Lab. 11 - Graph Problems (2)

Read the graphs given in the attached files (already given in the previous lab class) into their adjacency matrix, namely

- graph_10_60.txt,
- graph_10_90.txt,
- graph_20_60.txt,
- graph_20_90.txt
- graph_50_60.txt,
- graph_50_90.txt,
- graph_100_60.txt,
- graph_100_90.txt
- graph_7.txt (the graph shown in slide 11)

and solve the following problems for each graph:

11.1 Spanning trees

1. Use Prim's algorithm studied in the lecture to obtain the minimum spanning tree (MST) of a graph G, in the form of an adjacency matrix.

```
function T = prim (G)
```

2. What is the length of the spanning trees obtained for the graphs above? Use a function with signature

```
function c = min_spanning_length(G)
```

3. Assume that the graph corresponds to a distribution network, for which some redundancy is intended. For this purpose, specify a program that obtains, in the form of an adjacency matrix, the two minimal spanning trees that share no arc between them. Use function with signature

```
function [T1, T2] = mst_2(G)
```

Hint: Obtain a MST, remove the arcs, and obtain a second MST

11.2 Graph Distances

Use the Floyd-Warshall's algorithm to

a) Identify the most central node of the graph;

```
function k = most_central(G)
```

b) Identify the pair of nodes of the graph more far apart; and

```
function [u,v] = longest_distance(G)
```

c) Obtain the path between these nodes.

```
function P = longest_path(G)
```