

COMSATS University, Islamabad. Department of Computer Science

Class: RAI Date: 27-02-24

Subject: AIC530 - Programming for AI Instructor: Dr. Muhammad Imran

LAB 2

Question: Below are the provided BFS and DFS Algorithms. Convert these algorithms into a Python code and apply them over the graph of Romanian cities (provided at the end).

Algorithms:

BFS:

function breadth_first_search;

```
begin
                                                                            % initialize
  open := [Start];
  closed := [];
  while open ≠ [] do
                                                                      % states remain
    begin
      remove leftmost state from open, call it X;
                                                                         % goal found
         if X is a goal then return SUCCESS
           else begin
             generate children of X;
             put X on closed;
             discard children of X if already on open or closed;
                                                                         % loop check
             put remaining children on right end of open
                                                                              % queue
           end
    end
  return FAIL
                                                                       % no states left
end.
```



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DFS:

```
begin
  open := [Start];
                                                                            % initialize
  closed := [];
                                                                      % states remain
  while open ≠ [] do
    begin
      remove leftmost state from open, call it X;
      if X is a goal then return SUCCESS
                                                                         % goal found
         else begin
           generate children of X;
           put X on closed;
           discard children of X if already on open or closed;
                                                                         % loop check
           put remaining children on left end of open
                                                                               % stack
         end
    end;
  return FAIL
                                                                       % no states left
end.
```



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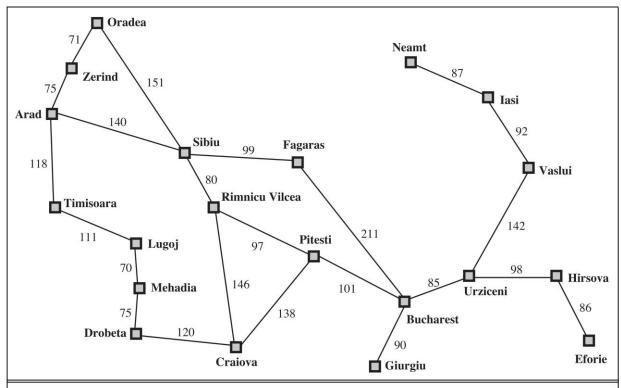


Figure 3.2 A simplified road map of part of Romania.