UTM
UNIVERSITI TEKNOLOGI MALAYSIA

SECR1213 NETWORK COMMUNICATIONS
SECTION 08
20242025/1

TASK 4

LECTURER'S NAME: DR. MUHAMMAD ZAFRAN BIN MUHAMMAD ZALY SHAH

GROUP NAME: 4G
GROUP MEMBERS :

NAME	MATIRC NO.
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ANISA CHOWDHURY	A23CS0288

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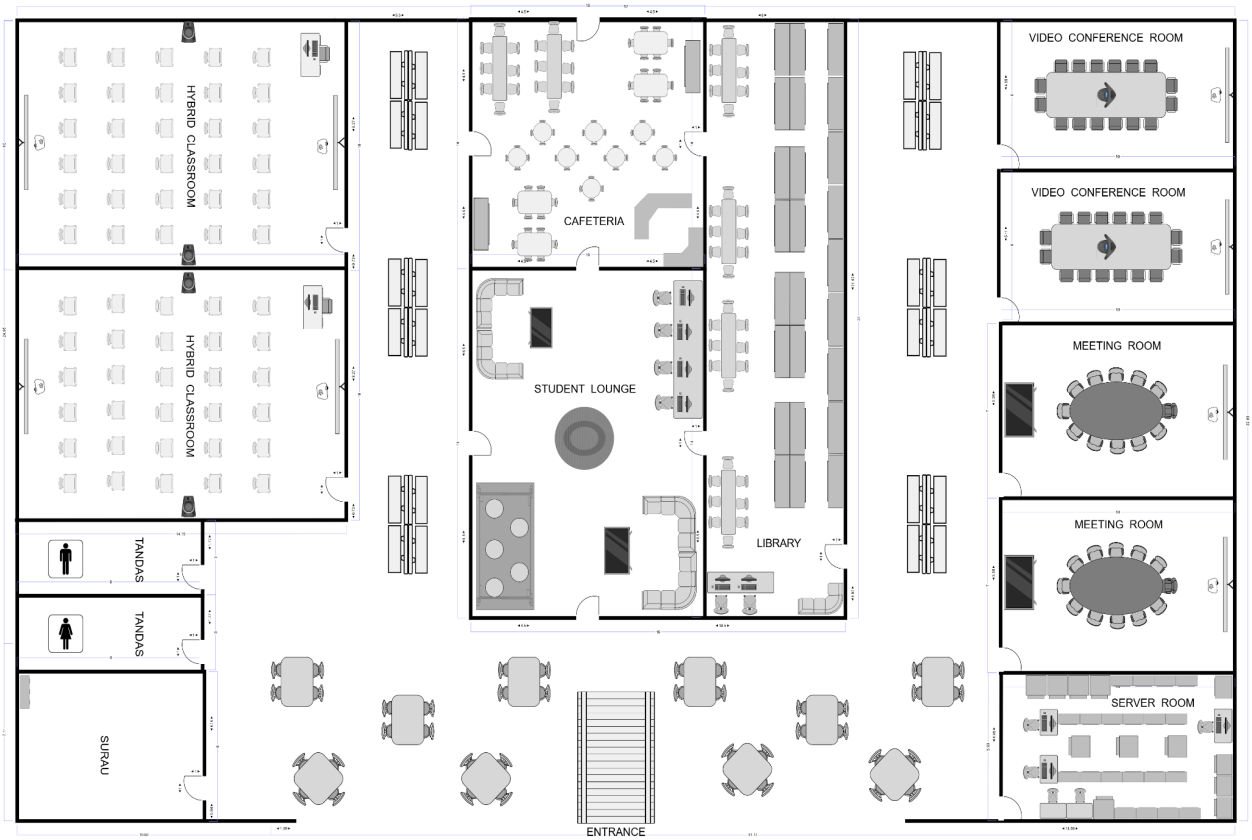
1.0 Work areas on the floor plan

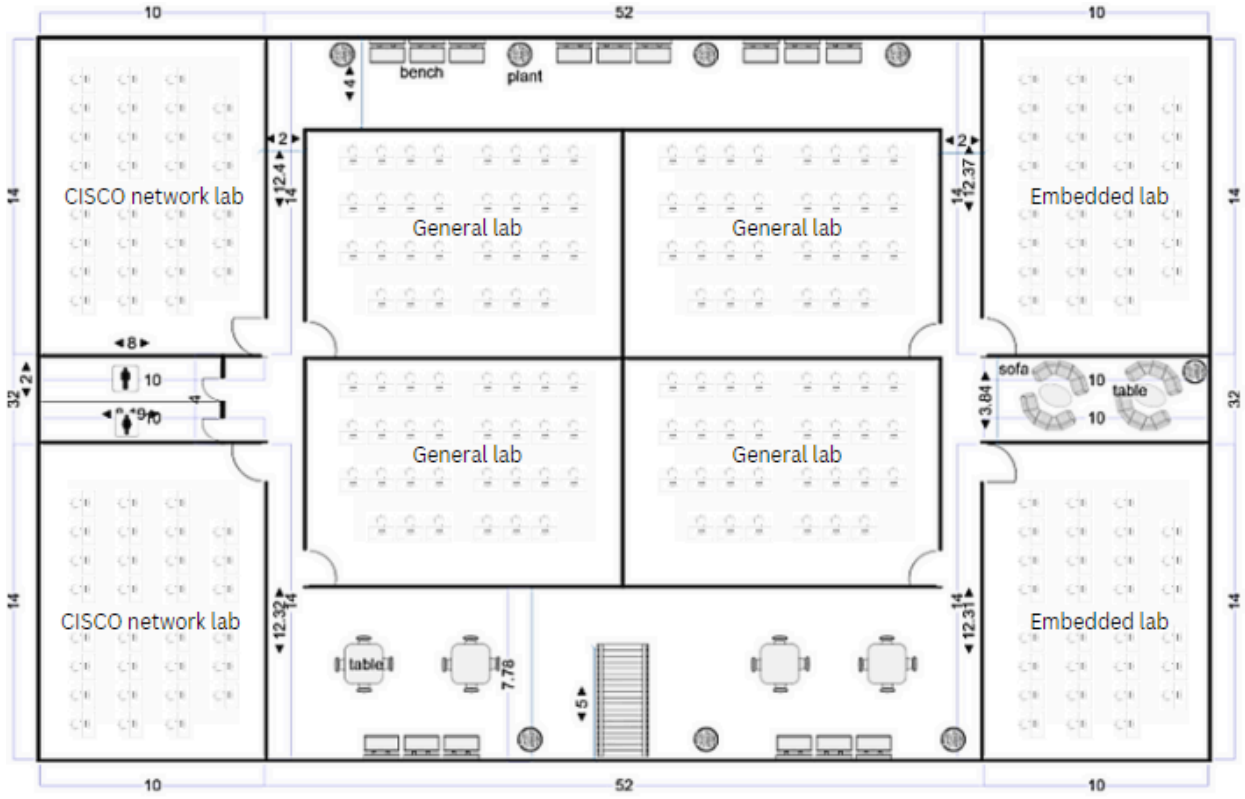
1.1 Ground Floor



1 unit = 1 meter

For the ground floor, there are a total 10 workspaces; 2 hybrid classrooms, 2 video conferencing rooms, 2 meeting rooms, 1 server room, 1 library, 1 student lounge and 1 cafeteria. Each of the hybrid classrooms have 1 workstation which is connected to a higher bandwidth. For the video conference room and meeting room, there is 1 workstation for monitoring and recording the whole discussion and purpose. Inside the server room, there are 3 workstations as network providers of the entire building, cooling fans to make sure all computers are not overheating and able to perform to their best potential. The student lounge is used to allow all the students to have a space to rest or any discussion conducted there. There are also 4 workstations in the student lounge area and 2 workstations in the library. A cafeteria is a place designed for all the students and staff to have their meals.

1.2 First Floor

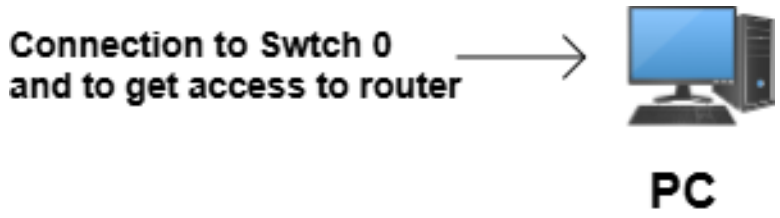


For the first floor, there are 8 workspaces; 2 CISCO network labs, 2 embedded labs, and 4 general labs. For each lab, there are going to be 30 workstations provided for students and faculty members. Each workstation in a lab will be connected to 1 switch, and every switch in every lab will be connected to a router, which will then be connected to an ISP. Other than the 3 types of labs, benches and sofas will be provided to ensure students always have space for discussion and rest.

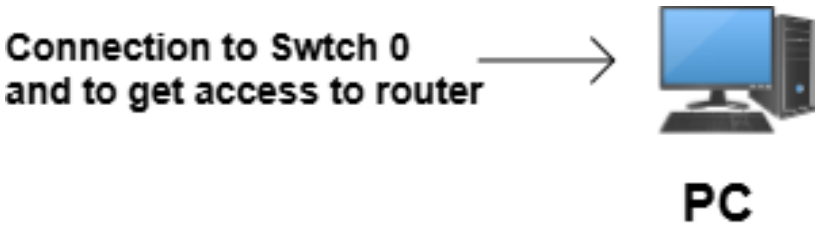
2.0 Network Diagram

2.1 Ground Floor

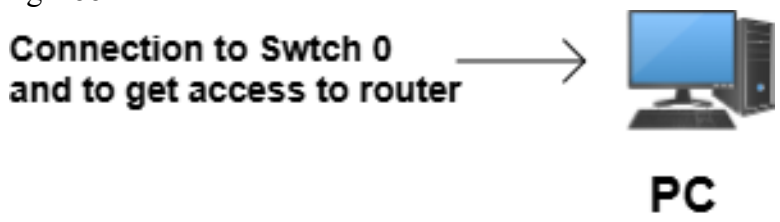
2.1.1 Hybrid Classroom



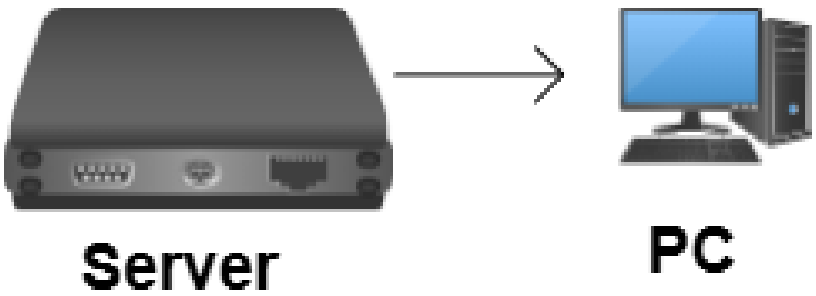
2.1.2 Video Conference Room



2.1.3 Meeting Room

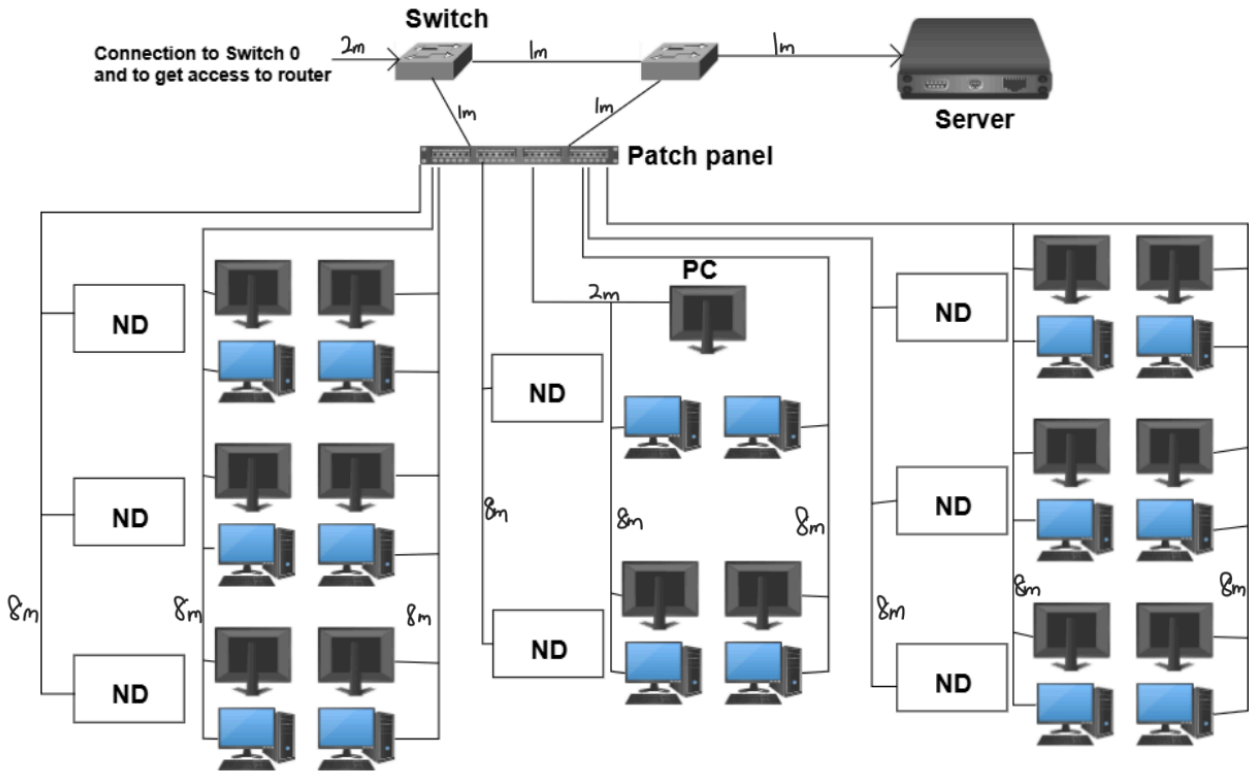


2.1.4 Server Room



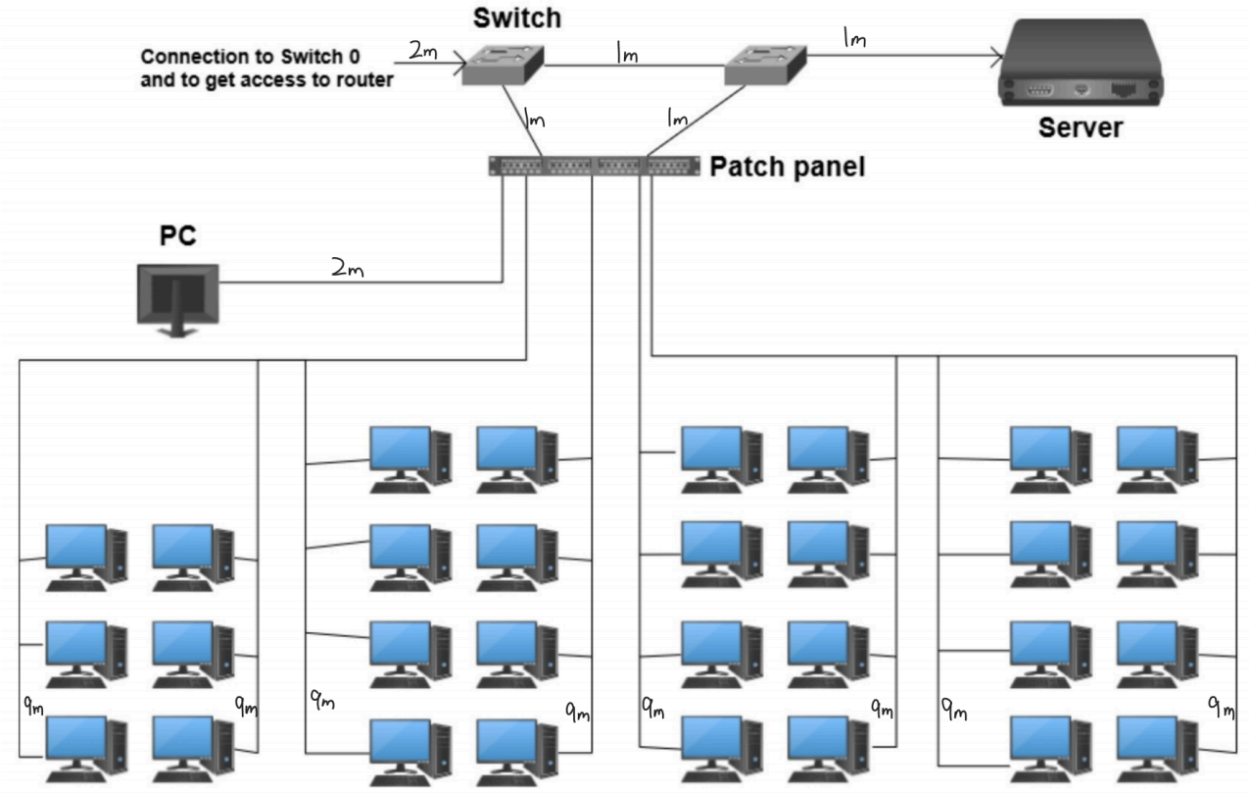
2.2 First Floor

2.2.1 CISCO Network Lab

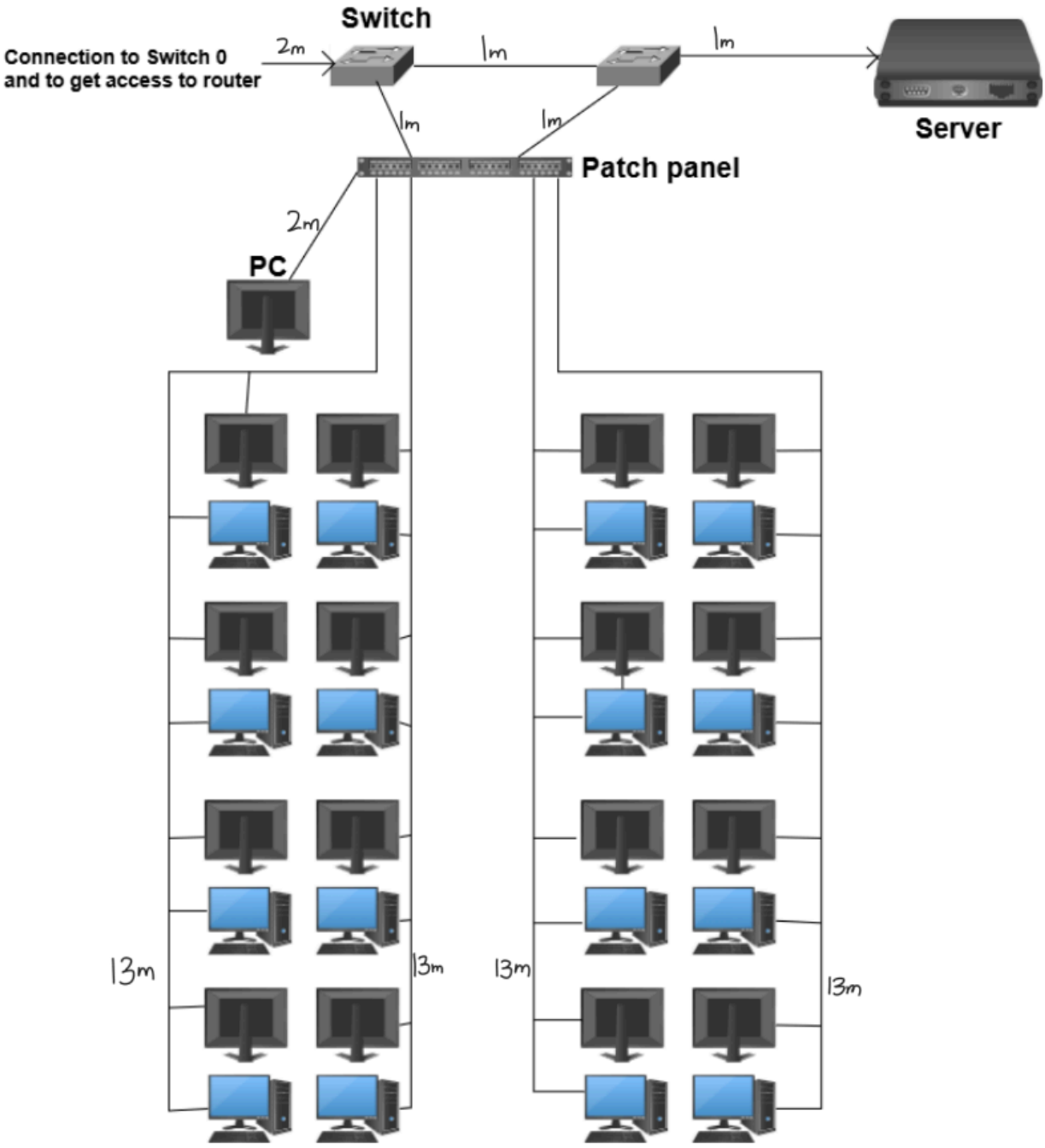


ND = Network devices

2.2.2 General Lab



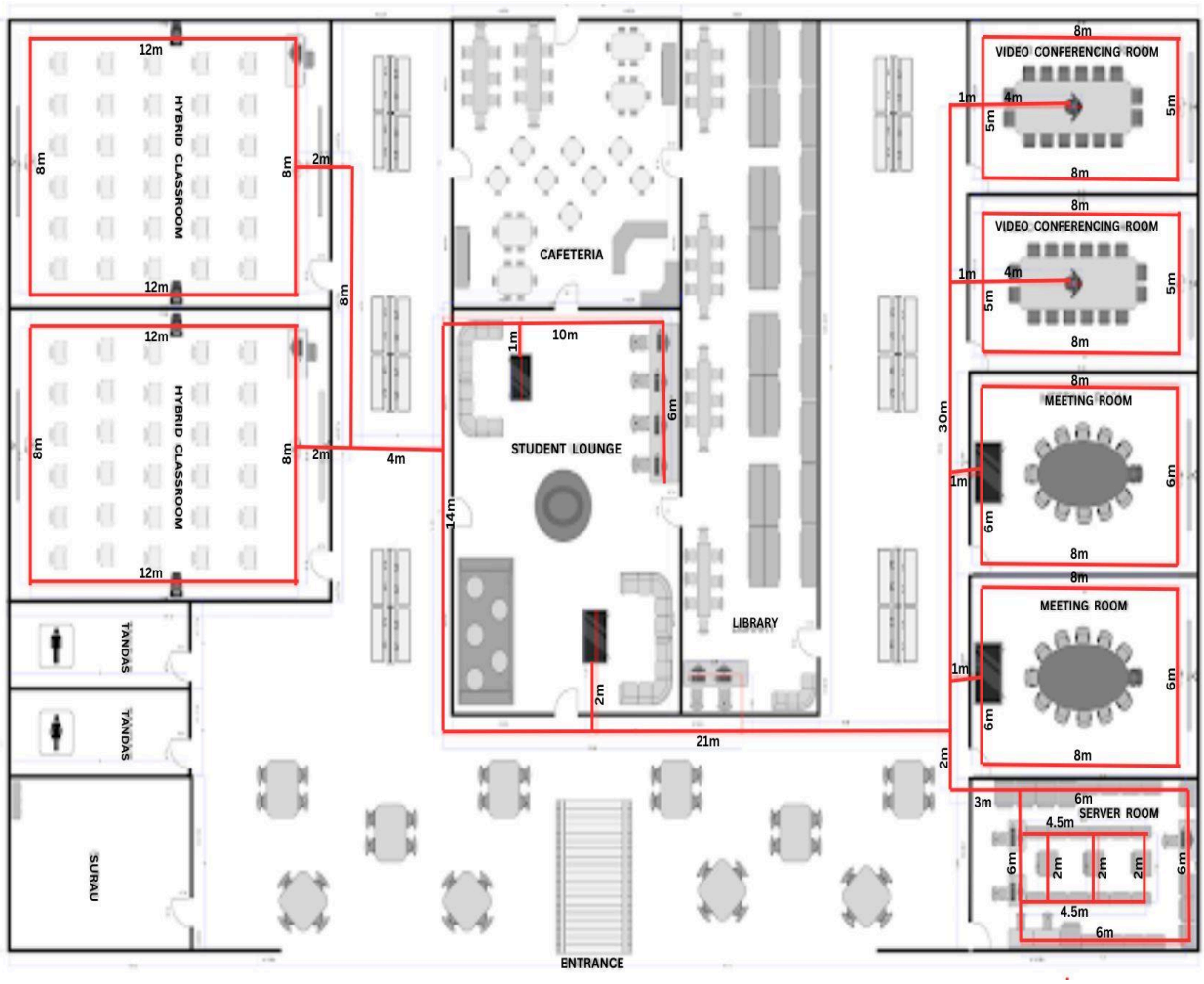
2.2.3 Embedded Lab



3.0 Cables & Connections

3.1 Floor cable plan

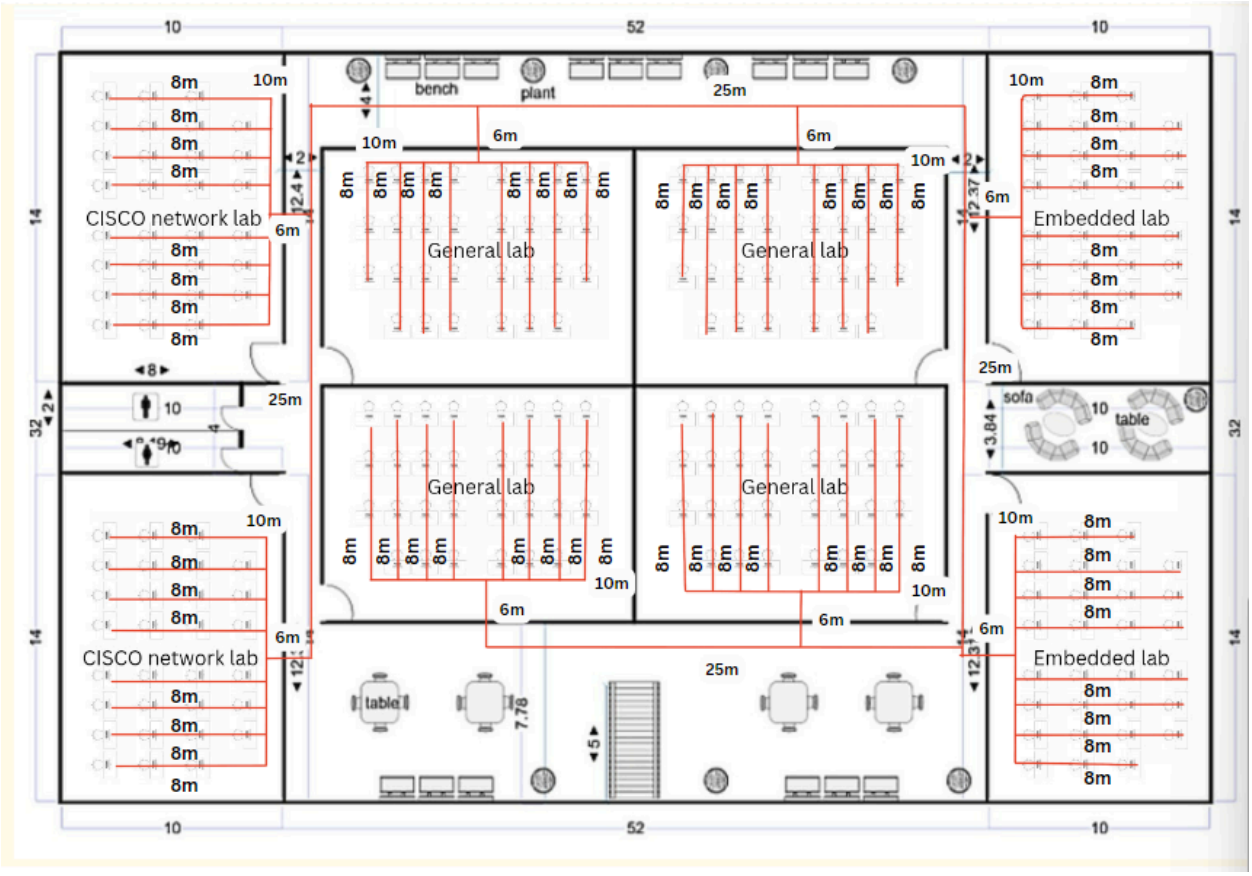
3.1.1 Ground floor



1 unit = 1 meter

CAT7 ethernet cable has been used in the ground floor to connect each workstations, switches and other electronic devices to the router for every workspaces and then finally to the server room which works as the network provider.

3.1.2 First Floor



We have determined to use CAT7 Ethernet cable for our network plan. First floor will be using the CAT7 Ethernet cable to connect each workstation and switches to the router for every lab.

3.1.3 Number of connections, patch cords and switch ports

Area	**Number of Shielded RJ45 Connector**
Hybrid Classroom 1	5
Hybrid Classroom 2	5
Video Conference Room 1	10
Video Conference Room 2	10
Meeting Room 1	10
Meeting Room 2	10
Server Room	10
CISCO Network Lab 1	30
CISCO Network Lab 2	30
General Lab 1	30
General Lab 2	30
General Lab 3	30
General Lab 4	30
Embedded Lab 1	30
Embedded Lab 1	30
Total	**300**

Area	**Number of Patch Cords**
Hybrid Classroom 1	5
Hybrid Classroom 2	5
Video Conference Room 1	10
Video Conference Room 2	10
Meeting Room 1	10
Meeting Room 2	10
Server Room	10
CISCO Network Lab 1	30
CISCO Network Lab 2	30
General Lab 1	30
General Lab 2	30
General Lab 3	30
General Lab 4	30
Embedded Lab 1	30
Embedded Lab 1	30
Total	**300**

Area	**Number of Switches**	**Number of Ports**
Hybrid Classroom 1	1	24
Hybrid Classroom 2	1	24
Video Conference Room 1	1	24
Video Conference Room 2	1	24
Meeting Room 1	1	24
Meeting Room 2	1	24
Server Room	1	24
CISCO Network Lab 1	2	48
CISCO Network Lab 2	2	48
General Lab 1	2	48
General Lab 2	2	48
General Lab 3	2	48
General Lab 4	2	48
Embedded Lab 1	2	48
Embedded Lab 1	2	48
Total	**23**	**552**

3.1.4 Cable type and length

Description	Cable Type	Length(m)
Ground Floor		
Hybrid Classroom 1	CAT7 Ethernet cable	42
Hybrid Classroom 2	CAT7 Ethernet cable	42
Video Conference Room 1	CAT7 Ethernet cable	31
Video Conference Room 2	CAT7 Ethernet cable	31
Meeting Room 1	CAT7 Ethernet cable	29
Meeting Room 2	CAT7 Ethernet cable	29
Student Lounge	CAT7 Ethernet cable	33
Server Room	CAT7 Ethernet cable	42
Peripheral connections	CAT7 Ethernet cable	65
Total length of the Ground Floor (m)		**344**
First Floor		
CISCO Network Lab 1	CAT7 Ethernet cable	80
CISCO Network Lab 2	CAT7 Ethernet cable	80
General Lab 1	CAT7 Ethernet cable	80
General Lab 2	CAT7 Ethernet cable	80
General Lab 3	CAT7 Ethernet cable	80
General Lab 4	CAT7 Ethernet cable	80
Embedded Lab 1	CAT7 Ethernet cable	80
Embedded Lab 1	CAT7 Ethernet cable	80
Peripheral connections	CAT7 Ethernet cable	100
Total length of the First Floor (m)		**740**
Fibre optic cable		**50**

Total length of all use cable (m)	**1134**

A shielded RJ45 connector is a specialized connector used to terminate Ethernet cables, particularly in shielded categories like CAT7. These connectors link devices such as computers, switches, and routers to the network. Implementing 300 shielded RJ45 connectors with CAT7 cabling ensures an effective and efficient network, minimizing communication breakdowns even in challenging environments like server rooms and laboratories with high electrical interference. The shielding improves strength and signal quality, making them ideal for high-speed data transfer, perfectly aligning with the demands of this project.

Each connector requires an RJ45 patch cord to establish a physical connection between a device and a switch. High-quality patch cords ensure stable connections with minimal signal loss, which is essential for maintaining the reliability and performance of the network. The total number of patch cords needed is 300, matching the number of shielded RJ45 connectors. This guarantees that every device has a dedicated cable, supporting efficient point-to-point connections throughout the network.

In this project, switch ports are provided using the Cisco Catalyst 2960-24TT-L Switch. This switch offers 24 Fast Ethernet ports for connecting devices like workstations and printers, along with 2 Gigabit uplink ports for high-speed communication between switches and the network backbone. Its port capacity is ideal for labs and classrooms with high device counts, and make it a perfect fit for server rooms and CISCO Network Labs. Using multiple switches where needed keeps the network organized and efficient ensuring seamless connectivity across the building.

A total of 1700m of CAT7 Ethernet cables is implemented in the building due to their advanced shielding and physical structure, which includes individually shielded twisted pairs and an additional outer shield. This design minimizes crosstalk and electromagnetic interference (EMI), providing superior signal quality and supporting speeds of up to 10 Gbps. These cables are ideal for high-performance networks, making them perfect for server rooms, labs, and hybrid classrooms requiring low latency and high bandwidth.

Fibre optic cables are used as backbone connections between floors and key network nodes. In this project, they connect switches between the ground floor and the first floor, ensuring high-speed, long-distance data transmission without interference. With their higher bandwidth and immunity to EMI, fibre optic cables are also suitable for installation in network labs. Additionally, wireless connectivity is applied in common areas such as lounges, meeting rooms, and open workspaces, offering flexibility and convenience for mobile devices like laptops, tablets, and smartphones.

4.0 Meeting minute

Date/Time	13/10/2024 7:00 p.m.
Agenda	Network Communications 4G Meeting
Minutes prepared by:	Lim Chen Xi
Location	Google Meet
1. Meeting Objectives	
Task 4 Discussion Meeting	
2. Attendance	
1. Chang Wen Xuen	A23CS5012
2. Lim Chen Xi	A23CS0103
3. Farah Nabila Binti Wan Ismail	A23CS0077
4. Anisa Chowdhury	A23CS0288
3. Minutes	
Introduction to the Task	Chang Wen Xuen explains the task that needs to be done for Task 4 and discusses assigning the task.
Assignation of task	1. Chang Wen Xuen Cable lengths, Identifying the cable length & type 2. Lim Chen Xi Network diagram and Meeting minute 3. Farah Nabila Binti Wan Ismail Floor plan(3.0) and workspace(1.0) for first floor 4. Anisa Chowdhury Floor plan(3.0) and workspace(1.0) for ground floor
Due date to finish	27/12/2024