DAA Lab2

Yugendra Senthil Kumar

CSE-C

CH.SC.U4CSE24252

1.Bubble Sort

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

#define MAX 100

int adj[MAX][MAX];
int V;

void dfs(int start, bool visited[])
{
    printf("%d ", start);
    visited[start] = true;

    for (int i = 0; i < V; i++) {
        if (adj[start][i] == 1 && !visited[i]) {
            dfs(i, visited);
        }
    }
}

int main()
{
    int startVertex;
    printf("Enter number of vertices\n");
    scanf("%d", &V);

    printf("Enter the adjacency matrix\n", V, V);
    for (int i = 0; i < V; i++) {
        for (int j = 0; j < V; j++) {
            scanf("%d", &adj[i][j]);
        }
    }
```

```
    printf("Enter starting vertex for DFS\n");
    scanf("%d", &startVertex);

    // Visited array
    bool visited[MAX];
    for (int i = 0; i < V; i++) {
        visited[i] = false;
    }
    printf("Traversal\n");
    dfs(startVertex, visited);

    return 0;
}
```

```
Enter the number of no. to enter:5
Enter the numbers:1
8
2
3
52
1,2,3,8,52,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$
```

2. Bucket Sort

```
#include<stdio.h>
#include<stdlib.h>
#include<limits.h>
int max_element(int* array, int size) {
    int max = INT_MIN;
    for (int i = 0; i < size; ++i)
    {
        if (array[i] > max)
        max = array[i];
    }
    return max;
}
void bucketsort(int* array, int size){
    int max = max_element(array, size);
    int bucket[max+1];
    for (int i = 0; i <= max; i++){
      bucket[i] = 0;
    }
    for (int i = 0; i < size; i++){
      bucket[array[i]]++;
```

```
    }
    int j=0;
    for (int i = 0; i <= max; i++){
        while (bucket[i] > 0){
            array[j++] = i;
            bucket[i]--;
        }
    }
}
int main(){
  int b;
  printf("Enter the number of no. to enter:");
  scanf("%d",&b);
  printf("Enter the numbers:");
  int* arr = (int*)malloc(b*sizeof(int));
  for(int i=0;i<b;i++){
    scanf("%d",&arr[i]);
  }
  bucketsort(arr,b);
  for(int i=0;i<b;i++){
    printf("%d,",arr[i]);
  }
  free(arr);
}
```

```
yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ gcc bucketsort.c -o bucket
yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ ./bucket
Enter the number of no. to enter:5
Enter the numbers:1
5
2
3
98
1,2,3,5,98,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$
```

3.Insertion Sort

```
#include<stdio.h>
#include<stdlib.h>
void insertionsort(int* arr, int n){
  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;
  }
}
int main(){
  int b;
  printf("Enter the number of no. to enter:");
  scanf("%d",&b);
  printf("Enter the numbers:");
  int* arr = (int*)malloc(b*sizeof(int));
  for(int i=0;i<b;i++){
    scanf("%d",&arr[i]);
  }
  insertionsort(arr,b);
  for(int i=0;i<b;i++){
    printf("%d,",arr[i]);
  }
}
```

```
1,2,3,5,98,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ gcc insertionsort.c -o ins
yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ ./ins
Enter the number of no. to enter:5
Enter the numbers:1
91
2
3
43
1,2,3,43,91,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$
```

4.Selection Sort

```
#include<stdio.h>
#include<stdlib.h>
void swap(int* a, int* b){
  int c = *a;
  *a = *b;
  *b = c;
}
void selectionsort(int* arr, int n){
  for(int i = 0;i<n;++i){
    int minindex = i;
    for(int j = i+1;j<n;++j){
        if(arr[j]<arr[minindex]){
    minindex = j;
        }
    }
    swap(&arr[minindex],&arr[i]);
```

```
  }
}
int main(){
  int b;
  printf("Enter the number of no. to enter:");
  scanf("%d",&b);
  printf("Enter the numbers:");
  int* arr = (int*)malloc(b*sizeof(int));
  for(int i=0;i<b;i++){
    scanf("%d",&arr[i]);
  }
  selectionsort(arr,b);
  for(int i=0;i<b;i++){
    printf("%d,",arr[i]);
  }
 }
```

```
1,2,3,43,91,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ gcc selectionsort.c -o sel
yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ ./sel
Enter the number of no. to enter:5
Enter the numbers:1
32
12
45
23
1,12,23,32,45,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$
```

5.Heap sort

```
#include<stdio.h>
#include<stdlib.h>
void swap(int* a, int* b){
  int c = *a;
  *a = *b;
  *b = c;
}
void heapify(int* arr, int n, int i){
  int largest = i;
  int l = 2*i+1;
  int r = 2*i+2;
  if(l<n && arr[l]>arr[largest]){
    largest = l;
  }
  if(r<n && arr[r]>arr[largest]){
    largest = r;
  }
  if(largest!=i){
```

```c
    swap(&arr[i],&arr[largest]);
    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--){
    swap(&arr[0],&arr[i]);
    heapify(arr,i,0);
  }
}
int main(){
  int b;
  printf("Enter the number of no. to enter:");
  scanf("%d",&b);
  printf("Enter the numbers:");
  int* arr = (int*)malloc(b*sizeof(int));
  for(int i=0;i<b;i++){
    scanf("%d",&arr[i]);
  }
  heapsort(arr,b);
  for(int i=0;i<b;i++){
    printf("%d,",arr[i]);
  }
  free(arr);
}
```

```
1,12,23,32,45,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ gcc heapsort.c -o heap
yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$ ./heap
Enter the number of no. to enter:5
Enter the numbers:1
32
12
32
54
1,12,32,32,54,yugen@fountain:/mnt/c/Users/yugen/C files/Lab2$
```