

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

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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
- ☐ b IPv4 is more secure than IPv6 due to its longer address format
- ☐ c IPv6 is the older version, while IPv4 is the newer
- ☐ 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

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

- ☐ a Public key
- ☐ b Private key
- ☐ c Shared key
- ☐ d Symmetric key

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

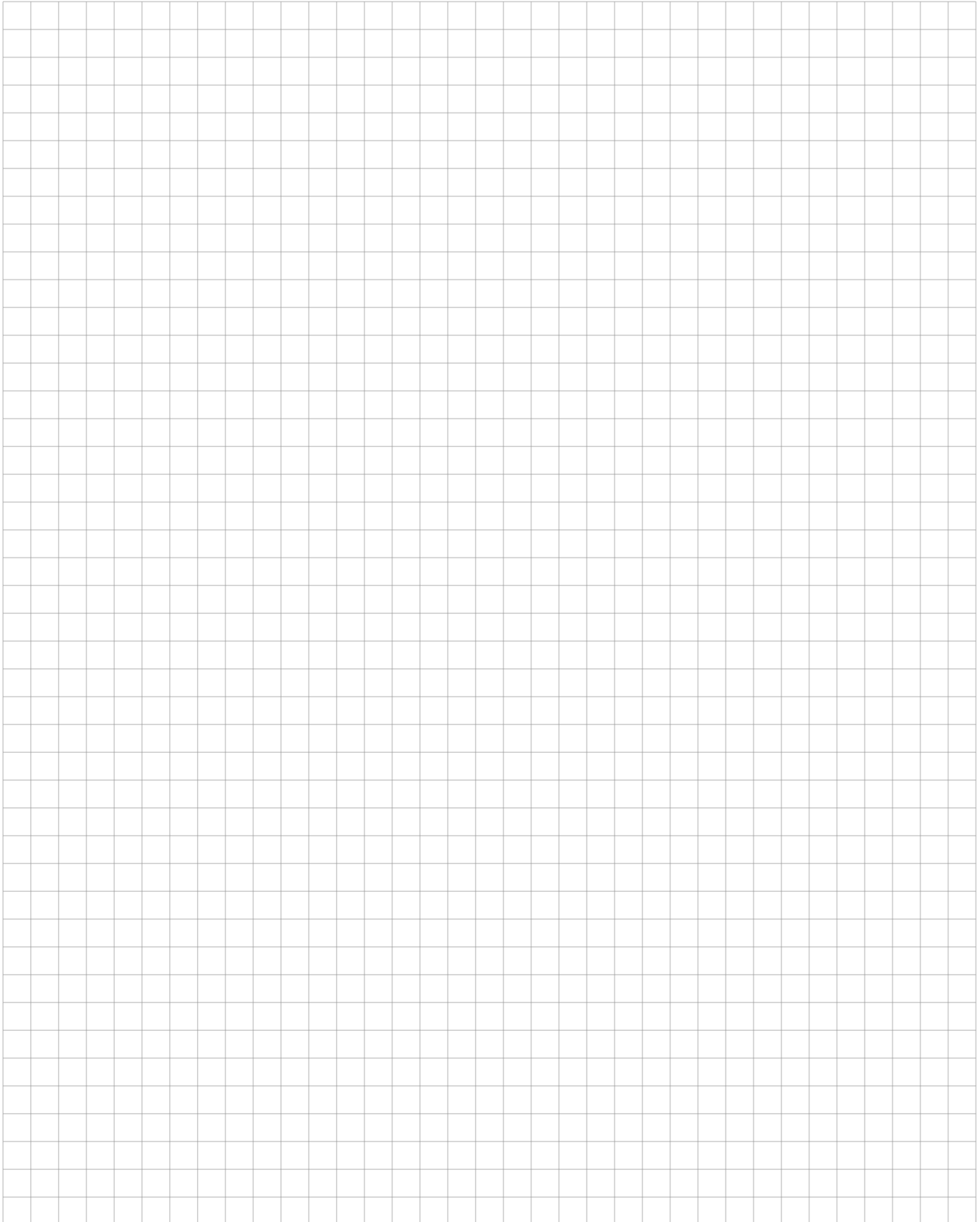
3p **2a** Each text message contains a date (8 bytes), time sent (4 bytes), up to 160 characters of text, and the sender's phone number (8-byte number). How many text messages can you store on a 128GB hard drive?

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

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



Theory of Computation

4p

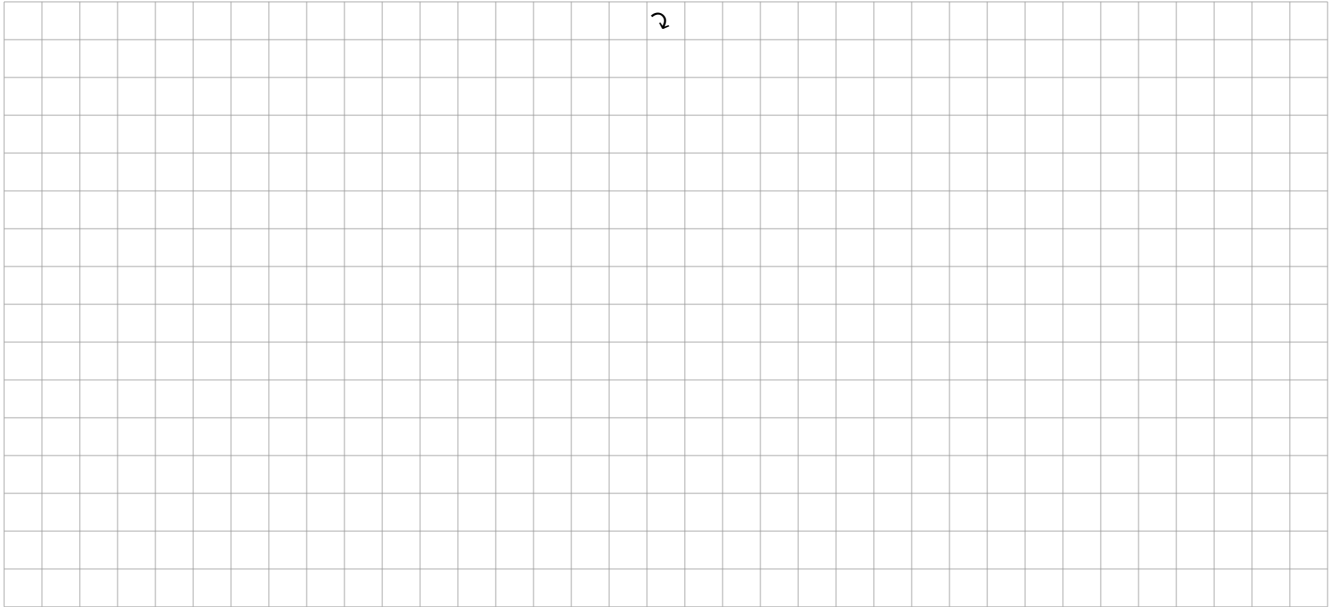
4a Can you explain the key differences between Deterministic Finite Automata (DFAs) and NFAs, and in what scenarios NFAs are more advantageous?

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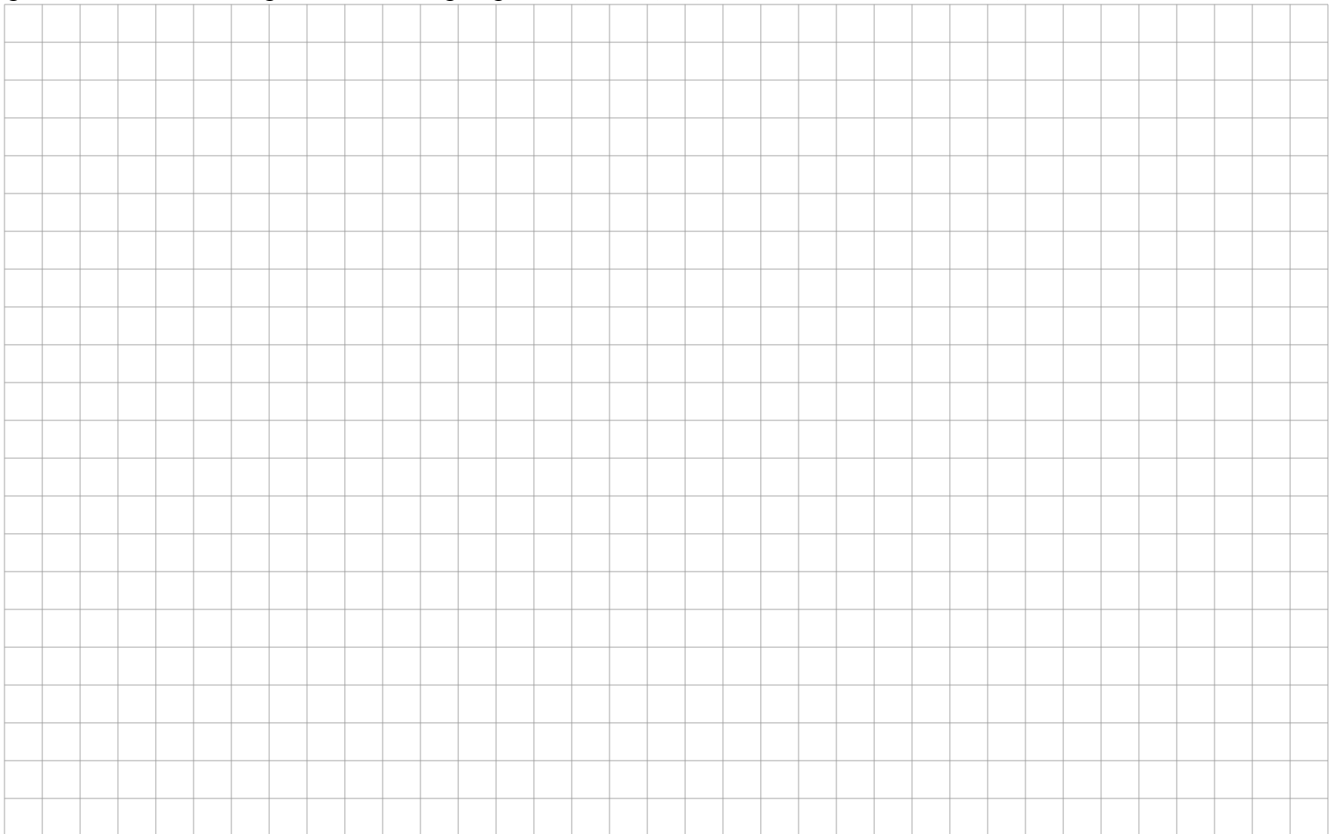
8p

4b Draw a DFA for the language accepting strings ending with '011' over input alphabets $\Sigma =$

 $\{0, 1\}$



6p **4c** Design an NFA that recognizes the language $L = \{ w \in \{0,1\}^* \mid w \text{ ends in } 010 \text{ or } 101 \}$.



Computer Networks

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

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

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

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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?

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

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

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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?

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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.

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