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SUBJECT:- DATA STRUCTURE **YEAR:- 2nd year (3 sem)**

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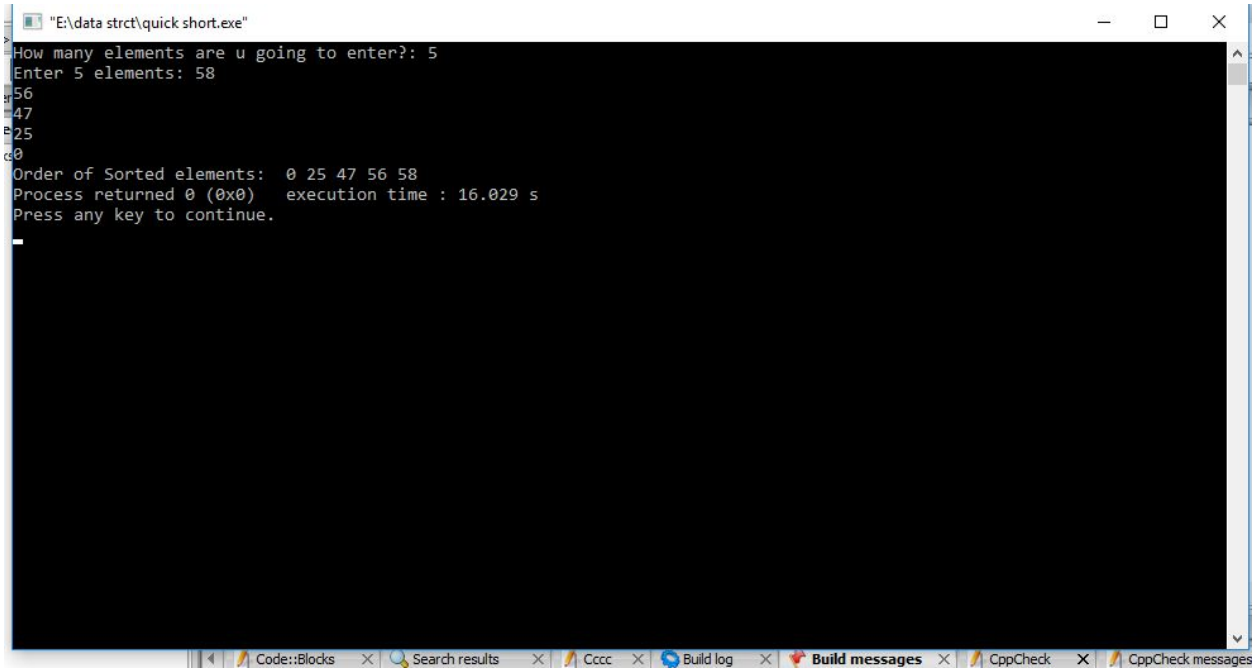
QUICK SORT

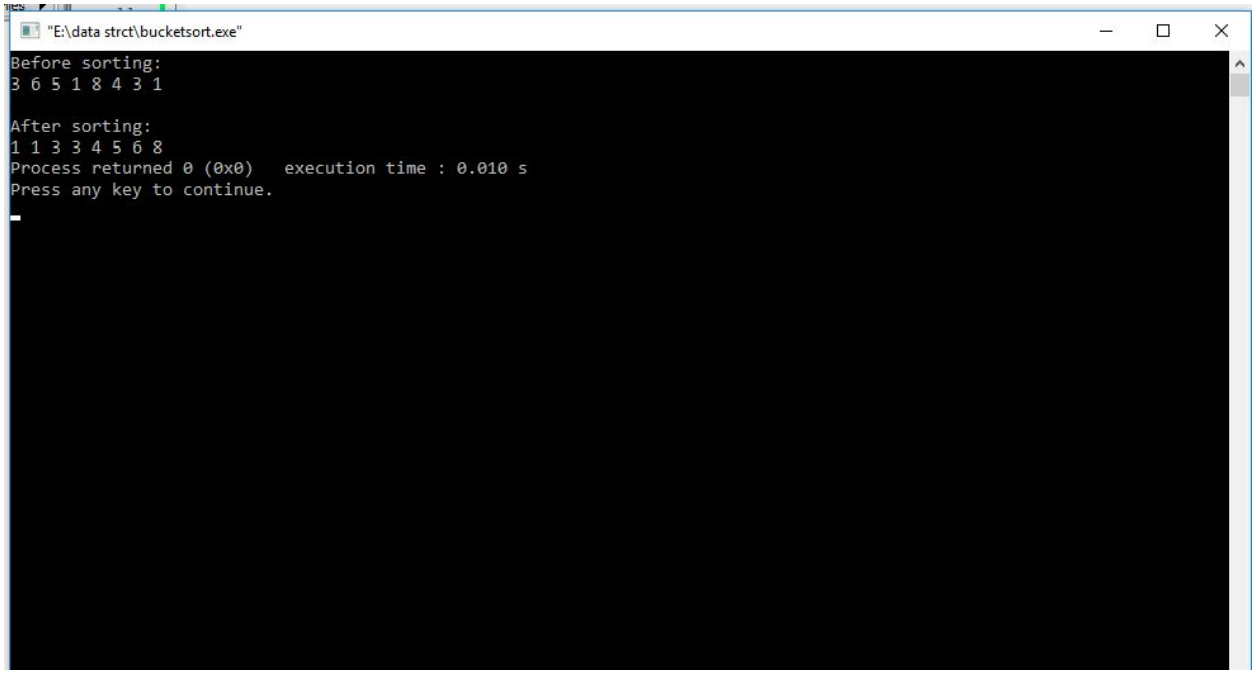
```
#include<stdio.h>
void quicksort(int number[25],int first,int last){
  int i, j, pivot, temp;

  if(first<last){
    pivot=first;
    i=first;
    j=last;

    while(i<j){
      while(number[i]<=number[pivot]&&i<last)
        i++;
      while(number[j]>number[pivot])
        j--;
      if(i<j){
        temp=number[i];
        number[i]=number[j];
        number[j]=temp;
      }
    }

    temp=number[pivot];
    number[pivot]=number[j];
    number[j]=temp;
    quicksort(number,first,j-1);
    quicksort(number,j+1,last);

  }
}
```

```
int main(){
   int i, count, number[25];
  printf("How many elements are u going to enter?: ");
   scanf("%d",&count);
   printf("Enter %d elements: ", count);
   for(i=0;i<count;i++)
  scanf("%d",&number[i]);
 quicksort(number,0,count-1);
 printf("Order of Sorted elements: ");
   for(i=0;i<count;i++)
     printf(" %d",number[i]);

   return 0;
}
```



BUCKET SORT

```
#include<stdio.h>

#define SIZE 10

void bucketSort(int a[], int n) {
    int i, j, k, buckets[SIZE];

    for(i = 0; i < SIZE; ++i)
        buckets[i] = 0;

    for(i = 0; i < n; ++i)
        ++buckets[a[i]];

    for(i = 0, j = 0; j < SIZE; ++j)
        for(k = buckets[j]; k > 0; --k)
            a[i++] = j;
}

int main() {
    int i, a[] = {3, 6, 5, 1, 8, 4, 3, 1}, n = 8;

    printf("Before sorting:\n");
    for(i = 0; i < n; ++i)
        printf("%d ", a[i]);

    bucketSort(a, n);
 printf("\n\nAfter sorting:\n");
    for(i = 0; i < n; ++i)
        printf("%d ", a[i]);
   return 0;}
```


"E:\data strct\bucketsort.exe"
Before sorting:
3 6 5 1 8 4 3 1
After sorting:
1 1 3 3 4 5 6 8
Process returned 0 (0x0) execution time : 0.010 s
Press any key to continue.

MAX HEAP

```
#include <stdio.h>

void main()
{
   int heap[10], no, i, j, c, root, temp;

   printf("\n Enter no of elements :");
   scanf("%d", &no);
   printf("\n Enter the nos : ");
   for (i = 0; i < no; i++)
      scanf("%d", &heap[i]);
   for (i = 1; i < no; i++)
   {
       c = i;
       do
       {
           root = (c - 1) / 2;
           if (heap[root] < heap[c])
           {
               temp = heap[root];
               heap[root] = heap[c];
               heap[c] = temp;
           }
           c = root;
       } while (c != 0);
   }

   printf("Heap array : ");
   for (i = 0; i < no; i++)
       printf("%d\t ", heap[i]);
   for (j = no - 1; j >= 0; j--)
```

```
    {
        temp = heap[0];
        heap[0] = heap[j];
        heap[j] = temp;
        root = 0;
        do
        {
            c = 2 * root + 1;
            if ((heap[c] < heap[c + 1]) && c < j-1)
                c++;
            if (heap[root]<heap[c] && c<j)
            {
                temp = heap[root];
                heap[root] = heap[c];
                heap[c] = temp;
            }
            root = c;
        } while (c < j);
    }
    printf("\n The sorted array is : ");
    for (i = 0; i < no; i++)
       printf("\t %d", heap[i]);

}
```

"E:\data strct\heap max tree.exe"

```
 Enter no of elements :6

 Enter the nos : 45
24
100
147
999
1001
Heap array : 1001        147     999     24      100     45
 The sorted array is :   24      45      100     147     999     1001
Process returned 6 (0x6)   execution time : 32.156 s
Press any key to continue.
```

MIN HEAP

```
#include<stdio.h>
void heapsort(int[],int);
void heapify(int[],int);
void adjust(int[],int);
main() {
        int n,i,a[50];
        system("clear");
        printf("\nEnter the limit:");
        scanf("%d",&n);
        printf("\nEnter the elements:");
        for (i=0;i<n;i++)
          scanf("%d",&a[i]);
        heapsort(a,n);
        printf("\nThe Sorted Elements Are:\n");
        for (i=0;i<n;i++)
          printf("\t%d",a[i]);
        printf("\n");
}
void heapsort(int a[],int n) {
        int i,t;
        heapify(a,n);
        for (i=n-1;i>0;i--) {
                t = a[0];
                a[0] = a[i];
                a[i] = t;
                adjust(a,i);
        }
}
void heapify(int a[],int n) {
        int k,i,j,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;
        }
}
void adjust(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++;
                if(item<a[i]) {
                        a[j] = a[i];
                        j = i;
                        i = 2*j+1;
                } else
                   break;
        }
        a[j] = item;
}
```

"E:\data strct\heap max sort.exe"

```
'clear' is not recognized as an internal or external command,
operable program or batch file.

Enter the limit:5

Enter the elements:45
0
25
65
45

The Sorted Elements Are:
        0       25      45      45      65

Process returned 10 (0xA)   execution time : 15.056 s
Press any key to continue.
```

Radix sort

```
#include<stdio.h>


int largest(int a[], int n)
{
    int large = a[0], i;
    for(i = 1; i < n; i++)
    {
        if(large < a[i])
            large = a[i];
    }
    return large;
}


void RadixSort(int a[], int n)
{
    int bucket[10][10], bucket_count[10];
    int i, j, k, remainder, NOP=0, divisor=1, large, pass;

    large = largest(a, n);
    printf("The large element %d\n",large);
    while(large > 0)
    {
        NOP++;
        large/=10;
    }

    for(pass = 0; pass < NOP; pass++)
    {
```

```
        for(i = 0; i < 10; i++)
        {
            bucket_count[i] = 0;
        }
        for(i = 0; i < n; i++)
        {
            remainder = (a[i] / divisor) % 10;
            bucket[remainder][bucket_count[remainder]] = a[i];
            bucket_count[remainder] += 1;
        }

        i = 0;
        for(k = 0; k < 10; k++)
        {
            for(j = 0; j < bucket_count[k]; j++)
            {
                a[i] = bucket[k][j];
                i++;
            }
        }
        divisor *= 10;

        for(i = 0; i < n; i++)
            printf("%d  ",a[i]);
        printf("\n");
    }
}

int main()
{
    int i, n, a[10];
    printf("Enter the number of elements :: ");
    scanf("%d",&n);
```

```
    printf("Enter the elements :: ");
    for(i = 0; i < n; i++)
    {
        scanf("%d",&a[i]);
    }
    RadixSort(a,n);
    printf("The sorted elements are ::  ");
    for(i = 0; i < n; i++)
        printf("%d  ",a[i]);
    printf("\n");
    return 0;
}
```