**Task**

You are tasked with designing, implementing, and documenting a solution (in packet tracer) and responding to major unit goals.

NOTE: the intention of this assessment isn't for all students to submit a complete network solution for all requirements. It is, in effect, allowing for extension and differentiation.

**Each submission must include the following at a minimum**

* A packet tracer file
* Evidence that your network design completes the testable requirements.
* Evidence of meeting the overall unit goals.

# Tools of Learning

### Network Design

In response to the interest in Cyber Security, Canberra College plans to build two dedicated cybersecurity classrooms.

Diagram

Description automatically generated

Partial classroom diagram

Additionally, you must factor in the SSICT Server Cabinet/Racks

Graphical user interface, application

Description automatically generated

The use case scenario is to create a network solution where students (and teachers)

Your ideal network solution should have:

* Two sets of Lab Computers that should have access to
  + External Internet by SSICT via Wireless or Ethernet
  + The internal Cyber Range
* BOYD (student laptops) should have access to
  + External Internet by SSICT via wireless
  + Internal Cyber Range via wireless
* Teacher devices should have
  + External Internet by SSICT via wireless
  + Internal Cyber Range via wireless
* Restrictions
  + The Cyber range should have no access to external networks
  + Lab, Teacher, and BOYD should be on a different network and should be isolated from each other.
  + Considerations for reliability, growth, etc.
* The Cyber-range is an intranet and has the following properties
  + We can use any IT address on the 10.1.0.0/16 subnet. However, you should allow for as much expansion as possible.
  + Should provide DNS for internal domains for the cyber range
  + Should provide DHCP for all devices connecting to the intranet
* Test requirements:
  + Demonstrate connectivity between:
    - A LAB PC
      * Can access the external gateway
      * Can access bushranger.playground.cbrc
    - A BOYD Laptop
      * Can access the external gateway
      * Can access bushranger.playground.cbrc
    - A Teacher Laptop
      * Can access the external gateway
      * Can access bushranger.playground.cbrc

NOTE: PCs on packet tracer can only have one network device. You'll need to use a server if you want multiple network devices (Network Interface Cards) on the same computer.

You will be assessed on:

* Evidence of technical understanding
* Depth of solution provided
* Effectiveness/efficiency of network design

Your packet tracer solution must include labels/notes describing each subnet, including:

* Subnet range
* Gateway
* DNS
* DHCP
* DHCP range and size

### Technical evidence

One of the requirements of a Network Engineer is to produce documentation that describes what it is they did, how they did it, and how it can be replicated. In addition, you are required to analyse what you did and provide, where applicable, an evaluation of why your approach was better than others.

You are not required to create evidence for all elements in your solution. Instead, you must create evidence that responds to the following unit goals.

* Justify your design process and how it relates to the network solution's design and configuration regarding handling the intranet's significant features (lab1, lab2, BOYD, and Teacher Laptops) and access to cyber range (DNS, DHCP, bushranger.playground.cbrc).
* Evaluate different strategies or approaches in creating the most effective and secure network between our intranet, SSICT intranet, and the Internet.

## Rubric

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Knowledge, Comprehension & Application** |  |  |  |  |  |
| **CRITERIA** | **EXPECTATIONS** | **POSS** | **STUDENT** | **GIVEN** | **MULTI** | **TOTAL** |
| **Network Design**  (individual) | You have submitted your packet tracer solution for the Network Design assignment.  A serious attempt requires that you have a network that appears to work and is fully documented in packet tracer, including:   * Subnet * Gateway address * DNS address (if applicable) * DHCP address (if applicable) * DNS address (if applicable) * DNS range (if applicable) | 2 | \_\_/2 | \_\_/2 | A 2x  T 1x | \_\_/ 4  \_\_/ 2 |
| **Evidence for Network Tests**  (individual) | You have submitted evidence of completing the use case of the Network.  The evidence supplied shows that you have submitted work in good faith to the spirit of the assignment and makes clear that any solutions produced are likely to be correct.   * Lab PCs can ping   + The external gateway   + Bushranger.playground.cbrc * BOYDs can ping   + The external gateway   + Bushranger.playground.cbrc * Teacher Laptops can ping   + The external gateway   + Bushranger.playground.cbrc | 2  2  2  2  2  2 | \_\_/2  \_\_/2  \_\_/2  \_\_/2  \_\_/2  \_\_/2 | \_\_/2  \_\_/2  \_\_/2  \_\_/2  \_\_/2  \_\_/2 | - | \_\_/2  \_\_/2  \_\_/2  \_\_/2  \_\_/2  \_\_/2 |
| **Technical Evidence**  (individual) | You have submitted evidence of completing your technical evidence. Your evidence appears to be done in good faith and seems to be substantive.  Evidence for knowledge, comprehension, and application may include:   * Justification of design process * Evaluate different strategies in effectiveness and security.   Note: the assessor may use their discretion to source other evidence from this assessment to judge the activity if required. | 2  2 | \_\_/2  \_\_/2 | \_\_/2  \_\_/2 | - | \_\_/2  \_\_/2 |
|  | **Analysis, Synthesis & Evaluation** |  | | **SUBTOTAL** | | **A\_\_/20**  **T\_\_/ 18** |
| **Network Solution: Evidence of Core Technical Understanding** | The evidence of your Network Solution shows evidence of your technical understanding.  Technical Understanding highlights your understanding of core networking principals such configuring computers, switches, routers, and etc.  Note: the assessor may use their discretion to source other evidence from this assessment to judge the activity if required. | 4 | \_\_/4 | \_\_/4 | - | \_\_ / 4 |
| **Network Solution: Effectiveness / Efficiency of Network Design** | The evidence of your Network solution shows evidence of deliverable design choices related to effectiveness and effeciency.  Effectiveness and effeciency is your un  Note: the assessor may use their discretion to source other evidence from this assessment to judge the activity if required. | 4 | \_\_/4 | \_\_/4 | - | \_\_ / 4 |
| **Network Solution: Depth of Solution Provided** |  | 4 | \_\_/4 | \_\_/4 | - | \_\_ / 4 |
| **Justification of Design Process** |  | 4 | \_\_/4 | \_\_/4 | A 1x  T 2x | A \_\_ / 4  T \_\_ / 8 |
| **Evaluation of Strategies** |  | 4 | \_\_/4 | \_\_/4 | A 1x  T 2x | A \_\_ / 4  T \_\_ / 8 |
|  | **Submission Guidelines** |  | | **SUB TOTAL** | | **A \_\_/20**  **T \_\_/28** |
| **Submitability** | **Assessment submission is ordered** and has a definite pattern to its construction. **The reader is not confused about the content in any given section and can follow the submission flow** easily. | 4 | \_\_/4 | \_\_/4 | - | \_\_ / 4 |
| **Formatting** | **Students have** **followed the formatting instructions,** including any provided templates and guides **or have created their own** legible formatting guide **and applied it constantly**. | 2 | \_\_/2 | \_\_/2 | - | \_\_ / 2 |
|  |  |  | | **SUB TOTAL** | | **\_\_ /6** |
|  | DAYS LATE \_\_\_/7 = \_\_\_% |  |  | **FINAL** | | **A \_\_/32 T \_\_/44** |

## Rubric sections

##### Section 1: Knowledge Comprehension and Application

This section of the rubric consists of the required elements of the assignment. Students should take special care to include ALL these elements as they are often extended in the following sections

##### Section 2: Analysis, Synthesis, and Evaluation.

This section will evaluate your ability to include critical thinking and justification elements into your work. Often the requirements for extension are not explicitly given, so it will be up to you to decide how best to demonstrate what you have learned beyond the required unit goals and curriculum. Items such as 3D models, pictures, drawings, diagrammatic responses, notes, evidence of problem-solving, advanced programming concepts, elegant responses, media, etc., are all available options.

##### Section 3: Submission Guidelines

Students are expected to provide a submission that fulfils the requirements listed in style guides while also submitting at an appropriate quality. Be aware that points in this section could be 2- or 4-point items. Treat them accordingly.

## Submission

All submission items should be stored in an appropriate format. For example, code must be stored in a programmatical format so it can be evaluated (**images of code or code copied and pasted into a document may not be marked**)

Evidence of working material must be recorded where appropriate. For example, to show how your robot meets a requirement, you must submit a recording of it completing that requirement. Similarly, if you need to show how your program can download a file from the internet and crack a password, you must submit a recording of it doing that.

Ask the teacher if you are unsure if an element needs to be recorded**.**

All materials must be submitted to Google Classroom.

Students are responsible for keeping backups/master copies.

## **Scoring Notes**

Formatting for all typed/written assessments should be as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Google Doc** | 11-12 Pt | 1.15-1.5 Line Spacing | 1 Space between paragraphs | Spelling and Grammar “Soft Limit” | In-Text Citations with footnotes | Title Page/Slide:   * Name * Date * Class * Aim * Assessment title |
| **Slides** | 10-12 pt. font text  14-24 pt. font titles | 1.0 1.15 Line Spacing | Bullet Points Preferred | Word Count per slide >100-110 “Soft Limit.” | Approved Templates and Themes |
| **Python** | We apply the following style guide to Python files. However, in general, most programs follow this overall layout.    [PEP 8: The Style Guide for Python Code](https://pep8.org/) | | | | | |
| **Arduino**  **C/C++** | We apply the following style guide to C/C++ files. However, in general most programs follow this broad layout.    I accept both K&R and K&R alternative bracing format. As long as it is consistent in your file.  [Arduino Style Guide for Creating Libraries | Arduino Documentation | Arduino Documentation](https://docs.arduino.cc/learn/contributions/arduino-library-style-guide) | | | | | |
| **Markdown** | We apply the following style guide to markdown documents. However, in general, most documents follow some variation of the following layout:    <https://github.com/google/styleguide/blob/gh-pages/docguide/style.md> | | | | | |

“Soft Limits” are not rigidly defined limits and will be assessed on a case-by-case basis. Ask for clarification on specific tasks

## Possible Scoring Groups are out of 2 or 4 Points.

##### 2-Point Criteria - Knowledge and Understanding

Criteria assessed as 2-Points are classified as Knowledge and Understanding criteria. These will examine and evaluate a student’s ability to effectively state facts and define terms and concepts. Analysis and synthesis of the information will not be assessed through these criteria.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **0 Points** | **1 Point** | **2 Points** |
| **2 Point Criteria** | **Not present** or **not able to be assessed** as the required criteria | Item is presented but **does not meet expectations** for quality, rigour, or detail. | Item is presented and **does meet expectations** for quality, rigour, or detail |

##### 4-Point Criteria - Analysis and Synthesis and Expert Review

To show true mastery of your developing skills, students must show that they can go beyond simple repetition of the given tasks or an explanation of processes. Students will demonstrate their ability to show higher-order thinking through analysis, evaluation, or linking multiple fields of learning to solve problems in novel ways.

## Analysis and Synthesis

Analysis and Synthesis components evaluate a student’s ability to effectively review data and understandings and develop these into a coherent and relevant statement. Analysis refers to the generating of thoughts from interpreting the data. In contrast, synthesis combines experience from one area with other pertinent knowledge to develop an original and compelling solution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0 Points** | **1 Point** | **2 Points** | **3 Points** | **4 Points** |
| **4 Point Criteria** | **Not present** or **not able to be assessed** as the required criteria | Evidence is presented and explained. However, it **does not show appropriate evidence of higher-order thinking** such as analysis, evaluation, or synthesis. | Evidence is presented and **shows appropriate evidence of higher-order thinking** such as analysis, evaluation, or synthesis. | Evidence is presented and **exceeds expectations for evidence of higher-order thinking** such as analysis, evaluation, or synthesis.  **-or-**  Item is presented and shows appropriate evidence of higher-order thinking such as analysis, evaluation, or synthesis and **exceeds expectations for quality or rigour** of understanding of the selected mastery. | Evidence is presented and **exceeds expectations for evidence of higher-order thinking** such as analysis, evaluation, or synthesis. **Additionally, this item exceeds expectations for quality or rigour** of understanding of the selected mastery. |

##### Expert Review

Expert Reviews evaluate a student’s ability to build solutions using the skills taught during the semester. Criteria assessed as 4-Points are classified as Analysis and Synthesis criteria. These will examine and evaluate a student’s ability to effectively review data and understandings and develop these into a coherent and relevant statement. Analysis refers to the generating of thoughts from interpreting the data. In contrast, synthesis combines experience from one area with other pertinent knowledge to develop an original and compelling solution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0 Points** | **1 Point** | **2 Points** | **3 Points** | **4 Points** |
| **4 Point Criteria** | **Not present** or **not able to be assessed** as the required criteria | Evidence is presented and broadly solves the problem. However**, the evidence does not show appropriate mastery** upon review. | Evidence is presented and broadly solves the problem. On review, it **does show appropriate evidence** of mastery. | Evidence is presented and solves the specific problem. On review, the evidence **shows understanding beyond expected mastery**.  **-or-**  Item is presented and broadly solves the problem. On review, it does show appropriate evidence of mastery and is **done so in a well-constructed or design method** that clearly shows higher levels of understanding**.** | Evidence is presented and solves the specific problem. On review, **the evidence shows understanding well beyond expected mastery** and is **done so in a well-constructed or designed method** that clearly indicates higher levels of understanding. |

##### Multiplier

Criteria will be combined with a **Multiplier**. While each criterion will be scored on the 0-1-2-4 scale, the multiplier will attach relevant worth to each criterion. Be aware of these multipliers and dedicate appropriate time to ensure you achieve your best result.

## Achievement Standards:

## Evidence of higher-order learning:

What is it that I mean by “higher-order thinking”?

It means I want you to go beyond replicating what we do in class. I want you to dig into your brain and understand why you did something, what about it was great, and what could be improved.

Why is this important? Reflective thinkers can go beyond what they are taught and can customise their learning to ben

