The University of Nottingham Ningbo China

SCHOOL OF COMPUTER SCIENCE

A LEVEL 1 MODULE, SPRING SEMESTER 2023-2024

Professional Ethics in Computing (COMP3056 UNNC)

Time allowed: **TWO Hours**

Candidates may complete the front cover of their answer book and sign their desk card but must NOT write anything else until the start of the examination period is announced.

Answer all TWO questions.
All questions are worth 25 marks each, hence the total mark is 50.
(Each question is worth equal marks)

No calculators are permitted in this examination.

Dictionaries are not allowed with one exception. Those whose first language is not English may use a standard translation dictionary to translate between that language and English provided that neither language is the subject of this examination. Subject specific translation dictionaries are not permitted.

No electronic devices capable of storing and retrieving text, including electronic dictionaries, may be used.

DO NOT turn your examination paper over until instructed to do so

ADDITIONAL MATERIAL: _British Computer Society Code of Conduct_.

INFORMATION FOR INVIGILATORS: Exam papers must be collected at the end of the exam.

Question 1 (25 marks)

a) Answer the following questions about *Privacy*.

   (i) Explain the idea of privacy as concealment, according to Richard Posner. [3 marks]

   (ii) Give one argument in favour of privacy as concealment, and one against. [2 marks]

   (iii) Explain the motivation for Solove's Taxonomy of Privacy. [3 marks]

b) Answer the following questions about *Computer Failure and Trust*.

   (i) List five different key reasons for computer failures. [5 marks]

     Hint: Your answer should be a simple list with one line per item.

   (ii) Give an example of when a programmer would be responsible for a software error with reference to Birsch's 3 criteria. [4 marks]

c) Answer the following questions about Computing and Self.

   (i) Which of these statements are true, and which are false? [4 marks]

     A. **Griefing** is when one or more people spoil the enjoyment or activity of other online users for their own pleasure, especially in the context of online games.
     B. **Trolling** is when a person deliberately sets up an ugly persona on the internet.
     C. A **cyberbully** is someone who uses the internet to harass a particular target, often using fake identities or public web sites to enable the harassment.
     D. **Self-concept** is the collection of ideas and feelings that we have about ourselves.

   (ii) The internet encourages people to develop sociopathic behaviour. Give reasons that support this statement. [4 marks]

Turn over

Question 2 (25 marks)

Please read the following scenario carefully and answer the questions.
All agents and events in this scenario are fictitious.

The Horseshire Health Service (HHS) is seeking to procure a heart disease alert system from Zing Software Development Company. Zing have used state-of-the-art machine learning techniques to develop the system. A medical doctor can enter a patient's personal data and medical measurements and the system is able to give an alert for risk of heart disease. If the system indicates high risk, then the medical doctor can investigate further and prescribe appropriate lifestyle changes and/or medication to prevent heart disease.

Erin works as a programmer and software tester for HHS and she has been working on the testing team for the new heart disease alert system. Whenever she identifies a failed test, the correct procedure is to raise a fault report form which is then received by both HHS and Zing and needs to be formally resolved, typically with a software fix.

The tests go well until, when she is almost complete, she performs a test based on historical data, at which point she determines that the system is biased for an ethnic minority population that represents 2% of the Horseshire population. In particular, the system will significantly underestimate risk of heart disease within this ethnic minority. Erin is concerned by her discovery of this bug and is not sure what to do. Because she is a programmer and knows the system, she is aware that if the bias is genuine, it will be hard to fix. Dealing with the bug could be costly and she estimates would delay the release of the system by several weeks. With this information, these are some options that she considers:-

(i) Formally complete and raise a fault report form.

(ii) She may have made a mistake running the test, so she should keep quiet. She reasons that if it is a genuine problem, another tester will also find it and raise it.

(iii) Claude, one of the lead developers at Zing, has become her friend over the course of the project. To save him from embarrassment, she should talk to him informally first, rather than raising a formal fault report. She reasons that Claude may be able to fix the problem quickly and quietly, causing less trouble.

(iv) She should discuss the bug with her manager Hamley first to decide on the correct course of action, given the potential negative consequences of the bug.

a) Identify all the agents and their relationships in this scenario. [5 marks]

b) Discuss Erin's options (i) to (iv) in relation to virtue theory, act utilitarianism, deontological ethics and the ethics of care. [8 marks]

c) Identify one item from the BCS Code of Conduct that could be breached for each of the options (i) to (iv), and explain why. [8 marks]

Suppose Erin chooses option (iv) and talks to Hamley. He tells Erin to take no further action on the grounds that the bug only affects a small number of people, if any at all, and so long as it is working well for the majority of people, that is the most important thing.

d) Discuss Erin's further options, with professional and ethical considerations, following Hamley's instruction. [4 marks]

[END OF EXAM PAPER]