

## **Exp-3.2**

### **Title:**

Finding Maximum and Minimum Values in a Sorted Array

### **Aim:**

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

### **Algorithm**

1. Start.
2. Accept input for the number of elements `N` from the user.
3. Accept input for the array elements from the user (as space-separated integers).
4. Initialize `min` and `max` with the first element of the array.
5. Traverse the array:
  - If the current element is less than `min`, update `min`.
  - If the current element is greater than `max`, update `max`.
6. Print the minimum and maximum values.
7. Stop.

### **Input:**

Enter number of elements: 8

Enter the array elements: 2 4 6 8 10 12 14 18

### **Output:**

Min = 2, Max = 18

**Program:**

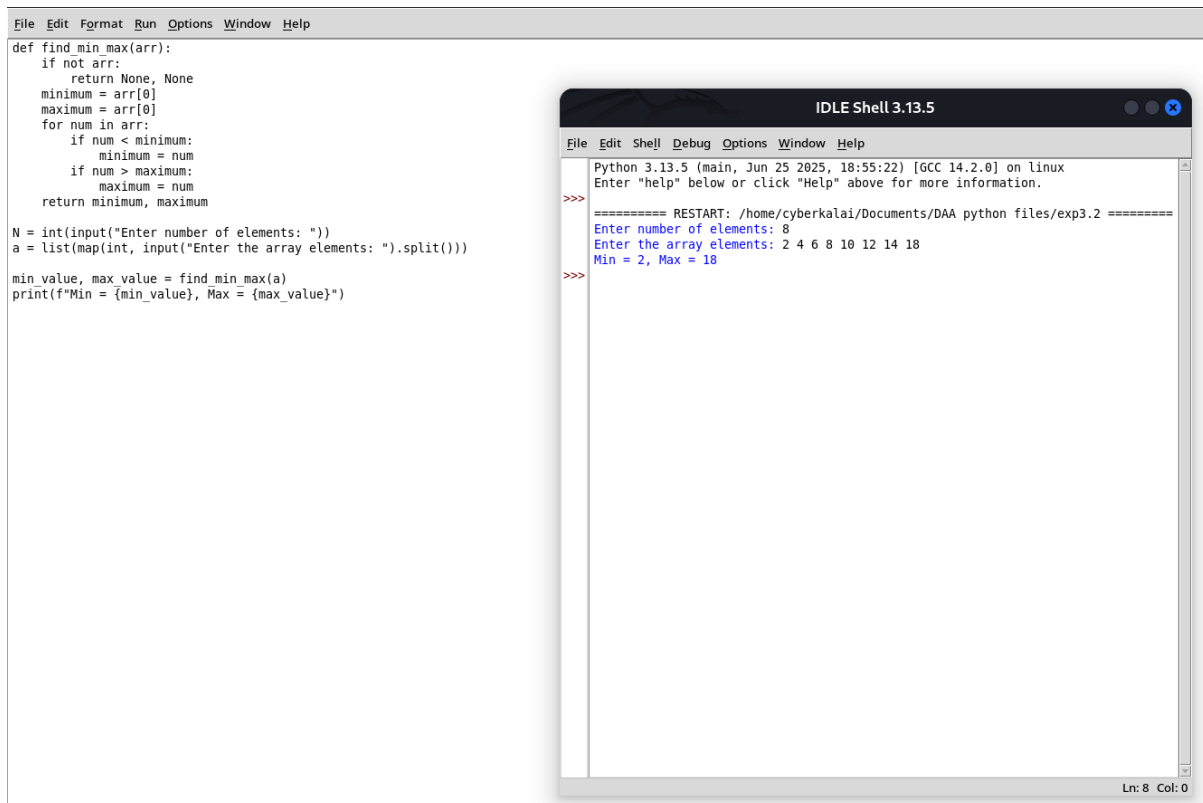
```
def find_min_max(arr):  
    if not arr:  
        return None, None  
    minimum = arr[0]  
    maximum = arr[0]  
    for num in arr:  
        if num < minimum:  
            minimum = num  
        if num > maximum:  
            maximum = num  
    return minimum, maximum  
  
N = int(input("Enter 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}")
```

**Performance Analysis:**

**Time Complexity:  $O(n)$**

**Space Complexity:  $O(1)$**

## Program Output:



The image shows a Python IDE window with a menu bar (File, Edit, Format, Run, Options, Window, Help) and a code editor. The code defines a function `find_min_max(arr)` that returns the minimum and maximum values of an array. It then prompts the user 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 IDE Shell window shows the execution output:

```
Python 3.13.5 (main, Jun 25 2025, 18:55:22) [GCC 14.2.0] on linux
Enter "help" below or click "Help" above for more information.
>>>
===== RESTART: /home/cyberkalai/Documents/DAA python files/exp3.2 =====
Enter number of elements: 8
Enter the array elements: 2 4 6 8 10 12 14 18
Min = 2, Max = 18
>>>
```

Ln: 8 Col: 0

## 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.