INFO1111: Computing 1A Professionalism

2021 Semester 1

Project 1

Group Name: RE16_Group_1

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1. Introduction

In this report, four members of our group are hired by a consulting company as a new graduate for each project field. We will respectively participate in a team that needs different abilities and specialties in computer areas, and help them in completing their contract with clients over the next 2-4 months.

First, in the “Person Profiles” section, each graduate will explain his strengths and weaknesses for technical and professional capabilities, previous experience in computer areas, and what is needed to improve for us.

Second, in the “Domain Descriptions” section, we will respectively present the similarities and differences of the four areas, suitable occupations and their research fields. All the references being used will be displayed in the “Sources / Bibliography” section at the end.

Third, in the “Comparative Analysis” section, we will analyze and evaluate the individual competencies for each graduate in these four project fields.

Then, in the “Project Allocation and Justification” section, we will briefly discuss the evidence and justify why each of us is allocated in a certain project field, with future interests demonstrated.

Finally, in the “Overview of Your Allocation Process” section, we will explain how our opinions towards the project allocation meet in consonance, and then collaborate to resolve different problems.

2. Person Profiles

2.1. <<Consultant 1: Xiaoyu Liu >>

My name is Xiaoyu Liu, as a recent graduate of data science to assist in completing contracts during the next two to four months. I am quite skilled at finding information online and using various modern tools to create data models in order to help decision makers to derive meaningful information, and make business decisions. However, my communication and writing skills may not be so outstanding.

In connection with professional capabilities, I am willing to listen to the tasks requirements of managers and finish the assigned tasks efficiently. One of my advantages on data science is machine learning and use of modern tools. There is not doubt that use of modern tools is one of the most significant skills. I can skillfully use excel for data integration and statistics and rstudio for model creating. On the other hand, some level of programming is required to execute a successful data science project. Whether python or R, I have a certain understanding and can use them in practical problems. Finally, I know the function of the database and how to use it . Nevertheless, maybe i am not the right team manager. Because I often get entangled with the choice of task which is not a good habit for a manager.

Talking about my previous experience, I once worked as an accountant in my father's construction company for a period of time. The first stage of my work is to estimate the price of total building materials and the salary of personnel in a construction project. After that I assisted my father in completing more favorable contracts according to the estimated profit range. It is the task of the second stage after the construction project starts. I need to know the price of kinds of building materials on the market in order to choose the cheapest and the safest one. Construction quality and expenditure need to be taken into account. The last stage of my work is to count the actual cost of construction materials and personnel wages. After the actual profit is obtained, all of them are tabulated and show them to my father. It was an unforgettable experience which let me try the possible working environment ahead of time.

In recent years, big data analyst is a popular job, and I am working in this direction. But i hope to improve my communication skills through talking with people around me. It is obvious that good communication can clear my ideas, increase the credibility of the analysis and improve the efficiency of team tasks. Of course, excellent professional skills are most important for data analysts.

2.2. <<Consultant 2: Zhongxu Wang>>

My name is Zhongxu Wang, and I am a new graduate with a major in Computer Science. In college, I did an advanced computer degree and had certain skills in the computer field. And in the next 2-4 months, I'll help them in completing their contract with different clients about computer science areas.

In terms of technical capabilities, I think I'm good at problem-solving and logical thinking when confronted with a difficult problem. I think problem-solving and logical thinking are very important skills for a Computer scientist or other careers in the computer area. In addition, in terms of programming, I have also mastered the foundation of some programming languages and have certain cognition in application development, such as the use of SQL databases. Also, I believe that my math knowledge can match that.

On the other hand, good computer workers need excellent professional skills. For myself, I am good at communication skills in teamwork or daily communication. In any group, you need to have people who can initiate conversations to get to know each other. In this way, everyone is more open to brainstorming during the project discussion.

About my previous experience. When I was in high school, I was a member of the student union and contributed to the IT department of the student union. Such as the daily data survey and analysis of the student union, some PPT, and picture design. In addition, I am also a member of the robot club of the school, and I have completed the instruction on how to control the spider-making robot with my classmates. In terms of competitions, I have participated in the science competition held by ASDAN and got top ten in my high school.

Finally, On the desired areas for improvement, I think my writing ability is very poor, although a computer worker does not need to master advanced academic writing skills. But a good writing skill can improve work efficiency. Moreover, good English skills can reduce the unnecessary time spent on grammar revision, vocabulary revision when writing an essay. Also, Multitasking skills are very important and need to be improved for me. I believe that a successful Computer Science worker can manage all of the things at the same time. For most importantly, Attention to Detail was a necessary habit, it would cause a high influence on your own. Successful computer workers must master certain practices and standards, and be careful of any things.

2.3. <<Consultant 3: Yixiao Zhao >>

My name is Yixiao Zhao, one of the graduate candidates allocated to assist in client contracts regarding the area of information system. My focus on technical capability in my university career was the use of management tools mostly for computational projects, and one of the most typical examples is Git in terms of collaborative development. I have also attempted to read a lot of paper and online resources about the information system, which granted me a better understanding in this area. However, I didn't emphasize on programming skills that much, which made me less capable of coding in multiple languages.

Talking about professional capabilities, I am very active and efficient on team collaboration. When being allocated to a team, I am highly motivated to complete every task I am responsible to. One of my most proud skills is the communication skill on both paper writing and face-to-face discussion. I am able to quickly demonstrate the key points of a topic of task, and effectively deliver those messages to my assigned team, then, exchange our ideas to finish up task allocation with highest efficiency. However, when a new topic or team is introduced to either assist the current processing, or add up the task needed to be processed, it usually takes me a longer time to adapt to sudden changes as I've already fully put myself into the thorough planning made before the processing.

Previously, I have approached a robust information system in a small enterprise for a while, with limited access though. During that time, I had some initial concepts of how modules of a system are assigned to do a certain part of the task by trying their functions under different environments. Another trivial but good experience is about being a team leader in a small invention competition of small electronic gadgets. Each of us were not good at electronics, but I was able to mobilize and motivate my team mates to actively research, and finally got a 3rd price. I think this is a good experience indicating my good capability in team management, which may be useful to apply to virtual environment.

I am interested in improving my programming capability, because it is very rare not to use those languages to create things, including the information system. I will have better practical performance in this area once progress is made. Moreover, if possible, I desire to try to operate some more advanced systems which can bring so much more new ideas than my previous robust but limited one. It will surely be beneficial to my knowledge in this area.

2.4. <<Consultant 4: Hengkai Zhang>>

My name is Hengkai Zhang, a new graduate student to assist with the project. This profile will elaborate on my personal experience, advantages, and weakness, in order to determine my place in the team as well as an introduction for myself.

One of my advantages comes to software development is critical thinking and innovative ideas. They are useful in both technical and professional domains. The pursuit of optimization is the result of my constant critical thinking and trying to combine it with more innovative ideas to find better solutions for current problems. Self-examination and responsibility are also important for teamwork in software development. Instead of passing the buck, I always prefer to find the solution as well as communicating with others. Especially with coding and programming, which are not my strengths, but I believe by the end of the project, my abilities of coding will increase.

I also have good financial and business knowledge; software is designed to help people with different needs and aspects. A commercial perspective can potentially help to design an application to be more financially successful and increase sales for the company. Despite my current coding experience is not sufficient, but I am willing to learn from others as well as mutual help in the team, which could lead to creating a more efficient and equal teamwork environment that allows team members to exchange ideas, knowledge, and skills.

Meanwhile, several experiences with my high-school newspaper and volunteering in an orphanage with emotional support could be helpful to express myself and find my role in the team. Both of my previous work experiences required teamwork and interpersonal skill, especially editing school newspapers. Though the experience of computing is limited my general working experience could be similar to software development, which both presents information and helps people. As well as circumspection of work, newspaper, and software both required well-organized structure and low toleration of tiny mistakes. On the other side, volunteering in an orphanage consulting emotional problems could increase my ability to sympathy and problem-solving. One important aspect of software development is solving problems, whether tasks came from coding and technical problems, or further development after the release of our application -- posing new visions based on customer reviews and comments.

I always dreamed of being a software developer, which required solid programming ability that I currently need more improvements. While the team required software development skills, I will be more eager to learn more programming languages and apply them to real situations.Also, the knowledge of project management and modern standards in software development is valued to me, to finally have my own developing company, technology is a core-comparative advantage as well as service support, more user-related information security, these are also brand new areas waiting for me to explore.

3. Domain Descriptions

3.1. Data Science

Data Science is an interdisciplinary field, it uses scientific methods, processes, algorithms and systems to extract knowledge and insights from various forms of structured and unstructured data, similar to data mining(Dare2 compete). It uses modern tools and technologies to process a large amount of data to find invisible patterns, obtain meaningful information and make business decisions. Data science uses complex machine learning algorithms to build prediction models. Principal areas of study within Data Science include machine Learning, modeling, statistics, programming, databases and data analysis(Simplilearn, 2021).

In the age of big data, Big data is rapidly becoming an important tool for enterprises and companies of all sizes. The availability and interpretation of big data have changed the business model of old industries and created new businesses. Therefore, graduates of Data Science become one of the most popular employment groups in all kinds of companies. Because a good data analyst can create a clear statistics model which can find the deficiencies and propose improvement methods through the company's past data. Additionally, data analysts can even conjecture the future trend of the market through big data, so as to provide effective development suggestions for managers. Commonly, data analysis can be detailed into four stags. The first stage is to collect useful data in databases, authoritative websites or questionnaires. After that is data integration in order to be convenient for modeling and other operations. Thirdly, modeling is the most important stage which directly affects the conclusion you get. Finally, analyzing and coming to the conclusion according to the models that we created before.

Data science is the study of all kinds of data, while computer science is the study of computer design, architecture and its application in the field of science and technology(Priya Pedamkar, 2020). Computer science and data science are different in calculation and data. Computer science is the field of data operation method, while data science is the field of researching, maintaining, transforming, storing and processing large amounts of data in different formats.In conclusion, computer science and data science are two different fields, but they are in the same field when they apply for technical use. Computer science enables us to use technology to calculate data, which enables us to operate on existing data for useful purposes.

Compared to data science, Information science is more biased in knowledge management, data management, interaction design and other fields, but they are complementary disciplines to some extent(John Spacey.2016).

Data science and software development are essentially different, because data science is an analytical activity, and software development and traditional engineering have a lot in common. Additionally, data scientists write code as a means to achieve their goals, while software developers write code to build things(The Dataist.2017).

3.2. Computer Science

Computer science specializes in computer theory, computing problems, and solutions. (Leigh Anne Smith, 2019) This consists of their theory, design, development, and application. (“What is Computer Science?“， n.d.) The basics of computer science are programming languages. Principal areas of study within Computer Science include artificial intelligence, computer systems, and networks security, database systems, software engineering like application development. We can even say that the words "computer science" included most of the basics of computer areas. (“What is Computer Science?“， n.d.)

Computer science is integral to modern life, so you’re likely to find your computer science skills in high demand across many different industries. (Sabrina Collier, 2021)These include financial organizations, management consultancy firms, software houses, communications companies, data warehouses, multinational companies, governmental agencies, universities, and hospitals.(Sabrina Collier, 2021)

Normally, People often confuse the distinction between computer science and software development. About that, Computer Science is the study of how computers work, mostly from the theoretical and mathematical perspective. And Software Engineering is the study of how software systems are built, including topics such as project management, quality assurance, and software testing. Thus, the two fields of study are actually overlapping circles on a Venn diagram, where each does indeed emphasize different areas of software development (one more practical, the other more theoretical), with a common focus on achieving a depth of computer and coding knowledge. (“COMPUTER SCIENCE VS. SOFTWARE ENGINEERING”, n.d.)

In addition, To compare Computer science and data science, they have overlapping skills.(Broughton Lab, 2020) Each utilizes computational processes. Operating knowledge of programming languages and algorithms is a need in each field, however, what one does with that knowledge is the primary differentiation among the 2 tracks. (Broughton Lab, 2020)Computer science focuses on the “how,” while data science looks at the “why.”(Broughton Lab, 2020)

Finally, Computer science is defined as “the study of the principles and use of computers.” (Kitanova, M, 2019) While computer information technology and systems are defined as “the study or use of systems (especially computers and telecommunications) for storing, retrieving, and sending information.”. While IT and CS degrees can lead to similar jobs, the differences between the two are quite pronounced. IT professionals should enjoy installing computer systems, using software, and maintaining networks and databases, while computer scientists should enjoy mathematics and software design. In summary, information systems need more business knowledge than computer science.

3.3. Information Systems

An information system (IS) refers to a technical integration of multiple components designed to collect, process, store, and distribute information (Zwass & Gregersen, 2001). In business application, information systems are widely introduced to assist the interaction between suppliers and customers, such as supply chain management, and digital marketing ("What is an Information system?", n.d.).

The use of information systems in business environments is very common today, which generally refers to complementary networks and interconnected components that will benefit the business decision-making processes by reserving and spreading information ("What are information systems,", n.d.). Specifically, this can be detailed into 3 parts. One is the storage and analysis of the information, which is usually done in much complex, even cloud-based databases. The insight provided is very helpful to issue resolutions (Davoren, 2019). Also, IS assists the decision-makers by making comparisons between analyses and external sources like financial reports from competitors to evaluate their strategies (Davoren, 2019). Another IS aspect to business parts is the business processes. A good IS can improve the efficiency as it simplifies the trifles like manufacturing, supply chain and employee processes (Davoren, 2019).

Compared to computer science, information systems emphasize on directly solving practical problems and optimizing technology for their uses in different processes, while the former is developed upon theory with mathematics, as it always involves programming languages (The College of St. Scholastica, 2017). Basically, information systems and computer science are all about solving problems by using computers and similar computational tools.

Software development is like the designing process of an information system, as a system itself is technically a software complex (Spacey, 2016). Similar to the relationship between IS and CS, SD and IS both concerns aspects of software on computers. However, CS professionals provide theoretical knowledge to support the solutions in the information system, while SD professionals design and create the platforms for IS experts to use as a connection between theory and practice.

Data Science and IS both interact with data, and perform a similar procedure of data analysis and processing to make decisions. Nevertheless, DS requires more on programming skills to tackle mathematics and statistics, and then give advice to areas that IS will concern, business for example, while IS includes the use of the conclusions coming from data analysis to improve communication between business components, for instance, creating strategies based on data figures about customers' interest.

3.4. Software Development

“Software development refers to a set of computer science activities dedicated to the process of creating, designing, deploying, and supporting software
And Software itself is the set of instructions or programs that tell a computer what to do. In order to understand that, the pervasive of software development and general use of software in real world is important, software can be discovered in anywhere, with the power of internet connecting them .”(Edwards, D .2016) Therefore, the development of software with the most general use not only including specifical personal use but also for sale to public.

Software itself play the role as a product in real life, it can combine with different industry. Game development is a good example for combination of visual arts, music , plots by the foundation and framework of programming. Software is directed face to public, as well as software development. It allows user to use their familiar programming languages with lower cost of study and create their own application with creativity and innovation. The industry of software development can also full with high-standard prerequisites, depends on difficulty of development for specific software. Working with different industry and adopted to develop different software offered software development more general use than other domains.

Compared with computer science, Software is more focus on application, use the concepts from computer science. It may require more familiar with multiple programming languages and apply their creativity and innovation.
On other hand, computer science, more required deep understanding of computation knowledge. They both required extensive knowledge of computation and programming, and problem solving ability. (Maryville university,2020)

Information system also have many differences with software development. Under the solid foundation of programming, information system may emphasis on organizational factors, specific reference to information, and creating systemic solution for information processing.(Sethi, M., & Sharma, A. n.d.)

Meanwhile, Data science as a popular major, some software engineering skill must overlap with software development. It required programming language to achieved automating processes and platform development. On this point, data science is like software development, instead of general development and multiple-specialization, data science processing data and may focus on statistics. Therefore, data science can provide big-data and help analysis data during the development of software, and software development can customize data-related .(Przybyla, M. 2020)

4. Comparative Analysis

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

Project	Competency	Name 1	Name 2	Name 3	Name 4
Data Science	Use of Modeling and Statistics Tools	3	1	1	1
	Programming Languages Skills	2	2	1	1
	Data Analysis Skills	3	2	3	2
	Mathematics	3	2	2	0
	Use of Database	1	1	1	1
Computer Science	Programming Languages Skills	2	2	1	1
	Logical Thinking	2	3	2	2
	Problem-Solving	1	3	2	3
	Mathematics	3	2	2	0
	Advanced knowledges and techniques for computer areas	0	1	1	0
Information Systems	Team Collaboration	2	3	3	3
	Use of Management Tools	1	2	2	2
	Paper and Face-to-face Communication Skills	0	2	3	3
	Leadership	1	2	3	3
	Knowledge Related to Information System	2	2	3	1
Software Development	Creativity	3	2	3	3
	Programming language	2	2	1	1
	Problem-solving	2	3	2	3
	Innovation	2	3	2	3
	Advanced Knowledges on Application	1	1	1	1

5. Project Allocation and Justification

Project	Consultant	Justification
Data Science	**Xiaoyu Liu**	Have a certain degree of data collection and statistics skills. Willing to understand more function on database and increase the proficiency of modern tools.
Computer Science	**Zhongxu Wang**	Want to learn more about practical and theoretical knowledge in computer areas. Also computer science research more mathematics, It happens that I also like math very much
Information Systems	**Yixiao Zhao**	I used to have some experience on a robust information system, which grants me a better capability in this field. I am also very interested in approaching some more advanced systems to benefit my knowledge in this area.
Software Development	**Hengkai Zhang**	Willing to know more about standard procedure on software development, including more advanced programming and application. It will also help my further career path being a software developer.

6. Overview of your allocation Process

Overall, the distribution and allocation of different domains are based on career pathways and personal interests. It allows us to explore the domain that we feel passionate about, and have a better understanding of our domain as well as the difference between them.

Software development is a very popular choice during the allocation. Meanwhile, computer science is challenging and rewarding, requiring more research to complete the domain description. To create a friendly and communicative teamwork environment, We have discussed our understanding of each different domain, compared our ability and attitude with personal justification, and finally determined the optimized solution of allocation.

The time balance between the project with other assignments and revision plans can be difficult to achieve equilibrium. Under different personal preferences for time usage, a well-established group meeting scheduler could effectively solve communication problems and avoid delay of working progress due to personal reasons. Beside fixed group meeting time, it is also important to finish personal profile and domain description on time, as it could avoid wasting more group meeting time for the personal part, and use time more efficiently.

Work distribution between our team is comparatively fair, each member completed their profile and domain descriptions separately. During the group meeting time, we exchange our understanding of our domains, giving pieces of advice that help to compare different domains, and brainstorming ideas for all parts of the report. But a well-organized work scheduler does not always represent the real situation. Delay submission of personal parts also restricts more participants on the active discussion of domains and complete other parts of the report.

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