Please upload your answer to a private git repository (i.e. GitLab/GitHub) and share the repository link to mlhadi@tmrnd.com.my, azhari.asrokin@tmrnd.com.my, nabihah@tmrnd.com.my

A. OPTICAL NETWORK

You are given a file that contains a list of nodes, and the possible connections/edges between each pair of nodes (if it exists), with the length given in KM.

Assuming that the link uses 1550nm transmission, convert the distance to propagation delay, and then create a minimum spanning tree that minimises the total propagation delay. From the generated tree, what is the largest delay from node A (root node) to the outermost node (leaf node)?

To illustrate the problem, consider the network in Figure 1 below, where you have 5 nodes, and each edge between nodes is the propagation delay in milliseconds. The edges highlighted in red is the resulting minimum spanning tree, and is redrawn in Figure 2.
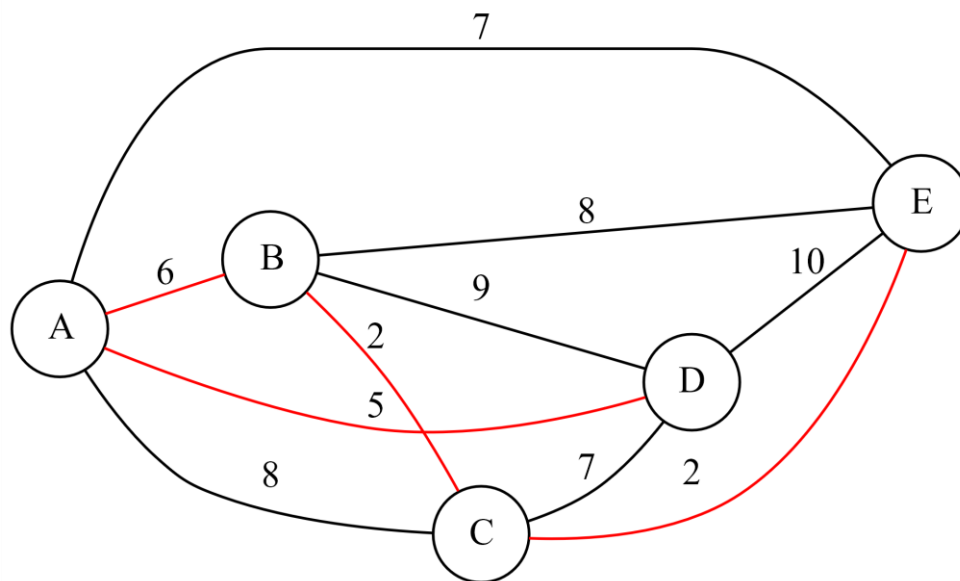

Figure 1 - Example network Graph with 5 nodes and possible length between the nodes
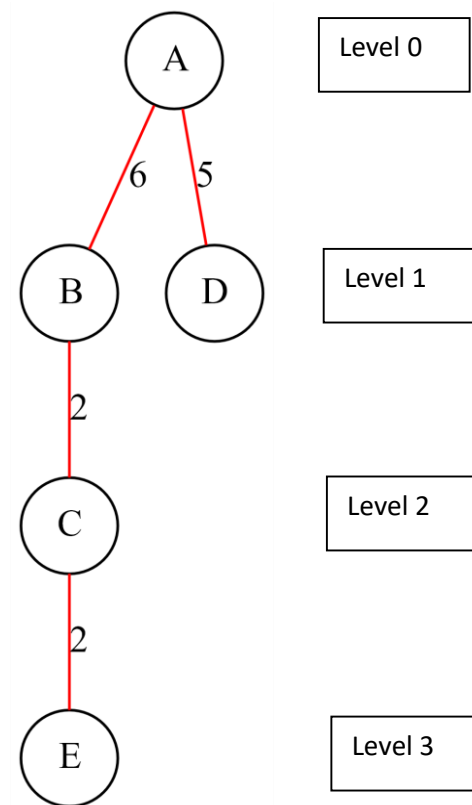
Figure 2 – Network in Figure 1 re-drawn as minimum spanning tree

The node that is furthest from A is node E, with the total propagation delay being 6 + 2 + 2 = 8 ms. Note that even though there is a direct path from A to E (with a propagation delay of 7 ms) in the original graph (Figure 1), we are only interested in the path created from the minimum spanning tree. Furthermore, we define furthest as the node with the highest level from the root node (node A). If there are multiple nodes, choose the one with the largest propagation delay.

Your input file (**input.txt**) contains the following format: The first line contains the number of nodes *n*, and the next following *n* lines contain the name of the nodes. After that, the following lines tell you the edges between the nodes, and the distance between them. As an example, for Figure 1, the input will be given as:

5

A

B

C

D

E

A B 6

A C 8

A D 5

A E 7

B C 2

B D 9

B E 8

C D 7

C E 2

D E 10

You are encouraged to write your solution in Python3.

B. CPE

You are given the files (json format) of CPE data from TM Customers (ONU LAN Port 1), with both ONU and RG data available.

From these CPE data files, please identify the parameters that may produce issues in the FTTH network connection. To make it easier to view, please fill in the table below:

Customer ID	Issues related to ONU	Issues related to RG
abc123@unifi	Lan - user use Lan 4 port	PPPUsername - wrong username - suppose same with username given
wxy987@unifi	RX Reading - Fiber reading out - Probably High Loss due to bending, patch Cord Issue etc	LOSI - Probably because of fiber core break/OLT card issue/configuration