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**COURSE NAME: DATA STRUCTURES FOR MODERN COMPUTING SYSTEMS**

**COURSE CODE: CSA0302**

Experiment 38: Topological Sorting

Code:

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

```
#include <stdlib.h>
```

```
#define MAX 100
```

```
int adj[MAX][MAX]; // adjacency matrix
```

```
int visited[MAX];
```

```
int stack[MAX];
```

```
int top = -1;
```

```
int n; // number of vertices
```

```
void push(int v) {
```

```
    stack[++top] = v;
```

```
}
```

```
int pop() {
```

```
    if(top == -1) return -1;
```

```
    return stack[top--];
```

```
}
```

```
void dfs(int v) {
```

```
    visited[v] = 1;
```

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

```
        if(adj[v][i] && !visited[i])
```

```
            dfs(i);
```

```

    }
    push(v); // push after visiting all neighbors
}

```

```

void topologicalSort() {
    for(int i = 0; i < n; i++)
        visited[i] = 0;

    for(int i = 0; i < n; i++)
        if(!visited[i])
            dfs(i);

    printf("Topological Order: ");
    while(top != -1)
        printf("%d ", pop());
    printf("\n");
}

```

```

int main() {
    int e, u, v;

    printf("Enter number of vertices: ");
    scanf("%d", &n);
    printf("Enter number of edges: ");
    scanf("%d", &e);

    // initialize adjacency matrix
    for(int i = 0; i < n; i++)
        for(int j = 0; j < n; j++)
            adj[i][j] = 0;
}

```

```

printf("Enter edges (source destination):\n");
for(int i = 0; i < e; i++) {
    scanf("%d %d", &u, &v);
    adj[u][v] = 1; // directed edge u -> v
}

topologicalSort();

return 0;
}

```

Output:

```

Enter number of vertices: 6
Enter number of edges: 6
Enter edges (source destination):
5 2
5 0
4 0
4 1
2 3
3 1
Topological Order: 5 4 2 3 1 0

```

=== Code Execution Successful ===