DATA STRUCTURES

DAY-13

1.Topological Sort

Program:

```
#include <stdio.h>
#include <stdlib.h>
 #define MAX 100
 typedef struct Node {
   int vertex;
   struct Node* next;
} Node;
 Node* createNode(int v);
void addEdge(Node* adj[], int u, int v);
void topologicalSortUtil(int v, int visited[], Node* adj[], int* stack, int* stackIndex);
void topologicalSort(Node* adj[], int V);
int main() {
   int V, E, u, v;
 printf("Enter the number of vertices: ");
   scanf("%d", &V);
    Node* adj [MAX] = {NULL};
   printf("Enter the number of edges: ");
   scanf("%d", &E);
   for (int i = 0; i < E; i++) {
      printf("Enter edge (u v): ");
      scanf("%d %d", &u, &v);
```

```
        addEdge(adj, u, v);
    }

    printf("Topological Sort: ");
    topologicalSort(adj, V);
    return 0;
}
Node* createNode(int v) {
    Node* newNode = (Node*)malloc(sizeof(Node));
    newNode->vertex = v;
    newNode->next = NULL;
    return newNode;
}
void addEdge(Node* adj[], int u, int v) {
    Node* newNode = createNode(v);
    newNode->next = adj[u];
    adj[u] = newNode;
}
void topologicalSortUtil(int v, int visited[], Node* adj[], int* stack, int* stackIndex) {
    visited[v] = 1;
    Node* temp = adj[v];
    while (temp) {
        int adjVertex = temp->vertex;
        if (!visited[adjVertex])
            topologicalSortUtil(adjVertex, visited, adj, stack, stackIndex);
        temp = temp->next;
```

```
    }
    stack[(*stackIndex)++] = v;
}

void topologicalSort(Node* adj[], int V) {
    int visited[MAX] = {0};
    int stack[MAX];
    int stackIndex = 0;
    for (int i = 0; i < V; i++) {
        if (!visited[i])
            topologicalSortUtil(i, visited, adj, &stack[0], &stackIndex);
    }
     for (int i = stackIndex - 1; i >= 0; i--) {
        printf("%d ", stack[i]);
    }
    printf("\n");
}
```

Output:

```
Enter the number of vertices: 6
Enter the number of edges: 6
Enter edge (u v): 5 2
Enter edge (u v): 5 0
Enter edge (u v): 4 0
Enter edge (u v): 4 1
Enter edge (u v): 2 3
Enter edge (u v): 3 1
```

Topological Sort: 5 4 2 3 1 0

2.Terminology sort

Program:

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

#define MAX_TERMS 100
#define MAX_LEN 100
void sortTerms(char terms[][MAX_LEN], int n);
int main() {
   int n;
   char terms[MAX_TERMS][MAX_LEN];
   printf("Enter the number of terms: ");
   scanf("%d", &n);
   getchar();
   printf("Enter the terms:\n");
   for (int i = 0; i < n; i++) {
      fgets(terms[i], MAX_LEN, stdin);
      terms[i][strcspn(terms[i], "\n")] = 0;
   }
   sortTerms(terms, n);
   printf("\nSorted terms:\n");
   for (int i = 0; i < n; i++) {
      printf("%s\n", terms[i]);
   }
   return 0;
```

```
}
void sortTerms(char terms[][MAX_LEN], int n) {
   char temp[MAX_LEN];
   for (int i = 0; i < n - 1; i++) {
      for (int j = i + 1; j < n; j++) {
         if (strcmp(terms[i], terms[j]) > 0) {
            strcpy(temp, terms[i]);
            strcpy(terms[i], terms[j]);
            strcpy(terms[j], temp);
         }
      }
   }
}
```

Output:

```
Enter the number of terms: 5
Enter the terms:
banana
apple
grape
cherry
date

Sorted terms:
apple
banana
cherry
```

date

grape