**Practical -2**

**Aim:** Write program to find maximum and Minimum number from the given set of numbers

using Divide and Conquer techniques.

**Theory:** The provided code implements a class **MaxMin** that utilizes a divide-and-conquer approach (specifically, a modified merge sort algorithm) to find both the maximum and minimum elements in an array.

1. **MaxMin Class:**

* **Attributes:** The calss initializes with **‘max’** and **‘min’** attributes set to **‘None’.**
* **Method: ‘find\_max\_min’:** This method takes an array, left index, and right index as arguments. It recursively divides the array to find the maximum and minimum elements.

**Acceptance Criteria:**

* **Input Array:** The program is expected to receive an array of integers.
* **Method Invocation:** The **find\_max\_min** method should be invoked with the appropriate array and indices to find the maximum and minimum elements.
* **Correctness:** The program should correctly identify and print both the maximum and minimum elements in the given array.

**Code:**

class MaxMin:

  def \_\_init\_\_(self):

        self.max = None

        self.min = None

    def find\_max\_min(self, arr, left, right):

        if left == right:

            self.max = self.min = arr[left]

            return (self.max, self.min)

        elif right - left == 1:

            self.max = max(arr[left], arr[right])

            self.min = min(arr[left], arr[right])

            return (self.max, self.min)

        else:

            mid = (left + right) // 2

            max1, min1 = self.find\_max\_min(arr, left, mid)

            max2, min2 = self.find\_max\_min(arr, mid + 1, right)

            self.max = max(max1, max2)

            self.min = min(min1, min2)

            return (self.max, self.min)

def main():

    arr = list(map(int, input("Enter the numbers separated by space: ").split()))

    n = len(arr)

    max\_min = MaxMin()

    max\_num, min\_num = max\_min.find\_max\_min(arr, 0, n - 1)

    print("Maximum number:", max\_num)

    print("Minimum number:", min\_num)

if \_\_name\_\_ == "\_\_main\_\_":

    main()

**Input:**

Enter the numbers separated by space: 23 48 47 15 200 48 444 23 48 58 47

**Output:**

Maximum number: 444

Minimum number: 15

**Conclusion:**

In the above program we have studied to find the ‘Find\_max\_min’ numbers by splitting the set of numbers in small parts till it cannot be easy to find the maximum number and minimum number of the program.

The above program in user def.

This method is more effective than simply comparing all the numbers one by one especially when we are dealing with larger numbers