BFS

-21Z201

```
import java.io.*;
import java.util.*;

public class bfs {
   private int v;
   private LinkedList<Integer> l[];
   private Queue<Integer> q;
   private int[] parent;

   void newgraph(int n) {
      v = n;
      l = new LinkedList[v];
      for (int i = 0; i < v; i++) {
         l[i] = new LinkedList<>();
      }
      q = new LinkedList<>();
      parent = new int[v];
   }

   void edge(int a, int b) {
      l[a].add(b);
      l[b].add(a);
   }

   void BFS(int x, int y) {
      boolean val[] = new boolean[v];
      Arrays.fill(val, false);
      Arrays.fill(parent, -1);

      val[x] = true;
```

```
    q.add(x);

    while (!q.isEmpty()) {
        int n = q.poll();

        for (int i = 0; i < l[n].size(); i++) {
            int a = l[n].get(i);
            if (!val[a]) {
                val[a] = true;
                q.add(a);
                parent[a] = n;
            }
        }
    }

    path(x, y);
}

void path(int x, int y) {
    System.out.println("Path from " + x + " to " + y + ":");
    pathcheck(x, y);
    System.out.println();
}

void pathcheck(int x, int y) {
    if (y == -1) {
        System.out.println("No path exists.");
        return;
    }

    if (x == y) {
        System.out.print(y + " ");
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        return;
      }

      pathcheck(x, parent[y]);
      System.out.print(y + " ");
   }

   public static void main(String args[]) {
      Scanner sc = new Scanner(System.in);
      bfs ob = new bfs();
      System.out.println("Enter the number of vertices:");
      int n = sc.nextInt();
      ob.newgraph(n);
      System.out.println("Enter the number of edges:");
      int e = sc.nextInt();
      System.out.println("Enter the edges");
      for (int i = 0; i < e; i++) {
         int x = sc.nextInt();
         int y = sc.nextInt();
         ob.edge(x, y);
      }
      System.out.println("Enter the starting vertex:");
      int x = sc.nextInt();
      System.out.println("Enter the ending vertex:");
      int y = sc.nextInt();
      sc.close();

      ob.BFS(x, y);
   }
}
```

OUTPUT

```
PowerShell 7.4.0
PS E:\ai>  & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetail
sInExceptionMessages' '-cp' 'C:\Users\sraad\AppData\Roaming\Code\User\workspa
ceStorage\2f516b541c1dea22cf734b8cb8c908cb\redhat.java\jdt_ws\ai_3e76fe2\bin'
 'bfs'
Enter the number of vertices:
4
Enter the number of edges:
6
Enter the edges
0 1
0 2
1 2
2 0
2 3
3 3
Enter the starting vertex:
2
Enter the ending vertex:
1
Path from 2 to 1:
2 1
PS E:\ai>
```