executed and got output successfully for user input.