# AQA

## A-level
## COMPUTER SCIENCE

Paper 1

June 2023

# Preliminary Material

**To be opened and issued to candidates on or after 1 September 2022, subject to the instructions given in the Teacher's Notes (7517/1/TN).**

**Note**

- The Preliminary Material and Skeleton Program are to be seen by candidates and their teachers **only**, for use during preparation for the June 2023 examination. They **cannot** be used by anyone else for any other purpose, other than that stated in the instructions issued, until after the examination date has passed. They must **not** be provided to third parties.

**Information**

- A Skeleton Program is provided separately by your teacher and must be read in conjunction with this Preliminary Material.

- You are advised to familiarise yourselves with the Preliminary Material and Skeleton Program before the examination.

- A copy of this Preliminary Material and the Skeleton Program will be made available to you in hard copy and electronically at the start of the examination.

- You must **not** take any copy of the Preliminary Material, Skeleton Program or any other material into the examination room.

**7517/1/PM**

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**INSTRUCTIONS  FOR  CANDIDATES**

**Electronic Answer Document**

Answers for all questions in all sections must be entered into the word-processed document made available to you at the start of the examination and referred to in the question paper rubrics as the **Electronic Answer Document**.

**Preparation for the examination**

You should ensure that you are familiar with the **Preliminary Material** and the **Skeleton Program** for your programming language.

**Dastan**

Dastan is a two-player game in which each player takes turns to move one of their five pieces on a six-by-six square grid. Each player has one mirza (ruler) and four standard pieces. Each player has a kotla (fortress).

The winner is the player who has the highest score when the game ends. The game ends when a player manages to move their mirza into the square containing the opponent's kotla or they capture the opponent's mirza.

The starting position of the game is shown in **Figure 1**. Player one's mirza piece is represented by 1, their other pieces by ! and their kotla by K. Player two's mirza piece is represented by 2, their other pieces by " and their kotla by k. Row numbers are shown on the left-hand side and column numbers at the top.
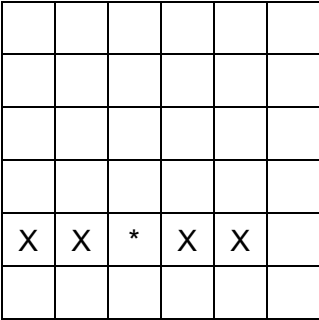
**Figure 1**
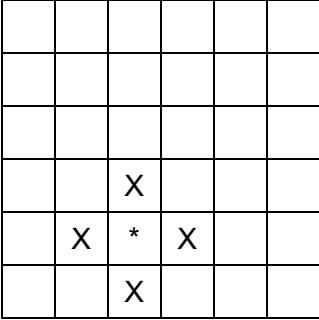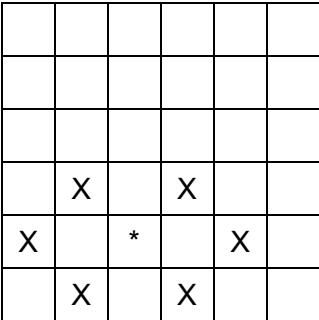
|   | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 |   |   | K1 |   |   |   |
| 2 |   | ! | ! | ! | ! |   |
| 3 |   |   |   |   |   |   |
| 4 |   |   |   |   |   |   |
| 5 |   | " | " | " | " |   |
| 6 |   |   |   | k2 |   |   |

Each player has a queue of five move options from which they can select the type of move they wish to make. On their turn, a player will make a selection from their queue of move options, choose one of their pieces to use with the move option and select the square to move to. This move is then made on the board. If the piece moved lands in the same square as one of the opponent's pieces then the opponent's piece is removed from the game.

The player can select any one of the first three move options from their queue to use; after use it is added to the rear of the queue.

Each move option has a name and details of how a piece can be moved. The move options are shown in **Figure 2**. The * represents the square currently occupied by the piece that is being moved. All of the move options are shown from the perspective of player two. Each X represents a square that the piece can be moved to.

**Figure 2**

| Move option | Description |
|---|---|
| **Ryott** <br><br> (grid showing a piece at * with X one square up, down, left, right) | The **ryott** (peasant) move option means a piece can move one square orthogonally from its current position. |
| **Chowkidar** <br><br> (grid showing a piece at * with X marks two squares horizontally and one square diagonally) | The **chowkidar** (guard) move option means a piece can move either exactly two squares horizontally or one square diagonally from its current position. |
| **Faujdar** <br><br> (grid showing a piece at * with X X to the left and X X to the right) | The **faujdar** (fort keeper) move option means a piece can move either one or two squares horizontally from its current position. |

**Jazair**

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| X | | X | | X | |
| | | | | | |
| X | | * | | X | |
| | X | | X | | |

The **jazair** (camel-mounted swivel gun) move option means a piece can move either two squares horizontally, two squares forward (either vertically or diagonally) or one square backwards diagonally from its current position.

**Cuirassier**

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | X | | | |
| | X | X | X | | |
| | | * | | | |
| | | | | | |

The **cuirassier** (armoured cavalry with a musket) move option means a piece can move either one or two squares forward, or two squares horizontally followed by one square forward from its current position.

In the game, there is an offer that contains a move option. Before moving a piece, a player can choose to take the move option from the offer, replacing one of the move options in their queue with it. A new move option will then be generated for the offer.

Each player starts the game with a score of 100. Their score decreases when they:
- move a piece – the amount of the decrease is based on how near the front of the queue the chosen move option was
- take the move option from the offer – the amount of the decrease is based on how near the front of the queue the replaced move option was.

Their score increases if:
- they capture an opponent's piece (by 1) or an opponent's mirza (by 5)
- one of their pieces or their mirza is occupying the same square as a kotla (by 5 for their own kotla; by 1 for their opponent's).

**Figure 3** shows the first few turns of a sample game.

**Turn over ►**

**Figure 3**

| Start state | Description | New state |
|---|---|---|
| Board:<br><br>|  | K1 |  |  |<br>|  | ! | ! | ! | ! |<br>|  |  |  |  |  |<br>|  |  |  |  |  |<br>|  | " | " | " | " |<br>|  |  |  | k2 |  |<br><br>Player one's turn<br><br>Player one queue:<br>1. ryott<br>2. chowkidar<br>3. cuirassier<br>4. faujdar<br>5. jazair<br><br>Offer: jazair<br>Player one score: 100 | It is player one's turn and they choose move option 3 (cuirassier) from the queue, the piece in row 2 column 2 and decide to move it forward 2 squares.<br><br>Their score decreases by 7 as they chose the third move option in their queue.<br><br>Their score increases by 5 as their mirza is in the square containing their kotla. | Board:<br><br>|  | K1 |  |  |<br>|  |  | ! | ! | ! |<br>|  |  |  |  |  |<br>|  | ! |  |  |  |<br>|  | " | " | " | " |<br>|  |  |  | k2 |  |<br><br>Player one queue:<br>1. ryott<br>2. chowkidar<br>3. faujdar<br>4. jazair<br>5. cuirassier<br><br>Offer: jazair<br>Player one score: 98 |
| Board:<br><br>|  | K1 |  |  |<br>|  |  | ! | ! | ! |<br>|  |  |  |  |  |<br>|  | ! |  |  |  |<br>|  | " | " | " | " |<br>|  |  |  | k2 |  |<br><br>Player two's turn<br><br>Player two queue:<br>1. ryott<br>2. chowkidar<br>3. jazair<br>4. faujdar<br>5. cuirassier<br><br>Offer: jazair<br>Player two score: 100 | Player two chooses move option 1 (ryott), the piece in row 5 column 2 and decides to move it one square forwards. The square the piece is moving to contains one of the opponent's pieces so that piece is captured.<br><br>Player two chose the first item in their queue, so their score decreases by 1 but is then increased by 1 for capturing a piece.<br><br>Their score increases by 5 as their mirza is in the square containing their kotla. | Board:<br><br>|  | K1 |  |  |<br>|  |  | ! | ! | ! |<br>|  |  |  |  |  |<br>|  | " |  |  |  |<br>|  |  | " | " | " |<br>|  |  |  | k2 |  |<br><br>Player two queue:<br>1. chowkidar<br>2. jazair<br>3. faujdar<br>4. cuirassier<br>5. ryott<br><br>Offer: jazair<br>Player two score: 105 |

Board:

| | K1 | | | |
|---|---|---|---|---|
| | ! | ! | ! | |
| | | | | |
| | " | | | |
| | " | " | " | |
| | | k2 | | |

Player one's turn

Player one queue:
1. ryott
2. chowkidar
3. faujdar
4. jazair
5. cuirassier

Offer: jazair
Player one score: 98

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Player one decides to take the move option in the offer and replaces their ryott with a jazair.

This reduces their score by 8.

The offer is replenished by a randomly selected move option.

Taking the move option from the offer does not count as a move; their score is not increased even though their kotla is occupied.

It is still player one's turn.

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Board:

| | K1 | | | |
|---|---|---|---|---|
| | ! | ! | ! | |
| | | | | |
| | " | | | |
| | " | " | " | |
| | | k2 | | |

Player one's turn

Player one queue:
1. jazair
2. chowkidar
3. faujdar
4. jazair
5. cuirassier

Offer: cuirassier
Player one score: 90

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Board:

| | K1 | | | |
|---|---|---|---|---|
| | ! | ! | ! | |
| | | | | |
| | " | | | |
| | " | " | " | |
| | | k2 | | |

Player one's turn

Player one queue:
1. jazair
2. chowkidar
3. faujdar
4. jazair
5. cuirassier

Offer: cuirassier
Player one score: 90

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Player one chooses move option 1 (jazair, the move option they have just taken from the offer), the piece in row 2 column 4 and decides to move it forward 2 right 2. This captures one of the opponent's pieces.

Player one chose the first item in their queue, so their score decreases by 1 but is then increased by 1 for capturing a piece.

Their score increases by 5 as their mirza is in the square containing their kotla.

It is now player two's turn.

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Board:

| | K1 | | | |
|---|---|---|---|---|
| | ! | | ! | |
| | | | | |
| ! | | | | |
| | " | " | " | |
| | | k2 | | |

Player one queue:
1. chowkidar
2. faujdar
3. jazair
4. cuirassier
5. jazair

Offer: cuirassier
Player one score: 95

**Turn over ▶**

Board:

| | K1 | | | |
|---|---|---|---|---|
| | | ! | | ! |
| | | | | |
| | ! | | | |
| | | " | " | " |
| | | | k2 | |

Player two's turn

Player two queue:
1. chowkidar
2. jazair
3. faujdar
4. cuirassier
5. ryott

Offer: cuirassier
Player two score: 105

Player two chooses move option 1 (chowkidar), the piece in row 6 column 4 (their mirza) and decides to move it right 2.

Player two chose the first item in their queue, so their score decreases by 1.

They no longer have a piece in the square containing their kotla, so they do not get any points for occupying that square.

It is now player one's turn.

Board:

| | K1 | | | |
|---|---|---|---|---|
| | | ! | | ! |
| | | | | |
| | ! | | | |
| | | " | " | " |
| | | | k | 2 |

Player two queue:
1. jazair
2. faujdar
3. cuirassier
4. ryott
5. chowkidar

Offer: cuirassier
Player two score: 104

**END OF PRELIMINARY MATERIAL**

**There is no Preliminary Material printed on this page**