

**INFO1111: Computing 1A Professionalism**

**2021 Semester 1**

***Project 1***

**Group Name: *RE07\_Gourp\_4***

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## 1. Introduction

In this report, there will be four parts that aimed separately to evaluate and analyze four new recruitments which can be classified as different parts of computing-related fields. For each new employee, the existing working teams require certain computational skills and comprehension of relative background knowledge and in general, it can be divided into four majors which are data science, computer science, information systems and software development.

For the first part of this report, a brief individual profile will be provided by each candidate. The main content and reason of this part are to evaluate and conduct a self-assessment which includes their strengths and weaknesses within the fields of technical and professional capabilities, previous experience for both general and computing areas, after that, they will need to describe in which area, they would like to develop further experience or improvement to complete the career ambitions.

Secondly, a domain description of four areas of computing will be provided to assess the fundamental theoretical knowledge as well as their understanding of the advanced knowledge of each area. And by providing relative information, a preliminary allocation of four positions can be made as both technical skills and theoretical knowledge are presented.

Afterwards, according to the project description by considering the qualifications provided on each project, there will be an analysis for each candidates' capability against the competencies required. On a scale of 0 (no knowledge/skills) to 4 (advanced knowledge/skills), each candidate will be marked. Which a final allocation and justification of each project will be decided due to the analysis presents an intuitive method. The final allocation for four candidates is Kevin Zheng will be responsible for the software development project, Guoliang Lin is under the department of information systems, computer science will be led by Carson Lu and Zelda Wu will work for the data science project.

Finally, an overview of the allocation process will be provided, especially the choosing procedure of each project and why it is the suitable approach of deciding the final allocation will be explained.

## 2. Person Profiles

### 2.1. <<Kevin Zheng>>

#### Education

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University of Melbourne trinity college, foundation student

Melbourne

2019.8-2020.12

University of Sydney, School of engineering

Sydney

Bachelor of advanced computing and Bachelor of science

2021.3-2026.3

#### Technical capabilities

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Strengths: python and C coding experience

Weakness: no experience in webs development and framework learning. Fewer experiences of working on real projects.

#### Professional capabilities

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Strengths: good oral communication skills and self-learning skills

Weakness: no good at the report or essay writing and no good at written communication skills

#### Previous experience

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- working on student union in high school period

#### Desired area

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Data science, working on AI, machine learning and deep learning, improve my written communication skills and improve report and essay writing ability.

## 2.2. <<Carson Lu>>

### **Education**

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University of Sydney School of engineering

Sydney

Bachelor of advanced computing

2021.3-2025.3

### **Technical capabilities**

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Strengths: Experienced in programming using Python, Php and Java , Understanding JavaScript + and C#

Weakness: unfamiliar with mac OS, unfamiliar with modelling language, no experience in information analysis

### **Professional capabilities**

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Strengths: good communication skill and teamwork skill

Weakness: slower code reading

### **Previous experience**

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- Webservice
  - The main feature      posting pictures and text
  - Technical use      MYSQL, Php, HTML, CSS, JavaScript
- Game development
  - Card game      classic STG
  - Technical use      Unity

### **Desired area**

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Would like to explore the variety of framework and methodology, experience develop the mobile app and meet other professional developers.

## 2.3. <<Guoliang Lin>>

### **Education**

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University of Sydney School of engineering

Sydney

Bachelor of advanced computing and Bachelor of Science

2021.3-2026.3

### **Technical capabilities**

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Strengths: Little knowledge of python, can do some basic programming, and familiar with the basic syntax of Linux.

Weakness: lack of ability to finish some complex tasks of programming

### **Professional capabilities**

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Strengths: have nice communication skills and listening skills

Weakness: lack of writing ability and leadership capability

### **Previous experience**

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No previous experience but do have experience in self-learning python and Linux system.

### **Desired area**

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As Artificial Intelligence becomes a trend of the human's future, people are affected by AI in many areas. Besides, an advanced AI area can promote the progress of human society. Thus, I wish to enter the field of AI.

## 2.4. <<Zelda Wu>>

### Education

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University of New South Wales, foundation student

Sydney

2019.3-2020.7

University of Sydney School of engineering

Sydney

Bachelor of advanced computing

2021.3-2025.3

### Technical capabilities

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Strengths: Well interpretation of projected related data sets and analyzing of it with the assistance of data processing software.

Weakness: Lack of coding knowledge and no experience with coding before starting this degree.

### Professional capabilities

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Strengths: Well adaptation with new environment and learning contents, be able to handle conflicts and think about teamwork from different aspects which might provide inspirations of works.

Weakness: Poor computational related problem-solving abilities

### Previous experience

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I have no previous practical experience with computational areas, but during high school, I took math and advanced math and other science-related subjects as a pre approach for studying computer science. Though I lack practical experience and most computer-related knowledge are limited to theories, mathematical fundamental could be a start of learning as it provides a logical method of solving task and there are lots of similarities between math and computer science.

### Desired area

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I would like to practice more on coding experience due to it is a major part of computer science, and it also takes a great percentage when solving problem after entering industries. It will be beneficial to learn multiple programming languages because when conducting projects, it may involve platform transformation, which means different languages might need to be applied. It is crucial to work with real-world data sets and client requirements for computing works, it not only requires me technical and professional abilities but also tests if it is capable to deal with sudden problems that occurred in work.

### 3. Domain Descriptions

#### 3.1. Data Science

Data science is an interdisciplinary field that uses logic, data, and algorithms to analyse structured or unstructured data and provides optimal solutions in different domains. It always related to machine learning, deep learning, and big data.

Data science working area:

1. Data engineering and data warehousing
2. Data mining and statistical analysis
3. Cloud and distributed computing
4. Database management and architecture
5. Business intelligence and strategy
6. ML/ cognitive computing development
7. Data visualization and presentation
8. Operations-related data analytics
9. Market-related data analytics
10. Sector-specific data analytics (healthcare, finance, insurance, etc.)

(Melody Ann Ucros, n.d.)

Difference:

The fundamental difference between computer science and data science is that the study of computer science is clearly oriented towards understanding the basic principles of computers and how to use some programming languages. Data science is an interdisciplinary field that analyses large amounts of data and finds patterns in them, and it focuses more on the understanding of mathematics, such as calculus and statistics (Anna Heinrich, n.d.).

The difference between data science and software engineering is that data scientists use programming languages as a way to get a target, whereas software engineering developers use programming languages to build things. They are fundamentally different in that data science is essentially an analytical activity, However, software development is very similar to traditional engineering. Data science uses analysis and modelling of large amounts of data to arrive at optimal solutions, while software engineering developers can use these models to make algorithms more effective ("The Difference between Software Development and Data Science – The Dataist," 2017).



### 3.2. Computer Science

Computer science could be generally concluded as a study field that relates to solving specific tasks by utilizing computational abilities that might include fundamental computation theories and algorithms ("What is Computer Science? - Computer Science, University of York," n.d.). There are subfields of computer science, for example, human-computer interaction, cybersecurity, and computational system management, which the utilization of it varies according to applied fields.

The most fundamental part of computer science is theoretical computer science, it provides an overview of mathematical techniques and the major topics of this subset might include computational complexity which mainly deals with evaluating and classifying the computational problems and how feasible to achieve them through existing resource, algorithms that involve specific procedure (step to step instructions) to solve a defined computational problems and others like information theory (Baldwin, Walker, & Henderson, 2013).

It also requires both hardware and software knowledge background with a focus on understanding what are the differences between them and how it performs in terms of the procedure of running codes ("Bachelor of Advanced Computing - Engineering UG - The University of Sydney," n.d.). The software mainly focuses on a collection of programs and code which already exist in computer systems compared to hardware which focuses on its physical components and functionalities.

For applying computer science to daily basis work, the ability of programming is crucial as it can be seen as the most efficient method to solve specific problems in industry, and different programming paradigms can be classified into the followings, like functional programming which is designed to work with symbolic computation that heavily relates on mathematical approach, imperative programming which using statements to alter the state of the program and is mostly utilized in hardware, project-oriented programming and service-oriented programming which emphasize various unit of computer work ("3.2.9 Classification of Programming Languages," n.d.). Another important concept in computer science would be security engineering, which by applying cryptography to maintain the security of system or program, identification and analyze of potential hazards and collect assurance evidence for safety case preparation, and finally with the assistance of technical techniques to encrypting data sets ("Information security," n.d.).

### 3.3. Information Systems

Information systems (IS) involve designing, implementing and evaluating computer systems that satisfy organisational needs. It encompasses topics such as systems approach, planning, requirements elicitation, system development, system implementation, and decision and knowledge systems.

The fields of information systems and information technology are quite similar, but information systems predate information technology, and information systems are much broader. IS includes all systems that store and transmit information, including technological and non-technological systems. As such, IS degrees might include classes in social science and information theory as well as technology. Conversely, information technology degrees usually focus more directly on the implementation and management of modern computer systems ("9 Information Systems Jobs to Consider | UAB Online Degrees," n.d.).

There are various jobs related to the information system. For example, Information System Manager. It is the job of managing all information technology-related resources in a company or organization according to needs and priorities.

Similar:

1. They all are high and advanced technology; it is not easy for everyone to study.
2. In order to utilize the knowledge, Mathematics and English foundation is necessary.
3. Self-learning skill is important, too. Because you need to finish problems by yourself most of the time.
4. You need to learn some computer language like java and python.

Difference:

1. Computer Science will be a bit theoretical generally.
2. Data Science will be more flexible; it needs data interpretation ability business analysis insight.
3. Software development specializes in the development of application software in computer software.
4. Information System major in computer information security and security.

### 3.4. Software Development

As the IBM researchers say: “Software development refers to a set of computer science activities dedicated to the process of creating, designing, deploying and supporting software.” (“What is software development? | IBM,” n.d.). The software can be developed for many purposes. The most three common ones are to achieve the needs of business, research, and personal use. It helps make competitive business, enhance workers’ efficiency, and improve customer’s experience.

Software is the tool that tells a computer what to do. It is divided into three different types, system software, programming software, application software (“What is software development? | IBM,” n.d.). System software is the software that can run independently when the computer is on, like operating system, disk management, utility, hardware management (Ben Lutkevich, n.d.). Programming software is tools that use in programming, like text editors, compilers, linkers, debuggers. Application software is the software designed to carry out a specific task, like web browsers, media players, photo editors, video games and mobile applications.

Software development majorly carries out by programmers, software engineers and software developers (“What is software development? | IBM,” n.d.). Most work for programmers is writing code using higher-level programming language, like C++, Java, or Python. They solve general tasks like merging database, displaying text and graphics. Software engineers should apply engineering theories and methods. Sometimes they also need to use modelling language. The jobs for software developers are similar with programmers, but they solve problems in a more specific field of software. They also run the development lifecycle.

Software development life circle is a sequence of works – planning, analysis, design, coding, testing, deployment, and maintenance. In the planning and analysis parts, the development teams should understand the purpose of the software that they would create. They should communicate with their clients and list all the details in documents. Next, the design part allows the teams to create the software architecture and outline models. The following is coding. Programmers translate the design into source code while software developers implement the code. When the coding starts, testing should also do at the same time. Software developers not only detect and fix issues and bugs but also check whether the program matches clients’ expectation. Testing is continued until the software become perfect. In the following deployment part. The development teams ask their clients to check their product and give feedback. The last step is maintenance. Although the product is finally created, the development teams still need to maintain it. Some issues may arise during testing, but they probably still exist. The client may ask for an additional feature in the software as well (“What Is the Software Development Life Cycle (SDLC) and Which Method Is the Best? | Upwork,” 2020).

## 4. Comparative Analysis

- 0: No knowledge/Skills
- 1: Fundamental Knowledge/Skills
- 2: Intermediate Knowledge/Skills
- 3: Advanced Knowledge/Skills

Project	Competency	Kevin Zheng	Carson Lu	Guoliang Lin	Zelda Wu
<b>Data Science</b>	Programming knowledge	2	3	1	1
	Communication skills	2	3	2	1
	Data intuition	2	1	1	2
	Curiosity	3	2	2	2
	Structured thinking	3	2	1	1
<b>Computer Science</b>	Math skills	2	1	1	2
	Problem-solving skills	3	1	1	1
	Computer and technology skills	2	3	1	1
	Information-organising skills	1	1	1	1
	Programming knowledge	2	3	1	1
<b>Information Systems</b>	Problem-solving skills	3	1	1	1
	Teamworking skills	2	2	1	1
	Communication skills	2	3	2	1
	Leadership skills	2	1	1	1
	Technical skills	2	3	1	1
<b>Software Development</b>	Coding ability	2	3	1	1
	Object-oriented design	2	1	0	0
	Problem-solving skills	3	1	1	1
	Teamworking skills	2	2	1	1
	Debug skills	2	2	1	1

## 5. Project Allocation and Justification

Project	Consultant	Justification
Data Science	Zelda Wu	In Data Science, sharp intuition and a curious spirit are the essential points for a successful data analyst. Zelda is a qualified candidate that meets the above features. Thus, she might be the best candidate for this job.
Computer Science	Carson Lu	Computer Science is the systematic study of the theoretical basis of information and computing and how they are realized the applied in computer systems. It means the people who have a sound foundation in computer and technology skill will be more suitable to take this job ----- Carson.
Information Systems	Guoliang Lin	Information systems are used to transmit a message between the users. It needs a comprehensive person to join. We can see Lin is a nice choice in this part. Besides, he has outstanding communication skill, which will promote him to develop. Then the selected person is Guoliang.
Software Development	Kevin Zheng	We can see from the comparative analysis that Kevin is an all-around talent, especially in problem-solving skill. As everyone knows, developing software must fix a lot of problems every day, Kevin's problem-solving skill and debug skill must help him finish his work he owns the corresponding coding ability as well. In summary, Kevin should be the best choice in software development.

## 6. Overview of your allocation Process

This group contains four members each completing a domain description and a personal profile. Each member of us works on one domain and one profile. Before understanding the context of the four different major and what skills they require, we are not able to move on. Guoliang does Information System; Kevin does Data Science; Zelda does Computer Science; Carson does Software Development. After finishing the domain and profile, we read other members' writing and check whether they make mistakes. Then, we discuss the comparative analysis.

We list skills that require in each of the four majors and meet a problem. These skills are quite similar, such as programming skill, teamwork. If each major gets the same competency, we do not reach the goal of this project. To solve it, we decide to make a priority for these skills and think about skills that other than just programming skills for different major. We do some further research specifically on skill requirement as well. After all preparation, we start dividing the skills. Although all developers or engineers who work in these fields always writing code, the technique they use in programming are not the same. For instance, data scientists write a program to analyze data while software developers are fixing bugs in the Apps that they want to produce. As a result, we put data intuition and structural thinking for data science competencies, problem-solving skills and debugging skills for software development competencies.

If we are going to work as a group again, we need to start work earlier. Although we have sufficient time working on this project, we may not have that much time as a holiday break to work.

Written work for each member:

- Zelda: Introduction, the domain of computer science, profile 4
- Kevin: domain of data description, comparative analysis, formatting, bibliography, profile 1
- Guoliang: Domain of Information system, allocation and justification, profile 3
- Carson: domain of software development, overview, profile 2

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