AQA

AS
COMPUTER SCIENCE

Paper 1

June 2016

Preliminary Material

To be opened and issued to candidates on or after 1 March 2016, subject to the instructions given in the Teachers' Notes (7516/1/TN).

Information

- The Preliminary Material is to be seen by candidates and their teachers **only**, for use during preparation for the examination on **Monday 6 June 2016**. It **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. It must **not** be provided to third parties.
- A Skeleton Program is provided separately by your teacher and must be read in conjunction with this Preliminary Material.
- Candidates are advised to familiarise themselves with the Preliminary Material and Skeleton Program before the examination.
- Another copy of this Preliminary Material will be made available to you in the examination. You will also be given access to the Skeleton Program and Data File 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.

There is no Preliminary Material printed on this page

INSTRUCTIONS FOR CANDIDATES

The question paper is divided into **three** sections and a recommendation is given to candidates as to how long to spend on each section.

Below are the recommended timings for the 2016 examination.

Section A
You are advised to spend no more than **20 minutes** on this section.
You will be asked to create a new program and answer questions **not** related to the **Preliminary Material** or **Skeleton Program**.

Section B
You are advised to spend no more than **20 minutes** on this section.
Questions will refer to the **Preliminary Material** and the **Skeleton Program**, but will not require programming.

Section C
You are advised to spend no more than **50 minutes** on this section.
Questions will use the **Preliminary Material** and the **Skeleton Program** and may require the **Training.txt Data File**.

Electronic Answer Document

Answers for **all** questions, for **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

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

AQA WARSHIPS

The **Skeleton Program** accompanying this **Preliminary Material** is a program for the one-player game AQA WARSHIPS.

The aim of the game is to destroy all the ships that have been hidden in a 10 x 10 grid called the board.

Before the start of the game the computer places five ships on the board. The player is not told where the ships are placed.

Each ship occupies a number of consecutive squares on the board determined by the type of ship that it is:

Ship type	**Length of ship (in squares)**
Aircraft Carrier (`A`)	5
Battleship (`B`)	4
Submarine (`S`)	3
Destroyer (`D`)	3
Patrol Boat (`P`)	2

Each square will either be empty or be occupied by at most one ship. The ships can only be placed horizontally or vertically on the board and cannot be placed diagonally.

The player fires a shot by specifying the location of a square on the board. To specify the location of a square the player enters a column number (between 0 and 9) and then a row number (between 0 and 9).

If the shot fired hits a ship it is called a 'hit' and the symbol '`h`' is used to show this on the board, otherwise it is called a 'miss' and the symbol '`m`' is used to show this on the board.

A ship is destroyed when all the squares that it occupies have been ‘hit’. The player wins the game when all the ships have been destroyed.

In the Skeleton Program there is a menu containing three options: `'Start new game'`, `'Load training game'` and `'Quit'`.

If the user chooses `'Start new game'` the computer randomly places the five ships on the board making sure that no ships overlap.

If the user chooses `'Load training game'` then a new game will start with the boats positioned at the locations shown in **Figure 1**. The **Skeleton Program** makes use of the **Training.txt Data File** to position the ships.

Figure 1

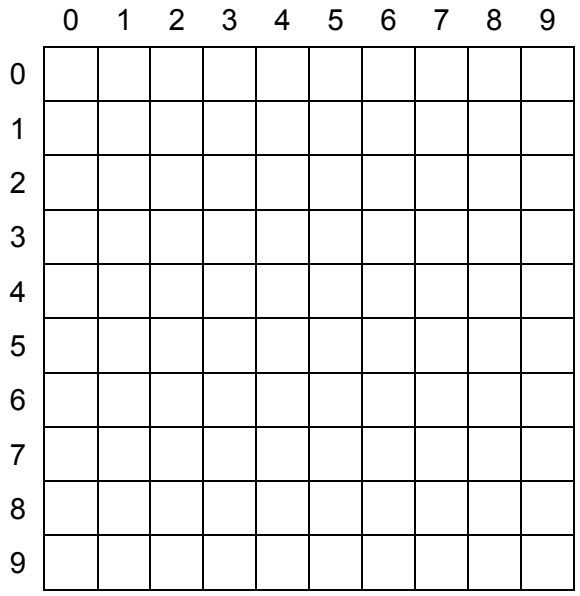
	0	1	2	3	4	5	6	7	8	9
0										
1									B	
2									B	
3									B	
4		P							B	
5		P								
6								S		
7								S		
8		A	A	A	A	A		S		
9						D	D	D		

To indicate that a square is occupied by a ship the first character of its ship type, eg `D` for Destroyer, is stored in the corresponding position in the `Board` data structure.

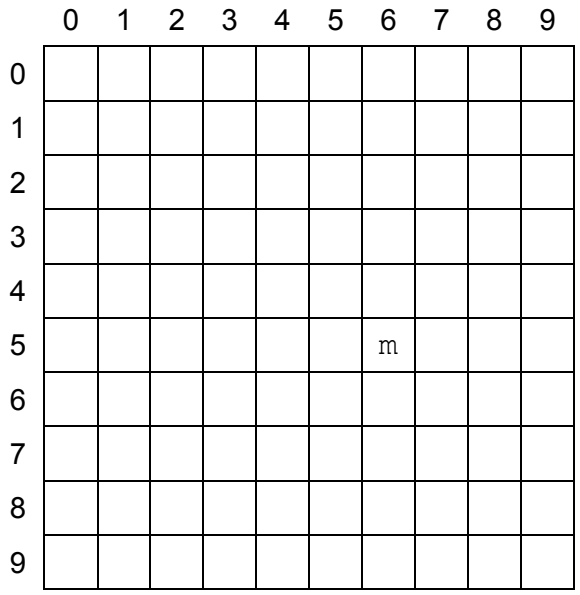
Preliminary Material continues on the next page

Figure 2 shows part of a possible game, using the training game, as displayed to the player.

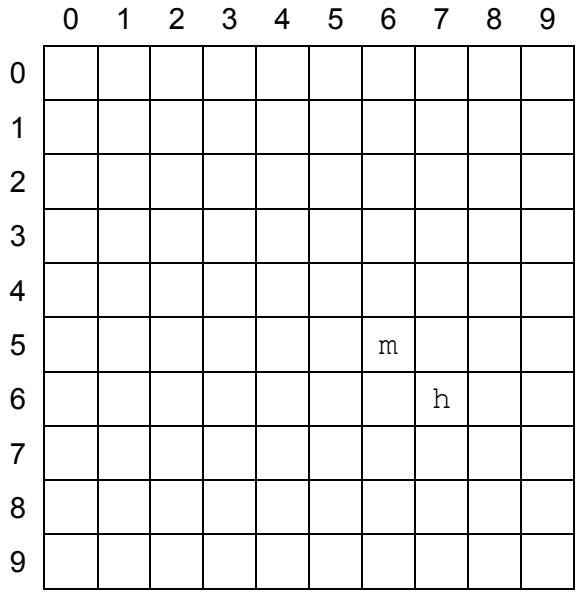
Figure 2



A blank board is displayed at the start of the game.



The player fires a shot at column 6, row 5 and this is recorded as a miss.



The player fires a shot at column 7, row 6 and this is recorded as a hit.

Data File

A **Data File** named **Training.txt** is supplied with the **Skeleton Program**. This stores the positions of the ships in the training game.

END OF PRELIMINARY MATERIAL

There is no Preliminary Material printed on this page