Bangladesh University of Business and Technology (BUBT)

Lab Report

Course code: CSE 352
Course title: Artificial Intelligence
Experiment no: 04
Experiment name: Write a python program to implement depth first search traversal for a graph.

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Code Input/Output:

Input of DFS

```
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 = set()
def dfs(visited, graph, node):
    if node not in visited:
        print (node, end = " ")
        visited.add(node)
        for neighbour in graph[node]:
            dfs(visited, graph, neighbour)
print("The Depth-First Search:")
dfs(visited, graph, 'A')
```

Output of DFS

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

Description:

Algorithm:

1. Each vertex of the graph is assigned to one of two categories in a typical DFS implementation:
   Visited
   Not Visited
2. The algorithm's goal is to label every vertex as visited while preventing cycles.
3. Any vertex in the graph can be placed on top of a stack to begin.
4. Add the top item to the visited list by taking it out of the stack.
5. List the nodes that are near that vertex. Place the items that aren't on the visited list first in the stack.
6. Till the stack is empty, keep performing steps 3 and 4.

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. Arrays save time.
  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. Compare the "while" loop, which is used when a condition needs to be verified after each iteration, to the "for" statement.
  Here is the basic structure of a for loop in Python:
  for [item] in [sequence]:
  Run code
- 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. The most popular keyword in Python is "def."
  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)