Test Progressive Assistants	
Network	
For 24-2 Generation	
Valid on *Short Semester Year 2023/2024*	

1. Peserta TPA tidak diperkenankan untuk:
    a. Mempublikasikan jawaban yang telah dibuat, baik secara sengaja maupun tidak sengaja.
    b. Membuka dan/atau menyalin jawaban dari buku, video, ataupun peserta lainnya.
    c. Melakukan tindakan yang menyebabkan jawaban dicontek oleh orang lain atau kelompok lain baik disengaja maupun tidak disengaja.
    d. Melakukan tindakan kecurangan lainnya.
2. Jika peserta TPA terbukti melakukan tindakan seperti yang dicantumkan pada butir ke-1, maka nilai TPA akan dinolkan sesuai dengan peraturan yang berlaku. Peserta juga akan diberikan sanksi sesuai prosedur yang berlaku.
3. Jawaban yang dapat diterima dan dinilai adalah jawaban yang dikumpulkan sebelum batas waktu yang telah ditentukan.

Jakarta, 30 Agustus 2024

Efran Nathanael
Teaching Assistant Development Officer

Soal

Case

NeLtech

NeLtech is an innovative IT solutions company dedicated to providing cutting-edge technology services to businesses of all sizes. Their office currently has 2 branches: **Kebon Jeruk** and **Alam Sutera**. As a **professional network engineer**, you are asked to design their network configuration using **Cisco Packet Tracer** as your tool. The requirements are stated as below:

- **General Requirements**
  - Use a **proper network architecture**. Please note that you **must understand the architecture that you use**.
  - Use **cluster** for each branch, floor, to create a **neat** and **tidy** network configuration.
  - For each office branch, use **Inter-VLAN routing**.
  - Implement **VLAN Trunking Protocol** (**VTP**) for network devices configuration.
  - For local network, use **private IP address** (RFC 1918).
  - Ensure that all IP addresses are assigned **automatically**, except for the servers and network devices.
  - Each port attached to end devices must be **instantly connected** without proper negotiation.
  - Implement **spanning tree protocol** (**STP**) with **load balancing** to optimize network traffic and prevent loops.
  - Enable **SSH** access on **all network devices** for secure remote management.
  - Use **802.1X authentication** for securing access to wireless access points.
  - Configure **first-hop redundancy** on core layers to ensure high availability.
  - Configure **VoIP** between the two branches.
  - **Prevent** the network from **possible vulnerabilities** or **attacks**.
  - **Each branch** will have their own **DHCP** and **AAA** server.

- **Kebon Jeruk Office Branch**
  - Use **Switch Virtual Interface** (**SVI**) for routing.
  - The office will consist of 3 floors, stated as below:
    - 1F: Receptionist, Marketing, and Customer Service
    - 2F: Network, Server, Human Resource, Finance
    - 3F: RnD, IoT, Board of Directors

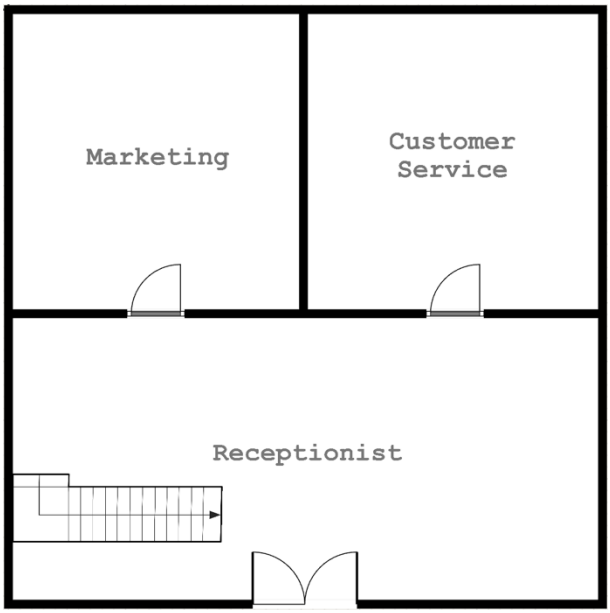

Figure 1. Kebon Jeruk - 1F

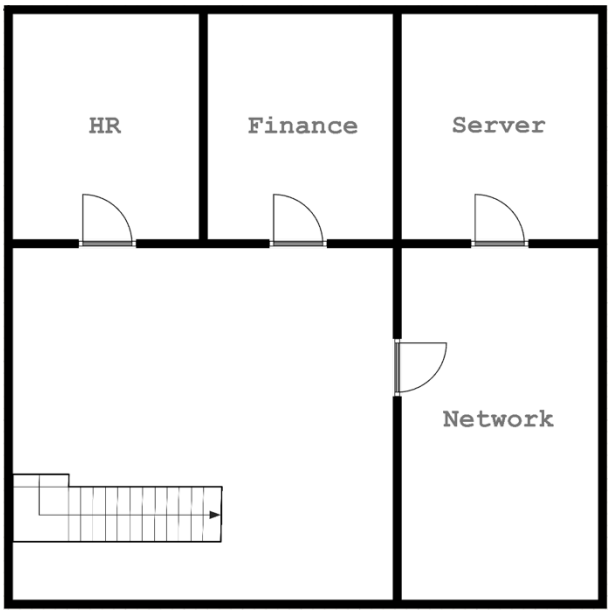

Figure 2. Kebon Jeruk - 2F

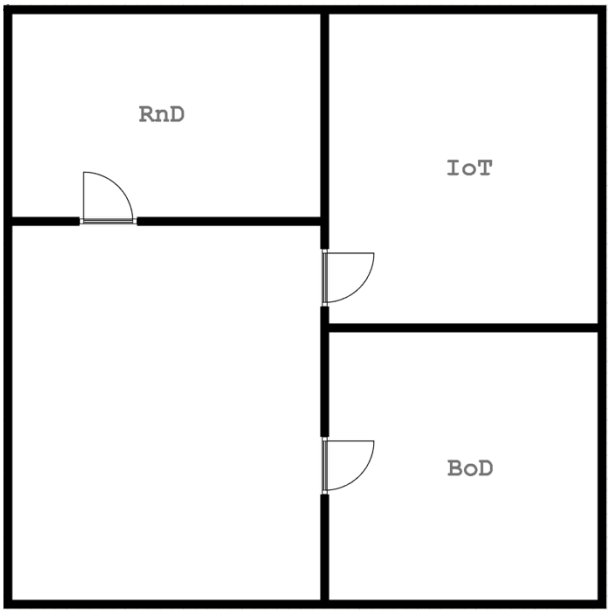

Figure 3. Kebon Jeruk - 3F

Unit	Hosts	Details
Receptionist	3	3 Staffs
Marketing	10	1 Head, 3 Officers, 6 Staffs
Customer Service	10	1 Head, 4 Officers, 5 Staffs
Network	16	1 Head, 4 Officers, 11 Staffs
Human Resource	6	1 Head, 5 Officers
Finance	8	2 Officers, 6 Staffs
Research and Development	6	4 Officers, 2 Staffs
IoT Division	10	1 Head, 3 Officers, 6 Staffs
Board of Directors	4	CEO, CFO, CMO, CTO

Table 1. Kebon Jeruk Units

- Each division **must have at least one telephone**, except for **Receptionist** and **Board of Directors**, where **each person** must have their own telephone.
- Each division **must have at least one PC**.
- Hans Indrawan, the Head of IoT division, wants you to **simulate** a fire emergency situation. Use **fire monitor**, **fire sprinkler**, and create a condition to **trigger the fire sprinkler**.
- Provide a **Wireless Connection** for Board of Directors, where **each person** will get their own **credentials**.

Service	Type	Details
NeLtech Web Application	Web Application	Public access
Receptionist Web Application	Web Application	Limited access for Receptionist Unit
Development Web Application	Web Application	Limited access for RnD and IoT Unit
Head Web Application	Web Application	Limited access for Board of Directors
Internal File Sharing Storage	File Sharing	Limited access for all internal unit of NeLtech Each unit has 1 account to access service
Internal Centralized Log Storage	Centralized Log	Every log record in network devices will be stored here

Table 2. Kebon Jeruk Services

Service Name	Domain Name
NeLtech Web Application	neltech.com
Receptionist Web Application	receptionist.neltech.com
Development Web Application	development.neltech.com
Head Web Application	head.neltech.com

Table 3. Kebon Jeruk DNS

- **Alam Sutera Office Branch**
  - Use **Router on a Stick** (**RoaS**) for routing.
  - The office will consist of 3 floors, stated as below:
    - 1F: Public Space
    - 2F: Sales, Research and Innovation, Training Room
    - 3F: Operational Management, Building Management

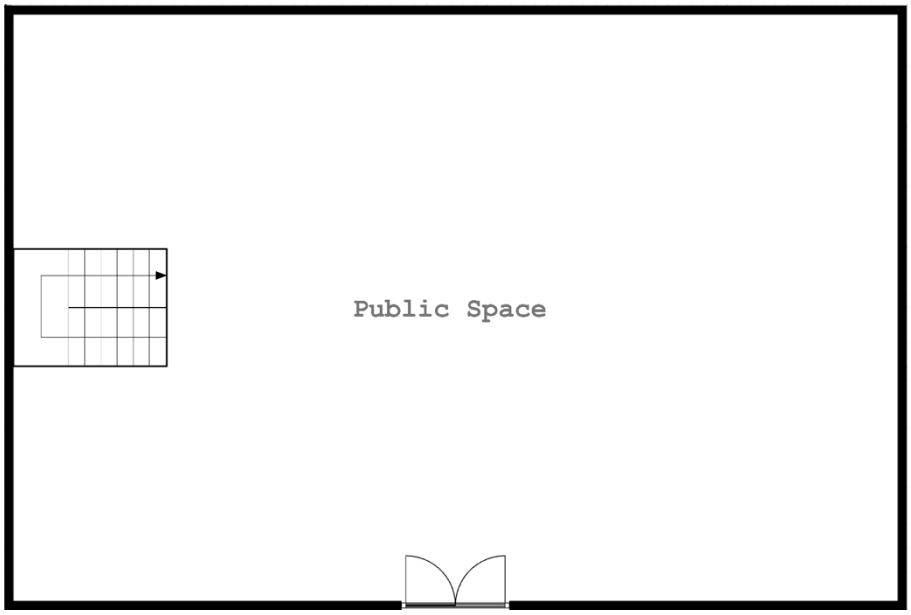

Figure 4. Alam Sutera - 1F

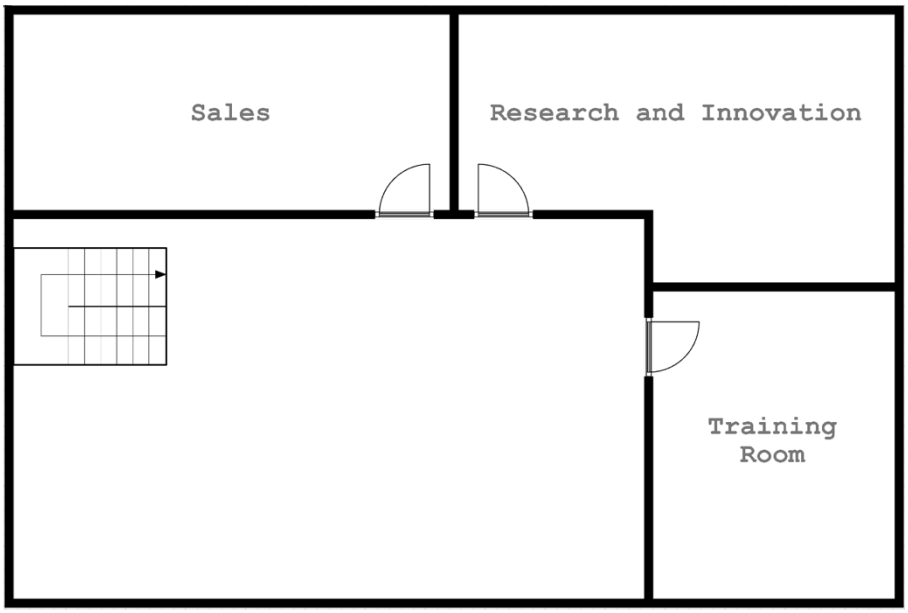

Figure 5. Alam Sutera - 2F

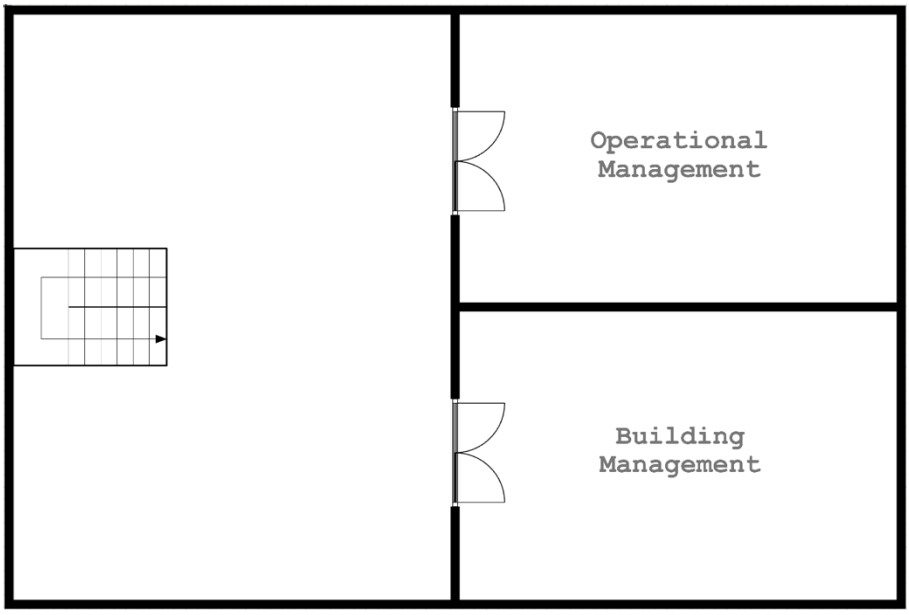

Figure 6. Alam Sutera - 3F

Unit	Hosts	Details
Sales	10	1 Head, 3 Officers, 6 Staffs
Research and Innovation	10	1 Head, 4 Officers, 5 Staffs
Training Room	20	20 Trainees
Operational Management	16	1 Head, 4 Officers, 11 Staffs
Building Management	16	1 Head, 4 Officers, 11 Staffs

Table 4. Alam Sutera Units

- The first floor will be **full wireless connection**.
- Each division **must have at least one telephone**.
- Each division **must have at least one PC**.

Service	Type	Details
Research Web Application	Web Application	Limited access for Research and Innovation Unit
LnT Web Application	Web Application	Limited access for Training Room
Management Web Application	Web Application	Limited access for Operational Management, Building Management, and Board of Directors
Internal Centralized Log Storage	Centralized Log	Every log record in network devices will be stored here

Table 5. Alam Sutera Services

Service Name	Domain Name
Research Web Application	research.neltech.com
LnT Web Application	lnt.neltech.com
Management Web Application	management.neltech.com

Table 6. Alam Sutera DNS

- **Public Network Configuration**

Network Segment	Network Address
Kebon Jeruk branch to Internet	100.50.50.64/27
Alam Sutera branch to Internet	100.50.51.0/27

Table 7. Internetwork Address

  - Configure **Dynamic NAT** on the top-most router of each branch.
  - Use **Exterior Gateway Protocol** for routing between branches.
  - Secure communication between both branches using **IPsec VPN**.
  - Add another **HTTP** and **DNS server** to be simulated as a **global web application**, and set the DNS server on each branch to **redirect to the global DNS server** when the record is not found.