Lab #9

1 Task 14

Write a program that for a given undirected graph $G = (V, E)$ and a subset of vertices C of V checks whether C is a vertex cover of G.

Example of an input is:

```
E = [
    1, 2;
    2, 3;
    4, 5;
    6, 7;
];
C = [1, 2, 3, 4, 5, 6, 7]; % Set of vertices (vertex
   cover)
```

To plot the graph and color vertices from C with a different color, you can use the following code:

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

You can use the following pseudocode:

Algorithm 1: Test for a vertex cover

Input : Edge list E, subset of vertices C
Output: True if C is a vertex cover of G, false otherwise

```
1  is_vc := true;
2  for i = 1 TO number of rows in E do
3  |   u := E(i, 1);
4  |   v := E(i, 2);
5  |   covered := false;
6  |   for j = 1 TO length(C) do
7  |   |   if C(j) == u or C(j) == v then
8  |   |   |   covered := true;
9  |   |   end
10 |   end
11 |   if not covered then
12 |   |   is_vc := false;
13 |   end
14 end
15 print(is_vc);
```