Bangladesh University of Business and Technology (BUBT)

Lab Report

Course code: CSE 352
Course title: Artificial Intelligence
Experiment no: 03
Experiment name: Write a python program to implement breadth first search traversal foa a graph.

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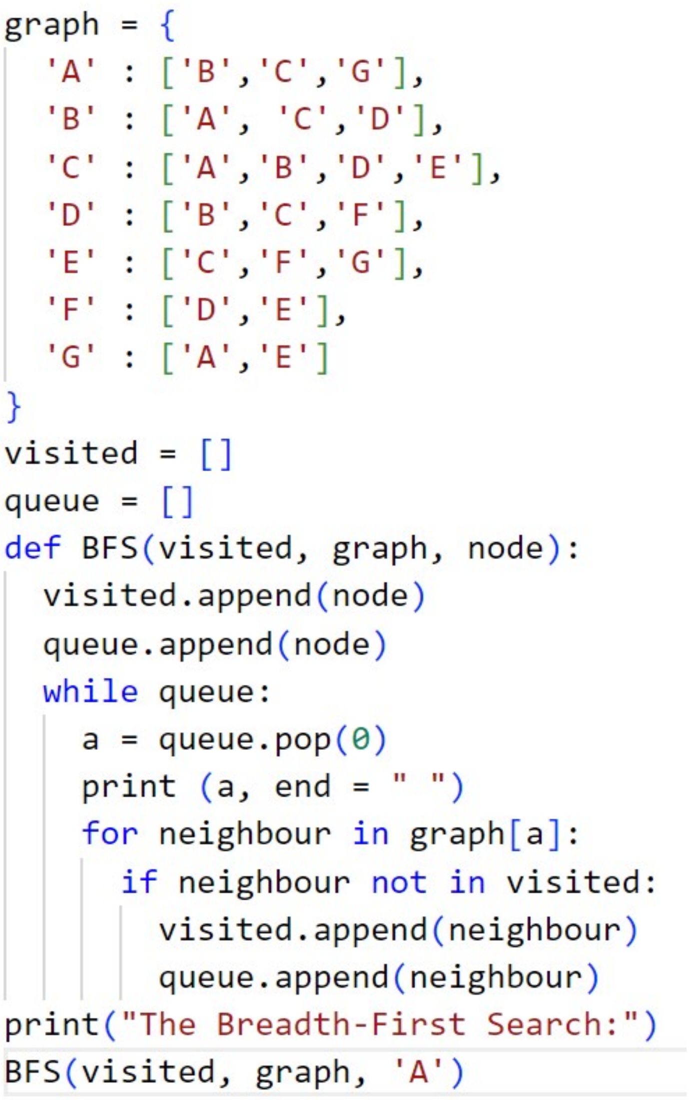
Report no: 03

Report name: Write a python program to implement breadth first search traversal for a graph.

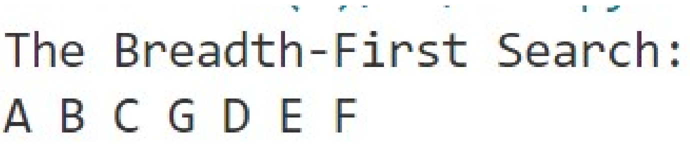
Code Input/Output:

Input of BFS



```
graph = {
    'A' : ['B','C','G'],
    'B' : ['A', 'C','D'],
    'C' : ['A','B','D','E'],
    'D' : ['B','C','F'],
    'E' : ['C','F','G'],
    'F' : ['D','E'],
    'G' : ['A','E']
}
visited = []
queue = []
def BFS(visited, graph, node):
    visited.append(node)
    queue.append(node)
    while queue:
        a = queue.pop(0)
        print (a, end = " ")
        for neighbour in graph[a]:
            if neighbour not in visited:
                visited.append(neighbour)
                queue.append(neighbour)
print("The Breadth-First Search:")
BFS(visited, graph, 'A')
```

Output of BFS



```
The Breadth-First Search:
A B C G D E F
```

Description:

Algorithm:

1. Each vertex of the graph is assigned to one of two categories in a typical BFS implementation:

   Visited

   Not Visited

2. The algorithm's goal is to avoid cycles while marking each vertex as visited.

3. Put any vertex of the graph at the end of the queue to get started.

4. Add the item at the front of the line to the visited list.

5. Make a list of the nodes that are close to that vertex. Place the items that haven't been visited at the end of the list.

6. Repeat actions 2 and 3 until the line is vacant.

Used functions:

- array[]: An array is a data structure that lets us hold multiple values of the same data type. Think of it as a container that holds a fixed number of the same kind of object.An array is used to store more than one value at a time. It can hold multiple values in a single variable, and also helps you reduce the overall size of the code.

  syntex: arrayName = array(typecode, [Initializers])

- If else(): The true and false parts of a given condition are both executed using the if-else() expression. If the condition is true, the code in the if block is run, and if it is false, the code in the else block is run.

  Syntax:

  if test expression:

  Body of if

  else:

  Body of else

- for loop(): When you wish to repeat a section of code a certain number of times, you use for loops. The for statement in Python executes the block each time it iterates over the elements of a sequence in order.

  Here is the basic structure of a for loop in Python:

  for [item] in [sequence]:

  Run code

- while loop(): A while loop repeats a block of code an unknown number of times until a condition is no longer met. A while loop will always first check the condition before running. If the condition evaluates to True, then the loop will continue to run the code while the condition remains True.

  Syntax of while Loop in Python

  while expression:

  statement(s)

- def(): The def keyword in Python is used to define a function; it is prefixed with a user-supplied function name to construct a user-defined function. A function in Python is a logical unit of code that includes a series of statements that are indented and are given names using the ”def” keyword.

  Syntax:

  def function name:

  function definition statements

- Print(): The print() method outputs the text to the normal external device, such as the display. Any object, including a string, can serve as the text. Before being displayed on the screens, the item will be changed into a string.

  Syntax: print(message)