

Network Communication

Section-07

Task 4

Group 6 :

Ahmad Kemal Aushaf (A19EC3002)

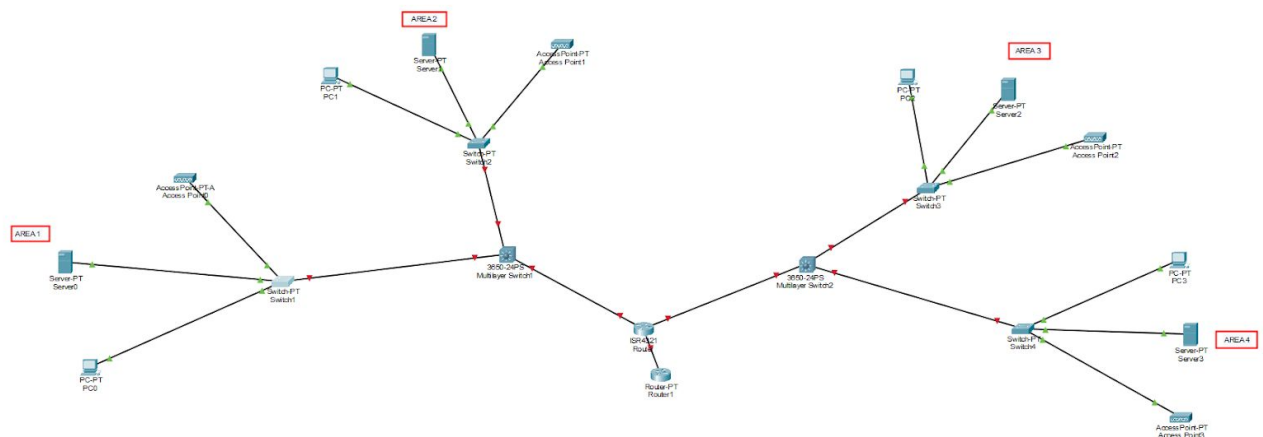
Muhammad Aqila Karindra Daffa (A19EC3010)

Savero Fajri Sutiono (A19EC3016)

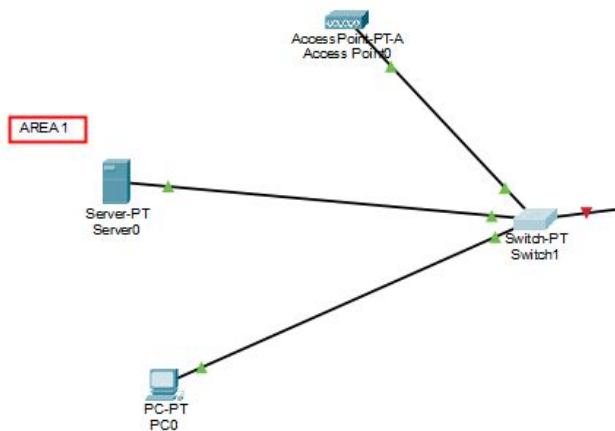
Zeiad Wael Mohamed (A19EC9047)

A. NETWORK TOPOLOGY

Our network design is using tree topology. Tree topology is a combination of star and bus topology. This topology is mostly used on larger networks. The tree network has some advantages such as it is highly flexible, scalable and it provides easy fault detection in a network that is why network management is very easy. And the disadvantages of this topology is that it is difficult to configure, there is a single point of failure if the hub device fails the entire network will shut down. Tree network is used to share information across the network and allow users to have many servers on the network. It is the best topology because the signals that are transmitted by the root nodes are received by all the computers at the same time.

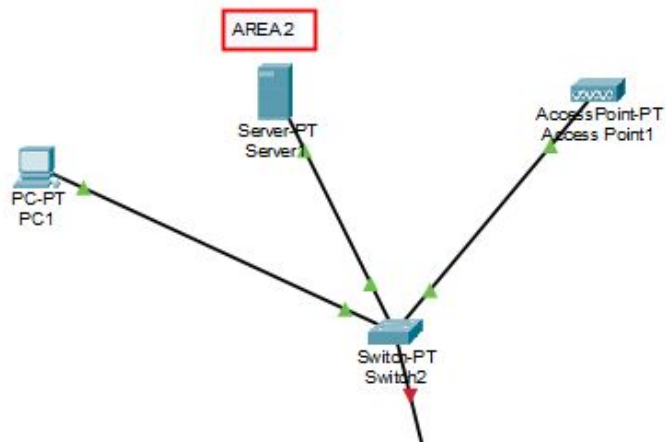


B. WORK AREAS



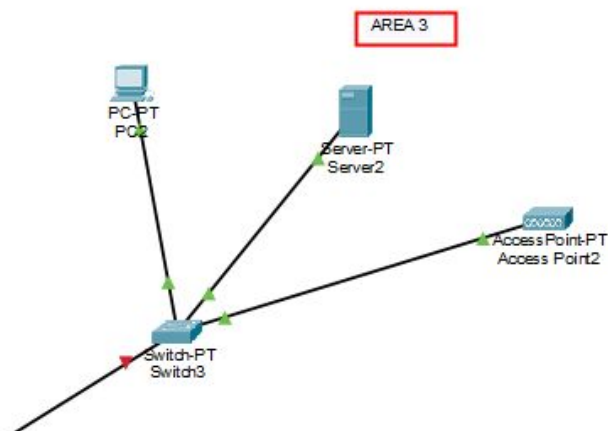
1)Work area 1

Work area 1 is located on the west side of the building that contains VCR and CS Lab on both floors (1st and 2nd floor). There are 2 switches of (24 PS) connected to end-user (PC0), Server 0, and Access point 0.



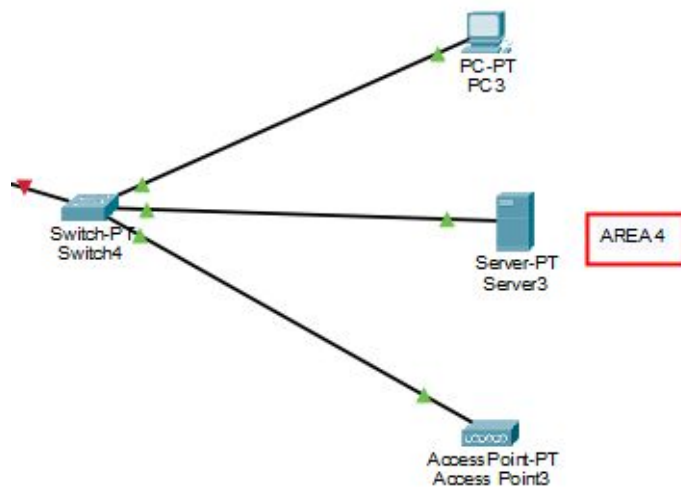
2)Work area 2

Work area 2 is located at the center of the building that contains GP Lab and N Lab on both floors (1st and 2nd floor). The switches are (24 PS) connected to end-user (PC1), Server 1, and Access point 1.



3)WORK AREA 3

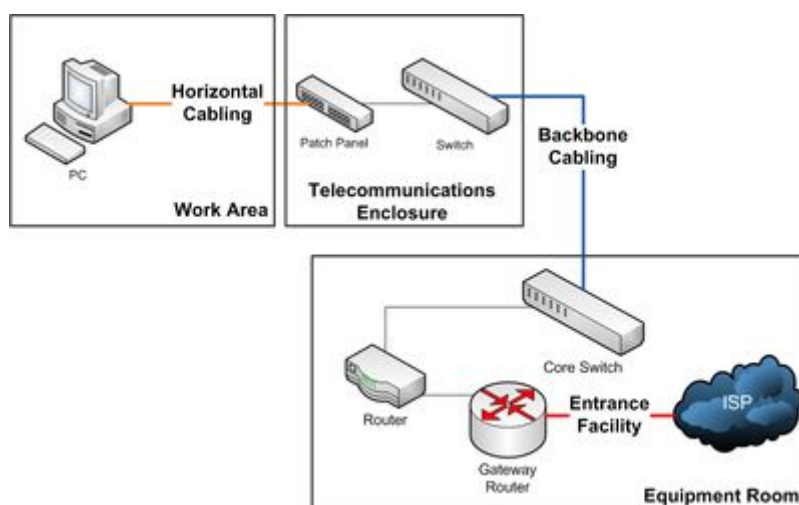
Work area 3 is located on the east side of the building that contains VCR and IOT Lab plus library on both floors (1st and 2nd floor). The switches are (24 PS) connected to end-user (PC2), Server 2, and Access point 2.



3)WORK AREA 4

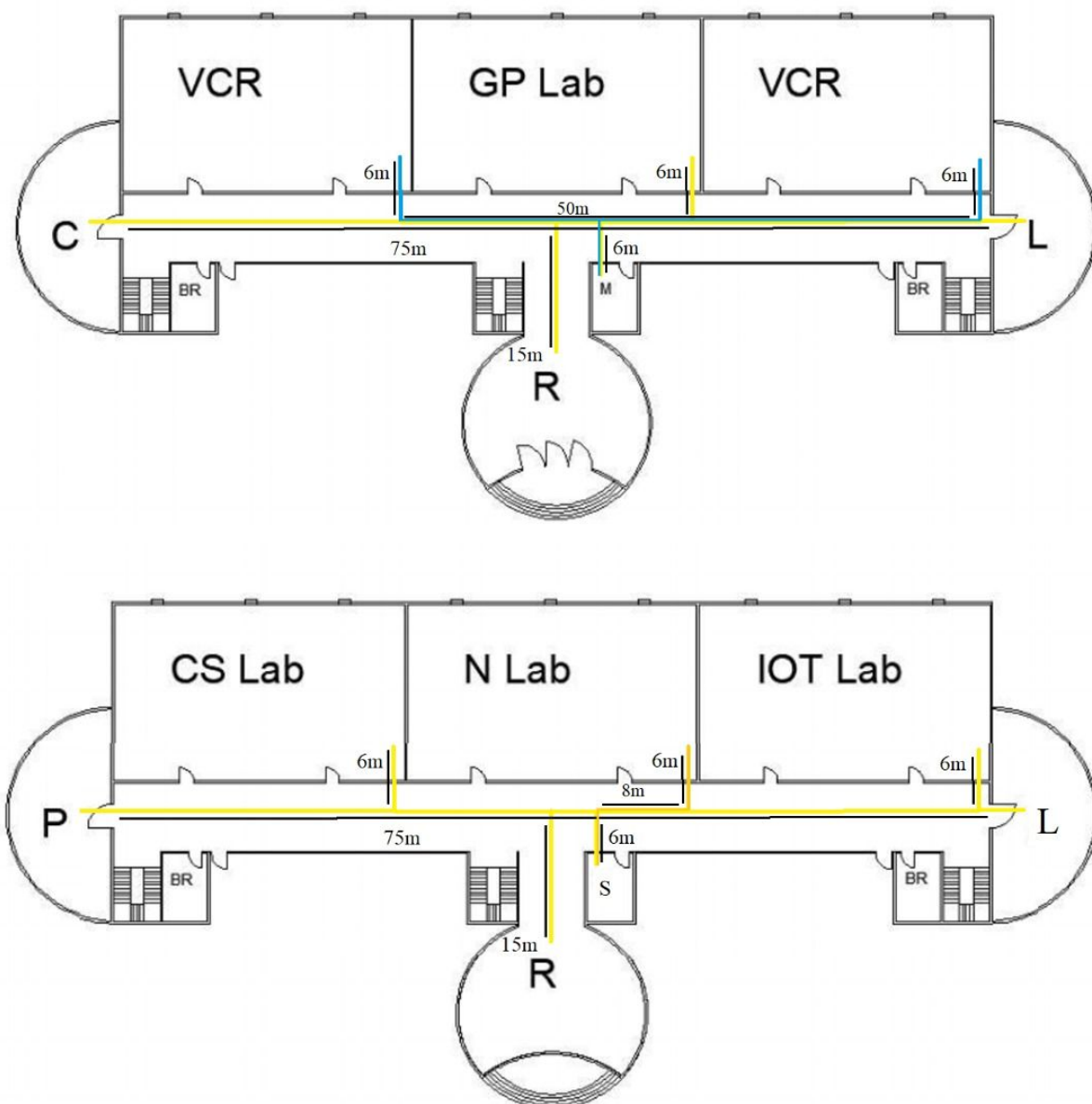
Work area 4 is located on the east side of the building that contains the Library on both floors (1st and 2nd floor). The switches are (24 PS) connected to end-user (PC3), Server 3, and Access point 3.

C. WIRED LAN CABLE STRUCTURES



D. CABLE LENGTH AND TYPE

1) Backbone cabling

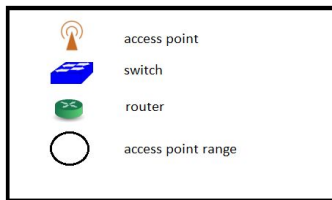


We are using vertical cabling or also known as “backbone”, by using category 5e cables to fulfill the needs of the GP lab, cafeteria, library, CS lab, and IoT lab. We are also using category 6 cable for the network lab, and fibre optic cables for both of the video conference rooms. The purpose of these 2 high speed cables is to get the higher performance for either labs or the video conference room. We don't want our client to experience a lag during an important video conference or other important things in the Network lab.

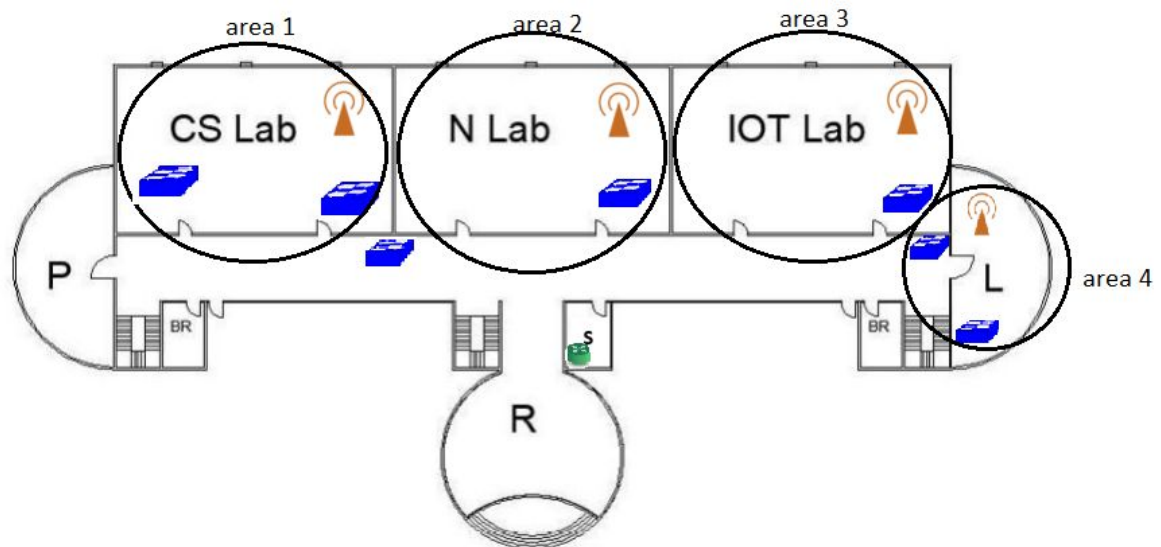
category 5e cable will consume the total of 470m. 198m is for us to pull from floor to floor but we are going to take 200m for spare and the other 270m are for inside the labs. For the category 6 cables we will need the length of 110m, 90m inside the lab and the other 20m is to pull from floor to floor. The last thing is 84m of fibre optic cable, 16m for inside the both video conference rooms and 68m to pull from floor to floor.

the specification of each room will be shown below on section **3 and 4**.

2) access point, switch, router, and access point range

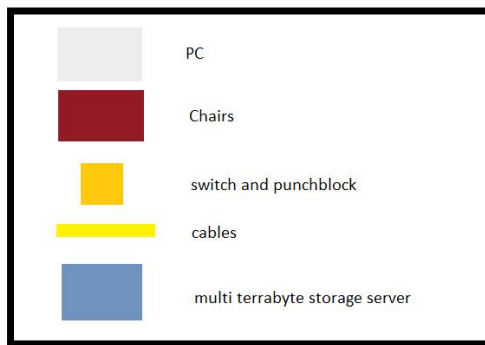


this diagram also represent for the 1st floor

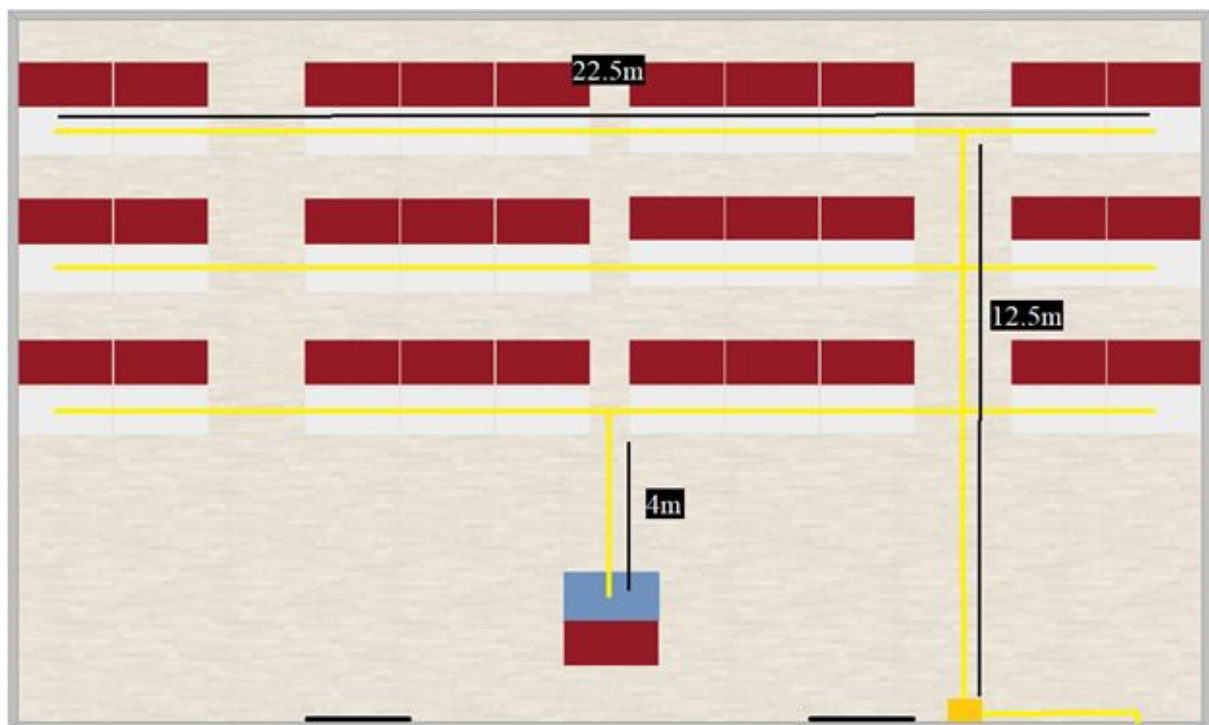


This diagram is based on the topology "**A**" there are 7 switches, 4 access point 1 routers and 4 areas with the diameters; (area 1,2&3=25m, area 4=15m).

3) labs

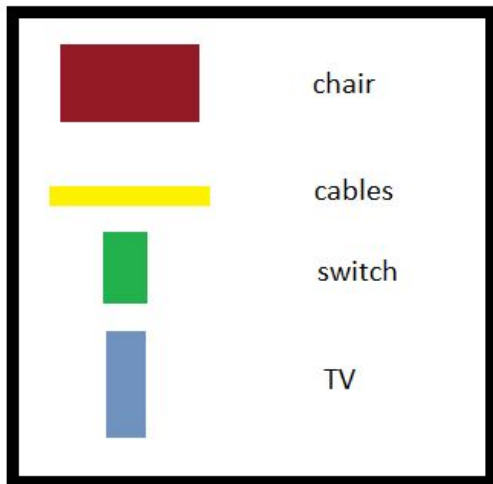


This diagram apply to all of the labs

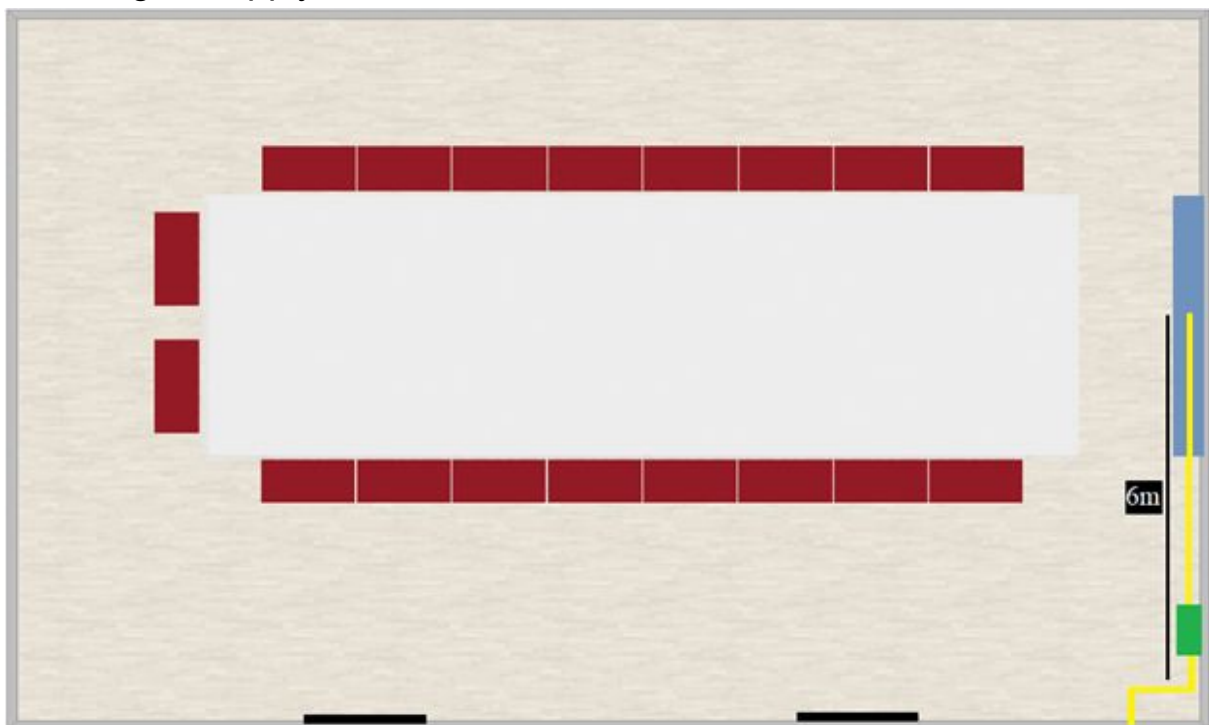


length of cables for each lab: $4m + 12.5m + (22.5 \times 3) = 84m$ but we are going to get 90m just for sure. so there are 3 labs using the category 5e cables, $90m \times 3 = 270m$. and one lab uses category 6 cable. so the labs consume 270m of category 5e cable and 90m of category 6 cables.

4) Video Conference Room



This diagram apply to both of the video conference room



Video conference room uses a fibre optic cable of 6m each room but to be sure we are going to get 8m. so we will need 16m of fibre optic cables for the video conference room.