COMP1002
Cyber Security & Networks

20 CREDIT MODULE

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

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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 architecture, protocol, and application.
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%)	**Monday 11 March 2024, 3pm**	10 April 2024
Report (70%)	**Wednesday 24 April 2024, 3pm**	23 May 2024

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: NHS is seeking to improve their patient data management system and internal networking infrastructure and faces the below critical questions.

1. Cybersecurity – Recently, The Times Health Commission has published ten recommendations to address the areas the NHS is struggling with. One of them is to create digital health accounts for patients, called **patient passports**, accessed through the NHS app to book appointments, order prescriptions, view records, test results or referral letters and contact clinicians[1]. It would track a patient's records for life, allowing any GP, NHS hospital, pharmacy or social care agency to access information[2]. Analyse and elicit the security requirements of a patient passport system by applying CIA and AAA models. Please provide a clear rationale for your analysis and provide details to support your statements.

2. Networking – When healthcare providers access patient records from the central database, they often experience delays. These delays are especially pronounced when accessing data-intensive files such as medical imaging (assuming the delay problem is network-related and not due to database server performance). Given the sensitive nature of patient data and the increasing reliance on telemedicine and digital health records, please 1) analyze which transport protocol should be used to build the communication between the healthcare provider and database and 2) how to use the tools we learned in this module to identify the potential bottleneck link which caused the network transmission delay.

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 is a useful approach of conveying complex information in an efficient manner.

Assessment Criteria:

The report MUST be structured as specified in the following table. Please be very careful and pay close attention to these instructions.

Content	Details	Marks
Section 1 – Question 1	Using CIA and AAA to identify the security requirements of the system with an explanation.	**50**

[1] https://www.thetimes.co.uk/article/the-times-health-commission-recommendations-nhs-dzhvfzbs6
[2] https://www.thetimes.co.uk/article/nhs-data-shared-freely-times-health-commission-bqhrfwh83

	Please provide a clear rationale for your analysis and provide details to support your statements.	
Section 2 - Question 2	Analyse which transport protocol should be used to build the communication between the healthcare provider and the database	**20**
	How to use the tools we learned in this module to identify the potential bottleneck link which caused the network transmission delay.	**30**

Format your report as follows: Use Arial as the font, with a minimum size of 11pts, all margins should be at least 2cm. **The maximum page limit is 3 pages (excluding the list of references, if any).** Please note that anything exceeding the maximum number of pages will not accessed by the markers. Please submit the lab reports 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
Section 1 – Question 1	Inappropriate security requirements have been identified Few if any relevant explanation.	Some security requirements have been identified with some explanation	Sufficient number of security requirements have been identified with some explanation	A good number of security requirements have been identified with good explanation	An excellent list of security requirements has been identified with excellent explanation	**/50**
Section 2 – Question 2	Inappropriate network answers have been provided for transport protocol selection and performance bottleneck analysis.	Some network answers have been provided to choose transport protocol and analyse network transmission bottleneck.	Sufficient network answers have been provided for transport protocol choice and performance analysis.	Good level of network answer has been provided to choose transport protocol and analyse the network transmission performance bottleneck.	An excellent level of network answer has been provided to choose transport protocol and analyse network performance issue. Good quality sources used throughout.	**/50**
Feedback/Overall	*Additional feedback*					**/100**

Table 2: Feedback Template for Assessment 1

Assessment 2: Report

Task:

Almost all companies/ organizations 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: DirectSales UK, a direct-to-consumer sales company, is planning to establish a new regional branch in Plymouth. The company is currently inviting proposals for the design of its networking and cybersecurity infrastructure for this new branch. The company has outlined some initial requirements but welcomes additional suggestions to ensure a robust and scalable network.

Initial Requirements:

- *Staff PCs, staff wifi, and guest network (Admin – 15 hosts, sales team – 35 hosts, guest network wifi – 55 hosts, employee wifi - 35 hosts).*
- *Company's web and e-commerce systems (20 hosts)*

The company also plans to increase its sales team 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 management system for its managers to view/ manage the employees' information, web browsing for its employees, web browsing for the guests and e-commerce site for the customers. 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 to 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)

- 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 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:

The submission includes the report and a separate packet tracer file with the implemented network. The report MUST be structured as specified in the following table. Please be very careful and pay close attention to these instructions.

Content	Details	Marks
Section 1 – Introduction	What you are covering and why, how the report is structured	**10**
Section 2 –System architecture	Describing the requirements/aims of your solution Describing the core infrastructure as a whole. The infrastructure should include both network components and security components. Citation: References should be cited as proofs to your statements, and the writing should be concise and easy to follow	**20**
Section 3 – Network architecture	Describing the network solutions in detail. The answer should provide enough details to understand the selected networking solution/ component, and what requirements each solution/component provides. Critical analysis: why have you chosen a particular solution and what are its pros and cons? Describing the addressing table using the provided template, listing the basic information for each network (network address, netmask, number of hosts, first host, last host). The separate packet tracer simulation file works as expected. Citation: References should be cited as proofs to your statements, and the writing should be concise and easy to follow.	**30**
Section 4 – Security architecture	Describing the security solutions in detail. The answer should provide enough details to understand the selected security mechanisms/components, and what security requirements each mechanism/component provides. Critical analysis: why have you chosen a particular solution and what are its pros and cons? Citation: References should be cited as proofs to your statements, and the writing should be concise and easy to follow	**30**
Section 5 – Conclusion	Conclude about what you have done in the report Discuss any relevant open issues/ challenges	**10**

Format your report as follows: Use Arial as the font, with a minimum size of 11pts, all margins should be at least 2cm. The overall length of the report must not exceed **6 pages** (excluding the list of references). Please note that anything exceeding the maximum number of pages will not accessed

by the markers. 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.
An illustration of the feedback template is presented in Table 3.

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
Section 1- 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.	A logical introduction with some context and structure being provided.	A concise and clear introduction with appropriate context and structure being provided.	An excellent, concise and clear introduction with appropriate context and structure being provided.	**/10**
Section 2- System Architecture	Insufficient consideration of the requirements and/or inappropriate/over simplistic design Few if any relevant references.	Demonstrating a basic level of integrated network and cyber security infrastructure. Few evidence of appropriate references.	A coherent and logical design, giving appropriate to the composition and placement of components. Some evidence of appropriate references.	A complete, coherent and logically sound design, considering a broad range of requirements Good use of a number of relevant sources in an appropriate manner.	A robust and holistic design that has carefully considered and selected appropriate technologies. An excellent set of appropriate peer-reviewed references.	**/20**
Section 3- Network Architecture	Insufficient consideration of network solutions No IP configuration or no subnetworks or consideration for multiple networks, no simulation file Few if any relevant references.	The inclusion of some appropriate solutions with an accompanying rationale. Basic IP configuration, minimal subnetworks, basic simulation file Few evidence of appropriate references.	A board approach to the design with a broad set of solutions with some rationale Functional IP configuration with subnetworks and simulation file Some evidence of appropriate references.	The design is well aligned to requirements and has also demonstrated a wider set of appropriate considerations Complete IP configuration design details and simulation file Good use of a number of relevant sources in an appropriate manner.	A holistic design well aligned to organisation requirements, well reasoned and evidenced and including a range of considerations with excellent rationale. Complete IP configuration, including explanations for the design, and simulation file An excellent set of appropriate peer-reviewed references.	**/30**
Section 4- Security Architecture	Overly simplistic design with a lack of rationale or understanding of countermeasures Few if any relevant references.	The inclusion of appropriate controls/procedures with an accompanying rationale. Few evidence of appropriate references.	A board approach to the design with a broad set of measures considered with supporting evidence Some evidence of appropriate references.	The design is well aligned to requirements and has also demonstrated a wider set of appropriate considerations – including technical and non-technical aspects Good use of a number of relevant sources in an appropriate manner.	A holistic design well aligned to organisation requirements, well reasoned and evidenced and including a range of considerations. An excellent set of appropriate peer-reviewed references.	**/30**
Section 5- Conclusions	The conclusions do not flow from the presented report.	Some attempts at deriving appropriate conclusions have been made. They	Some relevant and interesting insights that	A solid attempt at concluding the report, logically	The concluding remarks are a logical extension of the	**/10**

		do logically flow from the analysis presented.	logically flow from the report.	applied. Failed to provide an insight into the implications.	arguments presented. Clear and concise. Evidence of a good understanding of the implications of the analysis.	
Feedback/Overall	*Additional feedback*					**/100**

Table 3: Feedback Template for Assessment 2

General Guidance

Responsible use of Artificial Intelligence (AI) in assessments

Please refer to https://dle.plymouth.ac.uk/pluginfile.php/3235505/mod_resource/content/1/FoSE%20AI%20statement%20V3.pdf for guidelines about what you can use AI and what you cannot use AI for when writing or submitting assessment.

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/