- Correct port security config (MAC, mode, status)

- Wireless interface SSID, security key

- Interface is **up and secure,....**

- **Or** you can test their own work with show command

2.1. Scenario Overview

AUCA University has acquired new computers (both PCs and laptops). As an experienced computer technician, your task is to reconfigure the network in this exam file. You will:

- Install and configure proper Network Interface Cards and update Device Names on the new devices based on the ideal topology and a provided disconnected topology (which shows the required device names).
- Ensure that all devices (PCs, laptops, servers, routers, and access points) can communicate.
- Set up the necessary security features for network security.

2.2. Objectives

- **Hands-On Network Configuration:**
  Master the configuration of various network devices (routers, switches, wireless access points) using Packet Tracer, ensuring you can implement industry-standard settings.
- **User Profile & Security Management:**
  Learn to update and secure device profiles, including configuring hidden SSIDs, MAC filtering, and advanced wireless security protocols (WPA2, WEP).
- **IP Addressing & DHCP/DNS Services:**
  Gain practical experience in setting up IP addressing schemes, configuring DHCP servers for dynamic IP assignment, and setting up DNS services to resolve domain names.
- **Troubleshooting & Verification:**
  Develop your troubleshooting skills by verifying connectivity through ping tests and web browser validation, ensuring all devices communicate seamlessly.
- **Real-World IT Support Skills:**
  Simulate a real-world scenario where you integrate new hardware, configure security features, and maintain system integrity, preparing you for IT support roles in modern network environments.

2.3. Interesting Outcomes

- **Enhanced Problem-Solving Skills:**
  By working through a realistic network configuration scenario, you will sharpen your ability to

diagnose and resolve complex networking issues—a key skill in IT support and computer maintenance.

- **Improved Technical Proficiency:**
  Successfully completing the exam will boost your confidence and technical competence in configuring and managing both wired and wireless networks, making you more marketable in today's IT job market.

- **Real-World Experience:**
  The exercise mimics industry scenarios, allowing you to experience firsthand the challenges and rewards of maintaining a secure and efficient network, thereby bridging the gap between theory and practical application.

- **Critical Thinking & Decision Making:**
  The exam encourages you to think critically about security implementations, device configurations, and network design. This will help you make informed decisions in real-world IT support and network administration roles.

- **Integration of Multiple Technologies:**
  You will learn how various technologies interact—from MAC filtering and DHCP to DNS and wireless security—providing a comprehensive view of modern network management.

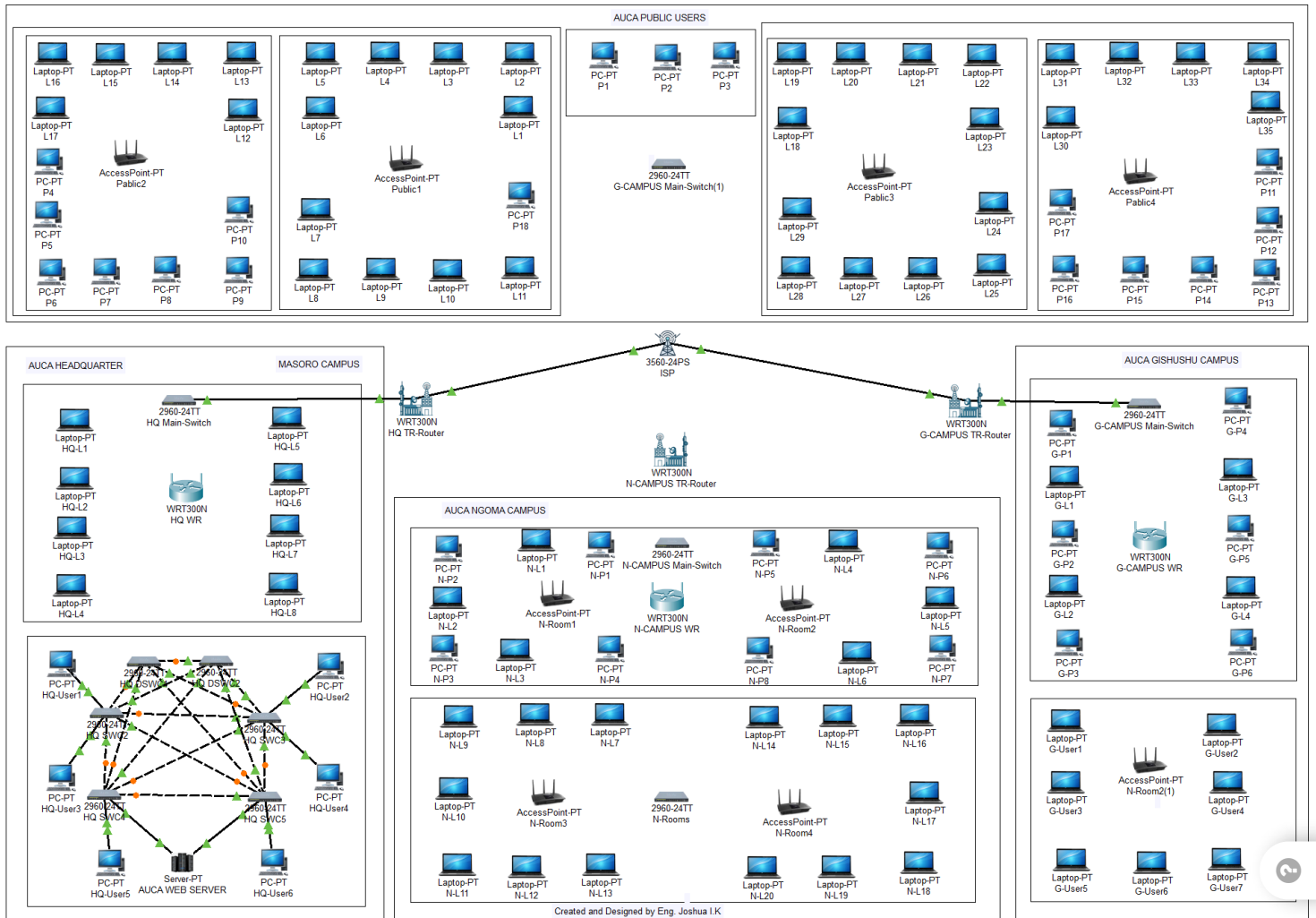- **Preparation for Certification & Career Advancement:**
  The skills and knowledge gained from this exam are directly applicable to industry certifications and career paths in computer maintenance, network administration, and IT support.

Ideal Network Topology:

Disconnected Topology:

Created and Designed by Eng. Joshua I.K
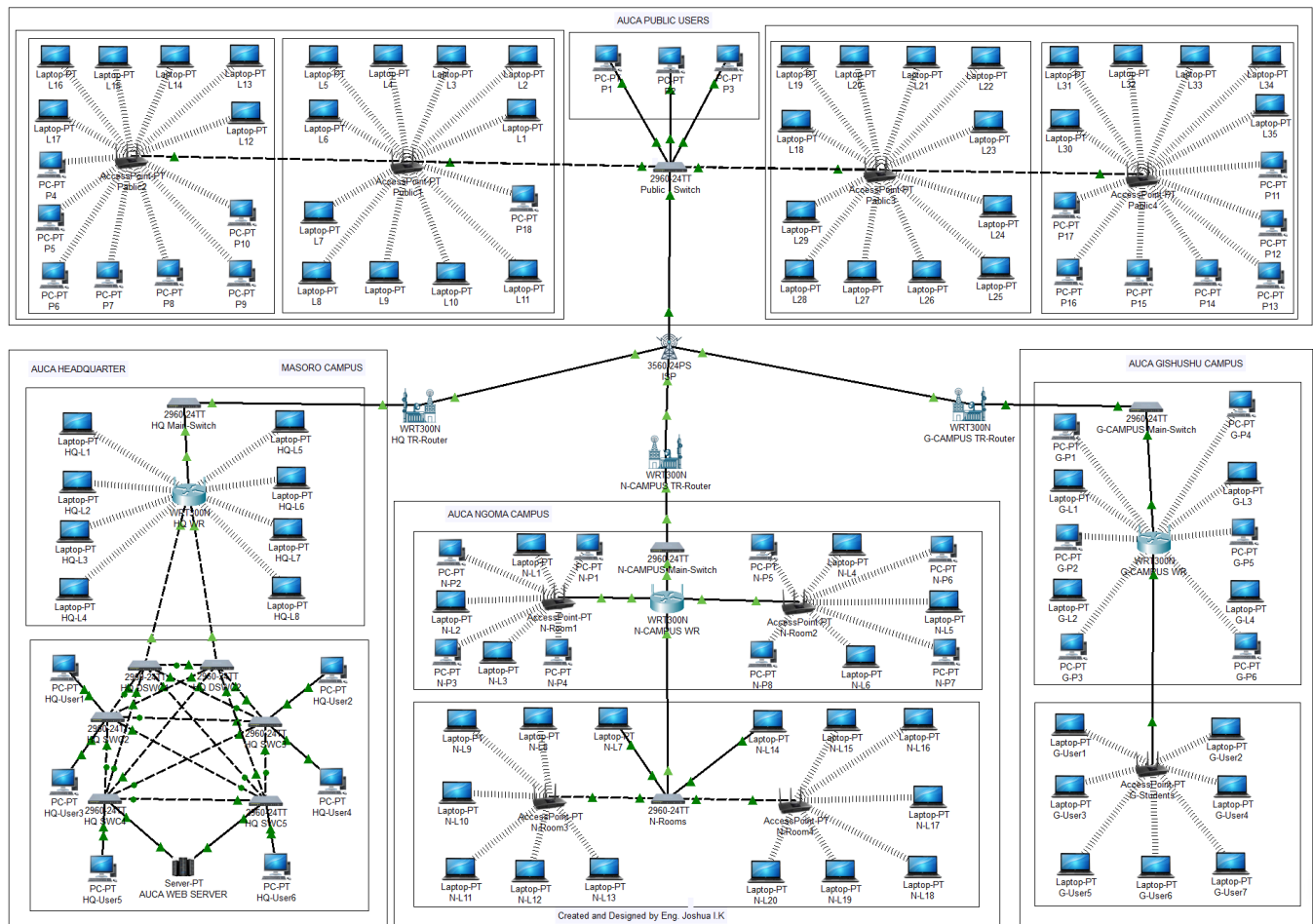
3. Device Configurations

1. TR-Routers (Wireless Routers for Campus Transmission)

Router	SSID	Passphrase
HQ TR-Router	HQ TR-Router	HQ-TR-Router@Auca#2025
G-CAMPUS TR-Router	G-CAMPUS-TR-ROUTER	G-CAMPUS-TR-Router@Auca#2025
N-CAMPUS TR-Router	N-CAMPUS-TR-ROUTER	N-CAMPUS-TR-Router@Auca#2025

WR-Routers (Wireless Routers for Work/Students)

Router	SSID	Passphrase

HQ WR	Auca-HQ	HeadQuarter@Auca#2025
G-CAMPUS WR	AUCA-G-CAMPUS	G-Campus@Auca#2025
N-CAMPUS WR	AUCA-N-CAMPUS	N-Campus@Auca#2025

Note:

- Set both TR routers and WR routers to hide their wireless SSIDs for security purposes, allowing only users with full credentials to access them.
- **Security Mode:** WPA2 Personal **and Encryption:** AES

Additional Security on WR-Routers:

- **HQ WR:**

Only allow connections from recognized MAC addresses.

Label	MAC Address
HQ-L1	00-01-43-A4-E0-27
HQ-L2	00-01-64-60-39-E1
HQ-L3	00-01-97-6D-C9-02
HQ-L4	00-60-47-72-86-86
HQ-L5	00-0C-CF-50-46-63
HQ-L6	00-90-0C-A7-14-DA
HQ-L7	00-01-63-E4-4C-39
HQ-L8	00-E0-8F-72-0D-3C

- **G-CAMPUS WR Router:**
  Allow connections from all users except block these two MAC addresses due to detected malicious

activity:

Label	MAC Address
G-L2	00-02-16-9D-D3-E5
G-L4	00-40-0B-C9-30-64

1. **Access Points Configuration**

Configure the following access points with their respective settings:

Access Point	SSID	Authentication	Pass Phrase / Key	Security Type
G-Students	G-Students	WPA2-PSK	auca.ac.rw	(PSK based)
N-Room1	N-Room1	WPA2-PSK	auca.ac.rw	(PSK based)
N-Room2	N-Room2	WPA2-PSK	auca.ac.rw	(PSK based)
N-Room3	N-Room3	WPA2-PSK	auca.ac.rw	(PSK based)
N-Room4	N-Room4	WPA2-PSK	auca.ac.rw	(PSK based)
Public1	Public1	WEP	1234567890	(WEP)
Public2	Public2	WEP	1234567890	(WEP)
Public3	Public3	WEP	1234567890	(WEP)
Public4	Public4	WEP	1234567890	(WEP)

Server Configuration

AUCA WEB SERVER:

Parameter	IPs/Subnet Mask
Static IP Address	192.168.0.10
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
DNS Server	192.168.0.10

Network for Other Devices:

- All PCs and Laptops must automatically obtain IP addresses from Routers.

4. Configuration Steps

Step 1: File Download & User Profile Update

- **Download** the provided .pka file from Canvas.
- Open the file in Packet Tracer (**v8.2.2.0400**) and update your **User Profile** as instructed.

Step 2: Reconfigure Network Devices

- **TR-Routers & WR-Routers:**
  - On **HQ WR**, enter the allowed MAC addresses.
  - On **G-CAMPUS WR**, block the two listed MAC addresses.
  - Change the SSID and security settings as per the tables above.
  - Ensure the SSIDs are set to "hidden" on all TR and WR routers.
  - For WR routers, configure MAC filtering:
- **Access Points:**
  - Configure each AP with the appropriate SSID, authentication method, and pass phrase or key.
- **AUCA WEB SERVER:**
  - Verify the static IP configuration.
  - Confirm that the server is in the correct subnet (192.168.0.0/24).

Step 3: Device Interface & IP Configuration

- **PCs and Laptops:**
  - Verify that each new device is installed with the proper Network Interface Cards.
  - Ensure that the devices are set to obtain IP addresses automatically from the DHCP service provided by the routers in the 192.168.0.0/24 network.

Step 4: Security and Connectivity

- **Security Settings:**
  - Double-check that each wireless router and access point is configured with the correct security mode (WPA2 Personal for most; WEP for Public SSIDs).
  - Confirm hidden SSID settings.
  - Validate MAC filtering rules on HQ WR and G-CAMPUS WR.
- **Connectivity Testing:**
  - Ping between multiple devices, especially testing connectivity to the AUCA WEB SERVER using both its IP address (192.168.0.10) and the domain name (**auca.ac.rw**).
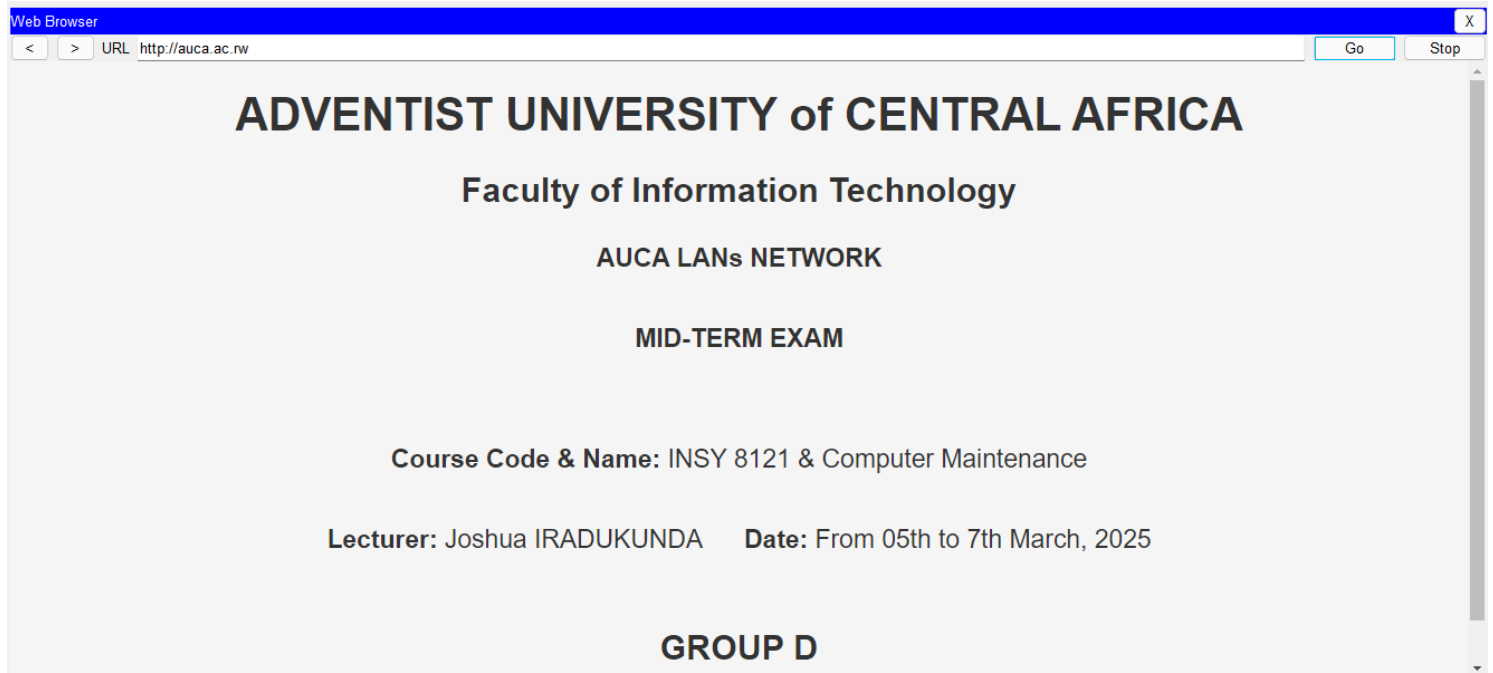 - Ensure all devices can access the web server.

Step 5: Verification and Testing

- **Ping Tests:**
  - From various PCs and laptops, run ping tests to verify connectivity to the AUCA WEB SERVER.
- **Browser Test:**
  - The IP address: **192.168.0.10**
  - The domain name: **auca.ac.rw**
  - Open a web browser on a client device and try accessing the AUCA website using:

Web Browser	X
< > URL http://auca.ac.rw	Go Stop

ADVENTIST UNIVERSITY of CENTRAL AFRICA

Faculty of Information Technology

AUCA LANs NETWORK

MID-TERM EXAM

Course Code & Name: INSY 8121 & Computer Maintenance

Lecturer: Joshua IRADUKUNDA   **Date:** From 05th to 7th March, 2025

GROUP D

- **Automatic Grading:**
  - Make sure all configurations meet the provided specifications, as the grading system will verify your settings automatically.

5. **Final Checklist Before Submission**

- **User Profile Updated:**
  - Student ID in Name field; Full Name and Phone in Additional Info.
- **TR-Routers & WR-Routers:**
  - SSIDs, passphrases, security modes, and encryption settings match the provided tables.
  - SSIDs are set to hidden.
- **MAC Filtering:**
  - **HQ WR:** Only the listed MAC addresses are allowed.
  - **G-CAMPUS WR:** Block the two specified MAC addresses.
- **Access Points:**
  - All APs are configured with the correct SSIDs, authentication methods, and keys.
- **Server & DHCP:**
  - AUCA WEB SERVER is configured with static IP 192.168.0.10.
  - All other devices receive IP addresses automatically from the 192.168.0.0/24 network.
- **Connectivity:**
  - Successful ping tests between devices, especially with the AUCA WEB SERVER.
  - Web browsing using both IP and domain name confirms DNS resolution.

- ## Save Configuration:

  - Save the final configuration with the filename: **YourStudentID_YourFullName_CM-spr25_MID.pka**

- ## Submission:

  - Upload the completed file back to Canvas before the deadline.

END.