SECTION - 4'B'

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ADA LAB TEST - 1

Q Sort a given set of N integer elements using Heap sort Technique and compute its Time taken.

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <time.h>
clock_t start, end;
double cpu_time;
void heapadj(int a[], int n)
{
  int i, j, item;
  j=0;
  item = a[j];
  i = 2*j+1;
  while (i <= n-1)
  {
    if (i+1 <= n-1)
    {
      if (a[i] < a[i+1]
      {
      i++;
      }
    }
```


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```
    if (item < a[i])
    {
      a[j] = a[i];
      j = i;
      i = 2 * j + 1;
    }
    else
    {
      break;
    }
  }
  a[j] = item;
}
void heapcons(int a[], int n)
{
  int i, j, k, item;
  for (k=1; k<n; k++)
  {
    item = a[k];
    i = k;
    j = (i-1)/2;
  while (i>0 && item > a[j])
    {
      a[i] = a[j];
```


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```
        i=j;
        j=(i-1)/2;
    }
    a[i]=item;
  }
}
int heapsort(int a[], int n)
 {
   int i, temp;
   heapcons(a,n);
   for(i=n-1; i>0; i--)
    {
       temp = a[0];
       a[0] = a[i];
       a[i] = temp;
       heapify(a, i);
    }
  }
int main()
 {
   int n, i, a[10000];
   srand(time(0));
   printf("Enter the number of elements:\n");
   scanf("%d", &n);
```


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```
printf("Array Elements:\n");
for(i=0; i<n; i++)
  {
    a[i] = rand() % 100;
    printf("%d ", a[i]);
  }
start = clock();
heapsort(a,n);
printf("\n sorted array :\n");
for(i=0; i<n; i++)
 {
  printf("%d", a[i]);
 }
end = clock;
cpu_time = (double)(end-start)/CLOCKS_PER_SEC;
printf("\n Execution time for Heapsort = %f seconds\n",
                        cpu_time);
 getch();
}
```


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Modification → Min Heap Tree Creation

```
void heapcons (int a[], int n)
{
  int i, j, k, item;
  for (k = 1; k < n; k++)
    {
      item = a[k];
      i = k;
      j = (i-1)/2;
    while (i>0 && item < a[j])
      {
        a[i] = a[j];
        i = j;
        j = (i-1)/2;
      }
    a[i] = item;
  }
}
```


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