Depth First Search(DFS)

DFS

```
#include <stdio.h>

int a[20][20], reach[20], n;

void dfs(int v)
{ int i;
  reach[v] = 1;
 for(i=1;i<=n; i++)
  { if(a[v][i] && !reach[i])
    { printf("\n %d -> %d", v, i);
      dfs(i);
    }
  }

void main()
{ int i, j, count=0;
  printf("\n Enter number of vertices:");
  scanf("%d", &n);
  for(i=1; i<=n; i++)
  { reach[i]=0;
    for(j=1;j<=n;j++)
      a[i][j]=0;
  }

printf("\n Enter adjacency matrix: \n");
 for(i=1; i<=n;i++)
  { for(j=1;j<=n;j++)
     scanf("%d", &a[i][j]);
   dfs(1);
   printf("\n");
   for(i=1; i<=n; i++)
    { if(reach[i])
        count++;
```

```
if(count==n)
   printf("\n Graph is connected");
else
   printf("\n Graph is not connected");
}
```

output

input adjacence matrix

0	1	1	1
0	0	0	1
0	0	0	0
0	0	1	0

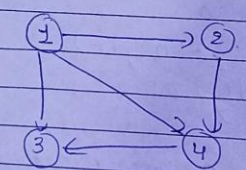
no. of vertices : 4

output

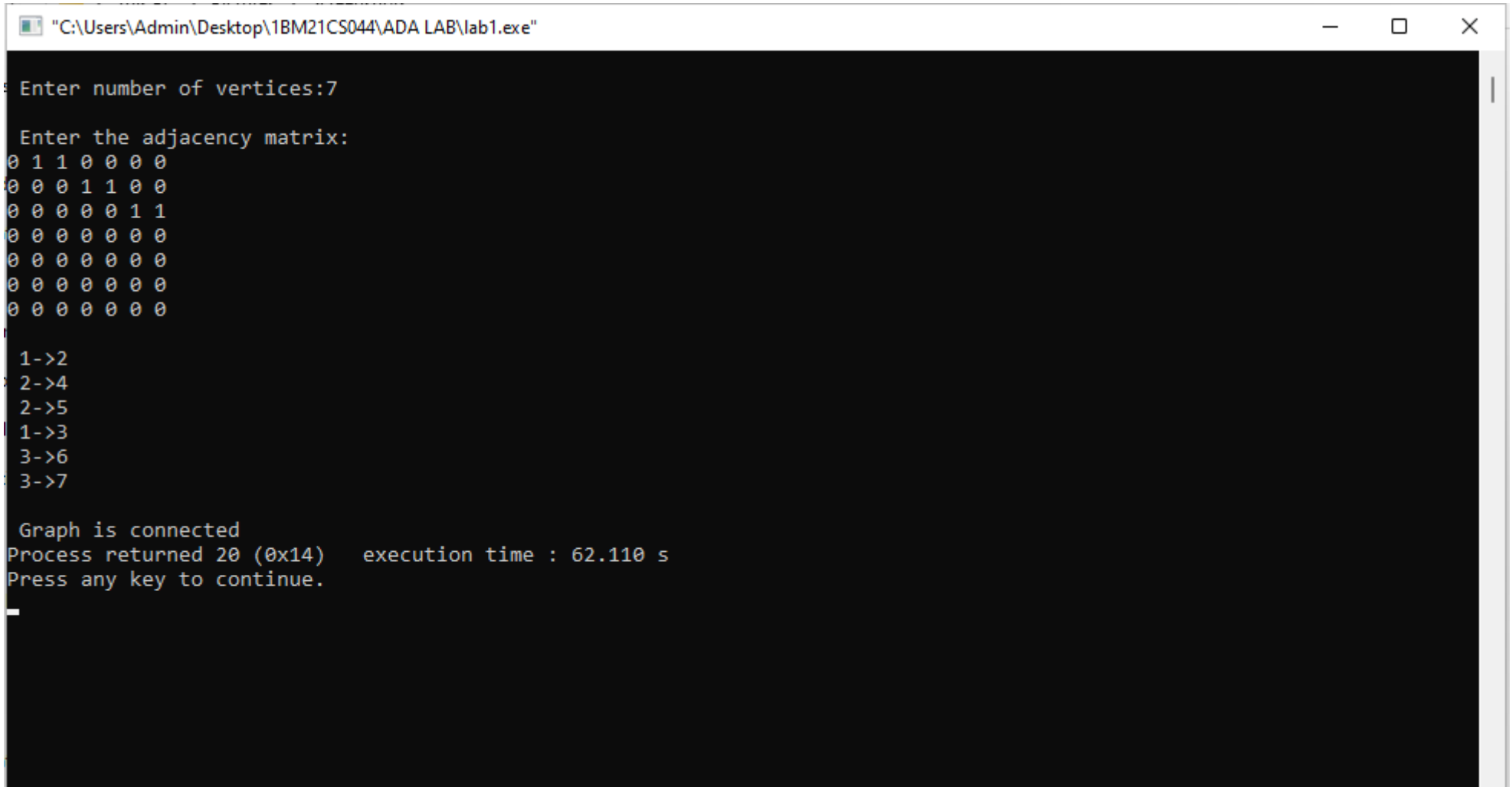
1 → 2

2 → 4

4 → 3



Output:


"C:\Users\Admin\Desktop\1BM21CS044\ADA LAB\lab1.exe"
Enter number of vertices:7
Enter the adjacency matrix:
0 1 1 0 0 0 0
0 0 0 1 1 0 0
0 0 0 0 0 1 1
0 0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 0 0 0 0 0
1->2
2->4
2->5
1->3
3->6
3->7
Graph is connected
Process returned 20 (0x14) execution time : 62.110 s
Press any key to continue.

Breadth First Search(BFS)

BFS

```
#include <stdio.h>
int a[20][20], q[20], visited[20], n, i, j, f=0, r=-1;

void bfs(int v)
{ for (i=1; i<=n; i++)
    { if (a[v][i] && !visited[i])
        q[++r] = i;
      if (f<=r)
      { visited[q[f]]=1;
        bfs(q[f++]);
      }
    }
}

void main()
{ int v;
  printf("\n Enter no. of vertices : ");
  scanf("%d", &n);
  for (i=1; i<=n; i++)
    { q[i]=0;
      visited[i]=0;
    }
  printf("\n Enter adjacence matrix of graph : \n");
  for (i=1; i<=n; i++)
    for (j=1; j<=n; j++)
      scanf("%d", &a[i][j]);
  printf("\n Enter starting vertex : ");
  scanf("%d", &v);
  bfs(v);
  printf("\n The node in bfs are : \n");
  for (i=1; i<=n; i++)
  {
    if (visited[i])
      printf("%d\t", i);
  }
}
```

input adjacence matrix

0 1 1 1
0 0 0 1
0 0 0 0
0 0 1 0

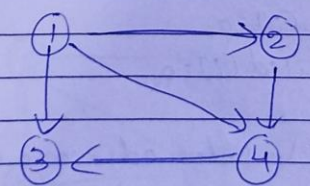
no. of vertices 4

Output

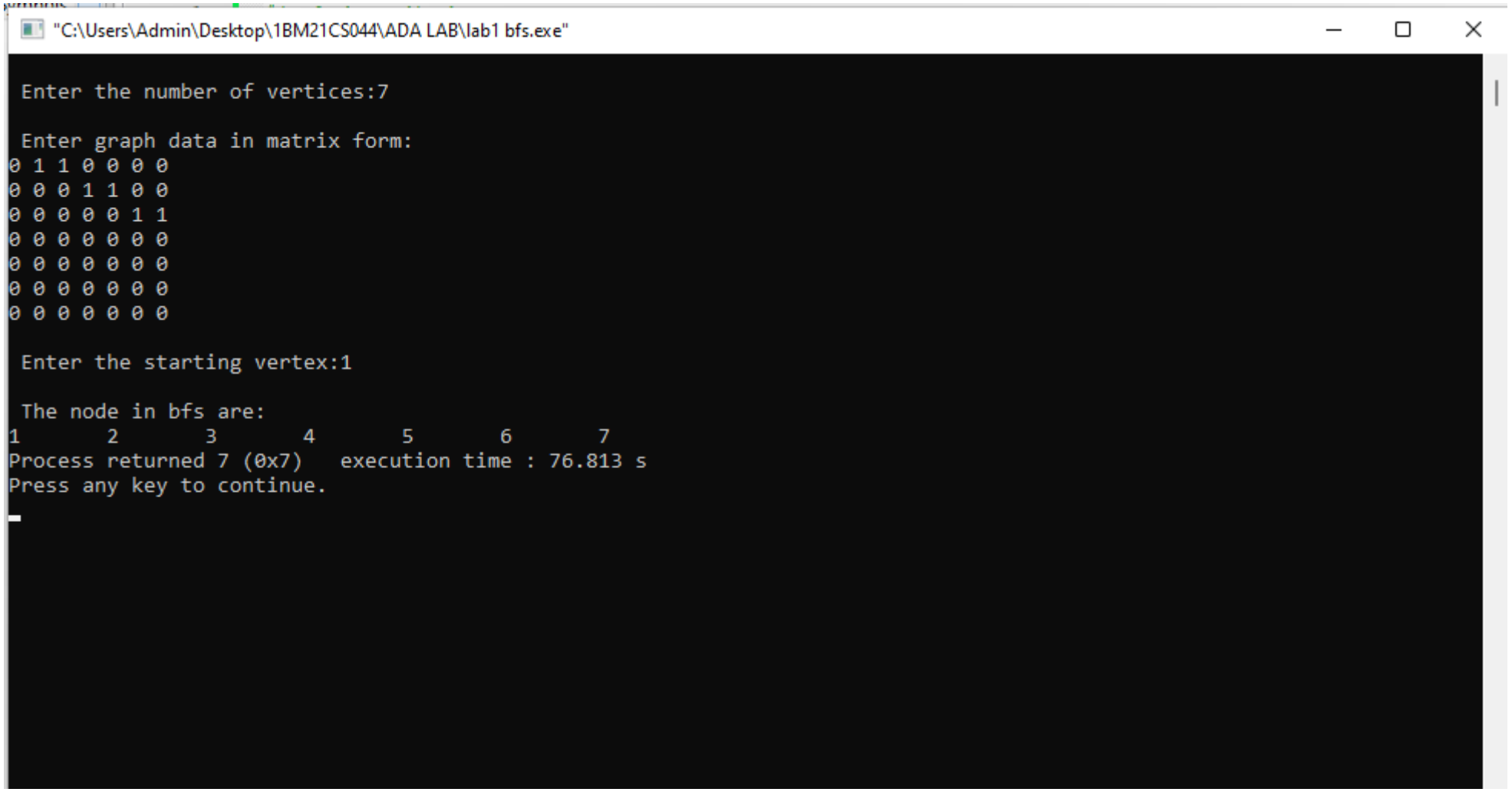
Enter starting vertex : 2

The node in bfs are :

1 2 3 4



Output:


"C:\Users\Admin\Desktop\1BM21CS044\ADA LAB\lab1 bfs.exe"
Enter the number of vertices:7
Enter graph data in matrix form:
0 1 1 0 0 0 0
0 0 0 1 1 0 0
0 0 0 0 0 1 1
0 0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 0 0 0 0 0
0 0 0 0 0 0 0
Enter the starting vertex:1
The node in bfs are:
1 2 3 4 5 6 7
Process returned 7 (0x7) execution time : 76.813 s
Press any key to continue.