

1.BINARY HEAP PROGRAM IN C PROGRAMMING

PROGRAM:

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

```
#define MAX_SIZE 10
```

```
int heap[MAX_SIZE];
```

```
int size = 0;
```

```
void insert(int data) {
```

```
    heap[size] = data;
```

```
    int i = size;
```

```
    size++;
```

```
    while (i > 0) {
```

```
        int parent = (i - 1) / 2;
```

```
        if (heap[parent] <= heap[i]) break;
```

```
        int temp = heap[parent];
```

```
        heap[parent] = heap[i];
```

```
        heap[i] = temp;
```

```
        i = parent;
```

```
    }
```

```
}
```

```
void display() {
```

```
    for (int i = 0; i < size; i++) {
```

```
        printf("%d ", heap[i]);
```

```
    }
```

```
    printf("\n");
```

```
}
```

```
int main() {  
    insert(10);  
    insert(20);  
    insert(15);  
    insert(30);  
    insert(25);  
  
    printf("Heap: ");  
    display();  
  
    return 0;  
}
```

OUTPUT:

Heap: 10 20 15 30 25

2.HEAP SORT PROGRAM IN C PROGRAMMING.

PROGRAM:

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

```
void heapify(int arr[], int n, int i) {  
    int largest = i;  
    int left = 2 * i + 1;  
    int right = 2 * i + 2;  
  
    if (left < n && arr[left] > arr[largest]) largest = left;  
    if (right < n && arr[right] > arr[largest]) largest = right;  
  
    if (largest != i) {  
        int temp = arr[i];  
        arr[i] = arr[largest];
```

```

        arr[largest] = temp;

        heapify(arr, n, largest);
    }
}

void heapSort(int arr[], int n) {
    for (int i = n / 2 - 1; i >= 0; i--) heapify(arr, n, i);

    for (int i = n - 1; i >= 0; i--) {
        int temp = arr[0];
        arr[0] = arr[i];
        arr[i] = temp;

        heapify(arr, i, 0);
    }
}

void printArray(int arr[], int n) {
    for (int i = 0; i < n; i++) printf("%d ", arr[i]);
    printf("\n");
}

int main() {
    int n;

    printf("Enter the number of elements: ");
    scanf("%d", &n);

    int arr[n];

    printf("Enter %d elements: ", n);
    for (int i = 0; i < n; i++) scanf("%d", &arr[i]);

```

```
printf("Original array: ");  
printArray(arr, n);  
  
heapSort(arr, n);  
  
printf("Sorted array: ");  
printArray(arr, n);  
  
return 0;  
}
```

OUTPUT:

Enter the number of elements: 5

Enter 5 elements: 5 3 8 2 1

Original array: 5 3 8 2 1

Sorted array: 1 2 3 5 8