UTM

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING

SECR1213 - NETWORK COMMUNICATIONS

TASK 4: Making the Connections–LAN and WAN

LECTURER:

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GROUP 3: THE PHOENIX

GROUP MEMBER:

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Task 4: Making the Connections–LAN and WAN

a. Identifying the work areas on the floor plan.

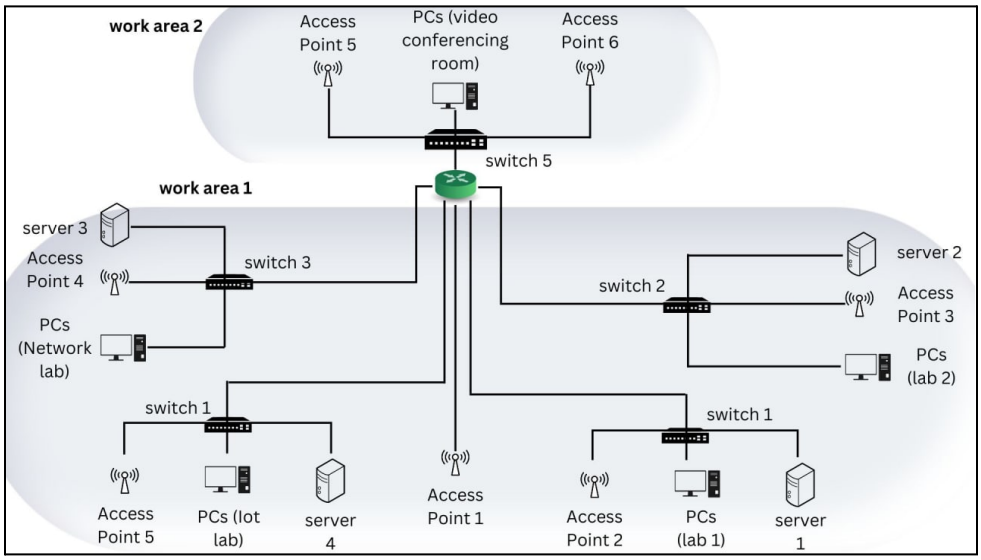


Figure 4.1 Work Areas on the Floor Plan

Work Area 1- The ground floor of the building has provided a connection to four of the labs, a video conferencing room and the student lounge. The labs include two general-purpose labs, a network lab and an IoT lab. Each lab will have a 48-port switch that connects to the router and connects to 30 PCs (30 ports used), 1 access point (1 port used) and 1 server (1 port used). Thus, a total of 32 ports are used in each lab. Besides, the ground floor work area also provides a connection of access points for the end-user (PCs, tablets, laptops, smartphones) that directly connect with the router.

Work Area 2- The first floor of the building provides a connection to a video conferencing room, and the student lounge. The first floor will be using a 48-ports switch that connects with the router. The switch will connect to 1 PC from 1 access point in each video conferencing room (1 port used in each room), 10 PCs in each video conferencing room (10 ports used in each room) and 1 access point at the student lounge (1 port used) which will use a total of 12 ports.

b. Identifying the number of connections, patch cords and switch ports.

The number of connections

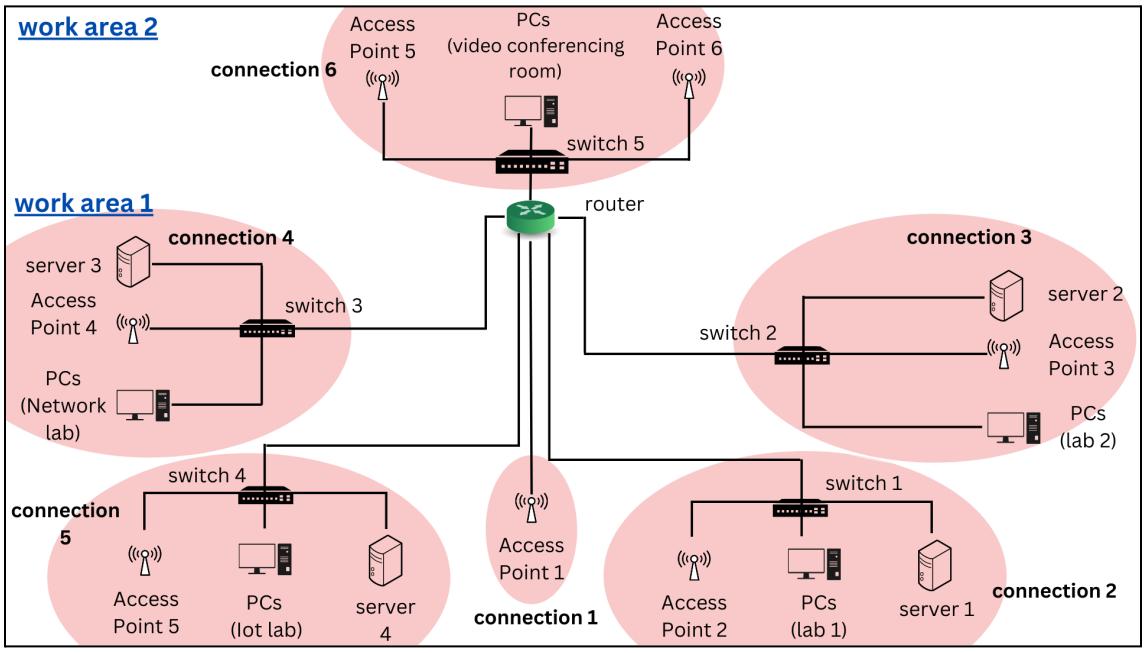


Figure 4.2 Work Areas Connection on the Floor Plan

Based on the above diagram, we have identified six (6) connections for this project.

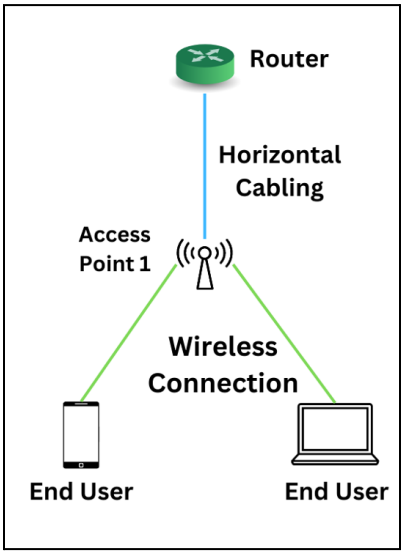


Figure 4.3 Connection 1

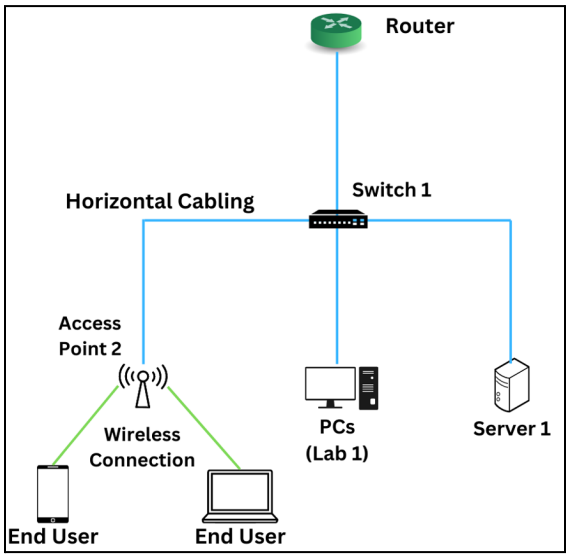


Figure 4.4 Connection 2

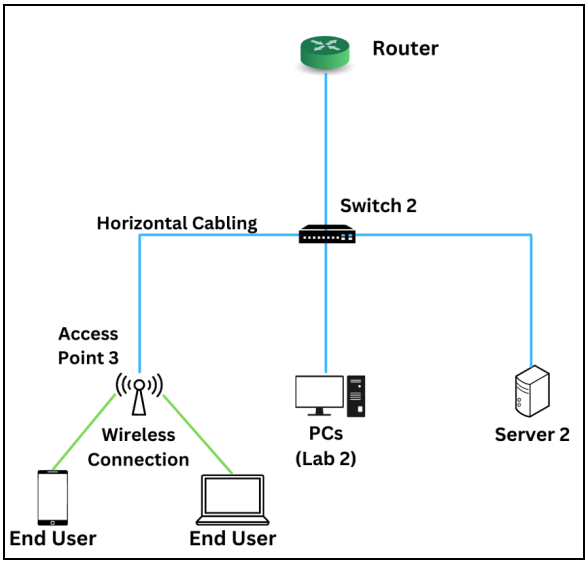


Figure 4.5 Connection 3

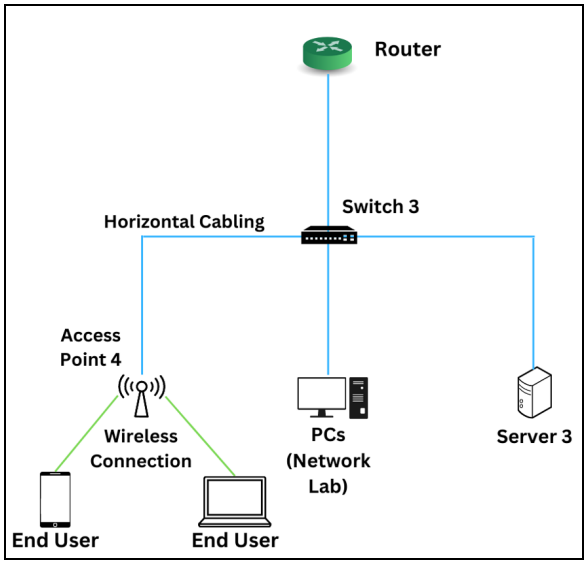


Figure 4.6 Connection 4

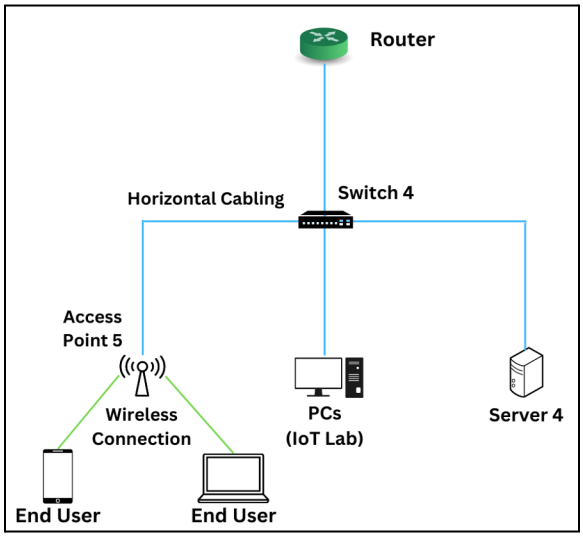


Figure 4.7 Connection 5

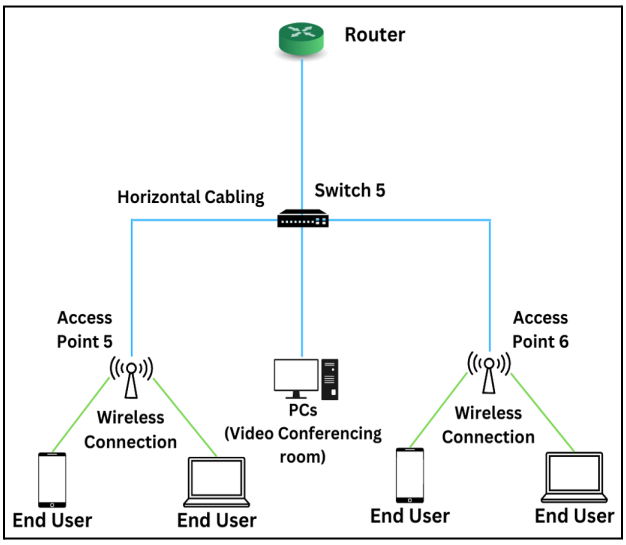


Figure 4.8 Connection 6

The number of patch cords

We use CAT6 cable as the patch cords. Overall, we will use approximately 146 patch cords.

In each lab, a 48-ports switch will connect with 30 PCs, 1 access point and 1 server. Thus, we will use 32 patch cords in each lab. Since there are four labs with one switch each, we need 4 patch cords to connect the switches to the router. Moreover, on the

ground floor, we have a connection between an access point to the router so we need 1 patch cord for it. The total number of patch cords used on the ground floor is 133.

On the other hand, for the first floor, we will use a 48-ports switch to connect the router with 1 patch cord. Then, we will use 10 patch cords in the connection between 10 PCs in the video conferencing rooms and the switch. Last but not least, we need 2 patch cords to connect 2 access points to the switch. The total number of patch cords used on the first floor is 13.

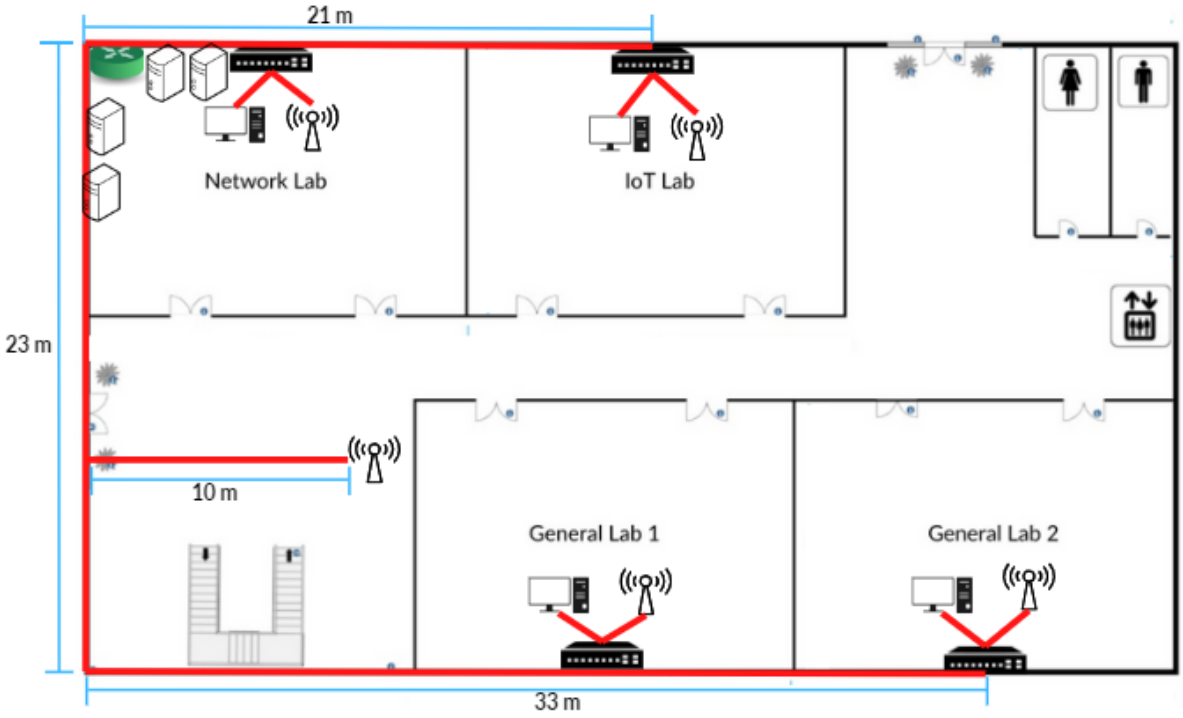
The number of switch port

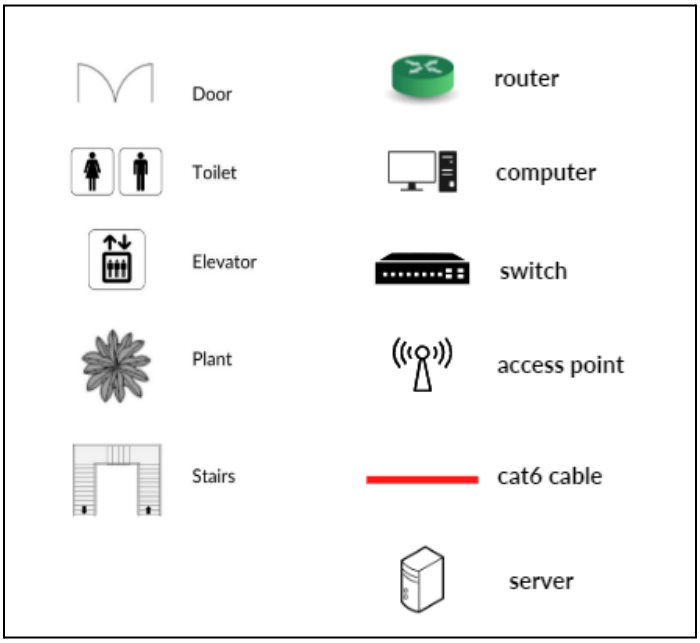
For this project, we planned to use five 48-ports switches. Among the five switches, four will be used for the ground floor to connect each lab's PCs, server and access point to the router whereas one will be used for the first floor to connect PCs in the video conferencing room and two access points to the router. We planned to use switches that have PoE. Power over Ethernet (PoE) is a technology for wired Ethernet LANs (Local Area Networks) that allows the electrical current necessary for the operation of each device to be carried by the data cables rather than by power cords. Doing so, this can minimize the number of wires that must be strung in order to install the network. Besides, we have ensured the switches picked are able to transmit data at high speed.

c. Identifying cable types and length.

There are a total of 5 switches, one router and 6 access points in the building. We will use Cat6 cable in this building.

Ground floor





Estimated length of cat6 cable needed

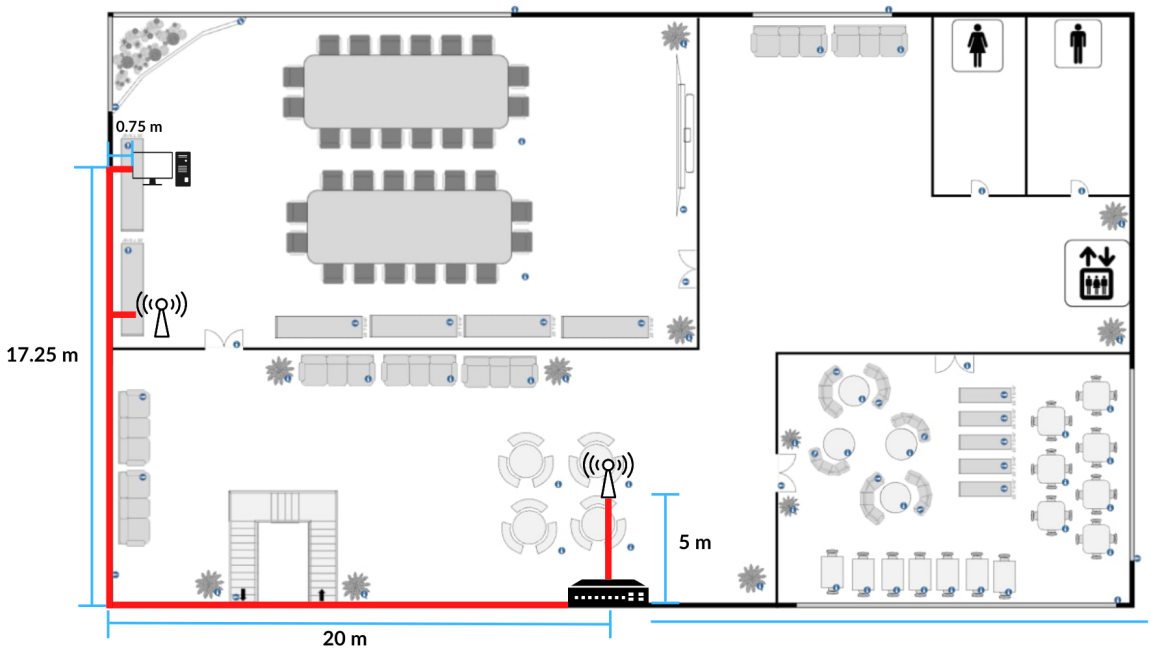
= 4 switches to router + access point to router + 4 server to 4 switches

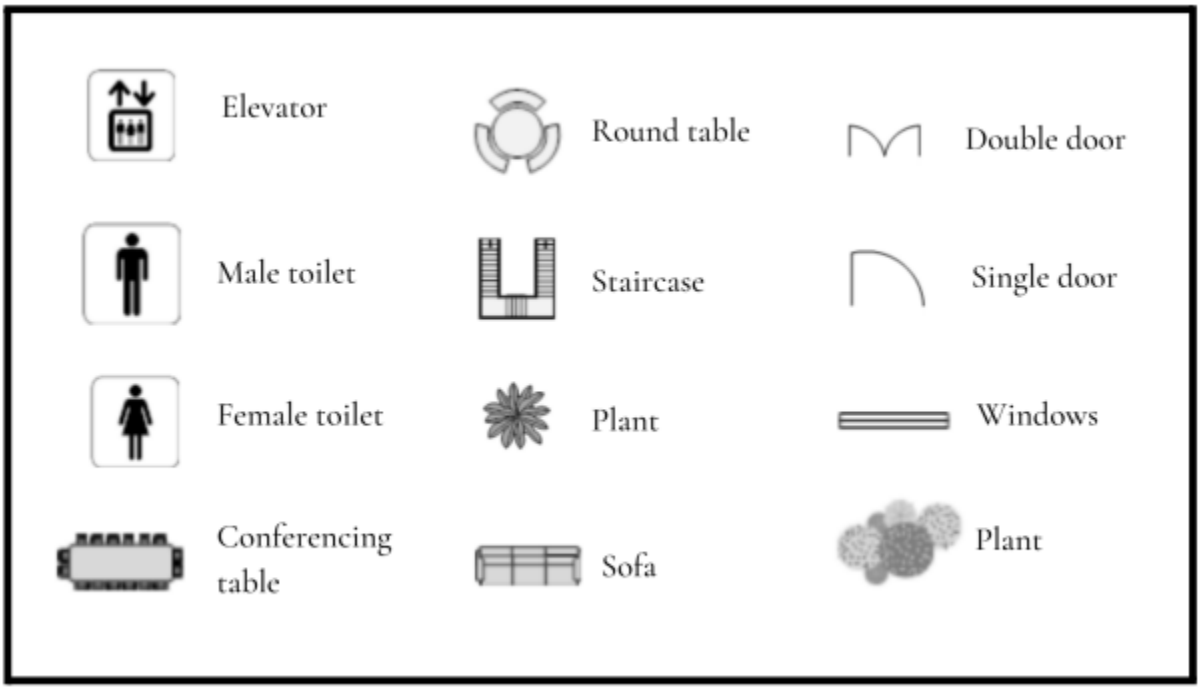
= (21+23+33+23+19+7)+(15)+(1+19+40+52)

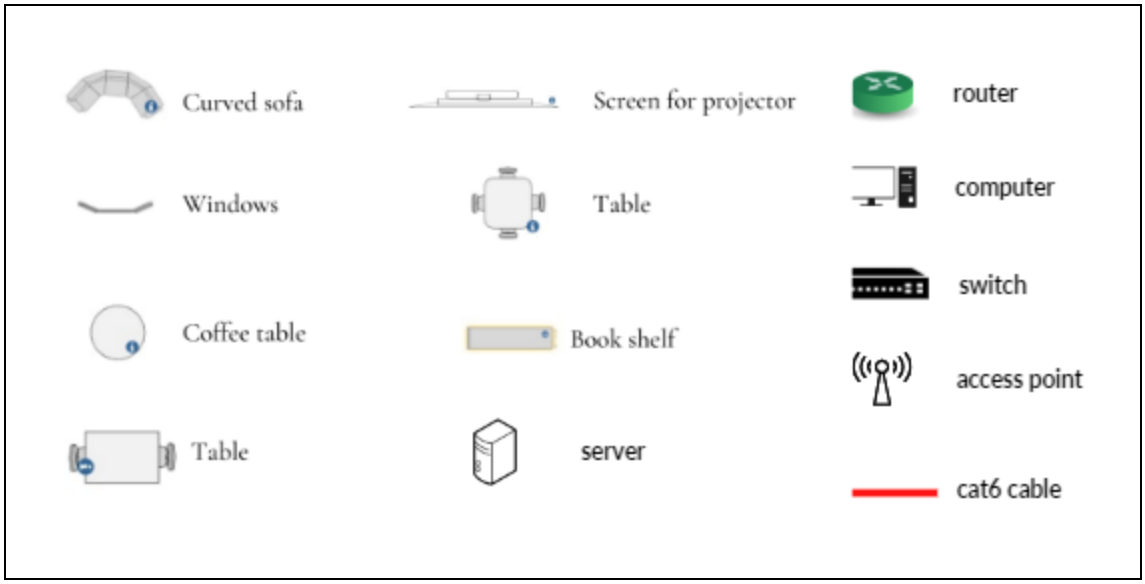
=126+15+112

=253m

First floor


0.75 m
17.25 m
5 m
20 m


Elevator
Round table
Double door
Male toilet
Staircase
Single door
Female toilet
Plant
Windows
Conferencing table
Sofa
Plant



Estimated length of cat6 cable needed

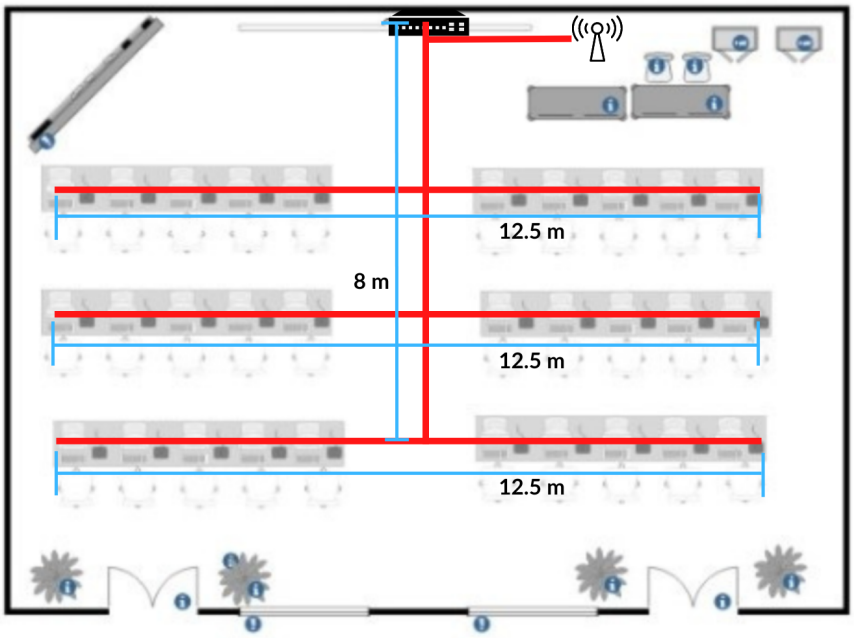
= Router (Ground Floor) to Switch + Access Point to Switch + Video Conferencing Room (Include PC and Access Point) to Switch

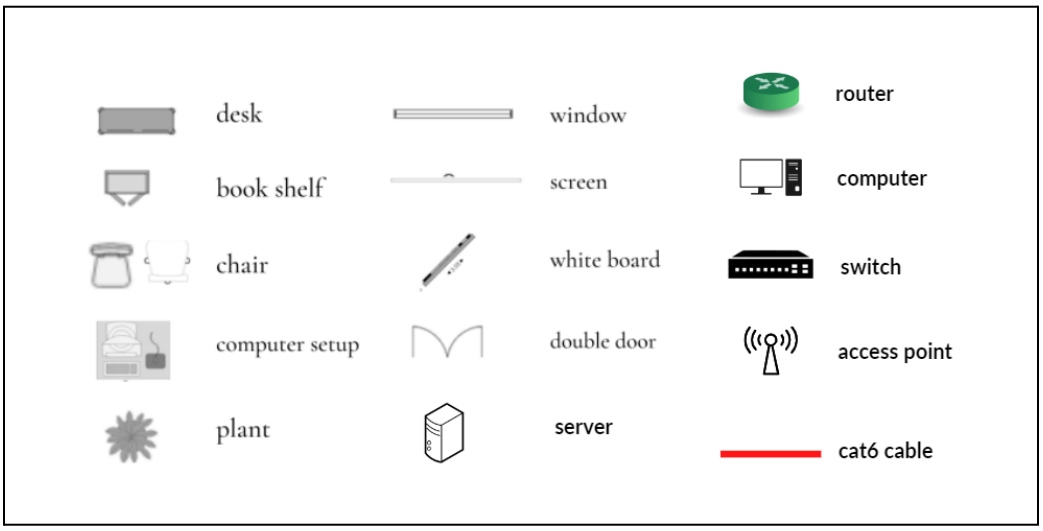
= 3 + 5 + (0.75+17.25+20) + (11.25 + 20)

= 77.25 m

Remark: 3m is the height from wall to celling.

Lab (2 General purpose labs, 1 Network lab and 1 IOT lab)





Estimated Length of Cat6 cable needed:

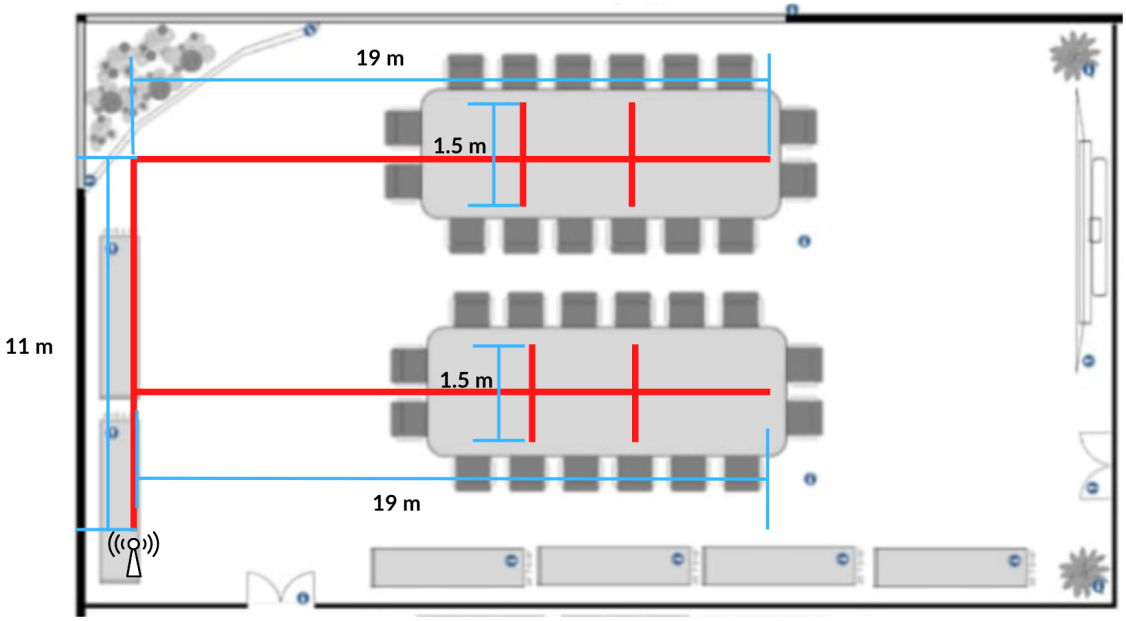
= Switch to access point + switch to each workstation PC

= 5 + [(5.25 + 6.25 + 7.25 + 8.25 + 9.25) x 2] + [(7.75 + 8.75 + 9.75 + 10.75 + 11.75)x2]
+ [(10.25 + 11.25 + 12.25 + 13.25 + 14.25) x 2]

= 5 + 72.5 + 97.5 + 122.5

= 287.5m

Video conferencing room



Estimated length of Cat6 cable needed

= Access point to each workstation PC

= (11 + 19) + (4.5 + 19) + [(11 + 0.75 + 11) x 2] + [(11 + 0.75 + 14) x 2] + [(4.5 + 0.75 + 11) x 2] + [(4.5 + 0.75 + 14) x 2]

= 30 + 23.5 + 45.5 + 51.5 + 32.5 + 38.5

= 221.5 m

Assume the ceiling height is 3m (around 10 feet)

(All estimation done based on the picture above and calculation is shown below.)

Estimated Total Length of Cat6 cable needed:

Ground Floor + First Floor

= (General Purpose Lab1 + General Purpose Lab 2 + Network Lab + IoT Lab + Ground Floor Cable Connection) + (Video Conferencing Room + First Floor Cable Connection)

= [(287.5 x 4) + 253] + (221.5 + 77.25)

= 1701.5 m

≈ 1702 m

Group 3, The Phoenix

MEETING FOR TASK 4 28/12/2022

28 NOV 2022 / 6.20 PM / TELEGRAM GROUP

ATTENDEES

Lee Rong Xian, Lu Qi Yan, Yusra Nadatul Alyeea, Harchana

AGENDA

Initiate the task.

1. Lu Qi Yan leads the discussion and analyse the task to make sure all the member understands.
2. Lee Rong Xian emphasis to the group members to do research on the project.
3. Harchana and Yusra suggest their ideas about task 4.

Divide the task.

1. The task is divided into 4 parts by LU QI YAN.
2. Suggested that **one** of the group members be in charge of **part a**, **one** of the group members in-charge of **part b**, and **two** of the group members in charge of **part c**.

Finish the task.

Bil	Items	Group member
1.	Part A - Identify the work areas	Yusra Nadatul Alyeea
2.	Part A - Sketching and Part C	Lu Qi Yan
3.	Part B – Sketching and identify the number of patch cords and switch ports	Lee Rong Xian
4.	Part B – Identify the number of connections	Harchana A/P Arulappan

ACTION ITEMS

Bil	Items	Status
1.	Connections, patch cord, and switch port identified	Done
2.	Cable length and types identified	Done
3.	A sketch of the PC and Network device arrangement (+cable) is clearly shown and labeled	Done