Program: BSc Computer Science
Course code: BCS1110
Examiners: dr. Ashish Sai & dr. Thomas Bitterman
Date/time: 24-Oct-2023, 17:00 to 19:00
Format: Closed book exam
Allowed aids: Pens, simple (non-programmable) calculator from the DACS list of allowed calculators

Sample Exam Paper (2)

BCS1110
2023/24

Multiple Choice Question

Instructions: For the following multiple-choice questions (MCQs), only one answer is correct. Please select the most appropriate option.

3p **1a** Which statement accurately describes Two-Factor Authentication (2FA)?:

- (a) 2FA involves using a username and a strong password for authentication
- (b) 2FA requires users to authenticate using their fingerprint and retinal scan
- (c) 2FA involves using two different forms of verification, such as something you know
- (d) 2FA is primarily used for remote data backup and recovery

3p **1b** Which of the following statements accurately describes the main difference between IPv4 and IPv6?

- (a) IPv4 and IPv6 have identical address formats, differing only in their implementation no
- (b) IPv4 is more secure than IPv6 due to its longer address format no
- (c) IPv6 is the older version, while IPv4 is the newer no
- (d) IPv4 uses 32-bit addresses, while IPv6 uses 128-bit

3p **1c** In a DFA, the set of states includes

- (a) Both accepting and non-accepting states
- (b) Only the initial state
- (c) Only the accepting state
- (d) A single state called the "halt" state

3p **1d** What is the primary function of the **git pull** command?

- (a) Fetch and merge changes from a remote repository into the current branch ←
- (b) Push changes to a remote repository
- (c) Create a new branch in the local repository
- (d) Stage changes for the next commit

Private Key used for decryption

3p **1e** In public key cryptography, which key is used for encryption?

- (a) Public key
- (b) Private key
- (c) Shared key
- (d) Symmetric key

1 ⟺ P

P ⟺ P

3p. **1f** Which logic gate performs the following operation: the output is true (1) if and only if one input is true (1), but not both?

- (a) AND gate
- (b) OR gate
- (c) XOR gate
- (d) NOT gate

Course Theme and Computing Hardware

3p **2a** Each text message contains a date (8 bytes), time sent (4 bytes), up to 160 characters of text, and the sender's phone number (8-byte number). How many text messages can you store on a 128GB hard drive?

128 GB = $128 \cdot 10^9$ bytes

message size = 8 + 4 + 160 (1) + 8

= 180

number of mes. = $\frac{128}{180} \cdot 10^9 =$

6p **2b** In computer science, abstraction is a fundamental concept that simplifies complex systems by hiding unnecessary details. How does abstraction benefit software development?

- API

Approch to simplify complex systems by losing a higher-level overwe, rather than focusin on un-necessary details

-> High level programming languages

-> API

2p **2c** Develop a truth table for the logical statement (X AND Y) OR (NOT Z), and construct a circuit diagram that mirrors this logical expression (**2d**) .

4p **2d** :

Algorithm and version control

4p **3a** With GUIs everywhere, why is the command line still in use?

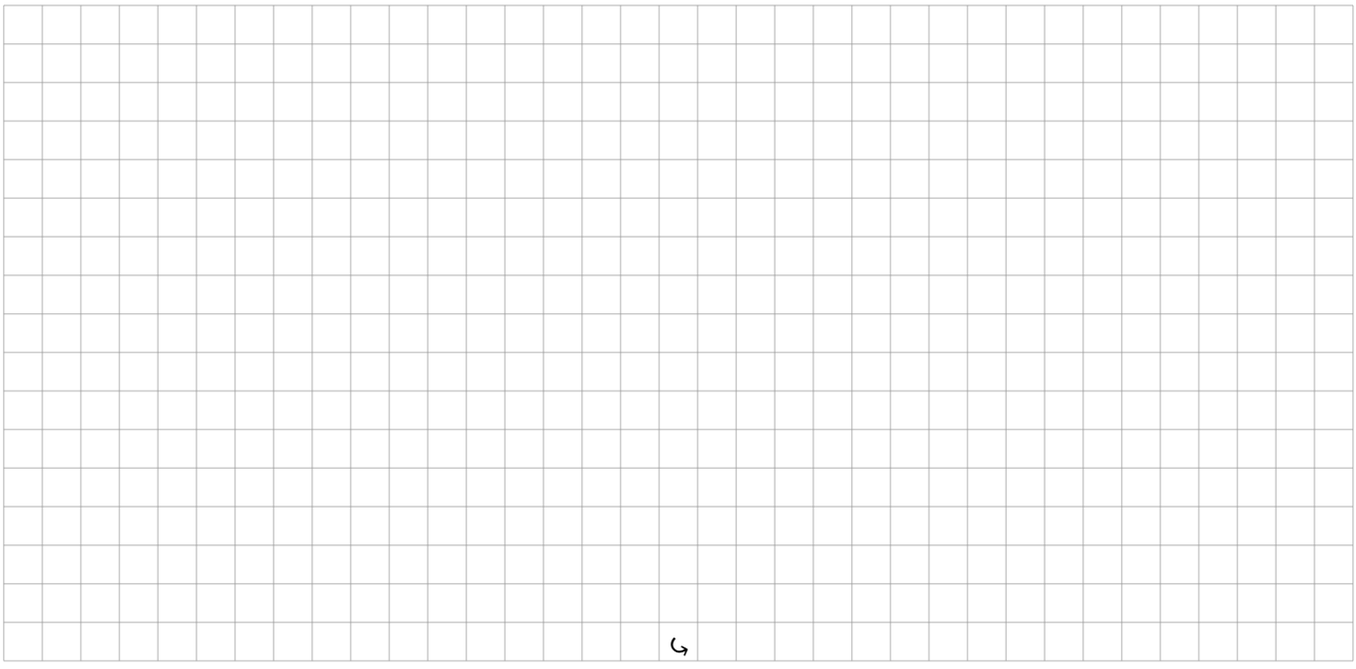
6p **3b**: Design a flowchart and write pseudocode for the process of preparing breakfast, taking into account different procedures for a weekday and a weekend. Include activities like brewing coffee, toasting bread, and frying eggs. Ensure that the flowchart and pseudocode outline distinct steps based on whether it's a weekday or weekend.

Theory of Computation

4p **4a** Can you explain the key differences between Deterministic Finite Automata (DFAs) and NFAs, and in what scenarios NFAs are more advantageous?

8p **4b** Draw a DFA for the language accepting strings ending with ‘011’ over input alphabets ∑ =

{0, 1}



6p **4c** Design an NFA that recognizes the language L = { w ∈ {0,1} | w ends in 010 or 101}.

Computer Networks

4p **5a** Describe how DNS spoofing works and why it is a concern for Internet users.

6p **5b** Describe the role of routers in connecting a Local Area Network (LAN) to an Internet Service Provider (ISP).

4p **5c** Define the following terms: LAN, WAN, MAN, Ethernet, JSON, API

Information Security

4p **6a** What does it mean that a messaging service is “end-to-end encrypted”? What is an example of a messaging service with “end-to-end encryption”? What is an example of a messaging service that does not “end-to-end encrypt” your messages?

4p **6b** Role of HTTPS: Explain the difference between HTTP and HTTPS in web browsing.

4p **6c** Discuss the significance of strong password policies, including password complexity requirements and periodic changes. Explain why weak passwords are a security risk.

Project (JavaCraft)

As a part of this course, you worked on a group project titled **JavaCraft**. In the following questions (7a, 7b and 7c), you should provide answers based on your work on the project.

2p **7a** What improvements or additional features could be added to enhance the game's functionality and user experience?

2p **7b** What is the use of the **clearScreen()** function, and why is it needed in the game?

2p **7c** Explain the role of the getCountryAndQuoteFromServer() function and its connection to the game's narrative.
