2024 EXAMINATIONS

Part I

COMPUTING AND COMMUNICATIONS – On-line Assessment

Available Time [1.5 hours]

SCC.141 PROFESSIONALISM IN PRACTICE

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*Candidates are asked to answer **ALL THREE** questions; each question is worth a total of 25 marks.*

Use a <u>single</u> answer booklet for all question answers in this paper.

Question 1

1.a. A company wants to develop a new mental health app using a value sensitive design approach. Define value sensitive design.

[2 marks]

1.b. The company wants to understand more about the potential end-users' values and how this might impact on their use of the mental health app.
Identity an appropriate method that the company could use, and one advantage and one disadvantage of your chosen method.

[3 marks]

1.c. Give an example of both a functional and non-functional requirement for the mental health app.

[3 marks]

1.d. An AI recruitment (hiring) tool is developed to identify the best candidates based on data available about the performance of past and current employees of a company. Explain why this could be unfair.

[2 marks]

1.e. Which UK law would AI systems violate if they discriminated against one or more groups of people?

i. AI Act (2023)
ii. Equality Act (2010)
iii. Computer Misuse Act (1990)
iv. GDPR

[1 marks]

1.f. Using the below, fill in the BLANK area in the following statement:
In the UK, BLANK is responsible for investigating violations of GDPR. BLANK is responsible for investigating claims of discrimination by AI systems.

i. National AI Commission
ii. Information Commisioner's Office
iii. Digital Consumer Protection Commission
iv. Equality and Human Rights Commission

[2 marks]

[Question 1 continues on next page]

[Question 1 continues]

1.g. You are developing an AI recruitment (hiring) tool. How would you apply the principle of "curiosity"?

[2 marks]

1.h. IBM's AI FactSheets (documentation showing how an AI was designed and tested) is an example of a/an _____

i. Best practice
ii. Legal requirement
iii. Industry standard

[1 marks]

1.i. The British Computer Society (BCS) charter requires the establishment and maintenance of sound ethical foundations for the use of computers. This code of conduct and ethics governs computing professionals over the following areas: public interest, competence and integrity, duty to relevant authority and duty to the profession.

i. List two codes of conduct that relate to *professional conduct in the public interest* and give an example for each case.

[4 marks]

ii. Discuss one example where *professional competence and integrity* caused harm to users and the public.

[1 marks]

iii. Explain through this example what harm(s) was (were) caused and reason(s) behind it (them)**.**

[3 marks]

iv. Give details on any implication for liability and negligence on behalf of the company or individuals involved.

[1 marks]

[Total 25 marks]

Question 2

2.a. What is digital accessibility and why is it important?

[3 marks]

2.b. The Web Content Accessibility Guidelines (WCAG) inform designers and developers how to make digital products and services more accessible to all users.
The WCGAC are based on four principles for designing accessible content: *perceivable, operable, understandable, and robust*.
Below are "definitions" that relate to the four principles for designing accessible content.
Which of the definitions below accurately relate to Perceivable? [Select one]

i. Users must be able to use the digital product's interface. The interface cannot require interaction that a user cannot perform.
ii. Users must be able interpret the information and the operation of the user interface.
iii. Users must be able to recognise all essential information on the screen, and it must be conveyed to multiple senses.
iv. Users must be able to utilise supporting assistive technologies and ensuring that, as devices and user agents evolve, the digital product remains accessible.

[1 marks]

2.c. The WCGAC are based on four principles for designing accessible content: *perceivable, operable, understandable, and robust*.
Below are "definitions" that relate to the four principles for designing accessible content.
Which of the definitions below accurately relate to Robust?

i. Users must be able to utilise supporting assistive technologies and ensuring that, as devices and user agents evolve, the digital product remains accessible.
ii. Users must be able to recognise all essential information on the screen, and it must be conveyed to multiple senses.
iii. Users must be able interpret the information and the operation of the user interface.
iv. Users must be able to use the digital product's interface. The interface cannot require interaction that a user cannot perform.

[1 marks]

[Question 2 continues on next page]

[Question 2 continues]

2.d. The WCGAC are based on four principles for designing accessible content: perceivable, operable, understandable, and robust.
Below are “practical examples that relate to digital functionality or content” of one of the four accessible design principles.
Which of the examples below relate to Perceivable?

i. Adding captions, transcripts, and audio descriptions to videos.
ii. Ensuring slideshows and videos have all the necessary controls available.
iii. Ensuring your digital product has predictable navigation.
iv. Testing keyboard-only navigation.

[1 marks]

2.e. The WCGAC are based on four principles for designing accessible content: perceivable, operable, understandable, and robust.
Below are “practical examples that relate to digital functionality or content” of one of the four accessible design principles.
Which of the examples below relate to Operable?

i. Adding text alternatives to all non-decorative images and essential icons.
ii. Adding keyboard and touchscreen support to all active elements.
iii. Writing simply—don't use a complex word when a simple one will do.
iv. Testing with different screen reader technologies.

[1 marks]

2.f. The WCGAC are based on four principles for designing accessible content: perceivable, operable, understandable, and robust.
Below are “practical examples that relate to digital functionality or content” of one of the four accessible design principles.
Which of the examples below relate to Understandable?

i. Ensuring colour is not the only method of conveying meaning.
ii. Giving users enough time to fill out a form or a method to extend the time.
iii. Ensuring error messages are clear and easy to resolve.
iv. Ensuring all the content and functionality can be accessed, regardless of device size or orientation.

[1 marks]

[Question 2 continues on next page]

[Question 2 continues]

2.g. The WCGAC are based on four principles for designing accessible content: perceivable, operable, understandable, and robust.
Below are "practical examples that relate to digital functionality or content" of one of the four accessible design principles.
Which of the examples below relate to Robust?

i. Adding text alternatives to all non-decorative images and essential icons.
ii. Ensuring slideshows and videos have all the necessary controls available.
iii. Ensuring your digital product has predictable navigation.
iv. Testing with different screen reader technologies.

[1 marks]

2.h. What is usability and why it is important?

[4 marks]

2.i. How can usability be evaluated? Describe two methods as part of your explanation.

[3 marks]

2.j. Explain the difference between the concept of "digital exclusion" and "digital divide".

[2 marks]

2.k. List 3 risk factors for digital exclusion.

[3 marks]

2.l. Provide two explanations for greater digital exclusion for females than males.

[2 marks]

2.l. Provide two reasons why older adults are consistently the <u>most</u> digitally excluded demographic.

[2 marks]

[Total 25 marks]

Question 3

3.a. Why is if often more fruitful to focus on error-tolerance rather than error-avoidance, and how can we build error-tolerant systems?

[4 marks]

3.b. What can we learn from looking at high-profile examples of software failure? (Refer to an example in your answer)

[3 marks]

3.c. The CIA security triad of Confidentiality-Integrity-Availability is a guiding model in information security and a strategy to include controls that minimise threats to software-based systems.

i. Describe the goal sought for each component of the CIA guiding model: confidentiality, integrity, and availability.

[3 marks]

ii. Using the STRIDE threat model, identify the intended "threat action" for each component, and provide a concrete example of how such a threat could be executed.

[3 marks]

3.d. The following question relates to security design principles:

i. List *two* security design principles proposed by Saltzer and Schroader for protecting information in software-based systems.

[2 marks]

ii. Using *examples*, explain how each principle you have listed can be used to guide the design and contribute to an implementation without security flaws.

[2 marks]

3.e. Which legal principle does mass surveillance violate?

i. Probable cause
ii. Habeas corpus
iii. Disclosure
iv. Freedom of assembly

[1 marks]

[Question 2 continues on next page]

[Question 2 continues]

3.f. Please select whether the blank sections in the statement below are 'positive' or 'negative'.
Surveillance used for anti-terrorism supports _____ freedom at the expense of _____ freedom.

[2 marks]

3.g. Explain how the panopticon works and how it relates to ONE contemporary form of surveillance**.**

[3 marks]

3.h. Define "rebound effect" and explain how it occurs.

[2 marks]

[Total 25 marks]

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