NAME : D V N Surya Kiran
SEC : CSE-B
ROLL NO : CH.SC.U4CSE24116

1. Bubble Sort

PROGRAM:

```
#include <stdio.h>
int main() {
int n;
printf("ENTER NO.OF.ELEMENTS:");
scanf("%d",&n);
int arr[n];
printf("ENTER THE VALUES:");
for(int i=0;i < n;i++){
scanf("%d",&arr[i]);
}
   for (int i = 0; i < n - 1; i++) {
      for (int j = 0; j < n - i - 1; j++) {
         if (arr[j] > arr[j + 1]) {
            int temp = arr[j];
            arr[j] = arr[j + 1];
            arr[j + 1] = temp;
         }
      }
```

```
    }
    printf("Sorted array: ");
    for (int i = 0; i < n; i++) {
        printf("\t%d\t,",arr[i]);
    }
    return 0;
}
```

```
amma@amma11:~$ gcc bubble_sort.c -o bubble_sort
amma@amma11:~$ ./bubble_sort
enter element 0: 6
enter element 1: 9
enter element 2: 8
enter element 3: 1
enter element 4: 3
1
3
6
8
9
```

2. Insertion Sort

PROGRAM:

```
#include <stdio.h>
int main() {
    int n;
    printf("ENTER NO.OF ELEMENTS");
    scanf("%d",&n);
    int arr[n];
    printf("ENTER THE ELEMENTS:");
    for(int i=0; i <n;i++){
```

```
scanf("%d",&arr[i]);
}
for (int i = 1; i < n; i++) {
    int key = arr[i];
    int j = i - 1;
    while (j >= 0 && arr[j] > key) {
        arr[j + 1] = arr[j];
```

```
            j--;
        }
        arr[j + 1] = key;
    }
    printf("Sorted array: ");
    for (int i = 0; i < n; i++) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

```
root@amma55:/home/amma# gcc insertionsort.c -o insertionsort
root@amma55:/home/amma# ./insertionsort
Enter number of elements: 7
Enter 7 elements:
4
5
6
7
1
0
2
Sorted array: 0 1 2 4 5 6 7
```

3. Selection Sort

PROGRAM:

```
#include <stdio.h>
int main() {
    int n;
    printf("ENTER NO. OF ELEMENTS: ");
    scanf("%d", &n);
    int arr[n];
    printf("ENTER THE VALUES: ");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    for (int i = 0; i < n - 1; i++) {
        int minIndex = i;
        for (int j = i + 1; j < n; j++) {
            if (arr[j] < arr[minIndex]) {
                minIndex = j;
            }
        }
        int temp = arr[i];
        arr[i] = arr[minIndex];
        arr[minIndex] = temp;
```

```
    }
    printf("Sorted array: ");
    for (int i = 0; i < n; i++) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

```
amma@amma11:~$ gcc selection_sort.c -o selection_sort
amma@amma11:~$ ./selection_sort
enter element 0: 9
enter element 1: 1
enter element 2: 0
enter element 3: 3
enter element 4: 6
0
1
3
6
9
```

4. Bucket Sort

PROGRAM:

```
#include <stdio.h>
```

```
int main() {
    int n;
    printf("ENTER NO. OF ELEMENTS: ");
    scanf("%d", &n);
    int arr[n];
    printf("ENTER THE VALUES (0 to 100): ");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    int bucket[101] = {0};
    for (int i = 0; i < n; i++) {
        bucket[arr[i]]++;
    }
    printf("Sorted array: ");
    for (int i = 0; i <= 100; i++) {
        while (bucket[i] > 0) {
            printf("%d ", i);
            bucket[i]--;
        }
    }
    return 0;
}
```

```
amma@amma11:~$ gcc bucket_sort.c -o bucket_sort
amma@amma11:~$ ./bucket_sort
enter element 0: 8
enter element 1: 2
enter element 2: 0
enter element 3: 1
enter element 4: 7
0
1
2
7
8
```

5) Max Heap

Program :

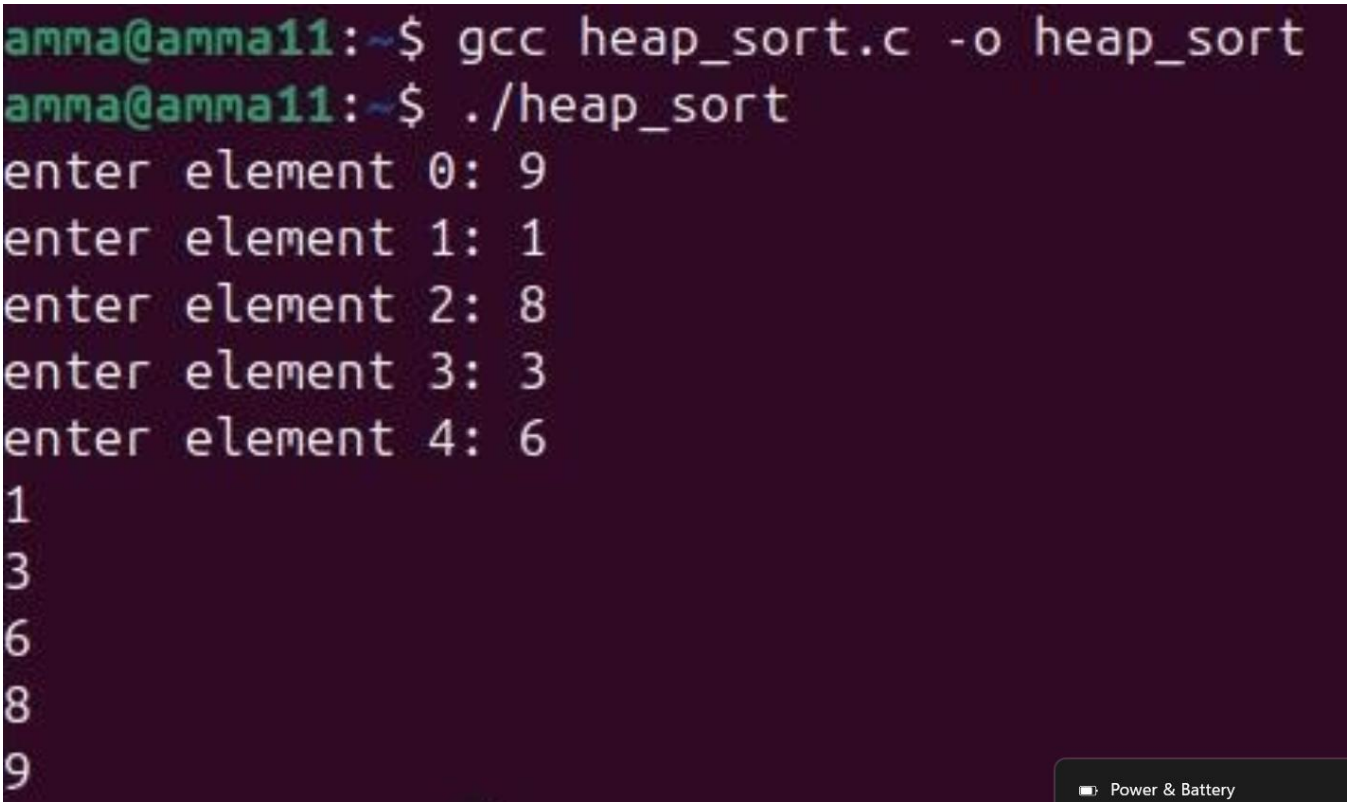
```
#include <stdio.h>
Max Heap


void maxHeapify(int a[], int
n, int i) {
    int largest = i;
    int left = 2 * i + 1;
    int right = 2 * i + 2;
    int temp;
```

```
    if (left < n && a[left] >
a[largest])
        largest = left;

    if (right < n && a[right] >
a[largest])
        largest = right;

    if (largest != i) {
        temp = a[i];
        a[i] = a[largest];
        a[largest] = temp;

        maxHeapify(a, n,
largest);
    }
}
```

```
void buildMaxHeap(int a[],
int n) {
    int i;
    for (i = n / 2 - 1; i >= 0; i--
)
        maxHeapify(a, n, i);
}

int main() {

printf("CH.SC.U4CSE2410
8\n");

    int a[6] = {3, 9, 2, 1, 4,
5};
    int n = 6, i;

    buildMaxHeap(a, n);
```

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

    return 0;
}
```

OUTPUT :



6) Min Heap

Program:

#include <stdio.h>

Min Heap

```
void minHeapify(int a[], int
n, int i) {
    int smallest = i;
    int left = 2 * i + 1;
    int right = 2 * i + 2;
    int temp;

    if (left < n && a[left] <
a[smallest])
        smallest = left;

    if (right < n && a[right] <
a[smallest])
        smallest = right;

    if (smallest != i) {
        temp = a[i];
        a[i] = a[smallest];
        a[smallest] = temp;
```

```
        minHeapify(a, n,
smallest);
    }
}

void buildMinHeap(int a[],
int n) {
    int i;
    for (i = n / 2 - 1; i >= 0; i--
)
        minHeapify(a, n, i);
}

int main() {

printf("CH.SC.U4CSE2410
8\n");
```

```
    int a[6] = {3, 9, 2, 1, 4,
5};
    int n = 6, i;

    buildMinHeap(a, n);

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

    return 0;
}
```

OUTPUT :

```
BFS Traversal: 2 root@amma52:/home/amma/Documents# ./bfs
Enter number of nodes: 3
Enter adjacency matrix:
0 1 0 1 1 1 1 1 1
Enter starting node: 0

BFS Traversal: 0 1 2 root@amma52:/home/amma/Documents#
```

7) BFS

Program :

```
#include <stdio.h>
```

```
#define MAX 100
BFS

int queue[MAX], front = 0,
rear = 0;

void enqueue(int x) {
    queue[rear++] = x;
}

int dequeue() {
    return queue[front++];
}

void bfs(int
graph[MAX][MAX], int n, int
start) {
    int visited[MAX];
    int i, node;
```

```
    for (i = 0; i < n; i++)
        visited[i] = 0;

    enqueue(start);
    visited[start] = 1;

    while (front != rear) {
        node = dequeue();
        printf("%d ", node);

        for (i = 0; i < n; i++) {
            if (graph[node][i] ==
1 && !visited[i]) {
                visited[i] = 1;
                enqueue(i);
            }
        }
    }
```

```
}

int main() {

printf("CH.SC.U4CSE2410
8\n");

    int n = 4;
    int graph[MAX][MAX] = {
        {0, 1, 1, 0},
        {1, 0, 1, 1},
        {1, 1, 0, 0},
        {0, 1, 0, 0}
    };

    bfs(graph, n, 0);

    return 0;
}
```

Output :


BFS Traversal: 0 1 2 root@amma52:/home/amma/Documents# gcc -o dfs dfs.c
root@amma52:/home/amma/Documents# ./dfs
Enter number of nodes: 3
Enter adjacency matrix:
0 1 0 1 1 0 1 1 1
Enter starting node: 0
DFS Traversal: 0 1 root@amma52:/home/amma/Documents#