

Innovation & Project Management Project Proposal

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Task 1: Ideation & Innovation

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Q.1: Innovation

This section describes how innovation influences society and influence how we advance, interact and improve modern technology . Innovation is defined as a new idea or method/ creating or using new ideas or methods[1]. Section 1 describes the effects of innovations and what changes have been brought about because of it. It highlights that humans are constantly innovating and that innovation can be found anywhere, not limited to big inventions such as the creation of the lightbulb[9]. These constant advancements have allowed humanity to evolve and improve both quality of life and efficiency regarding farming, factories, agriculture and communication[8]. The invention of the internet allowed for communication regardless of location and information gathering was made incredibly easy . Humans are able to detect and recognize patterns, correlating incidents that machines struggle to analyse. This has allowed society to consistently improve over machines and Artificial Intelligence. The section also theorizes that the current situation the world is in came about not because of technical abilities, but creativity and the ability to think outside the box and pursue new challenges. It also states that innovation used to be for skilled individuals, but in current society everyone can develop the abilities for innovation.

The second section describes the concepts and abilities used to describe the advancements of technology and innovation. The Fourth Industrial Revolution by Klaus Schwab describes the four distinct innovations of the industrial revolution throughout history[7]. It prominently describes the current revolution in the 21st century, with the invention of artificial intelligence and the internet which made communication and information a central location. The book explains how these inventions have changed the economy, industries and even how human beings operate in society, with an increasing reliance on artificial intelligence. Society operates in a real and virtual world and boundaries are blurring between the internet and physical world. Humanity will and has been massively transformed by these innovations and may even change humans themselves. The Kondratiev waves theory is a long-term economic cycle in the world economy that's associated with the technology life cycle[2]. This theory describes economic cycles driven by technological breakthroughs and how it influences economic growth and development over time. Each wave is associated with a technological breakthrough, such as the industrial revolution, electricity, or nuclear energy. This demonstrates how innovation boosts economic progress.

The third section explores creativity and how it has evolved through humans. Creativity is defined as the ability to use the imagination to create original ideas and innovate[3]. There is a common belief that creativity is something you are born with and exists within artists, that it is not something that can be cultivated and trained in people. Creativity is usually attributed to activities such as painting or producing music. But creativity is present in other occupations such as lawyers and engineers. Creativity is a skill that allows you to effectively take risks and learn from mistakes. This section describes how creativity gives companies a competitive edge by providing innovating solutions. People have been taught in schools to pursue logical explanations instead of exploring creativity possibilities and solutions which dampen potential. Being able to ignore normalisations and rules when innovating can produce unique ideas that create companies such as Apple and Microsoft. Having passion for these ideas are essential for creativity.

Q.2: Ideation

- Code Analysis Tool
- Network scanner

Developing a Network Scanner to detect open ports for Home Networks.

The aim of this project is to deploy a safe network scanner that detects open ports on home networks, assesses the risk level and provides guidance to the user based on the security risk it contains.

Objectives:

Analysis: The network scanner will look through the network to detect common open ports that contain vulnerabilities, and assess each ports purpose and risk level. The user will gain security advice based on the danger it possesses.

Design: The network scanner will be created with Python, It will take in input, scan, analyse then output the results.

User Experience: Providing clear explanations for the searching process and risk level for ports. A GUI can be made with "Tkinter" for easy software usage and improved user experience.

Testing: The network scanner will be thoroughly tested using sample networks to verify its reliability and functions.

This project will be to create a network scanner using Python to increase private network security and expose vulnerabilities . The user will be prompted to enter a range of IP addresses and a set of common ports will be checked for vulnerabilities. For any port found to be open, a risk level will be assessed along with an explanation of what it does and how to mitigate risk. I will create this project using the software engineering skills I've learned throughout this course and apply it by calculating risk scores and saving scan results.

Ports are defined as a point where network connections start and end [4]. Each individual port is directly tied to a service and numbered. This allows computers to know which port and service are connected. Every device on a network uses numbered ports to communicate with services, such as web servers. Some ports are reserved for certain protocols, such as all HTTP requests falling into port 80. If a port is open, that means it is looking for communication. While having ports open is standard for communication, it can lead to security vulnerabilities and exploitation if the network is compromised or untrustworthy. Attackers often scan networks for places to enter to gain unauthorized access. My tool aims to educate users on security awareness and prevent from malicious attackers.

Q.3: Research

https://www.linkedin.com/learning/python-essential-training-18764650?upsellOrderOrigin=default_quest_learning&trk=default_quest_learning

This is a beginner-level python course which introduces you to the language and teaches the fundamentals, such as data types and syntax. This will give me the essential skills needed to build the network scanner.

<https://www.udemy.com/course/python-programming-for-cybersecurity-from-zero-to-defender/>

This course will give the skills needed in a security context to develop the network scanner, the scripting will support my objectives.

<https://www.getyoureducation.net/course/ethical-hacking-scanning-networks>

This course will teach me the process of network scanning and how to detect vulnerabilities in the network. It covers the basics of ethical hacking and the importance of port scanning.

Task 2: Project Management

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Q.1

The proposed solution is the development of a python-based network port scanner. The aim is for the network scanner to scan home networks and detect any open ports. These ports will be identified and presented to the end user in an easy to understand format.

An IP address can be entered by a user and will be scanned with a predetermined list of common ports, such as port 80 and 21. These ports are commonly targeted by hackers, identifying whether they are open or not will help the user protect their network. The scanner will then attempt TCP connections to see if the ports are open or closed. Results will deliver the list of ports that are open along with an explanation of the dangers of keeping the port open. This will help the user understand security risks. A CLI will be used during development for testing and debugging. A GUI will also be developed for users who aren't familiar with devices, this increases overall usability. The results will then be logged to record scan activity, and further reviewed for troubleshooting. These logs will be explored to a CSV file to store the scan results. The overall aim of this project is to educate users on the dangers of keeping ports open and security awareness

This application will use:

- CLI (Command Line Interface)
- GUI (Graphical User Interface)
- Logging results
- Outputting results into a file

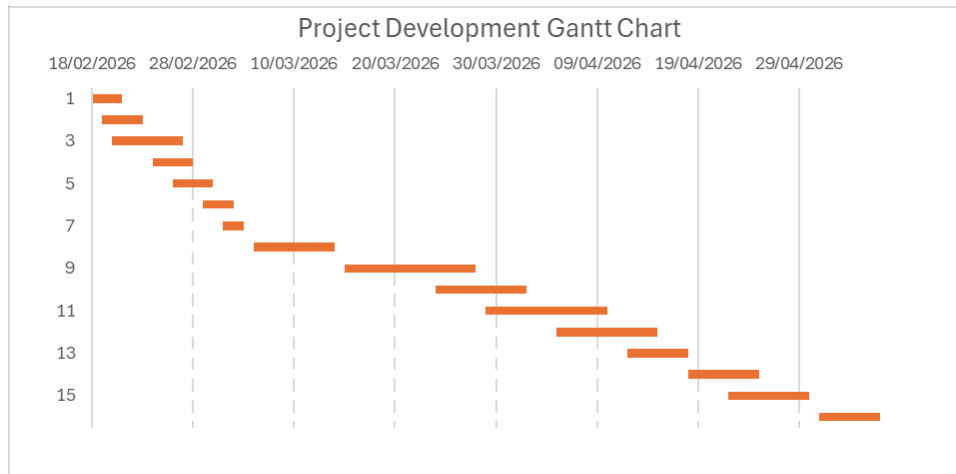
Required Resources:

- Python – Programming language used to build the port scanner and logic.
- Socket – python library used for port scanning.
- Tkinter - used for building the GUI.
- Visual Studio Code – writing the code for the port scanner.
- Git – creating iterations/versions of the project.
- Csv – exporting results to a file.

Q.2

Task	Start Date & End Date
Ideation	18/02/2026 – 21/02/2026
Aim and Objectives	19/02/2026 – 23/02/2026
Researching and Identification	20/02/2026 – 27/02/2026
Defining Project Scope and Resources	24/02/2026 – 28/02/2026
Project Planning and Gantt Chart	26/02/2026 – 02/03/2026
Risk Analysis	01/03/2026 – 04/03/2026
Methodology Selection (Agile)	03/03/2026 – 05/03/2026
System Design (Flowcharts)	06/03/2026 – 14/03/2026
Prototype Development (Port Scanner)	15/03/2026 – 28/03/2026
Performance Optimization	24/03/2026 – 02/04/2026
GUI Development	29/03/2026 – 10/04/2026
Testing Port Scanner and Debugging	05/04/2026 – 15/04/2026

User Testing and Feedback	12/04/2026 – 18/04/2026
Final Review & Improvements	18/04/2026 – 25/04/2026
Deployment Documentation	22/04/2026 – 30/04/2026
Final Report/Reflection	01/05/2026 – 07/05/2026



Early phases will focus on research and planning. The project scope will be defined along with the type of methodology that will be used. Potential risks will be taken into consideration, This is make development smooth and prevent unknown variables affecting the project. The later phases focus on the development of the port scanner and testing. User feedback will also be taken and used to create the final version of the project.

Q.3 Risk Analysis

Risk No.	Risk	Impact	Contingencies (Risk Mitigation Strategy)
1	Hardware failure & data loss	High	All projects will be backed up on an external hard drive, git hub and one drive. I will also utilize version control with git to enable rollbacks in case any problems occur with the newest release.
2	Limited Python / Networking knowledge	High	I will do online learning through the use of several courses I selected at the beginning of this project. The courses specialize in teaching regarding networking and creating network scanners using python.
3	Time management constraints	Medium	A detailed Gantt chart has been created and will be reviewed weekly. Agile sprint-style milestones will be used to track progress. Non-essential features (e.g. advanced GUI styling) will be deprioritized if delays occur.
4	Scope creep (adding unnecessary features)	Medium	My scope will define the minimum amount of requirements (MVP) possible to avoid adding on a lot of work that I can't do which will cause the objectives to overrun and cause time management to deteriorate.
5	Ethical/Legal Concerns	High	The port scanner I create will not be used for exploitative purposes. It will be used in a simulated environment with no own tools. The port scanner will be strictly used for security awareness and not exploitation.

Task 3: Project Development & Design Work

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Q.1

The most suitable development method I've chosen is Agile Scrum. I will work through the Port Scanner project in several key stages that continuously develops and adds features. Scrum will let me deploy a working version of the port scanner in a short amount of time and I can improve upon it with each iteration. Scrum divides project development into shorter portions/iterations called sprints which last 1-2 weeks. Each sprint improves upon a working version of the system, such as the first sprint creating port scanning features and the second sprint adds a GUI for user satisfaction. This development method assists time management which helps for deadlines and preventing scope creep. The overall plan is to develop the MVP (minimum viable product) as soon as possible and improve upon it each sprint by adding useful features. Scrum was chosen over other development methods such as waterfall method due to its flexibility if any challenges or unknown problems appear. Sprints assist with risk management by utilizing version control with each iteration of the port scanner. If there is any problems that occurred with the 3rd iteration, the version can be rolled back to the 2nd iteration[5]. Scrum isn't based on complexity, it focuses on simplicity and delivering value[6]. Compared to a methodology such as the waterfall model, which is a linear method with upfront planning, Agile allows for flexible changes during development. This is essential as many new problems can appear during the testing phase. Since the scope is flexible, Agile is a suitable methodology.

Q.2

R = Requirements

NR= Non-Requirements

ID	Requirement	Priority	Description
R1	IP Address Input	High	A user is prompted to enter an IP address for the port scanner to scan.
R2	Port Selection	High	The port scanner will look through a list of 1000 common and predetermined ports.
R3	Port Analysis	High	The system will detect whether the selected port is opened or closed using TCP connection attempts. The results will then be output.
R4	GUI	Medium	A GUI (Graphical User Interface) will be created for improved user experience and ease of use.
R5	Scan Results	Medium	Results will be exported into a CSV file format to store records of scans.
NR1	Performance	High	A common port scan (1000 ports) should take approximately 30 seconds to a minute.
NR2	User Friendliness	High	The results of the port scan will be displayed in a suitable manner for Users.
NR3	Reliability	Medium	The port scanner needs to be able to run on different types of operating systems such as Windows and Linux without errors or crashes.



This flowchart displays the logic the port scanner will follow. User is asked to input an IP address and select a port range. The scanner then attempts a TCP connection which each port within the range to determine if its empty or closed. The ports recorded as open will be displayed within the results.

GUI Wireframe Design

Enter IP Address:

Enter Port Range:

Scan Ports

Scan Results

Open Ports:
Port 21 (FTP) - High Risk
Port 445 (SMB) - High Risk
Port 23 - Medium Risk

Export Results to CSV

This is a simple Wire Frame Mock up of the GUI I will develop using tkinter. It contains a box that asks you to enter an IP address, then you are prompted to enter the port range to scan. When you

press the "port scan" button, it prompts a TCP connection with the ports within the range entered. The results are then printed out and you can then export results if wanted.

Q.3

```
C:\Users\Camden> Downloads > network_scanner (1).py > ...
1  from datetime import datetime
2  import socket
3  import ipaddress
4  import csv
5  import os
6
7  PORT_INFO = {
8      21: {"service": "FTP",      "risk": "HIGH",    "description": "File Transfer Protocol. Sends data in plain text.",    "advice": "Disable if unused. Use SFTP instead."},
9      22: {"service": "SSH",     "risk": "MEDIUM", "description": "Secure Shell for remote login. Subject to brute force attacks.",    "advice": "Use key-based auth. Disable root login."},
10     53: {"service": "DNS",     "risk": "LOW",    "description": "Domain Name System. Translates domain names.",    "advice": "Limit recursion. Apply rate limiting."},
11     80: {"service": "HTTP",    "risk": "MEDIUM", "description": "Unencrypted web traffic. ",    "advice": "Redirect all traffic to HTTPS (port 443)."},
12 }
13
14 RISK = {"LOW": 1, "MEDIUM": 2, "HIGH": 3, "CRITICAL": 4}
15
16
17 def print_banner():
18     print("=" * 60)
19     print("      Security Awareness Port Scanner")
20     print("=" * 60)
21     print()
22
23
24
25
26
27
28
29
30
31
32
33
34
```

This screenshot shows the progress I've made creating the port scanner. I've imported several libraries to efficiently aid in scanning ports. Once the port scanner is fully developed, I will add more ports that are subject to cyber attacks. Each port will be assigned a risk level which determines how dangerous it is for the user to leave the port open

```
=====
Security Awareness Port Scanner
=====

Enter IP Address (e.g. 192.168.0.1): 192.168.0.1
Enter Starting Port (e.g. 1): 1
Enter Ending Port (e.g. 1000): 500

[*] Starting scan...
```

This screenshot shows the CLI version of the port scanner. It prompts you to enter an IP address, a starting port, and an ending port. It then scans through the range of ports prompted. The GUI has not been developed yet, so a CLI will be used in its place for debugging and testing.

References

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[1]

Cambridge Dictionary, "INNOVATION | meaning in the Cambridge English Dictionary," *Cambridge Dictionary*. <https://dictionary.cambridge.org/dictionary/english/innovation>

[2]

A. Ganti, "Kondratieff Wave Definition," *Investopedia*, 2019. <https://www.investopedia.com/terms/k/kondratieff-wave.asp>

[3]

Cambridge Dictionary, "CREATIVITY | meaning in the Cambridge English dictionary," *Cambridge.org*, 2024. <https://dictionary.cambridge.org/dictionary/english/creativity>

[4]

Cloudflare, "What is a computer port? | Ports in networking | Cloudflare," *Cloudflare*, 2023. Available: <https://www.cloudflare.com/learning/network-layer/what-is-a-computer-port/>

[5]

"5 Ways Scrum Helps Manage Risks," *Scrum.org*. <https://www.scrum.org/resources/blog/5-ways-scrum-helps-manage-risks>

[6]

M. Iqbal, "Why is Scrum the Most Popular Agile framework? | Scrum.org," www.rebelscrum.site, Apr. 19, 2023. <https://www.scrum.org/resources/blog/why-scrum-most-popular-agile-framework>

[7]

K. Schwab, "The Fourth Industrial Revolution | Essay by Klaus Schwab," *Encyclopedia Britannica*, May 25, 2018. <https://www.britannica.com/event/The-Fourth-Industrial-Revolution-2119734>

[8]

R. N. Malhotra, "Technological advancements and human development: A tale of two worlds," *World Economic Forum*, Jan. 06, 2025. <https://www.weforum.org/stories/2025/01/technological-advancements-and-human-development/>

[9]

"The Importance of Continuous Innovation: Why Staying Ahead Means Never Standing Still | innosabi," *Innosabi.com*, 2025. <https://www.innosabi.com/resources/post/the-importance-of-continuous-innovation>