Lab 5

Contents

1 Highlighting vertices in a graph

When plotting a graph, it is possible to color certain vertices with another color. This can be achieved with `highlight` function as presented in the following example:

```
clear; close all;

A = [
    0 1 0 1;
    1 0 1 0;
    0 1 0 1;
    1 0 1 0
    ]; % Adjacency matrix

C = [1, 3]; % Vertices to highlight

figure;
G = graph(A);
h = plot(G);
highlight(h, C, 'NodeColor', 'r'); % 'r' for red, 'g'
    for green, 'b' for blue, etc.
```

2 Task 5.1

Write a program which for a given subset of vertices I of the graph $G = (V, E)$ checks whether I is an independent set of G. Plot the graph and highlight the vertices which are in the IS.

You can base your code on the following pseudocode that uses an adjacency matrix representation of G:

Algorithm 1: Test for independence

Input : Adjacency matrix A, set of vertices I
Output: Boolean value t (true if I is an independent set and false otherwise)

```
1  Function is_independent_set (A, I)
2      t := true;
3      if length(I) > 1 then
4          for v_index = 1 TO length(I)−1 do
5              v := I[v_index];
6              for w_index = v_index + 1 TO length(I) do
7                  w := I[w_index];
8                  if A[v][w] == 1 then
9                      t := false;
10                 end
11             end
12         end
13     end
14     return t;
15 end
```