注意：考試開始鈴響前，不得翻閱試題，並不得書寫、畫記、作答。

國立清華大學 108 學年度碩士班考試入學試題

系所班組別：服務科學研究所 乙組
考試科目(代碼)：管理資訊系統(5301)

一作答注意事項一

1. 請核對答案卷（卡）上之准考證號、科目名稱是否正確。

2. 作答中如有發現試題印刷不清，得舉手請監試人員處理，但不得要求解釋題意。

3. 考生限在答案卷上標記「◣由此開始作答」區內作答，且不可書寫姓名、准考證號或與作答無關之其他文字或符號。

4. 答案卷用盡不得要求加頁。

5. 答案卷可用任何書寫工具作答，惟為方便閱卷辨識，請儘量使用藍色或黑色書寫；答案卡限用 2B 鉛筆畫記；如畫記不清（含未依範例畫記）致光學閱讀機無法辨識答案者，其後果一律由考生自行負責。

6. 其他應考規則、違規處理及扣分方式，請自行詳閱准考證明上「國立清華大學試場規則及違規處理辦法」，無法因本試題封面作答注意事項中未列明而稱未知悉。

1. A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that any involved records cannot be altered retroactively, without the alteration of all subsequent blocks (Wikipedia). By virtue of a combination of technological advancement, Blockchain becomes an emerging technological platform for service innovation. Blockchain leverages such technologies as peer-to-peer networks, digital encryption, Internet, etc. to enable the data validation without a centralized trusted agency. Potentially, the characteristics of a blockchain could affect the practices of business transactions in the digital economy or even triggers service innovation to realized certain value propositions. For example, a person could borrow money via blockchain that transfers cryptocurrency from the other individual person to his/her digital wallet without the intermediary, such as a bank or fund transfer agency. This will change the credit system built in the current financial industries. The other example is that a type of knowledge presented as an academic article could be shared by encrypting the document via blockchain to distribute to others which could protect the authorship and secure the collection of the fee from recipients. By bringing blockchain technology into the knowledge service could affect the current service systems involving publishers, authors, research institutes, and libraries.

   By bearing this understanding of the potential impacts from adopting blockchain technologies for information services, please answer the following questions:

   (1) Viewing a university campus as a living environment, people (faculty, students, staffs, etc.), facilities (restaurants, dormitory, gymnasium, etc.), and activities (course registration, course exam, sports competition, etc.) compose the major interaction networks in such an educational service system. Please specify an existing service on campus that you will enhance it using blockchain technologies. Please draw a diagram to describe the interactions among the involved actors in this service system you identified.

Then, specify the changes of the interactions after you apply blockchain technologies to innovating the service system. **(15%)**

(2) Please analyze the benefits and hurdles of implementing your innovated service system. **(10%)**

2. Fake news is a buzzword nowadays. Have you ever thought the news you read is a fake news? Then, how could we differentiate between a fake news and a real news? A news reporter (journalist) could be regulated by his/her employer, the news agency, which bears the credibility from the general public. How about the self-media that individuals can post any messages that could be circulated quickly throughout the Internet to reach as many people as possible. That is, how could we tell the information published by an individual real or fake?

You may take or not take courses related to this research area or the techniques which can be used for classifying news into fake or real. You may use your intuition in answering the following questions.

(1) If I send you 1000 posts written in Chinese related to the local election held in Taiwan recently. Please invent a method that could effectively classify these news reports into two classes: fake or real. You can set up your assumptions or conditions that allows you to design your method properly or enables you to better tackle the task I gave you. **(15%)**

(2) It is not about fake or real if a person's post releases his/her perspective toward things happened. For example, to comment on the Kaohsiung major elected, one person may appraise his campaign strategy; however, the other person may condemn the major-elected by mentioning his intention to build a strong tie with China. Given this diversity of perspectives from the general public expressing in self-media, e.g., Facebook, ptt, etc., how could we capture the evolution of opinions from a large set of posts as a certain event occurred is not

an obvious task. Please propose a method that you plan to adopt to effectively capture the evolution of opinions by periodically collecting posts from self-media and visualizing it to facilitate people to understand what's going on. Note that you may specify the input, process, output, so that we can better understand how the information is processed. **(10%)**

3. According to Wikipedia, an Explainable AI (XAI) or Transparent AI is an artificial intelligence (AI) whose actions can be trusted and easily understood by humans, contrasting with the concept of the "black box" in machine learning. For instance, recent research has indicated the importance of making users understand how algorithms are used on social media sites to influence the types of newsfeed and advertisements we see daily.

   (1) In plain language, please explain WHY the explainability/transparency of AI is important using a real-life example. Please do not use the social media example mentioned above. **(10%)**

   (2) Propose a solution regarding how we can better design future information systems that take into account explainable AI. **(15%)**

4. (1) Please briefly state an Internet of Things (IoT) application that is most memorable to you, and explain why. **(10%)**

   (2) If you were asked to design an information system to help people cultivate good water intake behavior, how will you approach designing such a system? Please clearly state the main features/functions of such system, as well as how you are going to build such system with technology. Keep in mind that an information system can be any forms of technology, such as mobile applications, sensing/monitoring devices, or smart water bottles. **(15%)**