S.No: 29	Exp. Name: ***Graph Colouring***	Date:

Aim:

Write a program to colour the graph using backtracking and print the result as shown in the example. Fill the missing code in the below program.

Sample Input and Output:

```
Enter no. of vertices : 4
Enter no. of edges : 5
Enter indexes where value is 1
0 1
1 2
1 3
2 3
3 0
Colors of vertices
Vertex[1] : 1
Vertex[2] : 2
Vertex[3] : 1
Vertex[4] : 3
```

Source Code:

graphcolour.c

```
#include<stdio.h>
int G[50][50], x[50];
void nextcolor(int k){

    // start vertex with color1
   // check   for all k-1 vertices-backtracking
   // if you find any connected vertices have same colour
    //assign next color than x[i]
    int i,j;
    x[k]=1;
    for(int i=0;i<k;i++)
    {
      if(G[i][k]!=0 && x[k]==x[i])
      x[k]=x[i]+1;
    }

}

int main(){
  int n,e,i,j,k,l;
  printf("Enter no. of vertices : ");
  scanf("%d",&n);
  printf("Enter no. of edges : ");
  scanf("%d",&e);

  for(i = 0; i < n; i++)
    for(j = 0; j < n; j++)
      G[i][j] = 0;

  printf("Enter indexes where value is 1\n");
```

```
  for(i = 0; i < e; i++){
    scanf("%d %d",&k,&l);
    G[k][l] = 1;
    G[l][k] = 1;
  }

  for(i = 0; i < n; i++)
    nextcolor(i);

  printf("Colors of vertices\n");
  for(i = 0; i < n; i++)
    printf("Vertex[%d] : %d\n", i+1, x[i]);
 return 0;
}
```


Execution Results - All test cases have succeeded!

Test Case - 1	
User Output	
Enter no. of vertices : 4	
Enter no. of edges : 5	
Enter indexes where value is 1 1 2	
2 4	2 4
4 3	4 3
3 2	3 2
3 1	3 1
Colors of vertices	
Vertex[1] : 1	
Vertex[2] : 1	
Vertex[3] : 2	
Vertex[4] : 3	