Experiment No. 3

Aim: Implement Minimum and Maximum Problem using Divide & Conquer Approach

Theoretical Background:

The max-min problem is finding the maximum and minimum value in an array.

- Algorithm:

```
Algorithm Max_Min(I,j,max,min)
    {
    I    f (i == j)
         {
           Max<-- A[i]
           Min <-- A[j]
    }
         Else if (i= j-1)
          {
          If(A[i] < A[j])
           {
                      Max<-- A[j]
                   Min <-- A[i]
    }
         Else
     {
                      Max<-- A[i]
                   Min <-- A[j]
    }
     }
  Else
      {
                   Mid<--(i=j)/2
                   Max_min ( i, mid, max, min)
                   Max_min ( mid+1, max_new, min_new)

                   If(max<max_new) then
                             Max ←max_new

                   If(main>min_new) then
                             Min ←min_new
         }
```

Program

```
#include<stdio.h>
#include<conio.h>
int max, min;
int a[100];
void maxmin(int i, int j)
        {
         int max1, min1, mid;
         if(i==j)
         {
                 max = min = a[i];
         }
         else
         {
          if(i == j-1)
         {
          if(a[i] <a[j])
         {
                 max = a[j];
                 min = a[i];
       }
          else
           {
                  max = a[i];
                  min = a[j];
         }
          }
         else
          {
                  mid = (i+j)/2;
                   maxmin(i, mid);
```

```
                    max1 = max; min1 = min;
                     maxmin(mid+1, j);
          if(max <max1)
                     max = max1;
           if(min > min1)
                       min = min1;
          }
         }
         }
int main ()
{
          int i, num;
         clrscr();
          printf ("\nEnter the total number of numbers : ");
          scanf ("%d",&num);
          printf ("Enter the numbers : \n");
          for (i=1;i<=num;i++)
                   scanf ("%d",&a[i]);
         max = a[0];
         min = a[0];
          maxmin(1, num);
          printf ("Minimum element in an array : %d\n", min);
          printf ("Maximum element in an array : %d\n", max);
                    getch();
                    return 0;
                    }
```

Output:

Conclusion:

Thus, in this experiment we have studied about Min-Max Problem and how to solve it by using Divide and Conquer Approac