PROGRAM TITLE 07

BREADTH – FIRST SEARCH

AIM:

To Write the python program to implement BFS.

PROCEDURE:

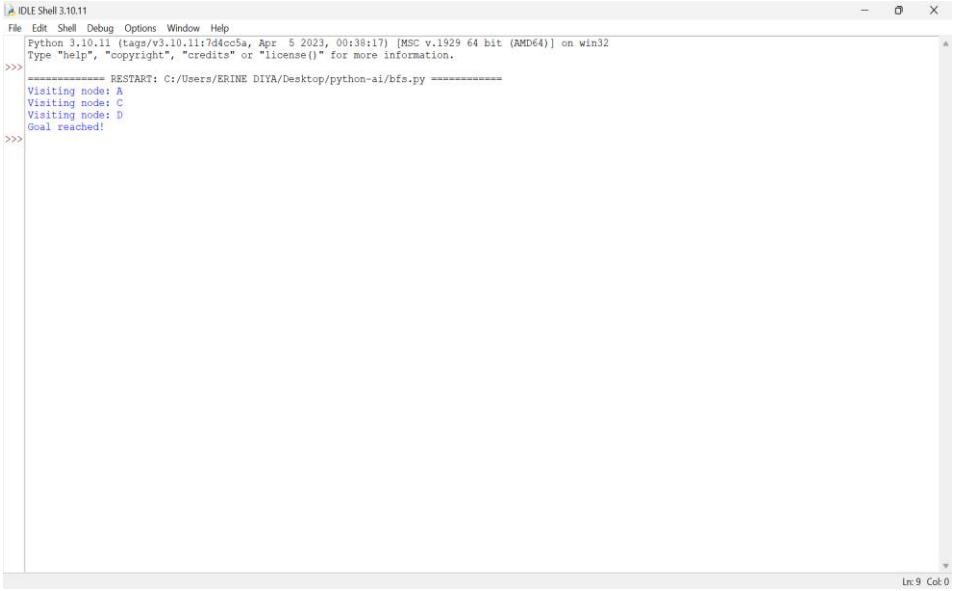
1. Initialize Graph Class: Define a class named Graph to represent a graph. The class initializes with an empty dictionary to store the adjacency list representation of the graph.
2. Add Edges: Implement the add_edge method within the Graph class to add edges to the graph. If a vertex is not present in the graph, create a new list to store its neighbors and append the neighbor to the list.
3. Breadth-First Search (BFS): Implement the bfs method within the Graph class to perform the Breadth-First Search traversal starting from a given vertex. The method initializes a set to store visited vertices and a queue (implemented using deque) to perform the BFS.
4. Traverse Graph: In the bfs method, use a loop to traverse the graph in a breadthfirst manner. Print each visited vertex as it is dequeued from the queue. Enqueue the unvisited neighbors of the current vertex and mark them as visited.
5. Usage: In the main section of the program, create an instance of the Graph class. Add edges to the graph using the add_edge method. Finally, call the bfs method with the starting vertex to perform the BFS traversal and print the result.

CODING:

```
from collections import deque


class Graph:     def
__init__(self):
self.graph = {}


   def add_edge(self, u, v):
if u not in self.graph:
self.graph[u] = []
self.graph[u].append(v)
def bfs(self, start):
visited = set()        queue =
deque([start])
visited.add(start)
```

```
        while queue:
            vertex = queue.popleft()
print(vertex, end=" ")

            if vertex in self.graph:                for
neighbor in self.graph[vertex]:
if neighbor not in visited:
visited.add(neighbor)
queue.append(neighbor)



if __name__ == "__main__":
    g = Graph()
    g.add_edge(0, 1)
    g.add_edge(0, 2)
    g.add_edge(1, 2)
    g.add_edge(2, 0)
    g.add_edge(2, 3)
    g.add_edge(3, 3)

    print("Breadth First Traversal (starting from vertex 2):")
    g.bfs(2)
```

OUTPUT:



RESULT:

Hence the program been successfully executed and verified.