COMP1002
Cyber Security & Networks

20 CREDIT MODULE

ASSESSMENT: 100% Coursework **W1: 30% Set Exercises**
 W2: 70% Report

MODULE LEADER: Dr Hai-Van Dang
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MODULE AIMS

- To familiarise students with fundamentals of information security and networking.
- To develop an understanding of security threats, vulnerabilities and countermeasures.
- To understand common network protocols and design common network infrastructures.

ASSESSED LEARNING OUTCOMES (ALO):

1. Describe the types of risk that may threaten an IT system and available countermeasures.
2. Explain the conceptual underpinnings of computer networking and data representation.
3. Explain the nature and role of networking and security protocols/controls and how they combine to provide system-level objectives.

Overview

This document contains all the necessary information pertaining to the assessment of *COMP1002 Cyber Security & Networks*. The module is assessed via **100% coursework**, across two elements: *30% Set Exercises* and *70% Report*.

The sections that follow will detail the assessment tasks that are to be undertaken. The submission and expected feedback dates are presented in Table 1. All assessments are to be submitted electronically via the respective DLE module pages before the stated deadlines.

	Submission Deadline	Feedback
Set Exercises (30%)	**4pm 24 April 2023**	24 May 2023
Report (70%)	**4pm 11 May 2023**	9 June 2023

Table 1: Assessment Deadlines

All assessments will be introduced in class to provide further clarity over what is expected and how you can access support and formative feedback prior to submission. Whilst the assessment information is provided at the start of the module, it is not necessarily expected you will start this immediately – as you will often not have sufficient understanding of the topic. The module leader will provide guidance in this respect.

Assessment 1: Set Exercises

Task:

The *Set Exercises* task in this module is focused upon answering two questions. Both questions carry equal marks.

Scenario: Retail company Brown-Rath is looking to enhance their security measures and internal networking infrastructure and has two critical questions:

1. Cyberattack – Recently, a company employee has been a victim of a cyber attack. The employee received an email offering a prize drawing. The prize included tickets to a game played by his favorite sports team, as well as gift certificates to several restaurants, including his favorite spot. The email includes a pdf file with more information on how to join the prize drawing. The employee opened the pdf file which installed a shell into his computer. Fortunately, the incident has been detected and resolved before any substantial harm to the company. The company feels that they would need to review their security solutions in place and enhance it. Your task is to analyze the incident and propose what you feel would be the most appropriate solutions for the company to enhance their security and prevent similar incidents in the future. Please provide a clear rationale for your analysis, selection, and provide detailed evidence to support your statements.

2. Networking – (1). If an employee experiences very low downloading speed when accessing a web server over the Internet (the web server is located outside of the company). Explain which networking tool could be used to locate whether the network problem is within the company or outside of the company (assume the problem is due to network, instead of web server). (2). The company's current network topology is based on a flat design (i.e., all hosts and servers are connected to the main router via access points and switches). The company is expected to double its size over the next five years and also needs to enhance its network security, your task is to propose an alternative network architecture to meet these needs.

Relevant supporting information may be included as appendices if required. Your report must be supported by references *where appropriate*. Any such information must be appropriately cited and referenced in your report. Please refer to the end of this assessment pack for information and links to resources on referencing. You are free to structure the report as you feel is appropriate but please reflect on the assessment criteria to ensure these aspects are incorporated. The use of Tables and Figures are a useful approach of conveying complex information in an efficient manner.

Assessment Criteria:

The structure of each laboratory report should be focused upon a scientific lab report. The following assessment criteria also provides an indicative report structure per each question:

- Introduction (10%)
- Background (25%)
- Critical Analysis (50%)

- Conclusion & References (15%)

The word count **for report is 500-700 words per question**. Please submit the report as a single **PDF** on the DLE.

A Rubric will be used to assess and provide feedback on the submissions. The template for this can be found below (Table 2).

Threshold Criteria (these are indicative only):

To achieve a 3rd/Pass (40%+), you must have articulated the problem and identified a suitable range of factors/considerations in relation to the question. Evidence of analyzing and interpreting data from sources and the use of appropriate references to support critical arguments.

To achieve a 2.2 (50%+), you must have clearly articulated the problem and presented a logical and coherent range of factors/considerations in relation to the question. Evidence of analyzing and interpreting data from multiple sources and the use of appropriate references to support critical arguments.

To achieve a 2.1 (60%+), you must have undertaken a thorough examination of the question. This would include a systematic review of the literature, including evidence of critical analysis and interpretation of multiple sources of data, reasoned and supported arguments related to the question and a critical reflection of the issue. The report will conclude with a logical and coherent conclusion based upon the evidence presented. Good evidence of referencing throughout.

To achieve a 1st (70%+), you must have undertaken a comprehensive examination of the question. This would include a thorough and systematic review of the literature, including evidence of critical analysis and interpretation of multiple sources of data, reasoned and supported arguments related to the question and a critical reflection of the issue. The report will be very coherent in the presentation of the issues and the resulting critical analysis. The report will conclude with a logical, coherent and insightful conclusion based upon the evidence presented. Excellent evidence of referencing throughout.

Criteria	Fail (<40%)	3rd/Pass (40%+)	2.2 (50%)	2.1 (60%+)	1st (70%+)	Grade
Introduction	The introduction fails to describe the subject domain, the context or structure of the report.	A sound introduction into the subject domain and purpose. Lacks in supporting evidence.	A logical introduction with evidence of planning and structure.	A concise and clear introduction with appropriate context and structure being provided. Good number of appropriate references.	An excellent, concise and clear introduction with appropriate context and structure being provided. Well referenced with supporting evidence throughout.	**/10**
Background	Too little relevant background material at an appropriate level.	An appropriate level of background material has been identified and discussed	An good level of background material has been identified and discussed.	An robust level of background material has been identified and discussed. Clearly lending to good quality sources.	An excellent level of background material has been identified and discussed Good quality sources used throughout.	**/25**
Critical Analysis	No meaningful critical analysis of the identified issues.	Evidence of critical analysis of issues and drawing upon relevant evidence to support commentary.	Evidence of logical and coherent analysis of a limited range of issues.	Good evidence of analysing data across multiple sources and drawing new trends/analyses from it..	Excellent evidence of analysing data across multiple sources and identifying new trends/analyses from it.	**/50**
Conclusions & References	The conclusions do not flow from the presented report. Few if any relevant references.	Some attempt at deriving appropriate conclusions has been made. They do logically flow from the analysis presented. Some evidence of appropriate references	Some relevant and interesting insights that logically flow from the report.	A solid attempt at concluding the report, logically applied. Failed to provide an insight into the implications. Good use of a number of relevant sources in an appropriate manner	The concluding remarks are a logical extension of the arguments presented. Clear and concise. Evidence of a good understanding of the implications of the analysis. An excellent set of appropriate peer-reviewed references	**/15**
Feedback/Overall	*Additional feedback*					**/100**

Table 2: Feedback Template for Assessment 1

Assessment 2: Report

Task:

Almost all companies of all shapes and sizes rely on computers and networks to undertake their commercial activities. It is imperative therefore that the underlying infrastructure to support the business is fit for purpose and secure.

Scenario Overview:

Plymouth Hotel has several branches in the South West region and decides to build a new branch in Exeter. They have put out to tender the design of the networking and cyber security infrastructure for the new branch. The hotel has given some thought to their requirements, but not being experts, they are open to consider additional requirements you feel would be required.

Initial Requirements:
- *Staff PCs, staff wifi, and guest network (Admin – 12 hosts, sales team – 20 hosts, guest network wifi – 60 hosts, employee wifi - 28 hosts).*
- *Hotel web and payment systems for booking room and services (20 hosts)*

The company also plans to increase its guest capacity further in two years' time.

Use as network address: XY.X.Y.0/24
XY – last two digits of your UoP ID: X=___ , Y= ___(replace the *0* digits with *1*).
e.g. :   Student ID = 1234567 -> X=6, Y=7, XY=67, IP address: 67.6.7.0/24
Student ID = 1122333 -> X=3, Y=3, XY=33, IP address: 33.3.3.0/24
Student ID = 5678902 -> X=1, Y=2, XY=12, IP address: 12.1.2.0/24

The new branch activities include the hotel management system for its front-desk employees to view and manage guests' booking, the management system for manager to view/ manage the employees' information, web browsing for its employees, web browsing for the guests and web application for the guests to book room services.

As an independent consultant, your task is to compete for the tender by proposing a solution for their networking and cyber security infrastructure. Drawing upon the topics in the module, devise an appropriate approach that would fulfil their requirements. Within the proposal, please ensure you reflect and justify the design decisions – for example, suggesting 10Gbit Ethernet and every single possible security control would be a prohibitively expensive option and ultimately overkill for what the company wishes to achieve and you would be unlikely win the tender. Within the proposal, it is essential you provide a rationale for your design and support this with accompanying evidence.

This is an individual report. You are free to structure your report as you feel appropriate, but the following key aspects need to be addressed as part of the submission (please also refer to the assessment criteria with which your report will be assessed against); also provide commentary detailing what the different options are when you present and analyse various key terminologies (e.g. file systems and computer systems):

- Introduction (i.e., what you are covering and why, how the report is structured)
- System Architecture (i.e., an overview of the core infrastructure, a high-level view of the solution and the requirements/aims of what your solution is looking to achieve)
- Network Architecture (i.e., detailed description of the networking infrastructure) including addressing table using the template here and packet tracer simulation
- Cyber Security Architecture (i.e., detailed description of the security infrastructure)
- Conclusion (i.e., what are the critical points you wish to highlight to sell your proposal)

The description of the network architecture must use the provided template here for company networks, listing the basic information for each network (network address, netmask, number of hosts, first host, last host) and a separate packet tracer file with the implemented network.

Assessment Criteria:

- Introduction (10%)
- System Architecture (20%)
- Network Architecture – including addressing table and packet tracer simulation (30%)
- Cyber Security Architecture (30%)
- Conclusions and Supporting Evidence (references) (10%)

The overall length of the report (excluding appendices) must not exceed **3,000 words**. *Relevant* supporting information may be included as appendices if required. Your report will be assessed on the depth and breadth of your arguments, evidence of research, and overall quality of presentation. It will be expected to have appropriate introduction and conclusion sections, and to be supported by references. Please submit a zip file (.zip) containing the report (as a single PDF) and a separate packet tracer file with the implemented network on the DLE.

An illustration of the feedback template is presented in Table 2.

Threshold Criteria (these are indicative only):

To achieve a 3rd class/pass (40%+), you must demonstrate a basic understanding of networking and cyber security technologies and have made appropriate design decisions – including the nature and location of the technologies. The report will also evidence some logical and coherent reasoning behind the design.

To achieve a 2.2 (50%+), you must demonstrate a good understanding of networking and cyber security technologies and have made appropriate design decisions – including the nature and location of the technologies. The report will also evidence some logical and coherent reasoning behind the design, with appropriate evidence of referencing and accessible to non-technical audiences.

To achieve a 2.1 (60%+), you must demonstrate a solid understanding of networking and cyber security technologies and have made appropriate design decisions – including the nature and location of the technologies. A variety of technologies have been considered and approximately

deployed to provide a robust solution. The report will provide logical and coherent reasoning behind the design, with good evidence of referencing to support the rationale.

To achieve a 1st (70%+), you must demonstrate an excellent understanding of networking and cyber security technologies and have made appropriate design decisions – including the nature and location of the technologies. A wide variety of technologies have been considered and approximately deployed to provide a robust solution. The report will provide logical and coherent reasoning behind the design, with excellent evidence of referencing to support the rationale.

Criteria	Fail (<40%)	3rd/Pass (40%+)	2.2 (50%)	2.1 (60%+)	1st (70%+)	Grade
Introduction	The introduction fails to describe the subject domain, the context or structure of the report.	A sound introduction into the subject domain and purpose. Lacks in supporting evidence.	A logical introduction with evidence of planning and structure.	A concise and clear introduction with appropriate context and structure being provided. Good number of appropriate references.	An excellent, concise and clear introduction with appropriate context and structure being provided. Well referenced with supporting evidence throughout.	**/10**
System Architecture	Insufficient consideration of the requirements and/or inappropriate/over simplistic design	Demonstrating a basic level of integrated network and cyber security infrastructure.	A coherent and logical design, giving appropriate to the composition and placement of components.	A complete, coherent and logically sound design, considering a broad range of the requirements	A robust and holistic design that has carefully considered and selected appropriate technologies.	**/20**
Network Architecture	No IP configuration or no subnetworks or consideration for multiple networks, no simulation file	Basic IP configuration, minimal subnetworks, basic simulation file	Functional IP configuration with subnetworks and simulation file	Complete IP configuration design details and simulation file	Complete IP configuration, including explanations for the design, and simulation file	**/30**
Security Architecture	Overly simplistic design with a lack of rationale or understanding of countermeasures	The inclusion of appropriate controls/procedures with an accompanying rationale.	A board approach to the design with a broad set of measures considered with supporting evidence	The design is well aligned to requirements and has also demonstrated an wider set of appropriate considerations – including technical and non-technical aspects	An holistic design well aligned to organisation requirements, well reasoned and evidenced and including a range of considerations.	**/30**
Conclusions & References	The conclusions do not flow from the presented report. Few if any relevant references.	Some attempt at deriving appropriate conclusions has been made. They do logically flow from the analysis presented. Some evidence of appropriate references	Some relevant and interesting insights that logically flow from the report.	A solid attempt at concluding the report, logically applied. Failed to provide an insight into the implications. Good use of a number of relevant sources in an appropriate manner	The concluding remarks are a logical extension of the arguments presented. Clear and concise. Evidence of a good understanding of the implications of the analysis. An excellent set of appropriate peer-reviewed references	**/10**
Feedback/Overall	*Additional feedback*					**/100**

Table 3: Feedback Template for Assessment 2

General Guidance

Extenuating Circumstances

There may be a time during this module where you experience a serious situation which has a significant impact on your ability to complete the assessments. The definition of these can be found in the University Policy on Extenuating Circumstances here: https://www.plymouth.ac.uk/uploads/production/document/path/15/15317/Extenuating_Circumstances_Policy_and_Procedures.pdf

Plagiarism

All of your work must be of your own words. You must use references for your sources, however you acquire them. Where you wish to use quotations, these must be a very minor part of your overall work.

To copy another person's work is viewed as plagiarism and is not allowed. Any issues of plagiarism and any form of academic dishonesty are treated very seriously. All your work must be your own and other sources must be identified as being theirs, not yours. The copying of another persons' work could result in a penalty being invoked.

Further information on plagiarism policy can be found here:

Plagiarism: https://www.plymouth.ac.uk/student-life/your-studies/essential-information/regulations/plagiarism

Examination Offences: https://www.plymouth.ac.uk/student-life/your-studies/essential-information/exams/exam-rules-and-regulations/examination-offences

Turnitin (http://www.turnitinuk.com/) is an Internet-based 'originality checking tool' which allows documents to be compared with content on the Internet, in journals and in an archive of previously submitted works. It can help to detect unintentional or deliberate plagiarism.

It is a formative tool that makes it easy for students to review their citations and referencing as an aid to learning good academic practice. Turnitin produces an 'originality report' to help guide you. To learn more about Turnitin go to:
https://guides.turnitin.com/01_Manuals_and_Guides/Student/Student_User_Manual

Referencing

The University of Plymouth Library has produced an online support referencing guide which is available here: http://plymouth.libguides.com/referencing.

Another recommended referencing resource is Cite Them Right Online; this is an online resource which provides you with specific guidance about how to reference lots of different types of materials.

The Learn Higher Network has also provided a number of documents to support students with referencing:

References and Bibliographies Booklet:

http://www.learnhigher.ac.uk/writing-for-university/referencing/references-and-bibliographies-booklet/

Checking your assignments' references:

http://www.learnhigher.ac.uk/writing-for-university/academic-writing/checking-your-assigments-references/