



TNWK213 NETWORKING

Network Design

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Introduction

Introduction

NEUC has assigned our group to design a network spanning multiple buildings, with at least two floors each. The network must ensure that all devices across these buildings have internet access and can communicate efficiently, covering offices, commercial, medical, or educational facilities.



Floor Plan Layout

Floor Plan Layout



Computer Room

**First Building
1st Floor**

0



Office

**First Building
2nd Floor**

0



Classroom

**Second Building
1st Floor**

0



Library

**Second Building
2nd Floor**

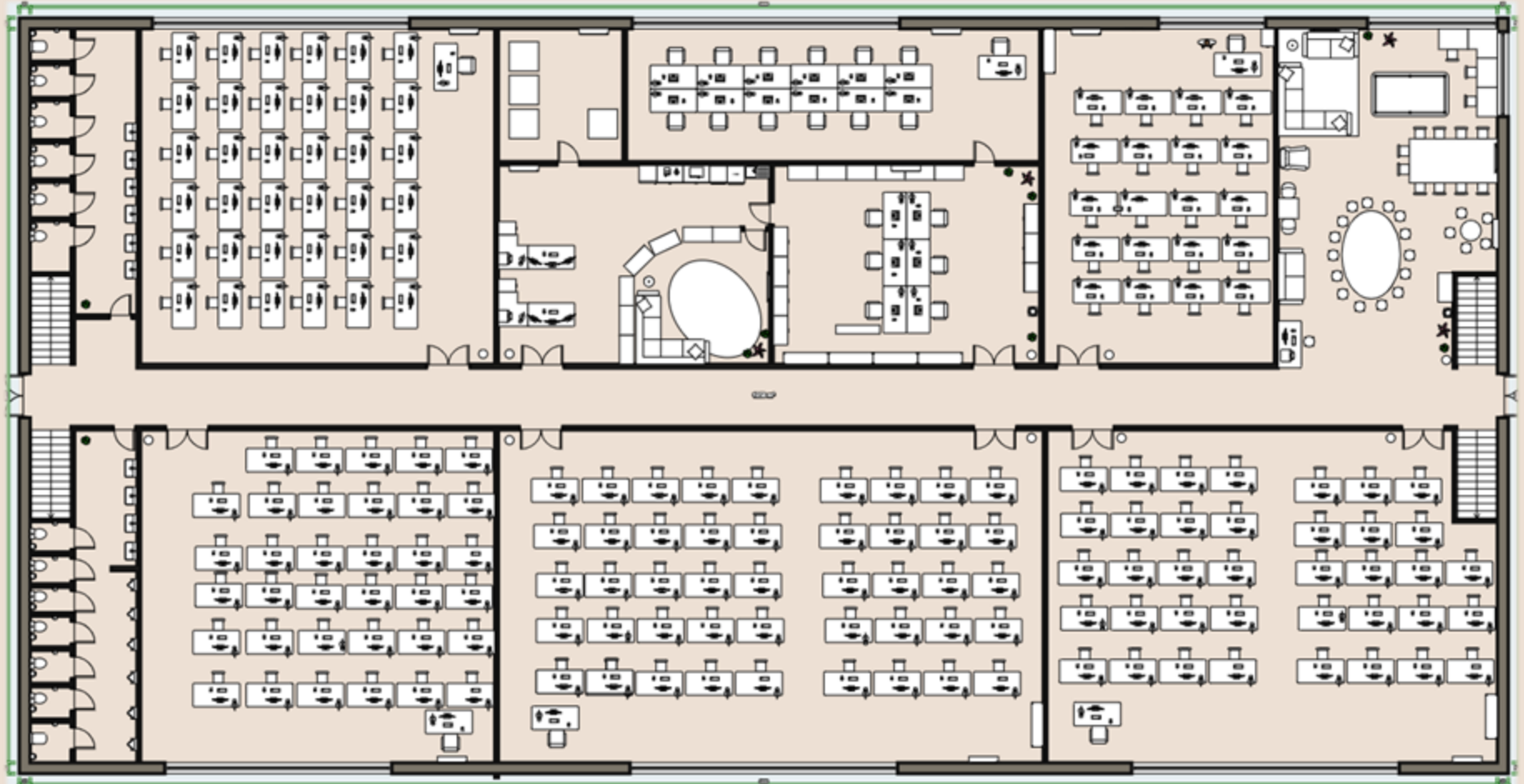
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Floor Plan Layout



Computer Room

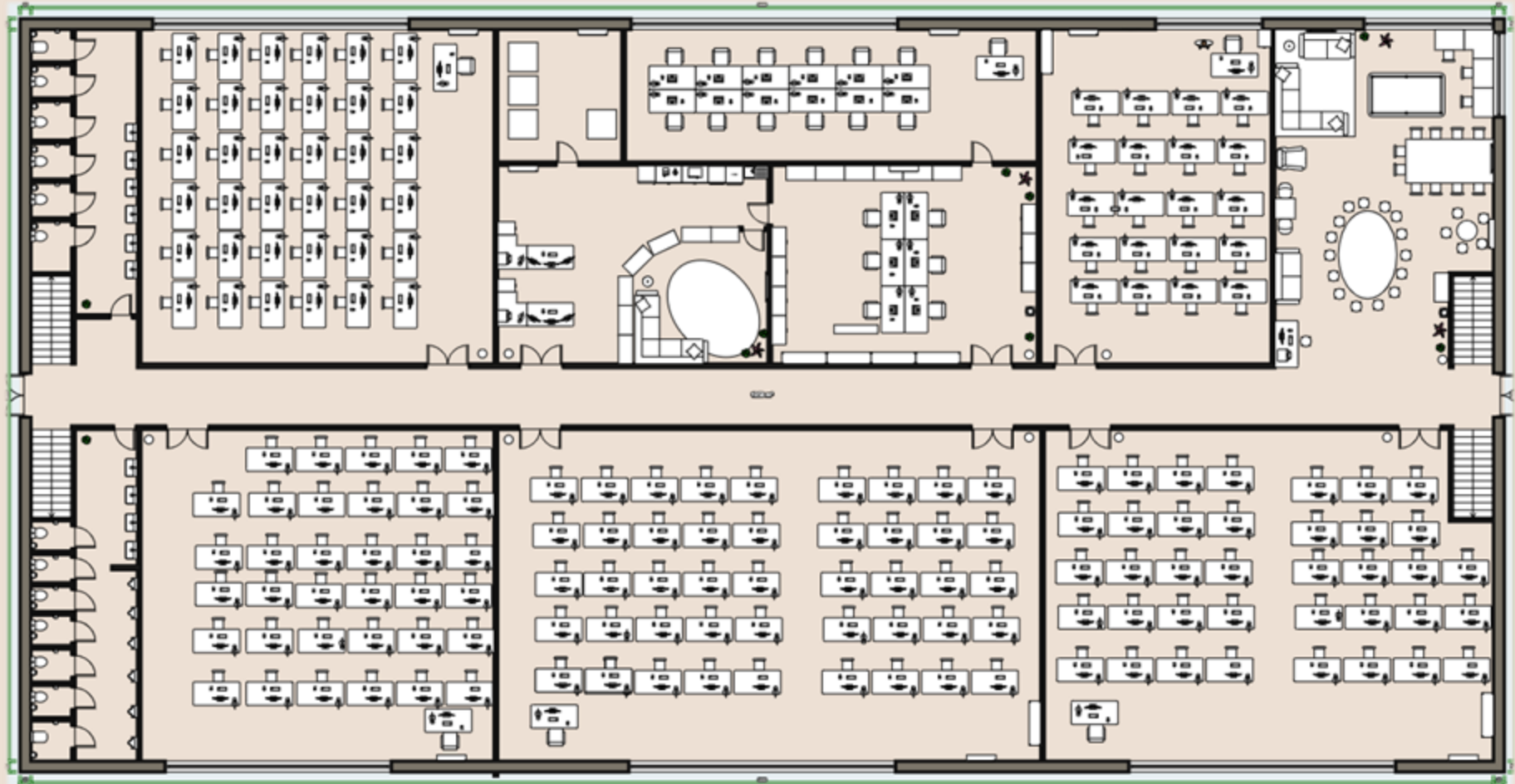
First Building
1st Floor





Computer Room

First Building
1st Floor



- ❖ Easy access the computer room
- ❖ Supervise the computer easily
- ❖ Share the resource to the office easily

Floor Plan Layout



Computer Room

**First Building
1st Floor**

0



Office

**First Building
2nd Floor**

0



Classroom

**Second Building
1st Floor**

0



Library

**Second Building
2nd Floor**

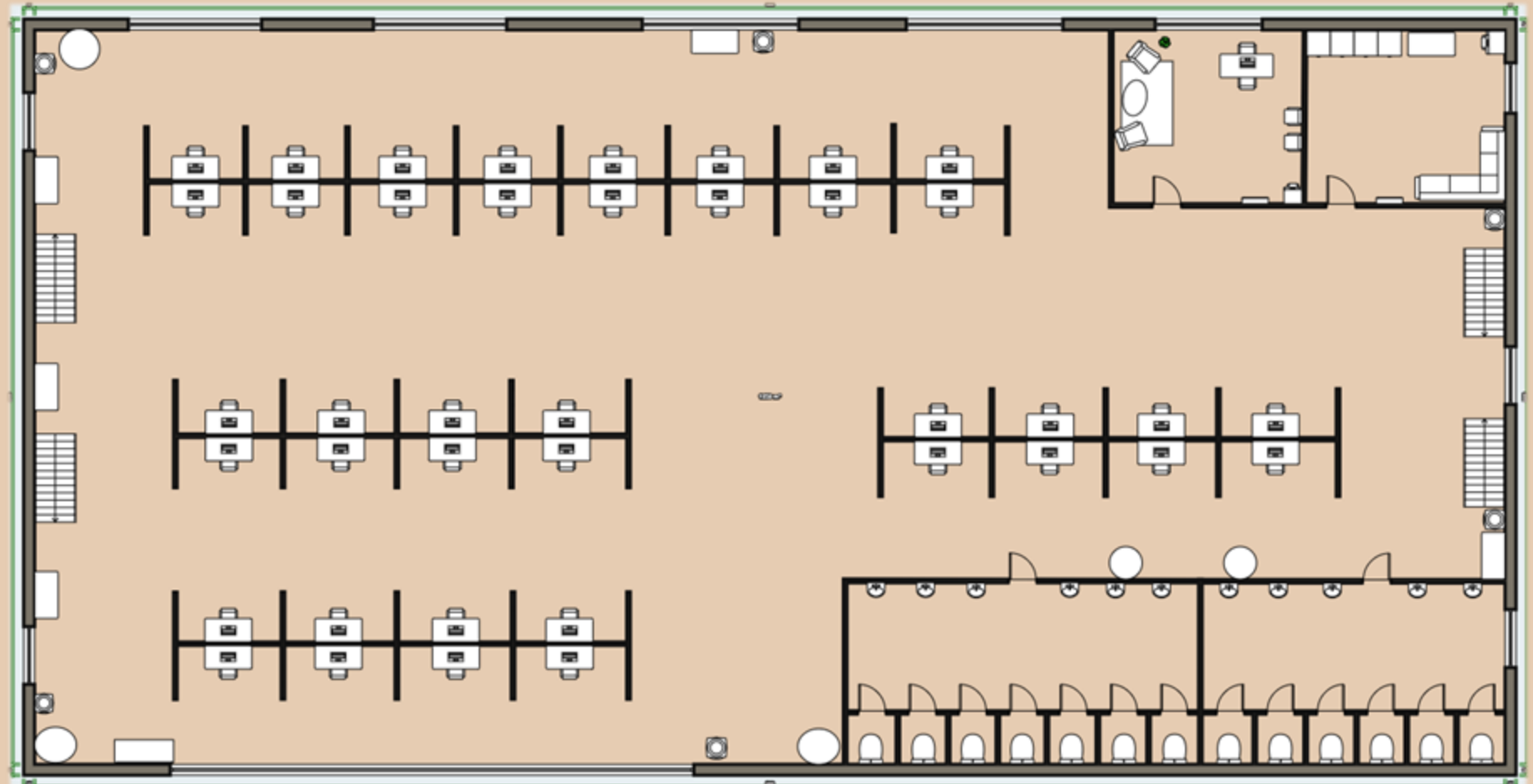
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Floor Plan Layout



Office

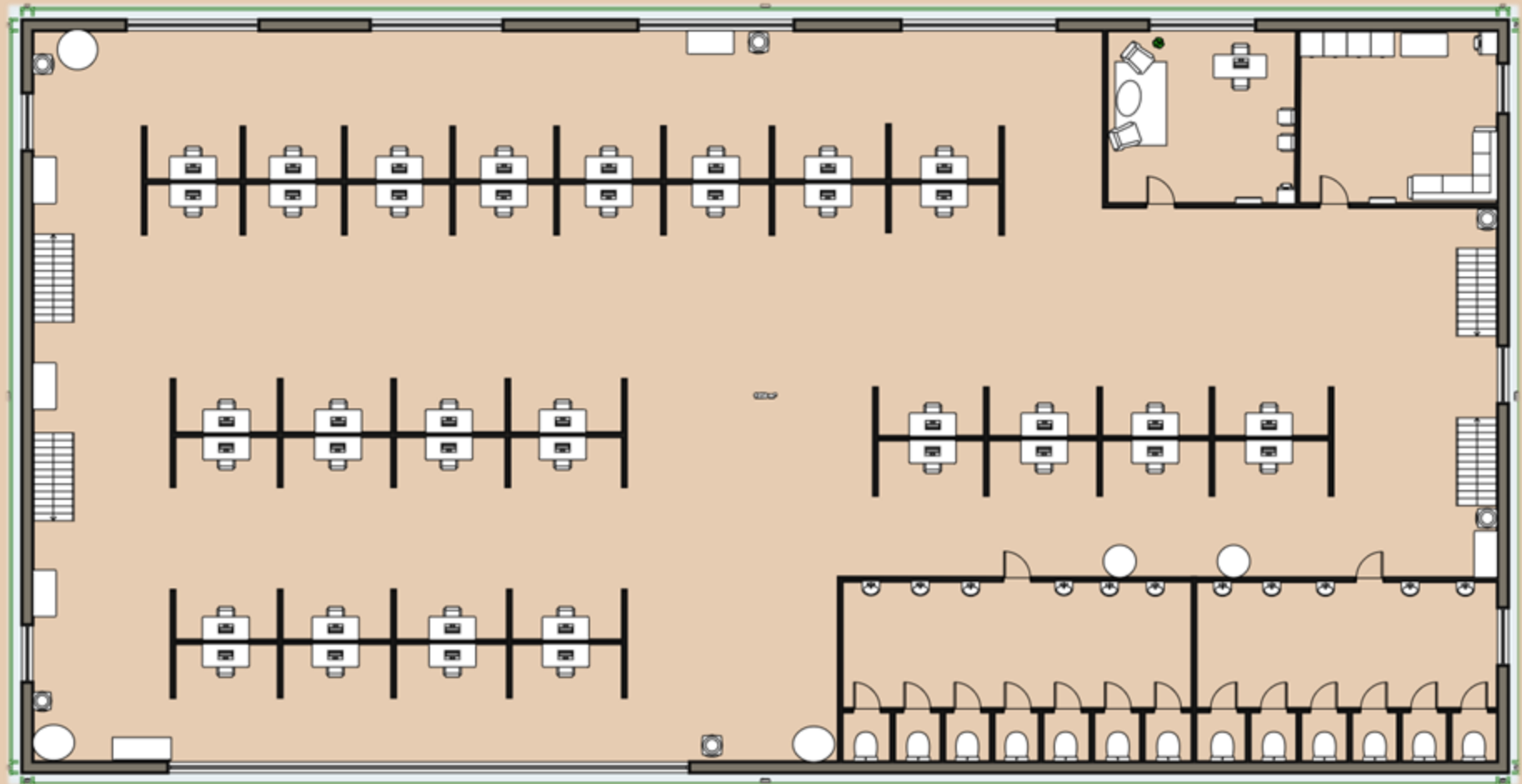
First Building
2nd Floor





Office

First Building
2nd Floor



- ❖ Easily get into the computer room without using the stairs
- ❖ Students can ask questions easily

Floor Plan Layout



Computer Room

**First Building
1st Floor**

0



Office

**First Building
2nd Floor**

0



Classroom

**Second Building
1st Floor**

0



Library

**Second Building
2nd Floor**

0

Floor Plan Layout



Classroom Second Building 1st Floor



F



Classroom

**Second Building
1st Floor**



- ❖ **Easy access for all, especially those with mobility issues.**
- ❖ **Minimizes the need for stairs.**

Floor Plan Layout



Computer Room

**First Building
1st Floor**

0



Office

**First Building
2nd Floor**

0



Classroom

**Second Building
1st Floor**

0



Library

**Second Building
2nd Floor**

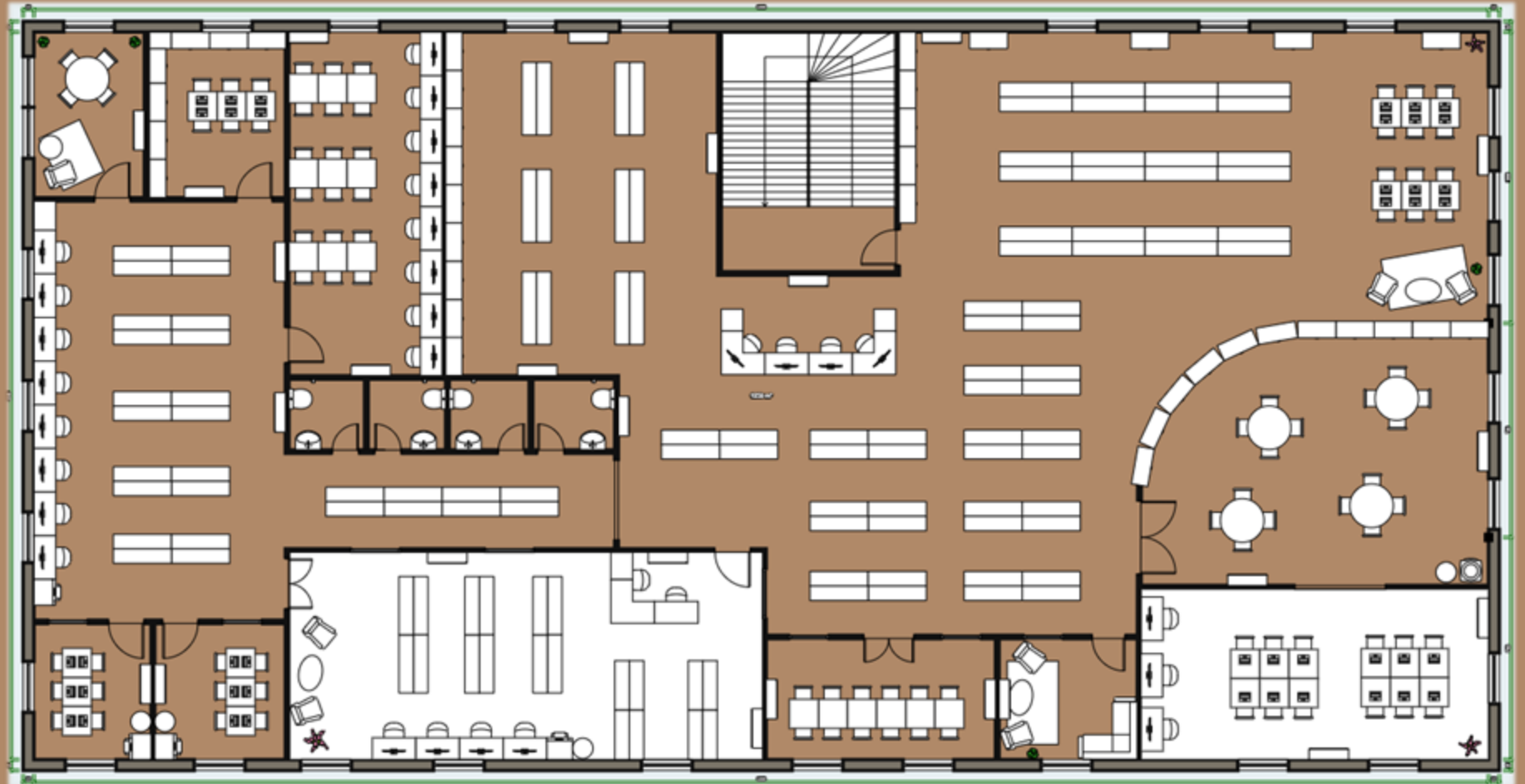
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Floor Plan Layout



Library

Second Building
2nd Floor

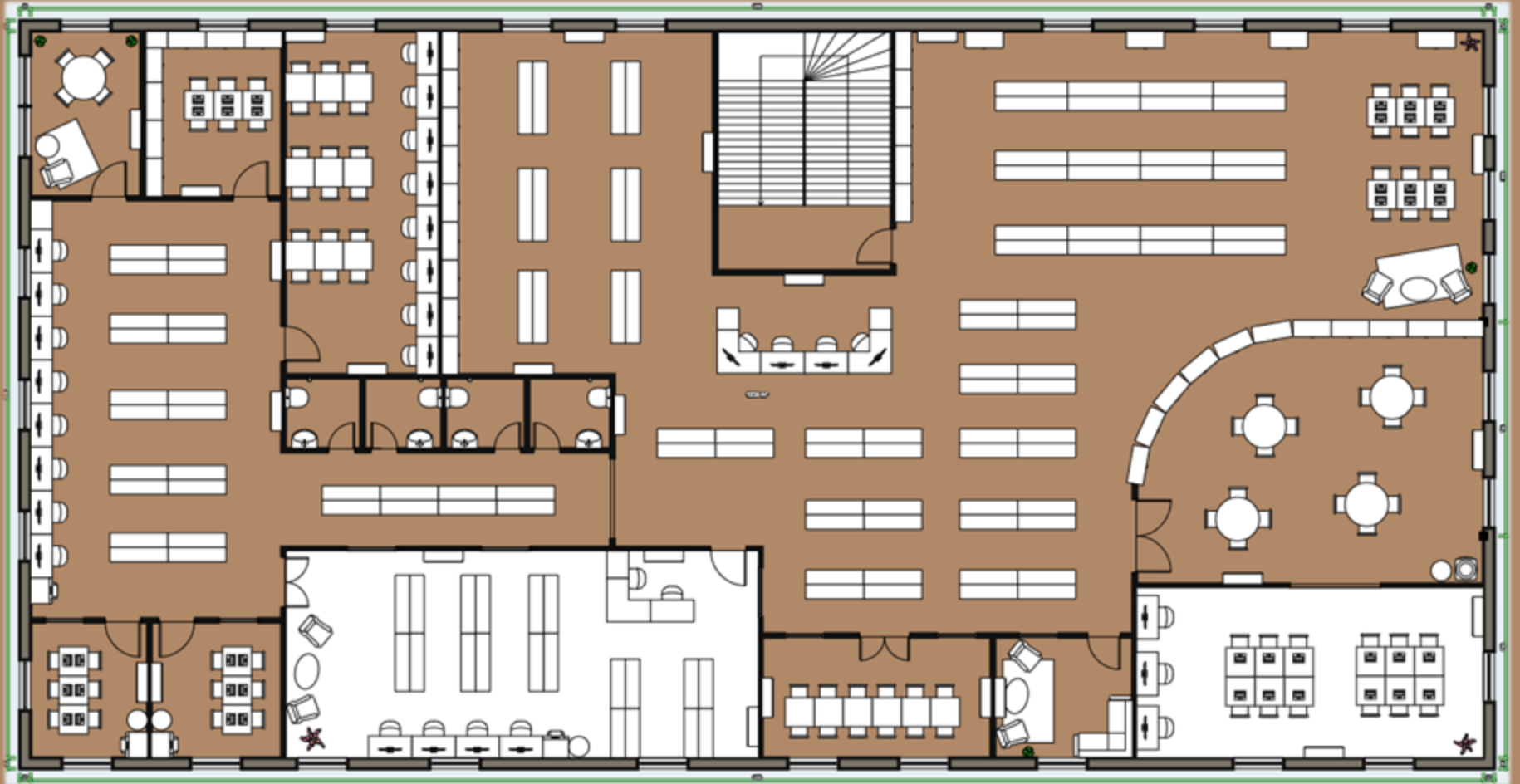


F



Library

Second Building
2nd Floor



- ❖ Reduces the noise
- ❖ Ensure a better traffic flow
- ❖ Environment conducive to learning and research
- ❖ More natural light

Floor Plan Layout



Computer Room

**First Building
1st Floor**

0



Office

**First Building
2nd Floor**

0



Classroom

**Second Building
1st Floor**

0



Library

**Second Building
2nd Floor**

0



Network Devices

Router, Switch, Cabling, Wireless Access Point

ROUTER

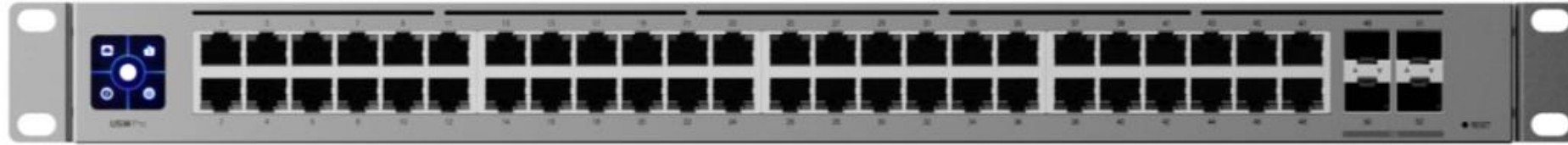


ROUTER: UDM-SE

We chose it because it supports PoE

PRODUCT NAME	UDM-Pro	UDM-SE
RACK WIDTH	1RU	1RU
INTERFACE	LAN (8) GbE RJ45 ports (1) 10G SFP+ port	LAN (8) GbE RJ45 ports (1) 10G SFP+ port
	WAN (1) GbE RJ45 (1) 10G SFP+ port	WAN (1) 2.5 GbE RJ45 ports (1) 10G SFP+ port
WIRELESS/WIRED	Wired	Wired
INTERFACE SLOTS	4	4
MODULAR LAN SWITCH PORTS	(8) GbE RJ45	(8) 2.5 GbE RJ45 including (2) PoE+ and (6) PoE
PRICE	US\$379	US\$499

SWITCH

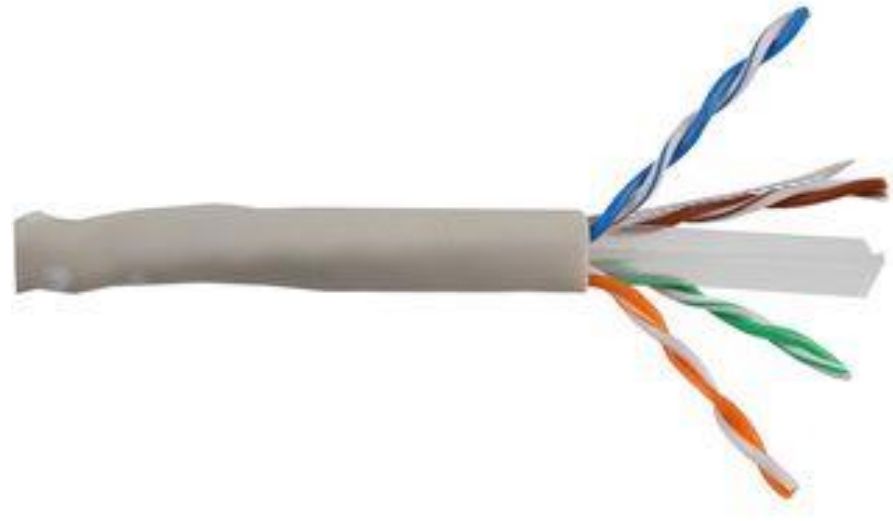


SWITCH: USW-Pro-48

We chose it because it can increase internet cabling connected.

PRODUCT NAME	USW-Pro-48	USW-48
FORWARDING PERFORMANCE	130.944Mpps	77.376 Mpps
SWITCHING CAPACITY	176 Gbps	104 Gbps
PORT QUANTITY	52	49
GIGABIT PORTS	48	48
FSP PORTS	(4)1/10G	(1)1G
WIRELESS/WIRED	Wired	Wired
PRICE	US\$599	US\$399

CABLING



CABLING: CAT6

We chose it because it supports higher data transmission speeds.

PRODUCT NAME	CAT5e	CAT6
MAXIMUM BANDWIDTH	Up to 100Mhz	0-250 MHz (minimum); 500 MHz maximum
MAXIMUM DATA RATE	1000Mbps	10 Gbps over 33.55 meters (110-165 feet) of cable
MAXIMUM CABLE DISTANCE	100 meters	100 meters for slower network speeds (up to 1,000 Mbps) and higher network speeds over short distances. For Gigabit ethernet, 55 meters max, with 33 meters in high crosstalk conditions.
<div>CAT5E</div> 		<div>CAT6</div> 
CONNECTOR	RJ45	RJ45
SHIELDING	UTP/STP	UTP/STP
COST	Varies by length and manufacturer generally \$0.20-\$30 per foot.	Varies by length and manufacturer, with \$0.40 - \$0.60 per foot as an average. Generally. About 20% higher than Cat5e.

Wireless Access Point



WIRELESS ACCESS POINT: U7-Pro

We use U7-Pro because its performance is better than that of U6-Enterprise.

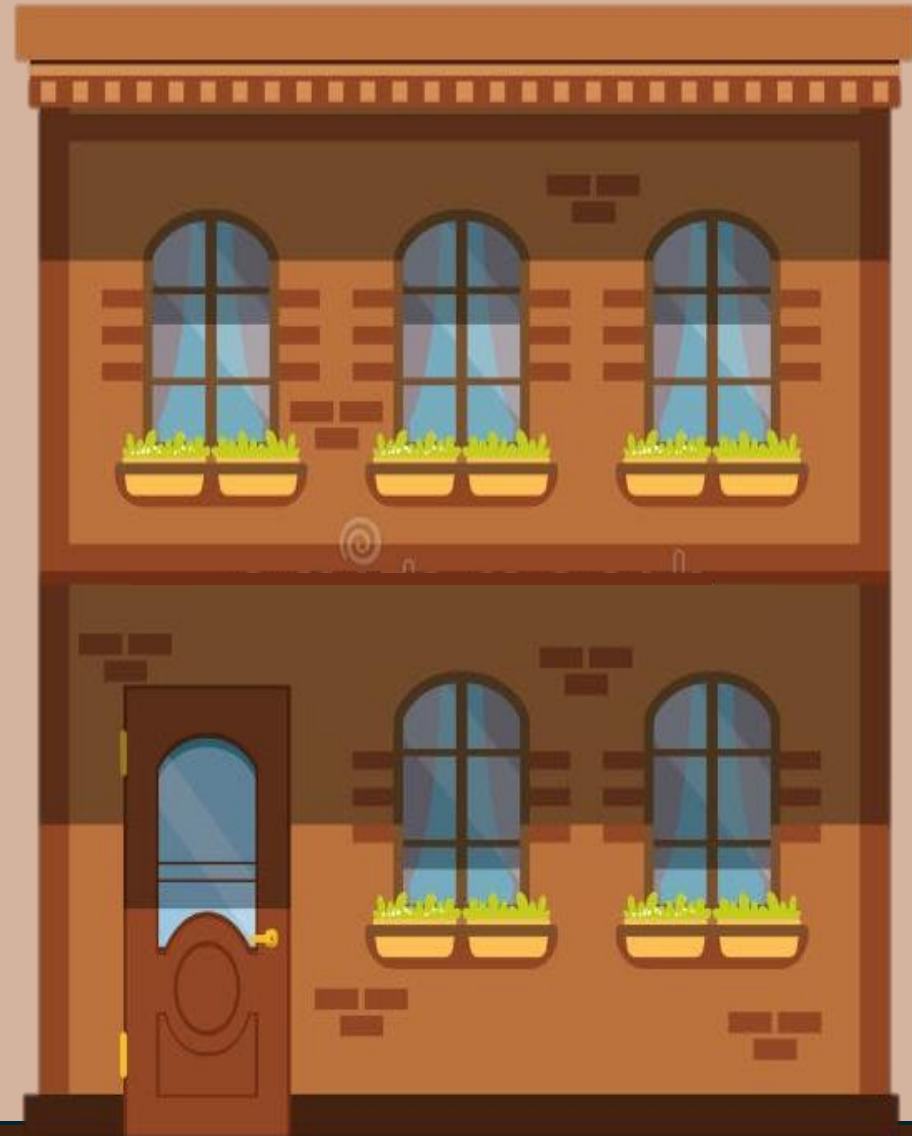
Product Name	U6-Enterprise	U7-Pro
Wi-Fi Standards	802.11a/b/g/n/ac/ax (WiFi 6/6E)	802.11a/b/g/n/ac/ax/be (WiFi 6/6E, WiFi 7)
Wireless Security	WPA-PSK, WPA-Enterprise (WPA/WPA2/WPA3)	WPA-PSK, WPA-Enterprise (WPA/WPA2/WPA3/PPSK)
Spatial Streams	8 per radio	6 per radio
Max. Data Rate	2.4 GHz 573.5 Mbps (BW40) 5 GHz 4.8 Gbps (BW160) 6 GHz 4.8 Gbps (BW160)	2.4 GHz 688 Mbps (BW40) 5 GHz 8.6 Gbps (BW240) 6 GHz 5.7 Gbps (BW320)
Uplink	1/2.5 GbE RJ45 port	1/2.5 GbE RJ45 port
POE+	Yes	Yes
VLAN	802.1Q	802.1Q
Concurrent Clients	600+	300+
Price	US\$279	US\$189

SIDE VIEW OF NETWORK DIAGRAM

BUILDING 1

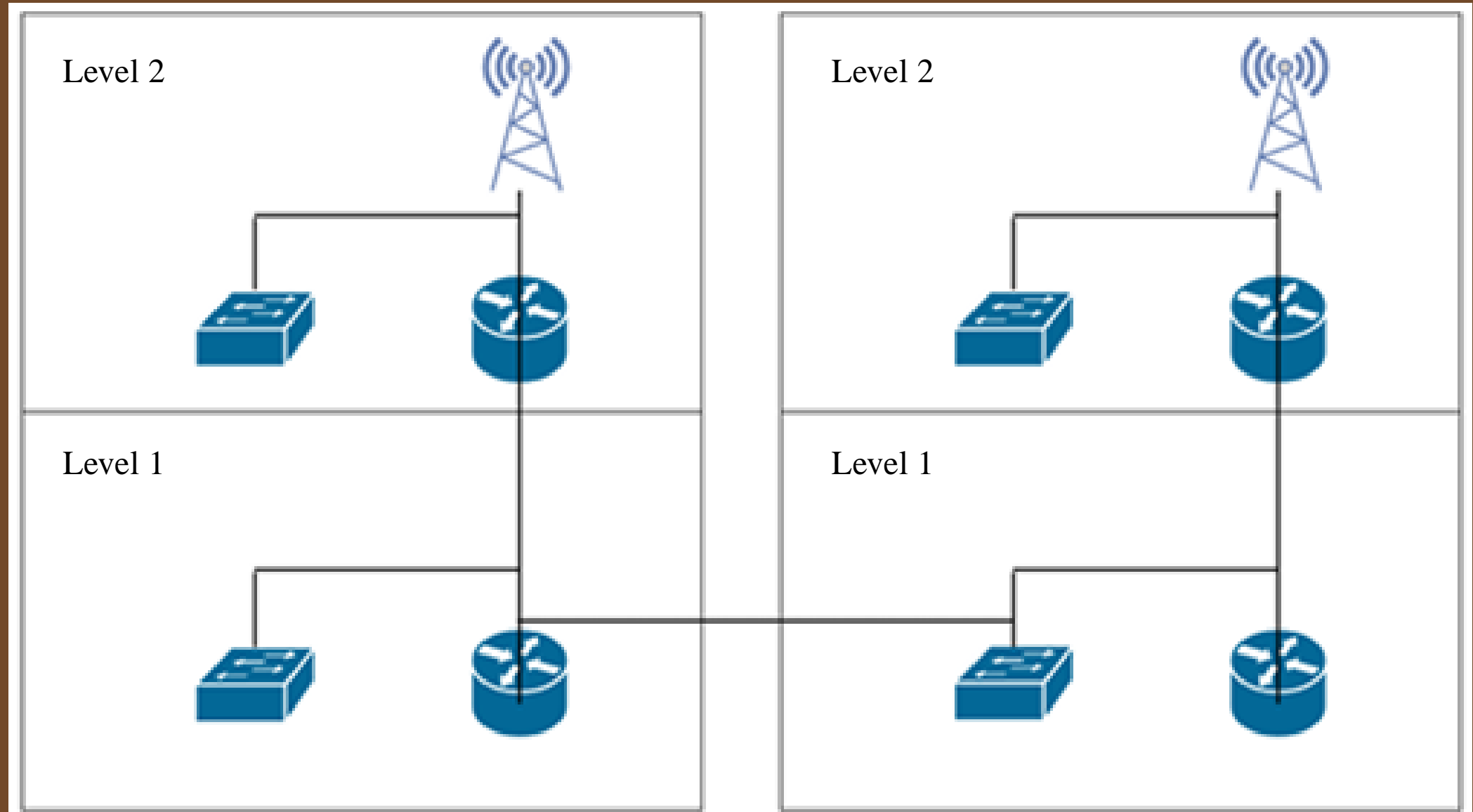


BUILDING 2



Office & Computer Room (Building 1)

Classroom & Library (Building 2)





AERIAL VIEW OF NETWORK DIAGRAM

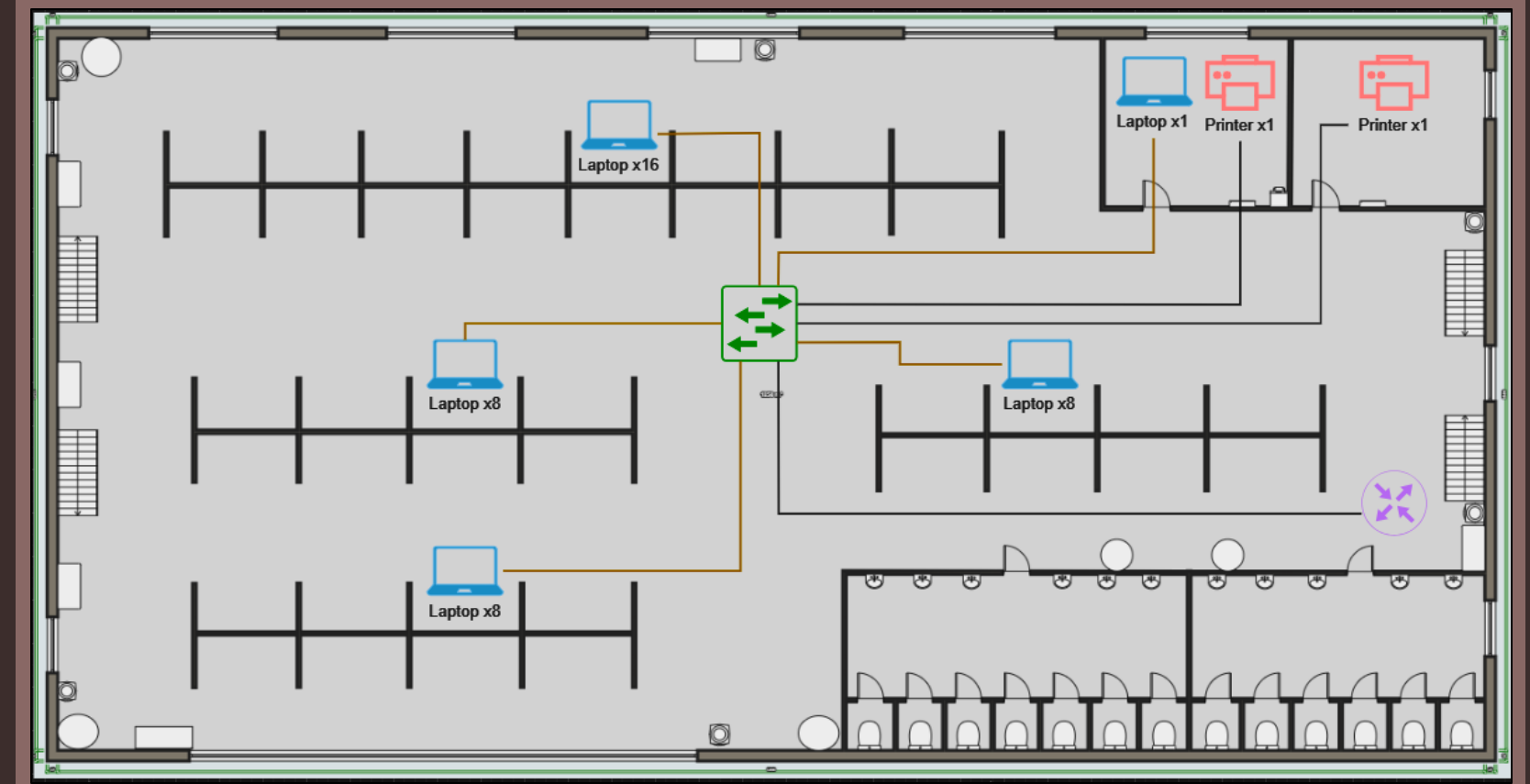
Office, computer room, classroom, library

First Building: 1st Floor

OFFICE

COMPUTER
ROOM

CLASSROOM



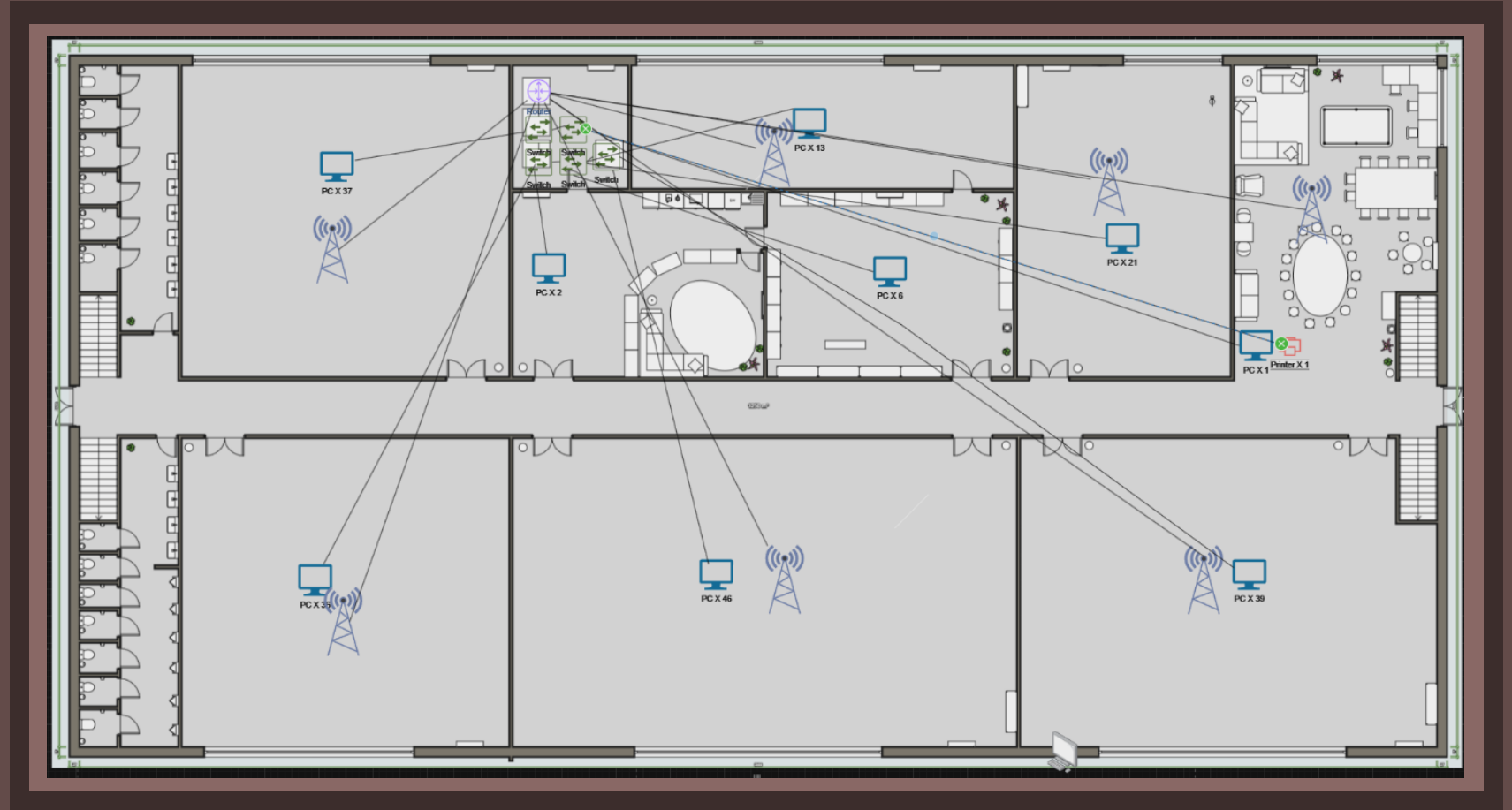
First Building: 2nd Floor

OFFICE

COMPUTER
ROOM

CLASSROOM

LIBRARY



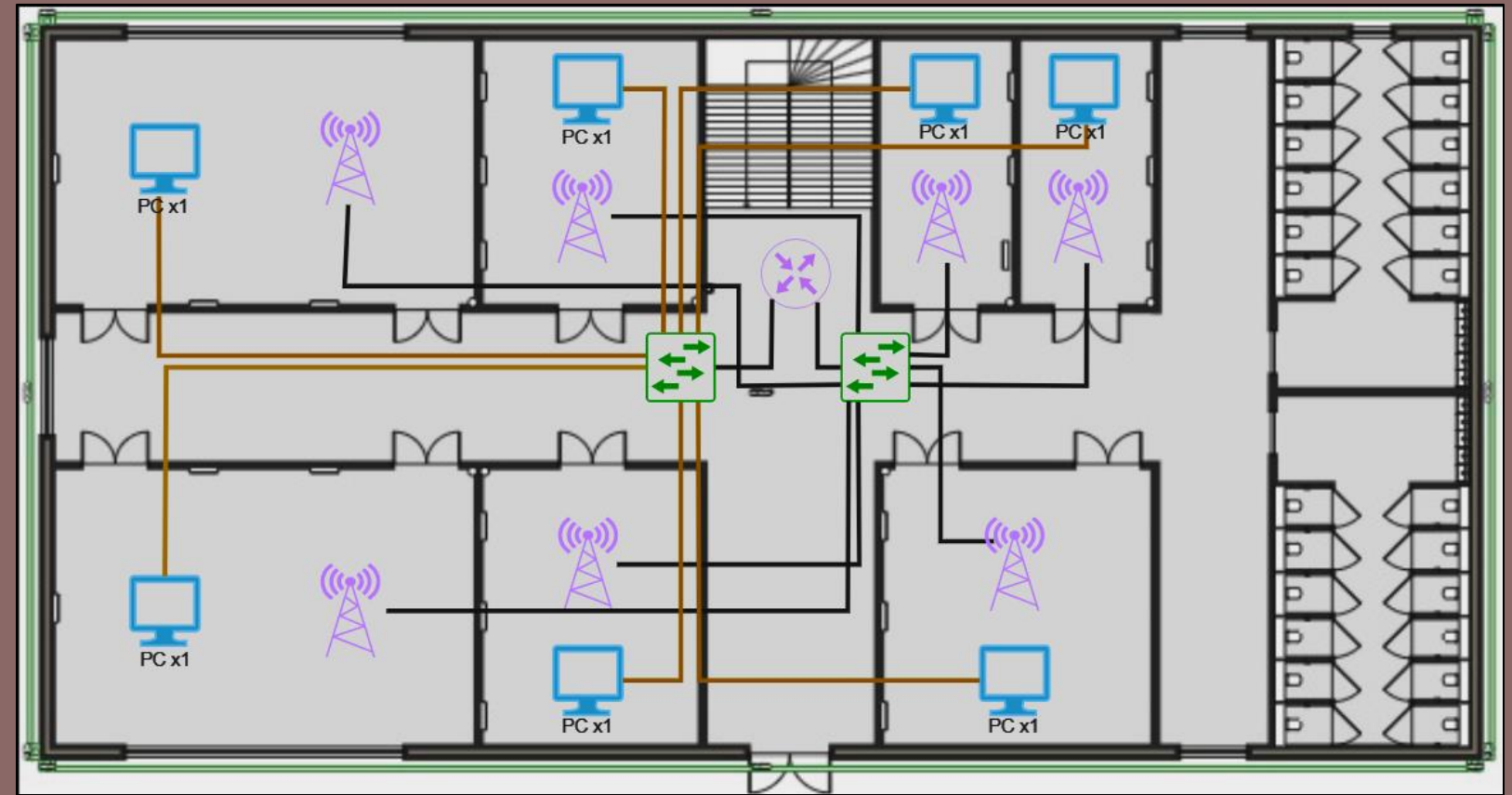
OFFICE

Second Building: 1st Floor

COMPUTER
ROOM

CLASSROOM

LIBRARY

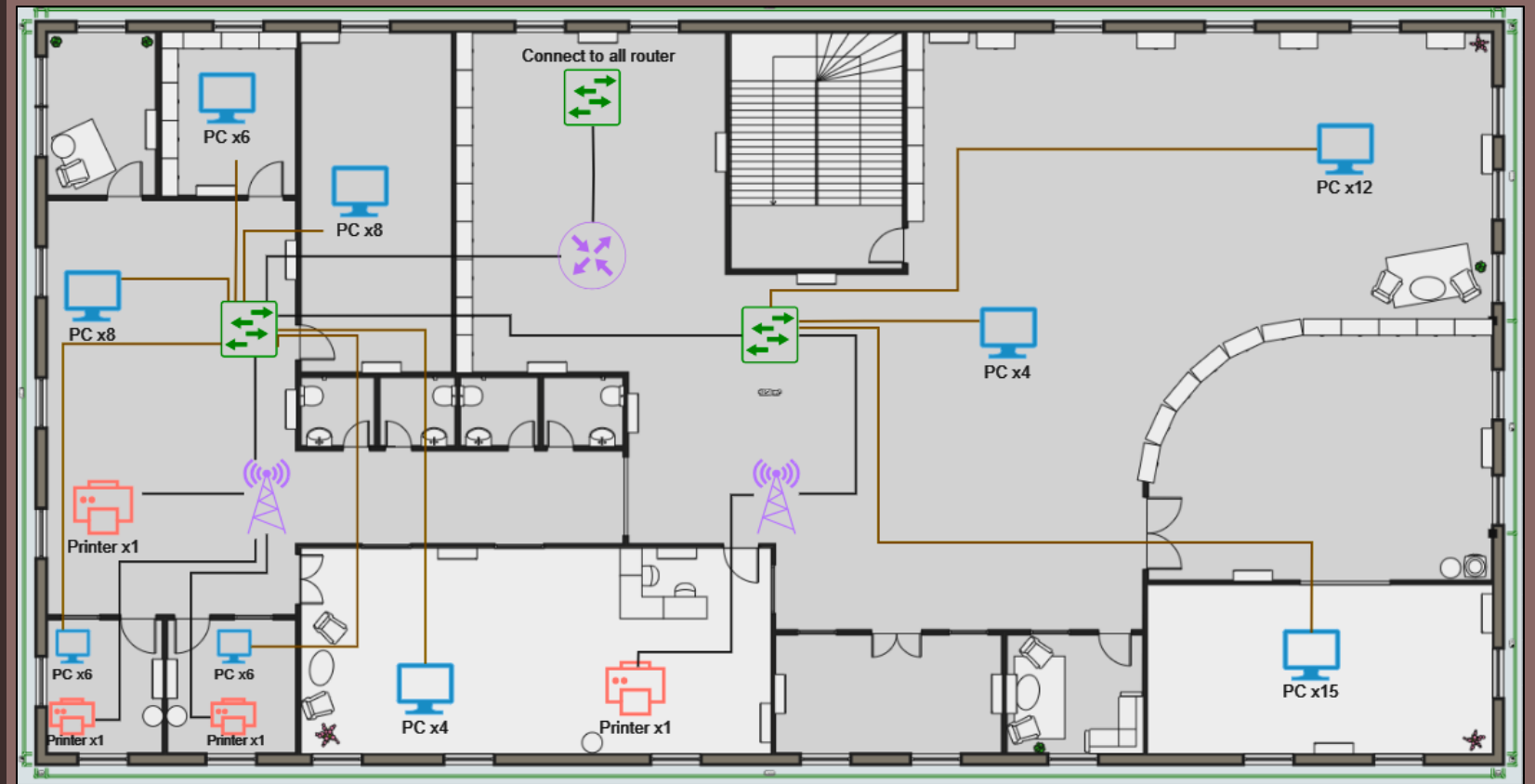


COMPUTER
ROOM

Second Building: 2nd Floor

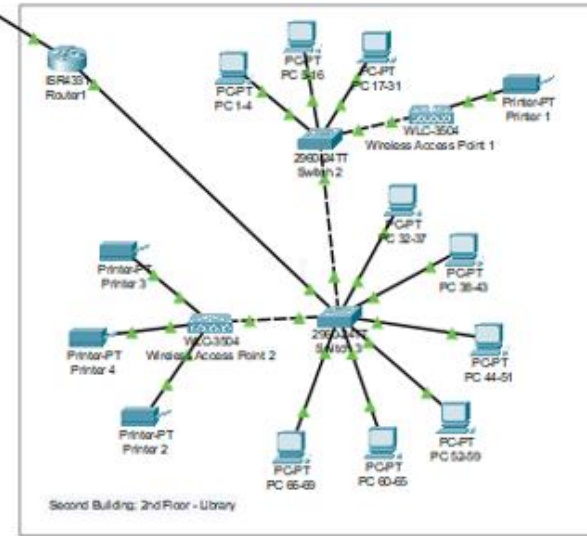
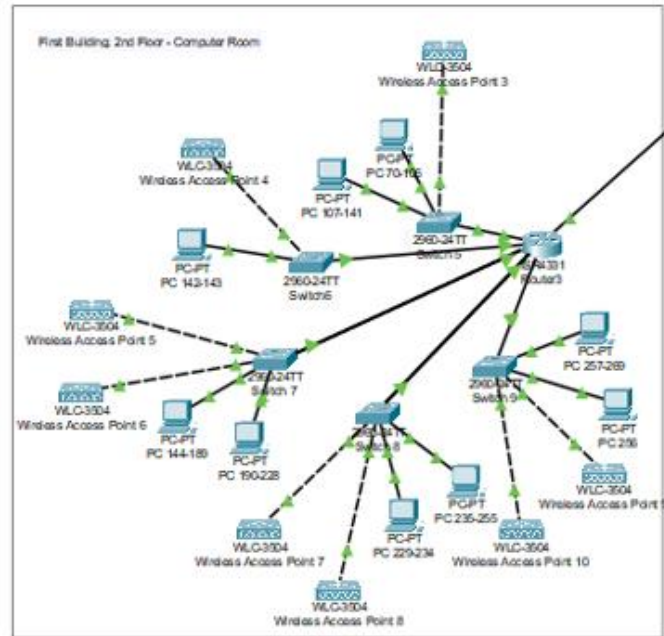
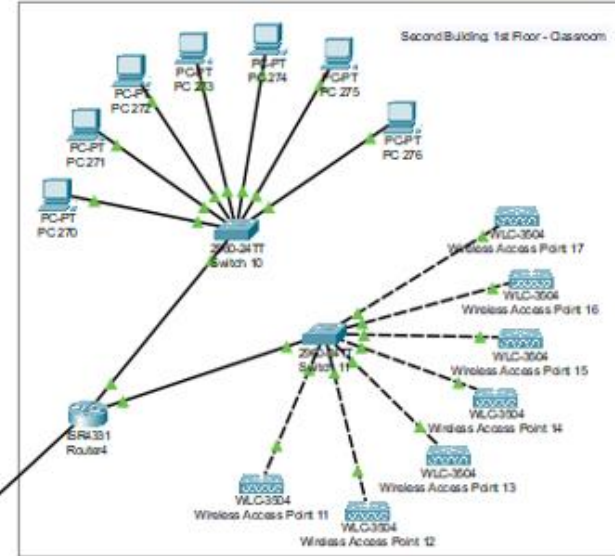
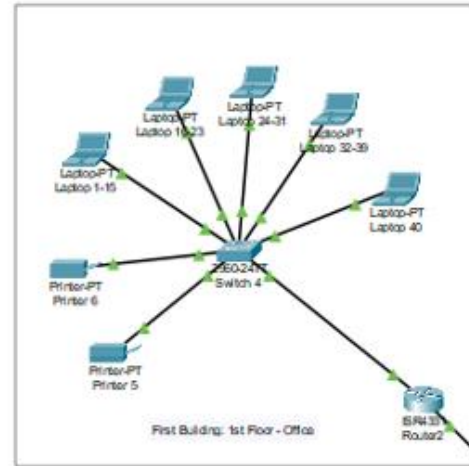
CLASSROOM

LIBRARY





TOPOLOGY





Conclusion

Conclusion

In summary, we collaborated to design an optimal network that boosts performance, ensures reliability, enhances security, and simplifies management. We achieved this with carefully chosen devices and cabling, delivering near-top-notch quality while staying budget-friendly.

A nighttime photograph of a city street, likely in New York City. In the foreground, a subway train is visible on the right side, with its windows reflecting the city lights. A series of streetlights with multiple lamps are positioned along the sidewalk, casting a warm glow. In the background, the city skyline is visible, with the Empire State Building prominently featured on the left. The sky is a deep blue, and the overall atmosphere is urban and vibrant.

THANK YOU