Directions

A. Due Date: 12 May 2025 at 8:00am

B. The assignment must be done by individual students.

C. The assignment includes several submission elements, including an in-class presentation. The in-class presentation is required in order to receive a grade for the assignment. Students who do not perform the in class presentation on the days listed below will not receive a grade.

D. The lab report summary must be submitted in PDF or DOCX format via Moodle.

E. The presentation file must be submitted in PDF or PPTX format via Moodle.

F. The quiz produced must use automatic grading via an external quiz platform that records names, answers, and quiz results.

Cyber Security in Computer Networks

The primary objective of this project is to gain hands-on experience in network cybersecurity through the completion of a SEED lab and its presentation to the rest of the class. A secondary objective is the development of presentation skills to others about cyber security issues.

1   Step 1: Lab Selection and Completion

I put a list of SEED network cyber security labs on the course Moodle site. You can see the whole list of network cyber security labs at: `https://seedsecuritylabs.org/Labs_20.04/Networking/`

Select one of the labs from the list to perform by signing up for it on the Moodle lab selection assignment. Each student must perform a different lab.

The labs include detailed instructions about how to set up the environment and what to do. Each lab is different, but they share commonalities such as the use of Docker containers and virtual networking (also via Docker). Each lab should take about 1 week to complete, so give yourself enough time to perform it.

Every lab is built of multiple steps. Record all code that you write, document the steps you took, and take screen shots of each step you perform in completing the lab.

There are two types of labs:

- Network protocol and infrastructure labs in which you setup a network library, tool, or protocol chain to accomplish some security task.
- Attack labs in which you setup a network topology and use some technique to attack the computers in the topology.

Choose whichever type of lab you find more interesting.

2   Step 2: Lab Results Report

Create a lab report for the lab you performed in English or Hebrew. The lab report must be based on the MS Word template given for the project. Fill in all parts of the template.

All red text between <> characters must be replaced with black text as appropriate, removing the <> symbols. For example: <name> should be replaced with Michael May (if that is your name).

All *blue italics text* must be removed before submission.

3   In Class Presentation

I built a schedule of lab presentations based on a logical ordering of the topics. I have grouped topics together so there will be some logical flow between the presentations. Presentations will take place over the course of 4 two-hour class sessions, with each session containing 4 presentations. If you know you can not make it to class on a particular day, do not sign up for a lab that must be presented that day!

Based on the schedule, the presentation dates will be: 12 May, 18 May, 19 May, 25 May.

You will present your lab and its findings to the whole class. You will teach the class about what you learned from doing the lab, sharing your knowledge with everyone. Your presentation should be planned for 30 minutes and include the following elements:

1. A 8-10 minute introduction to the lab's goals and techniques. Take time to explain the protocol studied, its use, and how it contributes to the internet.
2. An 8-10 minute explanation of how the lab works.

Protocol and network infrastructure labs For labs of this type, explain what protocol or tool setup will be done. Explain their importance and how we will see that the setup worked.

Attack labs For labs of this type, explain how the attack works, what elements of the protocol are set up or attack works on, and what damage the attack can cause.

For all labs, include network topology figures and configuration information.

3. A 8-10 minute demonstration of key parts of the lab, including setup or attack steps live. Show the Docker images and setup and show how the procedures work. Make it clear what is setup and how it works or what the attack does and how we can tell the attack succeeded.

Create a slide presentation file (PPTX or PDF) to accompany your presentation. Ensure that it's clear and visually engaging.

4   In-Class Quiz

To test how well the class understood your presentation and demonstration, you will create a quiz to give to everyone. The quiz must be multiple choice and run on a platform that enables you to ask questions, automatically grade the responses, and record who answered what. Potential platforms include Google Forms and Quizlet. Try out the quiz tool before you actually give the quiz to ensure it meets the requirements.

The quiz must include 3-5 multiple choice questions that check for understanding of the protocol you studied and the attack you presented. The quiz questions must be clearly written and be challenging. They should force the students to recall your presentation and the results you presented.

The questions may be in English or Hebrew, but must be clearly written and presented. Use spell check and grammar check on all questions and answers.

The quiz will take place after your presentation. The quiz will be 5-10 minutes long at most, so ensure the questions can be answered within that time frame.

5   What to turn in

Submit the following elements via Moodle.

1. Presentation Slide Deck: Turn in your slide deck in PDF or PPTX format.

2. Lab report: Turn in your lab report in DOCX or PDF format.

3. Quiz grades: Turn in the grades from the quiz along with the answers from each student. Use the quiz's export feature to submit the grades in Excel or CSV format.

6   Grading Rubric

6.1   Lab Results Report (45%)

Completeness: 20% : All steps are documented with clear screenshots and descriptions

Analysis: 15% : Insightful analysis of the results and understanding of the setup or attack mechanisms

Clarity: 10% : Well-organized report with clear, concise language

6.2   Class Presentation (40%)

Content: 20% : Accurate and thorough background information, clear demonstration of lab results

Delivery: 10% : Clear and confident speaking, good pacing, and engagement with the audience

Visual Aids: 10% : Slide deck is well-designed with relevant visuals and easy-to-follow flow

6.3　In-Class Quiz (15%)

Relevance: 5% : Questions are directly related to the presentation content

Difficulty: 5% : Questions are challenging but fair, reflecting an understanding of the lab

Clarity: 5% : Questions are clearly worded without ambiguity