THE UNIVERSITY OF THE SOUTH PACIFIC

School of Information Technology, Engineering, Mathematics and Physics

(STEMP)

CS218: Mobile Computing

Assignment 1

Semester 2, 2025

Group Assignment [3 Members Only]

Weight: 10% of final grade

Due Date: Week 7 – 10pm Friday 5th September 2025

Part 1: Mobile Management & Network Roaming Configuration (33%)

Objective: Create a functional network using Cisco Packet Tracer to demonstrate how a mobile device can maintain its connectivity when moving from its home network to a foreign network, simulating a more realistic cellular environment with multiple cell towers per city.

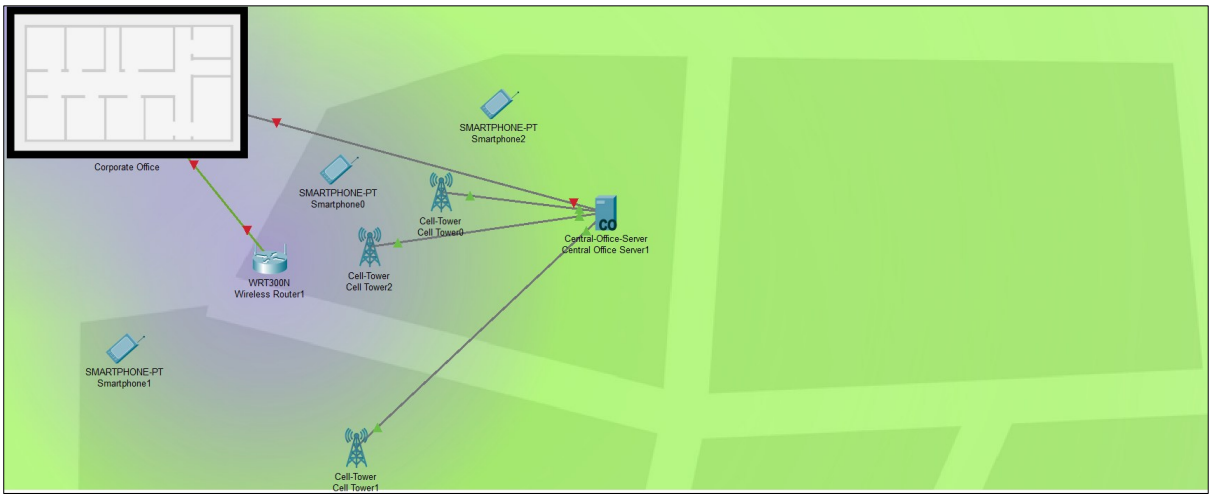

Figure 1 Sample Layout Only – Use Your Own Network Setups

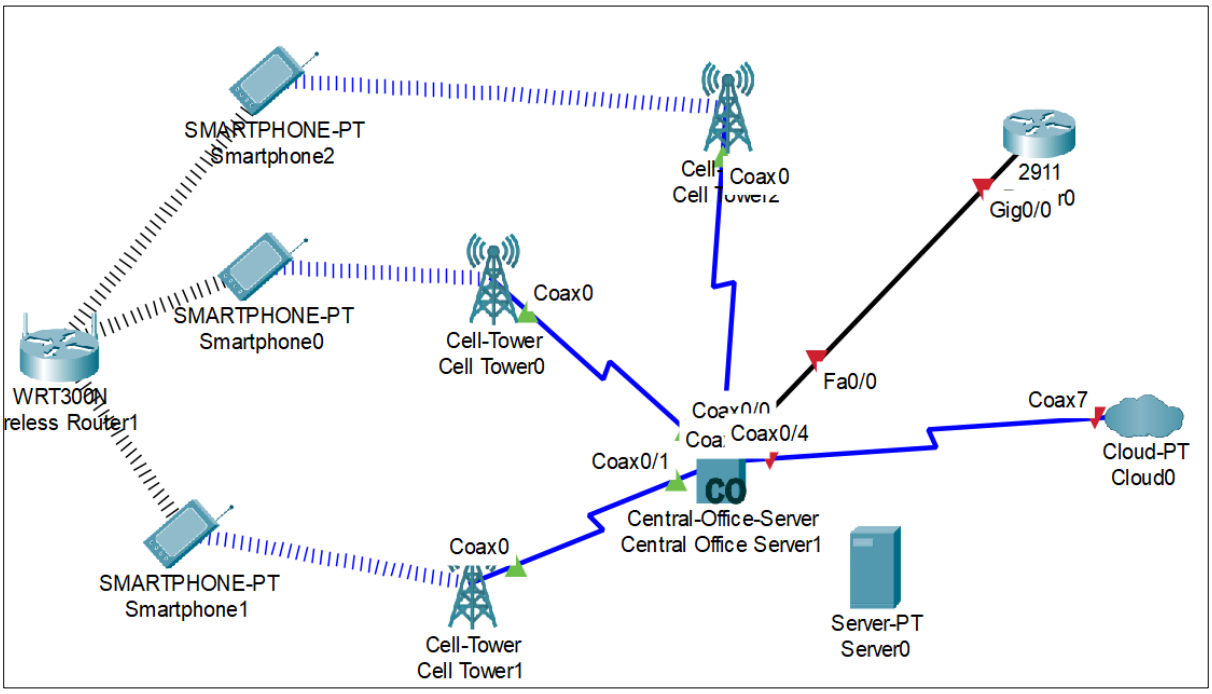

Figure 2 Sample Layout Only - Use Your Own Network Setup

Instructions:

1. **Network Setup:** Use Cisco Packet Tracer to design and build your own mobile network simulating connectivity from home network to a foreign network with roaming. You can include devices such as a Router, Central Server, Switch, an Access Point, a Web Server, Cell Tower in each city and at least three client devices (e.g., laptop, smartphone, IoT device).
2. **DHCP Services:** Configure DHCP Services on the network using a core device such as a Router or Central Server with DHCP.
3. **Connectivity & Verification:** Ensure the laptop and IoT device connect to the wireless Access Point and the Smartphone connects to the Cell Tower for 3G/4G coverage. Verify that all devices can successfully ping each other and the Web Server.
4. **Web Server & HTML:** Create an `index.html` file on the Web Server. This file must contain a simple login form with a button.
5. **Interactive Web Page:** When the login button is pressed, the page should display a picture of the student along with their details (e.g., name, student ID) and a fun fact simulator. You can add at least three fun facts with a Next fun fact button.

Deliverables:

- A single Packet Tracer file (.pkt)
- A report with network topology diagram and screenshots of successful pings as well as relevant output displays.
- The `index.html` file.

Part 2: Live Stream Production (33%)

Objective: Produce a multi-camera live stream and a post-production video, demonstrating competence in live broadcasting and video editing.

Instructions:

1. **Streaming Software:** Use **OBS Studio** or a similar alternative (e.g., Streamlabs Desktop, StreamYard, etc).
2. **Live Broadcast:** Conduct a live stream for a minimum of **10 minutes**. The stream must be multi-camera, with a minimum of two separate camera inputs.
3. **Camera Switching:** Throughout the live stream, demonstrate the ability to switch between the camera feeds and other scenes (e.g., screen share, graphics).
4. **Post-Production:** After the live stream, create a new, edited video from the recorded footage. This video should be polished, with cuts, titles, and improved audio.
5. **Performance Analysis:** Using the streaming software's built-in tools, document a graph or chart showing key performance metrics such as latency, frame rate, and CPU usage.

Deliverables:

- A link to the 10-minute live stream recording.
- A link to the post-production video.
- A report with the performance graph and a summary of the features used.

Part 3: Mobile Application Development (34%)

Objective: Design and prototype a functional mobile application, applying principles of user experience (UX) and mobile development frameworks.

Instructions:

1. **App Concept:** Design a **music and video player app** that allows a user to create and manage multiple playlists. The app should be able to store both audio and video files. Students may propose a more creative theme for approval (e.g., a collaborative playlist app).
2. **UI/UX Design:** Use a design tool like Figma or Adobe XD to create at least 5-7 screen mockups that illustrate the app's user flow. These should include a home screen, playlist view, and playback screen.
3. **Functional Prototype:** Build a low-fidelity, interactive prototype of the app using a cross-platform framework like **Flutter** or **React Native**. The prototype must demonstrate the core features: creating a playlist, adding media, and basic playback functionality.

Middleware Analysis Report: Write a 2-3 page report that addresses the following:

4. Compare and contrast your chosen middleware framework (e.g., Flutter) with a different form of mobile middleware (e.g., a native-only approach or a mobile backend-as-a-service like Firebase). Discuss the pros and cons of each in terms of development speed, performance, and functionality.
5. Explain the role of your chosen middleware in the mobile computing protocol stack. Describe how it functions between the application layer and the underlying hardware/network layers.

Deliverables: A link to the UI/UX mockups. A link to a video demonstration of the functional prototype. A 2-3 page Middleware Analysis Report.

Submission Details: Upload a zipped folder with naming convention as SXXXXXXX_A1 containing all relevant files (SingLe pdf for all reports for Parts 1 to 3, a Packet Tracer file and index,html file.) by the due date: 10pm Friday 5th September, 2025. Only the group leader should submit the file and add all members details and percentage contribution.

Marking Rubric

Criteria	Excellent (9-11 pts)	Good (6-8 pts)	Satisfactory (3-5 pts)	Unsatisfactory (0-2 pts)
Network & Configuration	All devices are correctly configured and function as intended. DHCP services are fully operational, with all devices receiving a valid IP address. Connectivity between all specified devices is confirmed via successful pings.	Most devices are configured correctly. DHCP functions, but minor issues with some device connectivity.	DHCP is partially configured or some devices fail to connect. Pings are inconsistent between devices.	Network is incomplete or non-functional.
Web Server & HTML	The index.html file is well-structured and the login form is complete. The interactive button correctly displays the student's details, photo, and a functioning fun fact simulator with at least three facts. The design is clean and professional.	The HTML page functions correctly, but the design is basic. The interactive button displays the required student details but the fun fact simulator may have minor bugs or only contain one or two facts.	The HTML has errors or the interactive button does not work as intended. The fun fact simulator is incomplete or missing.	The HTML file is missing or does not display correctly.
Documentation	The Packet Tracer file, network diagram, and report are complete, well-organized, and accurately reflect the network. Screenshots of successful pings and the interactive web page are clearly labeled and included in the report.	Documentation is provided but may lack some detail or organization. Screenshots are present but may not be clearly labeled or formatted.	Documentation is incomplete or has significant errors.	Documentation is missing or does not match the project.
CBOK – Teamwork, Communication, Abstraction & Programming				
Criteria	**Excellent (9-11 pts)**	**Good (6-8 pts)**	**Satisfactory (3-5 pts)**	**Unsatisfactory (0-2 pts)**
Live Broadcast	The 10-minute live stream is seamless, demonstrating smooth transitions between multiple camera inputs and scenes.	The live stream is 10 minutes, and camera switching is demonstrated, but may have minor stutters or technical issues.	The live stream is under 10 minutes or camera switching is not clearly demonstrated.	No live stream recording is provided.
Post-Production	The edited video is polished, with professional cuts, titles, and improved audio. The final product is significantly better than the raw stream.	The edited video shows evidence of editing, but may lack a polished finish.	The edited video is a simple trim of the raw stream with no additional features.	The post-production video is missing.
Performance Analysis	The performance graph is clearly documented and correctly explains key metrics like latency and frame rate.	The graph is provided but may lack detailed analysis or explanation of the metrics.	A graph is provided, but it is incomplete or inaccurate.	No performance analysis is documented.
CBOK – Teamwork, Communication, Abstraction & Programming				
Criteria	**Excellent (10-12 pts)**	**Good (7-9 pts)**	**Satisfactory (4-6 pts)**	**Unsatisfactory (0-3 pts)**
UI/UX Design	The mockups are professional, creative, and clearly demonstrate a logical user flow.	The mockups show a clear user flow but may be visually basic.	The mockups are incomplete or difficult to follow.	No mockups are provided.
Functional Prototype (LO5)	The prototype fully demonstrates the required features (playlists, adding media, playback) and is well-structured.	The prototype demonstrates most features but may have minor bugs or incomplete functionality.	The prototype is non-functional or only demonstrates a single feature.	No prototype is submitted.
Middleware Analysis Report	The report is well-researched, clearly compares middleware frameworks (LO1), and accurately explains the role of the chosen tool in the protocol stack (LO2).	The report provides a basic comparison and explanation but lacks depth. It addresses the learning outcomes but needs more detail.	The report is submitted but does not effectively address the learning outcomes.	The report is missing or plagiarized.
Total Marks: 100			**Weighting**	**10%**
Penalties will apply for plagiarism and late submissions. Due Date: Friday 10pm Week 7 5th Sept, 2025				