

**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

**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** Example multiple choice question. I think the instructor for this class is really mean because:
- a He gives us really long, mean assignments
  - b He makes us show up for class on time
  - c He asks mean multiple choice questions
  - d None of the above. He is, in fact, sweet and charming
- 3p **1b** According to Moore's Law, approximately how often was the number of transistors on a computer chip supposed to double?
- a Every 1 year
  - b Every 2 years
  - c Every 5 years
  - d Every 10 years
- 3p **1c** In a deterministic finite automaton (DFA), what is the number of transitions defined for each symbol in the alphabet for every state?
- a Zero
  - b One
  - c More than one
  - d Two
- 3p **1d** Which service is NOT typically part of Amazon's AWS?
- a Amazon S3 (Cloud Storage)
  - b Amazon Kindle
  - c Manages Servers
  - d Website Hosting

3p **1e** Which of the following is NOT a common method used in Two-Factor Authentication (2FA)?

- a Something you know (password)
- b Something you have (mobile device)
- c Something you like to eat (a type of food)
- d Something you are (fingerprint)

3p. **1f** Which encryption uses a different key for encrypting and decrypting data?

- a Symmetric
- b Asymmetric
- c Monometric
- d CSRF

**Course Theme and Computing Hardware**

3p **2a** Identify some advantages and disadvantages of a using a Biometric authentication system in a company (Hint: think about privacy)?

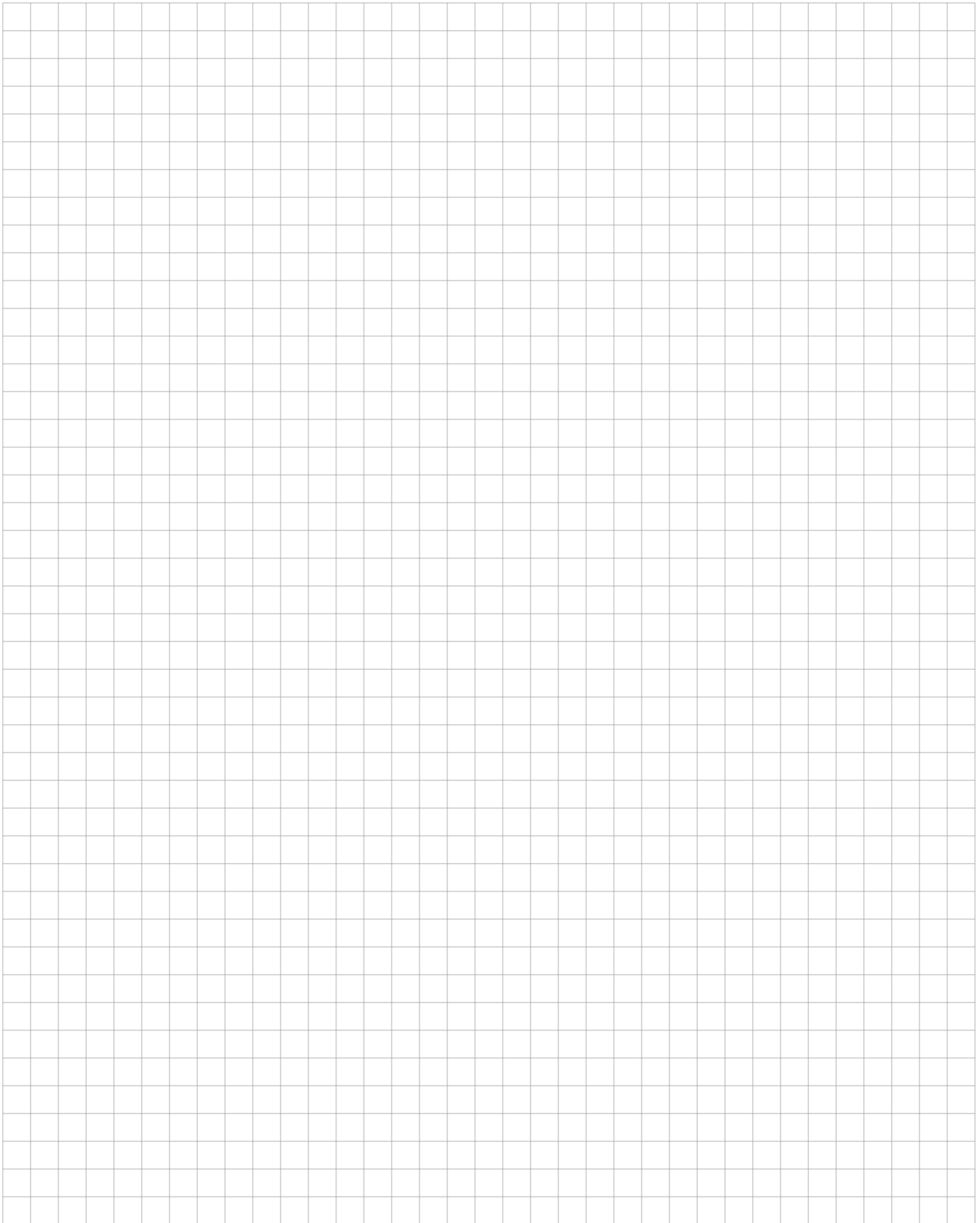

6p **2b** Convert the following binary numbers to decimal:

- a.  $(01101)_2$
- b.  $(011110)_2$
- c.  $(1011000)_2$
- d.  $(111111)_2$
- e.  $(1101)_2$
- f.  $(111110)_2$


2p **2c** Complete the truth table for the logical statement A OR (B AND (NOT C)) and draw the circuit diagram for this system (**2d**).

4p **2d**

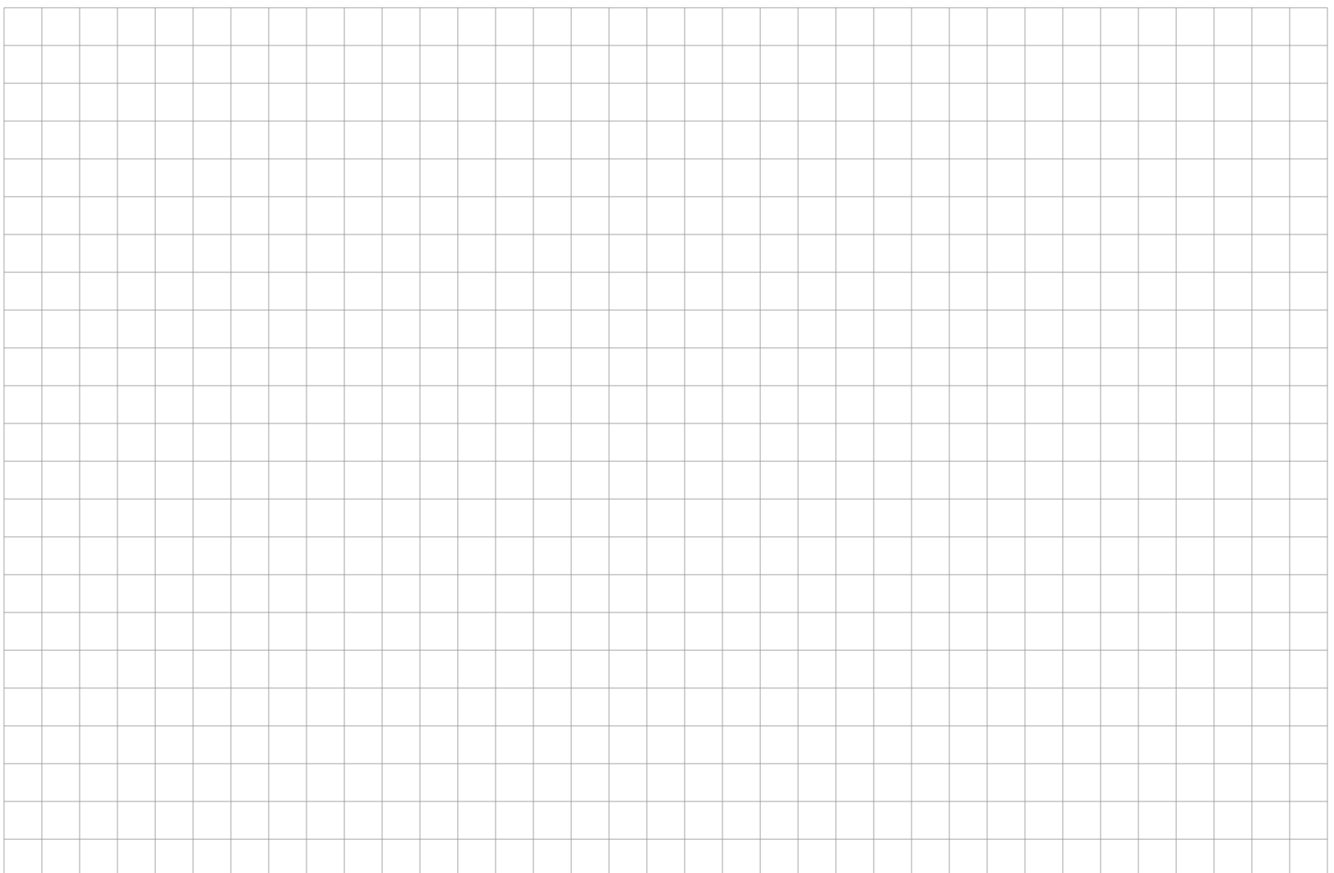
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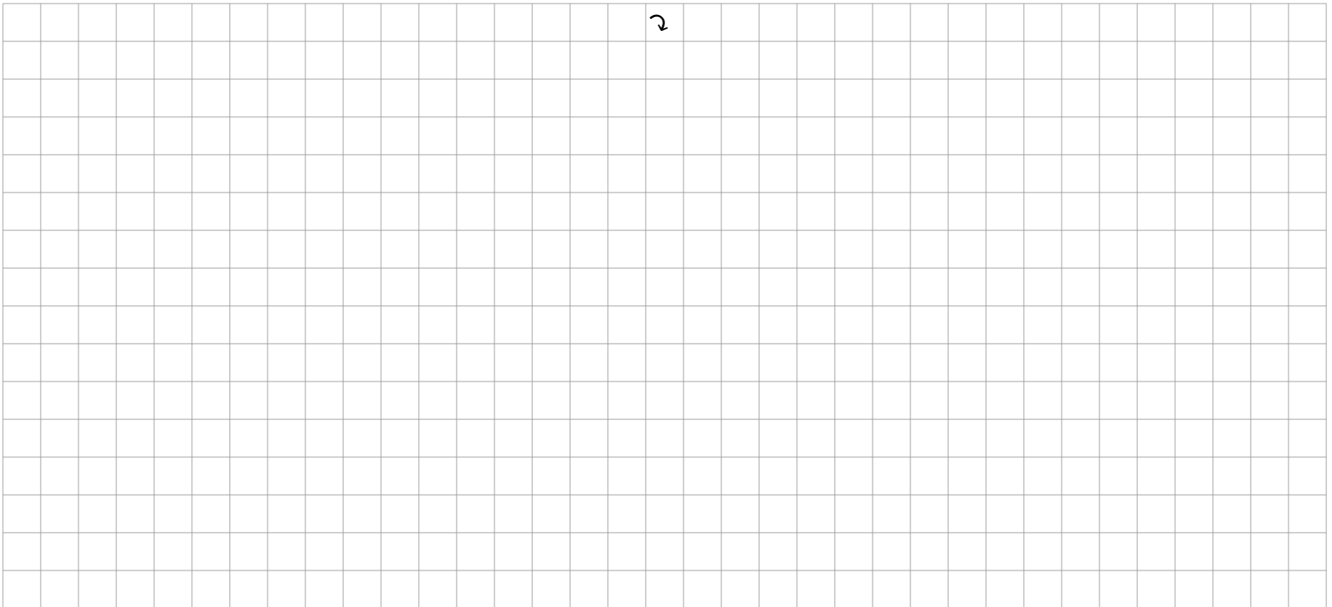
**Algorithm and version control**

4p **3a** Name a type of algorithm that is not a program

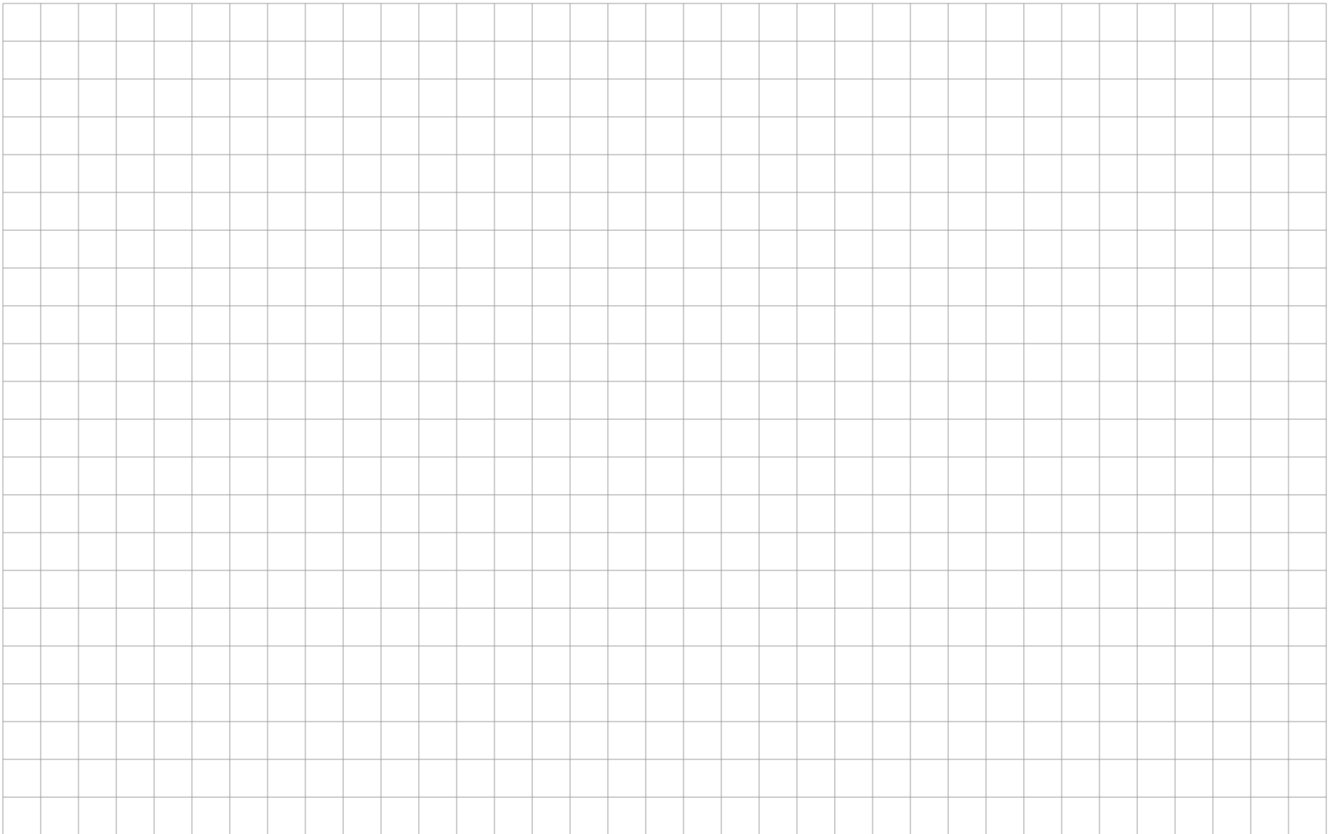

6p **3b:** Create a flowchart and pseudocode for the process of getting ready to leave the house in the morning. Include such activities as hitting the snooze button several times, taking a shower, getting dressed, and so on. Make sure to have different procedures depending on whether it is a weekday or weekend







6p **4c** Let  $\Sigma = \{a, b\}$  and let  $L = \{baa\}$ . Design a DFA for  $L$ .





### Computer Networks

4p      **5a**      Explain what is IPv4. Why was there a need to move from IPv4 to IPv6?


6p      **5b**      What are the different types of IP addresses (static, dynamic) and where are they typically used?



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4p

**5c** Why do we need a transport layer in TCP/IP? Name at least two protocols used in this layer


**Information Security**

4p **6a** Describe the process of Two-Factor Authentication (2FA). Explain how it adds an additional layer of security compared to single-factor authentication.


4p **6b** Explain how Social Engineering attacks occur. Include examples and discuss preventive measures that can be taken.


4p **6c** Describe a type of attack a hacker might perform to steal your data. In your answer, you should include: The name of the attack, a short description of the attack and Why this type of attack could be bad for a user


**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** In order to get which flag to draw, you had to call a function to interact with a website. Can you name this function (or the command you would enter to invoke this function)? If your group did draw a flag, please name the flag you drew.


2p **7b** You had to design a Finite State Automata as a part of your secret door logic, can you draw the FSA you submitted with your project (the FSA does not have to be accurate, we will accept it as a valid solution as long as it somewhat resembles your submission).



2p

**7c** Can you name the new blocks you included in your source code?
