

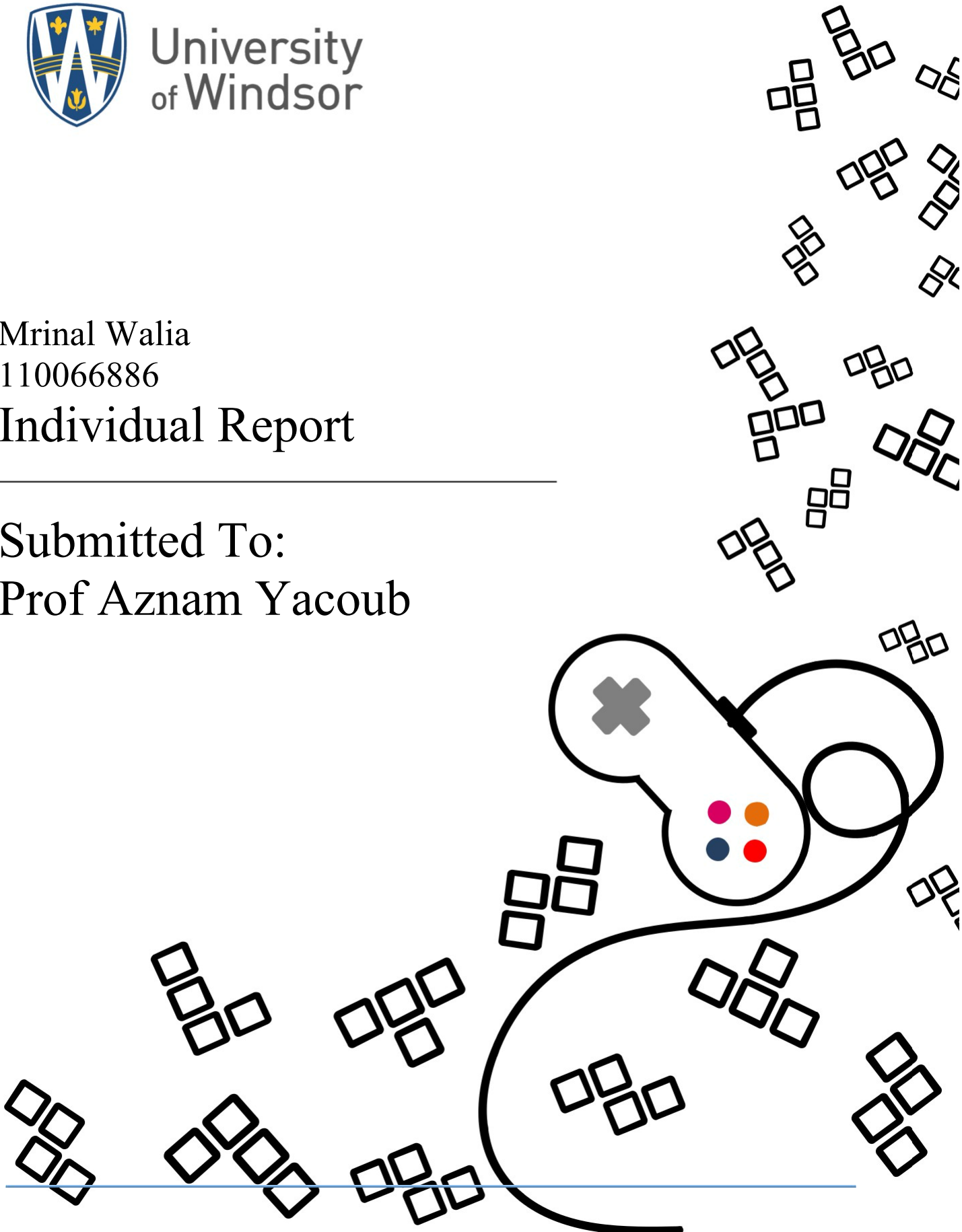


University  
of Windsor

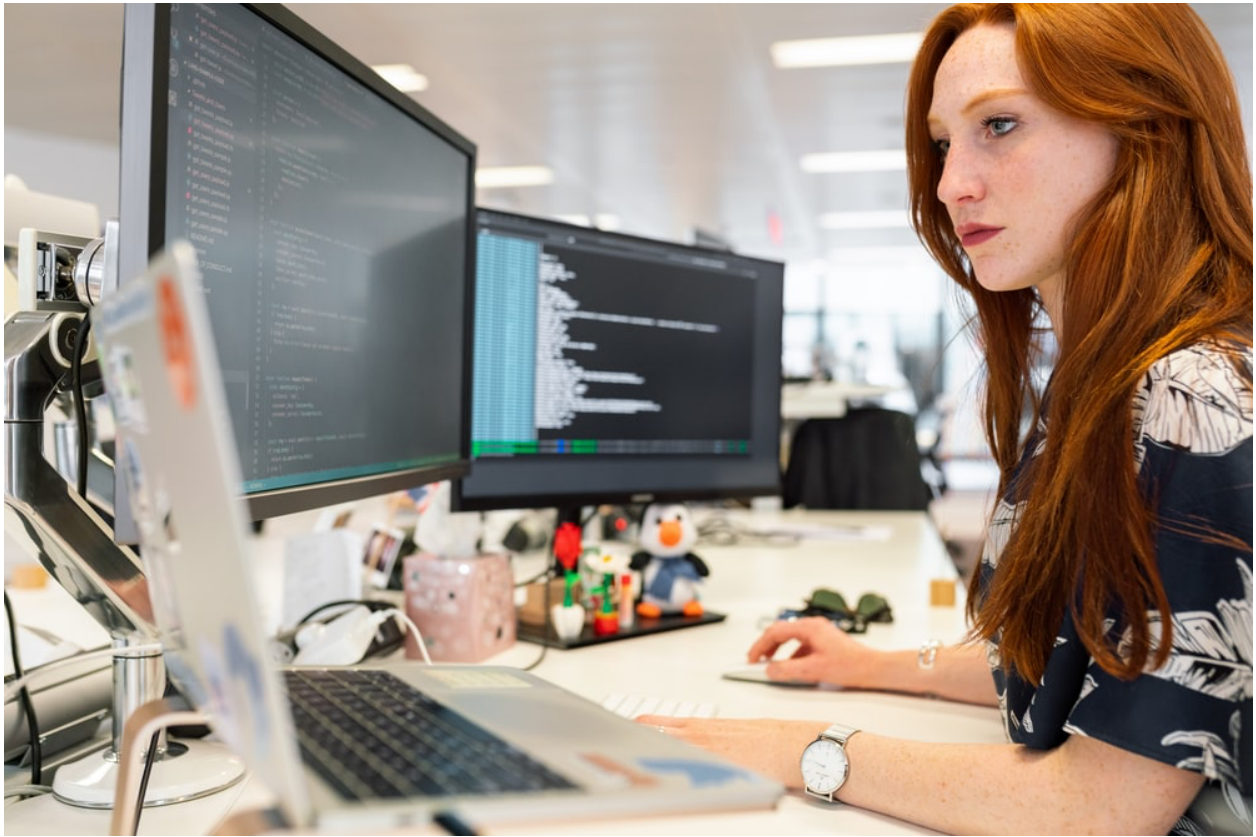
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## Individual Report

Submitted To:  
Prof Aznam Yacoub



# Individual Report



<https://unsplash.com/@thisisengineering>

In the early days of computing, software engineering was mainly about writing code to make computers do what they wanted. We were lucky to have a few tools to help automate our project efficiently and make our life a little easier. But many things have changed drastically in the past few years.

With big data, machine learning, blockchain, cloud computing, and the internet of things, software engineering has become much more complex. It's now a critical part of almost every industry, and the demand for skilled software engineers is higher than ever.

This report will talk about the theoretical practices and the practical knowledge gained from the course Advanced Software Engineering.

## What is software engineering, and why are software engineers important?

Software engineering is the art of designing, creating, testing, and maintaining software. It's a complex process that takes a lot of skill and knowledge. That's why software

engineers are so important. They're the ones who make sure that our software is effective, efficient and meets the customer's needs. They work hard to ensure that our software is up to date and meets the latest industry standards. Without them, the world would be a very different place.

## Is software engineering required to produce (industrial) software?

It has been debated that software engineering is not required to produce industrial software. After all, computers are just machines that run programs, and humans can write programs without any special training, right? While it is correct that anyone can write a program given enough time and patience, writing industrial-grade software is a different story.

Industrial-grade software needs to be reliable, efficient, and robust – not to mention user-friendly. This is where software engineering comes in. Software engineers use their computer science and engineering knowledge to design and develop software that meets these requirements. They also work on improving the quality of existing software products. In short, software engineering is essential for producing high-quality industrial software products.

## What are the benefits and disadvantages of software engineering?

While software engineering has several advantages, including speed, efficiency, and accuracy. There are many benefits to following a career in software engineering. Perhaps the most obvious one is the high level of job security. With the rapid growth of the tech industry, there's a high demand for software engineers. If you have the necessary skills, you'll always have a job in this field.

Additionally, software engineering is a highly versatile profession. You can work in various environments and industries, and your responsibilities will vary depending on the company you work for. You might be responsible for designing and developing software, or you might oversee testing and debugging applications. No matter what, you'll always use your creativity and problem-solving skills to develop innovative solutions.

It also has several drawbacks. One major drawback is that it can be more expensive than other methods. Additionally, the software can be glitchy and difficult to fix, sometimes requiring an entire overhaul. Despite these drawbacks, software engineering is still the most efficient and accurate way to develop software and remains the industry standard.

## What is the goal of Software Engineering? In which domain might software engineering be applicable? Do you think that Software Engineering should genuinely exist?

Software engineering aims to create, design, develop, test, and maintain software. It is a process that is used to solve problems and create software that is reliable and efficient. To do this, software engineers use a variety of tools and techniques. They also need to have a firm understanding of computer science concepts.

Software engineering exists in almost every domain, including aerospace, automotive, defence, healthcare, and manufacturing. Some people think that software engineering should exist but in their fashion. Others believe that it is a necessary field that has helped improve software quality and made software delivery easy.

## What are the different possible roles in the practice of software engineers?

There are various roles that a software engineer can take on while in practice. These roles can differ based on the company, the project, or the individual engineer's skillset and preferences. The most common roles for a software engineer include:

- Developer:** Writes and tests code for new features or applications
- Analyst:** Reviews requirements and designs, may also write code
- Architect:** Designs systems and oversees the work of other developers
- Tester:** Tests applications to find bugs and defects

## Software engineers VS Software developers?

The words software engineer and software developer are often used interchangeably, but there is a difference. The main difference is that software developers write code to

create software products, whereas software engineers design, develop and test software products. So, software engineers are more senior than software developers and have a higher level of responsibility.

## What is the key (central important) aspects of software engineering?

There are several critical aspects of software engineering that students should be aware of:

1. Design: good design is essential for creating effective and efficient software. Another vital aspect is testing software must be rigorously tested to meet the requirements and perform as expected.
2. Software engineering involves project management skills, so students should be familiar with concepts such as quality management, technical writing, and risk management.
3. It is also essential to have a strong understanding of computer science concepts to create effective and efficient software.

## In your thought, what do researchers in software engineering do?

I believe that researchers in software engineering are constantly looking for new ways to improve the software development process. They are constantly exploring new technologies and methods that can help make the process more efficient and effective. Researchers also diligently develop new tools and applications to make software development more manageable and less time-consuming. In my opinion, they are crucial to the success of the software engineering field.

## Based on your prior experience, what did you learn in this course?

The Advanced Software Engineering Course provides students with the opportunity to learn about more advanced software engineering concepts. This course taught me about design patterns, software architecture, and software engineering processes. In addition, I gained knowledge about software development methodologies, software

testing methods, software quality and software project management. This program is a vital steppingstone for those who want to pursue a career in software engineering.

**Given the knowledge you got about software engineering, in your view, which role fits the best to your personality and skills, and how would you implement your career path? In which domain would you like to work?**

The knowledge gained from the course in advanced software engineering will help me become a successful machine learning engineer. In my opinion, I have creativity, problem-solving skills, communication skills, teamwork skills, and a thirst to learn. I plan to apply machine learning algorithms and tools to design and develop scalable machine learning applications and software to excel in my field. LinkedIn Learning helped me learn all these concepts and terminology in machine learning. I also got in touch with some of the seniors from this course who are currently working as machine learning engineers in the industry.

It helped me understand how things work in practice and how software engineering is applied in machine learning tasks. I plan to become an Artificial Intelligence (AI) Engineer in machine learning engineering as this domain involves working with traditional and modern machine learning techniques. Some techniques are computer vision, image processing, neural networks, natural language processing, etc. AI Engineers build the core models employed to power the AI application. My elective "Topics In AI" is helping me learn more about my domain.

**In your view, what point(s) was not talked about in the course and might be necessary for software engineering?**

In my opinion, the course Advanced Software Engineering offered in the MAC program from the University of Windsor should have focused equally on the coding part as it is seen that in most of the technical interviews for the software engineer roles, many coding questions are asked.

## Conclusion

A software engineer is an expert who uses engineering principles and practices to design, develop, test, and maintain software. Software engineering is a modern field that has evolved from computer science and has become an essential component in software development.