PUSL3132
Ethical Hacking

20 CREDIT MODULE

ASSESSMENT: 50% Coursework

MODULE LEADER: Professor Nathan Clarke

MODULE AIMS

- To introduce and understand the role and responsibilities of a penetration tester, including relevant legal and operational consequences.
- To introduce strategies that can be utilised in enabling a structured and methodical analysis of organisational systems and vulnerabilities.
- To introduce the tools and techniques that are applied within the field and be able to explain the findings in a meaningful fashion.

ASSESSED LEARNING OUTCOMES (ALO):

1. Demonstrate a systematic understanding and critique the roles and responsibilities of a Penetration Tester with consideration for legal and ethical issues.
2. Apply appropriate tools and techniques that can be used to both attack and defend systems in given scenarios.
3. Interpret and analyse results from a range of tools and document findings in an appropriate manner.

Assessment 1

Task:
With the ever-increasing complexity of technology, it is imperative that organizations are able to robustly test and evaluate the security of their computer systems and networks. Penetration testing forms a critical component of that evaluation.

Scenario Overview:

CoconutCream is a Sri Lankan beauty manufacturer. The Managing Director has decided to ensure the organisation is fully digital in all its operations. The MD is however concerned about the risks posed by this move and has hired the services of a penetration testing consultant (you!).

Your task is to perform a thorough examination of the company and provide a detailed report on the security and vulnerabilities of their systems. It is expected you will identify and explain the methodology taken, provide a rationale to explain what tests/tools are being used in addition to evaluating the vulnerabilities that exist within the system. It is important you reflect on the legal and ethical implications of this approach. Given the size of the organization, they do not have a testbed available – so testing will be performed on operational systems – so please consider and mitigate the impact of the evaluation. Based upon the examination, the report should also contain the necessary information for the company to mitigate the identified risks. ***It is critical that you undertake a practical-based pen-test of the systems and document this in your report.***

In order to facilitate the examination, a virtual environment has been created with a number of critical systems you would expect. This has been created on an isolated subnet and additional information will be provided by the academic on how to access this.

This is a group report consisting of between **4 members**. Additional instructions will be provided on how to select your groups via the DLE. 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)
- Background (i.e. literature detailing why penetration testing is required, what are the roles and responsibilities of a pen-tester and the ethical and legal considerations)
- Testing Methodology (i.e., testing strategy and rationale for the approach and tools selected)
- Evaluation (i.e., results of the penetration test with accompanying narrative for a novice to understand)
- Mitigation (i.e. what controls and configurations are required to improve the level of security and reduce the likelihood of compromise)
- Your conclusion (i.e., what are the critical findings and mitigations)

Submission Requirements:

- The overall length of the report (excluding appendices) should not exceed **5000 words**.
- Report submitted at as single PDF document to DLE
- Appendix with completed Generative AI Declaration

Acceptable level of generative AI tool use in this assessment element

The acceptable level of GenAI use for this element is detailed with the allowed uses listed below. This is split into three categories (**Solo Work** – work must be your own with no AI support, **Assisted Work** – some uses of AI tools allowed, **Partnered Work** – AI tools integral part of the work). If you have any questions, please contact the module leader.

Solo Work	You must not use generative AI tools to prepare your submission.	☐
Assisted Work	You are permitted to use generative AI tools to assist you to prepare your submission.	☒
Partnered Work	Generative AI tool use is required as an integral part of the assessment, but transparency is required.	☐

Table 1: Acceptable Level of generative AI use

In line with the indicated acceptable level of AI use above, the following uses are acceptable:

- **A2 - Planning & Structuring Projects**
- **A4 - Language Refinement**
- **A8 - Review and Improvement of Technical Work**

Any use of AI in your work must be declared within your documentation. You **must also include a signed Generative AI Declaration as an appendix to your submission**. The declaration form can be found on DLE. This form will not be included in any word count associated with this assignment.

Assessment Criteria:

The following marking scheme will be used for this part of the assessment:

- Introduction (5%)
- Background (10%)
- Testing Methodology (15%)
- Evaluation (35%)
- Mitigation Recommendations (25%)
- Conclusions and Supporting Evidence (references) (10%)

It is important that all members of the group contribute towards all sections of the report. It is NOT appropriate for one member to complete the background section and another group member to complete the evaluation.

An illustration of the feedback template is presented in the table below.

Threshold Criteria (these are indicative only):

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.	**/5**
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.	A robust level of background material has been identified and discussed. Utilising good quality sources.	An excellent level of background material has been identified and discussed. Good quality sources used throughout.	**/10**
Testing Methodology	No meaningful reference to a logical testing approach.	Evidence of a sound yet simple approach to the pen test.	Good evidence of understanding and applying testing methodologies	Excellent evidence of understanding and applying testing methodologies.	A comprehensive methodology, reflective of current practice and mindful of additional operational factors.	**/15**
Evaluation	Little meaningful practical testing and poor discussion of the results.	Clear yet basic demonstration of undertaking a pen test across the principle phases.	A good demonstration of pen testing with accompanying presentation and analysis of the results	Excellent use of pen testing throughout and a detailed presentation and analysis of the results	A comprehensive and complete pen test using appropriate tools and a well structured presentation of the results with accompanying analysis and discussion.	**/35**
Mitigation Recommendations	No meaningful and logical mitigations provided.	Evidence of appropriate mitigations but with limitations on the coverage and analysis.	Good evidence of appropriate mitigations with accompanying analysis.	A very good set of appropriate mitigations with accompanying rationale and analysis.	A complete set of mitigations, well aligned to results from the pen test with accompanying analysis and discussion.	**/25**
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**

AI Declaration

Complete the table below and attach it as an appendix to your submission. This table is not included in any submission word count. Use it to **declare** your level of generative AI usage for your submission by selecting one out of **Solo**, **Assisted** or **Partnered Work**. If you select **Assisted Work**, indicate how AI was used.

Solo Work	**S1 – Generative AI tools have not been used for the preparation of your submission.**	☐
Assisted Work	**Generative AI tools have been used to assist you to prepare your submission.** Please indicate below the general tasks for which you have used AI. Select all that apply.	☐
	A1 – Idea Generation and Problem Exploration Used to generate ideas, and to explore approaches to solving a problem, developing a design, or investigating a question. You must critically assess AI-generated suggestions and ensure your own intellectual contributions are central.	☐
	A2 – Planning and Structuring Reports or Projects Used to help outline the structure of reports, documentation and projects. The final structure and implementation must be your own work.	☐
	A3 – Research Assistance Used to locate and summarise relevant articles, technical documentation or online resources. The interpretation and integration of research into your submission remain your responsibility.	☐
	A4 – Language Refinement Used to check grammar, refine language or improve sentence structure in reports. AI should be used only to suggest improvements, and you should check the original meaning is preserved. You must ensure that code documentation accurately reflects the code and is correct.	☐
	A5 – Mathematical Calculations Used to suggest appropriate mathematical methods or to check solutions. AI should not be used to produce the mathematical workings and descriptions that you submit.	☐
	A6 – Solution Architecture and Design Used to help outline the architecture or structure of a technical solution, such as system components, class hierarchies, mathematical models, engineering designs or processes. The final design and structure must be your own.	☐
	A7 – Coding and Computational Assistance Used to generate example code, understand syntax, explore alternative implementation, use computational tools, or learn new coding or computational concepts. Any submitted code must be your own, and you must be able to explain it.	☐
	A8 – Review and Improvement of Technical Work Used to review code, calculations, models, designs, simulations, or other technical work; improve readability, structure or presentation; or help correct errors. AI should be used only to provide suggestions for improvement. You must ensure the output accurately reflects your knowledge.	☐
	A9 – Testing, Verification and Validation Support Used to create test cases, validate outputs or suggest edge cases for software testing, or guide verification and validation. You are responsible for test planning and interpreting results.	☐
	A10 – Data Analysis and Visualisation Used to suggest ways to analyse, present or visualise datasets. The analysis and interpretations that you present must be your own.	☐
	A11 – Other AI roles not listed above Please specify:	☐
Partnered Work	**P1 – Generative AI tool use forms an integral part of the assessment and is compliant with the assessment brief.**	☐

By completing this table, you are making a declaration about how you have used AI to prepare your assessment. Please note that the above uses can and will change as AI tools and technologies change. We reserve the right to update the form at the end of each academic year.

General Guidance

Extenuating Circumstances

There may be a time during the module where you experience a serious situation having 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/student-life/your-studies/essential-information/exams/exam-rules-and-regulations/extenuating-circumstances

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

Turnitin is an 'originality checking tool' allowing 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://help.turnitin.com/new-links.htm?Highlight=guide

The university also has Draft Coach available on the online version of Microsoft Word. Draft Coach is a Turnitin plugin and provides instant feedback on how to address citation issues, grammar mistakes and matches with Turnitin's database.

Referencing

The University 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.