b) Write a C/C++ program for finding the number of cycles in the graph.

```
/*
 * C++ Program to Find Number of Cycles in a Graph
 */
#include<iostream>
#define SIZE 20
using namespace std;

bool map[SIZE][SIZE], F;
long long f[1 << SIZE][SIZE], res = 0;
/*
 * Main: count the number of cycles in a graph
 */
int main()
{

   int n , m, i, j, k, l, x, y;
   cout<<"Enter number of vertices and number of edges: ";
   cin>>n>>m;
   for (i = 0; i < m; i++)
   {
      cout<<"Enter source vertex and destination vertex of an edge:: ";
      cin>>x>>y;
      x--;
      y--;
      if (x > y)
        swap(x, y);
      map[x][y] = map[y][x] = 1;
      f[(1 << x) + (1 << y)][y] = 1;
   }

   for (i = 7; i < (1 << n); i++)
   {
      F = 1;
      for (j = 0; j < n; j++)
      {
         if (i & (1 << j) && f[i][j] == 0)
         {
            if (F)
            {
               F = 0;
               k = j;
               continue;
            }
            for (l = k + 1; l < n; l++)
            {
               if (i & (1 << l) && map[j][l])
                  f[i][j] += f[i - (1 << j)][l];
            }
            if (map[k][j])
               res += f[i][j];
```

```
        }
      }
    }
    cout<<"Number of Cycles: "<<res/2<<endl;
    return 0;
}
```

```
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM3\CCN>  & '
-vscode.cpptools-1.16.3-win32-x64\debugAdapters\bin\WindowsDebugLaunch
zgk' '--stdout=Microsoft-MIEngine-Out-prozhc4q.zfj' '--stderr=Microsof
MIEngine-Pid-0ksohyp1.u1p' '--dbgExe=C:\msys64\mingw64\bin\gdb.exe' '-
Enter number of vertices and number of edges: 4 4
Enter source vertex and destination vertex of an edge:: 1 2
Enter source vertex and destination vertex of an edge:: 1 4
Enter source vertex and destination vertex of an edge:: 2 3
Enter source vertex and destination vertex of an edge:: 3 4
Number of Cycles: 1
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM3\CCN>
```