

Practice Matlab test

This is the **practice** Matlab test for TNSL20 course. You should receive your test assignment via email from one of your teachers. Please, confirm that you have received the assignment immediately by replying to this email with something like "OK" or similar. Only then you can start working on your task.

You are ALLOWED to use:

- All lab materials
- Previously written code
- MATLAB documentation

You are NOT allowed to use:

- Communication of any kind (email, chat, discussion, phones or other mobile devices, etc.) All mobile devices should be off and away.
- Help from other person!

The test is scheduled until the end of the lab.

In this test to pass this part of the course you need to solve the task correctly.

Please, write a single script for the following task, save and send it to your teacher as an attachment to a single email, in reply to the email, in which you have received this document. Before leaving, please wait for a confirmation from your teacher that your submission has been received.

Good luck!

Task

Write a program that for a given undirected graph $G = (V, E)$ as an edge list and a subset of edges M of E checks whether M is a matching (that is, no two edges in M share a common vertex).

Plot the graph and highlight the edges in M .

Example of an input is:

```
1 E = [  
2     1, 2;  
3     2, 3;  
4     4, 5;  
5     6, 7;  
6 ]; % edge list  
7 M = [  
8     1, 2;  
9     4, 5;  
10    6, 7;  
11 ]; % a matching
```

Try also:

```
1 M = [  
2     1, 2;  
3     2, 3;  
4     6, 7;  
5 ]; % not a matching, because edges (1, 2) and (2, 3)  
    share vertex 2
```

To plot the graph using an edge list and color edges in M with a different color, you can use the following code:

```
1 G = graph(E(:, 1), E(:, 2));  
2 h = plot(G);  
3 highlight(h, M(:, 1), M(:, 2), 'EdgeColor', 'r'); % '  
    g' - green, 'r' - red, 'b' - blue, etc
```

You can use the following pseudocode:

Algorithm 1: Test whether M is a matching

Input : Edge list E , subset of edges M

Output: True if M is a matching, false otherwise

```
1  $is\_matching := true;$ 
2 for  $i = 1$  TO number of rows in  $M$  - 1 do
3    $u_1 := M[i, 1];$ 
4    $v_1 := M[i, 2];$ 
5   for  $j = i + 1$  TO number of rows in  $M$  do
6      $u_2 := M[j, 1];$ 
7      $v_2 := M[j, 2];$ 
8     if  $u_1 == u_2$  OR  $u_1 == v_2$  OR  $v_1 == u_2$  OR  $v_1 == v_2$  then
9        $is\_matching := false;$ 
10    end
11  end
12 end
13  $print(is\_matching);$ 
```
