



General Certificate of Education
Advanced Subsidiary Examination
June 2012

Computing

COMP1/PM

Unit 1 Problem Solving, Programming, Data Representation
and Practical Exercise

Preliminary Material

To be given to candidates on or after Thursday 1 March 2012, subject to the instructions given in the *Teachers' Notes (COMP1/TN)*.

Information

- This Preliminary Material comprises Instructions for Candidates.
- 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 again in the examination. You will also be given access to the Skeleton Program 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 four sections and a recommendation is given to candidates as to how long to spend on each section. Below are the recommended timings for the 2012 examination.

Section A

You are advised to spend no more than **35 minutes** on this section.

Questions will examine the specification content **not** specific to the **Preliminary Material**.

Section B

You are advised to spend no more than **20 minutes** on this section.

You will be asked to create a new program **not** related to the **Preliminary Material** or **Skeleton Program**.

Section C

You are advised to spend no more than **15 minutes** on this section.

Questions will refer to the **Preliminary Material** and the **Skeleton Program**, but will not require programming.

Section D

You are advised to spend no more than **50 minutes** on this section.

Questions will use the **Skeleton Program** and the **Preliminary Material**.

Electronic Answer Document

Answers to questions for all four 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**.

Turn over for more Preliminary Material

Turn over ►

Based on the description in Staius' journal you are sure that this must be the right place. The blue-green moss covering the rocks and the dense tree foliage combine together to conceal the cave entrance; you almost walked straight past it and it was only by luck that you saw it. There isn't any time to waste – ever since the journal was discovered everyone has been looking for this place. The thick cobwebs across the entrance prove that you must be the first one here – you know that if you are right you could be the one that finds, in the cavern below the mountain, the single draft of Styxian potion contained in Staius' flask. The journal says that there is a fearsome beast lying in wait, but the risk is worth it. Staius wrote that consuming the potion would grant the drinker invulnerability. Nothing could hurt you, cut you, graze, scratch or bruise you. Your thoughts start to drift, imagining what you could do with such power.

"Snap out of it," you tell yourself. Someone else could find this place and you can't take that risk – the flask only contains enough potion for one. Quickly you shoulder your pack, then you light your torch, brush aside some cobwebs and step into the cave.

Inside, the ground is rough and you stumble several times. As you go deeper into the mountain the cave darkens and soon the only light is coming from your torch. After walking for a few minutes the cave widens and then ends abruptly. You take your pack off and take out your copy of the journal. You read the description of the cave again. It says that at the end of the cave there is a large fissure near the western part of the wall and that the cavern, where the flask is hidden, is at the bottom of the fissure. You move over to the west side of the cave. Sure enough, the fissure is there. You take off your pack and then move carefully nearer to the edge. The light from the torch does not reach far enough down to reveal the bottom, but you can see that the fissure walls are too steep to get down unaided so you will need your climbing equipment. You place your torch carefully on the floor nearby and take your rope, pitons, and carabiners out of the pack.

Your foot slips on some loose stones and you fall backwards into the fissure. You tumble down the hole in a shower of dust and pebbles, falling into the cavern below. You land painfully on the rocky floor.

It is dark, your torch is back in the cave and it weakly illuminates your immediate surroundings, but you cannot see any further into the cavern. You become aware of a sonorous noise around you and it takes you a few minutes to work out what it is. The monster is asleep somewhere in the cavern and is snoring loudly. The sound reverberates around so you can't work out in which direction the monster lies.

You can see the bottom aperture of the fissure several metres above your head and try to scramble up the wall to reach it, but the rock face is too sheer and you can't get sufficient purchase. From what you can remember of the journal you must be at the northwest corner of the cavern.

You make your mind up. You can't get out of the cavern the way that you came in and the monster could wake soon. You decide to explore the cavern. Maybe you will find another way out. Maybe you will find the Styxian potion. You have no choice but to play the game of...

MONSTER!

"MONSTER!"

The **Skeleton Program** in this Preliminary Material is a program for the one-player game "MONSTER!".

When playing MONSTER! the player starts in the northwest corner of a dark cavern. The cavern is represented by a 7x5 rectangular grid of cells. The player's current position is indicated by an "*". The player is presented with a list of five options – they can either return to the main menu (where they can save the current game if they want to) or they can move one cell in one of four possible directions. If they enter "N" they will move one cell to the north, "S" will move them one cell to the south, "W" will move them one cell to the west and "E" will move them one cell to the east. The initial position of a new game is shown in **Figure 1**.

Figure 1

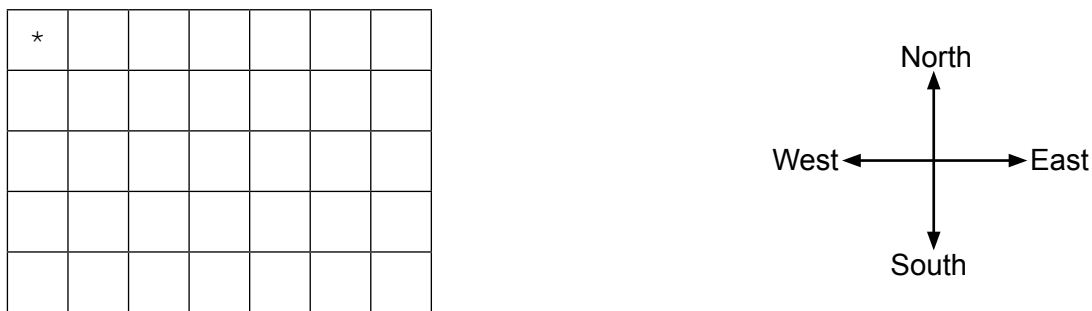
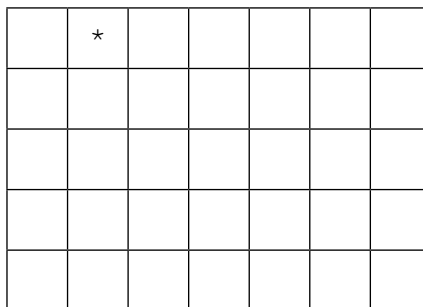


Figure 2 shows a new state resulting from the user selecting "E" in the starting position:

Figure 2



The aim of MONSTER! is to find the hidden treasure (a flask containing a Styxian potion) that is in one of the cells of the cavern. Unfortunately, the cavern is dark and the only way that a player can find the flask is to move around until they are in the same cell as the flask. When a new game is started the flask will be in a random position in the cavern (though it won't be in the same cell as the player starts in). If the player moves into the cell that contains the flask then they win the game.

The cavern is also the lair of a fearsome monster that guards the flask. At the start of a new game the monster is asleep. As the cavern is dark the player cannot see where the monster is. If the player moves into the cell that contains the monster then the monster will wake up and eat the player and the player will have lost the game.

Turn over ►

The monster has set two traps in its cavern. Again, the player cannot see where these traps are. If the player moves into a cell that contains a trap then the monster will wake up. When the monster is awake it will move around the cavern until it either eats the player or the player finds the flask. The monster is twice as fast as the player and makes two moves for each player move. Each move is one cell in one of the four possible directions. When it is awake the monster's skin glows so the player can tell the position of the monster. The monster can see in the dark and so knows where the player is. The current position of the moving monster is indicated by an "M" in the cavern displayed to the player.

If the monster moves into the same cell as the flask then it kicks the flask out of the way and the flask will be moved to the cell where the monster came from. When the monster is awake, it does not matter if the player (or the monster) moves into a cell containing one of the traps.

Figure 3 shows part of a possible game as displayed to the player. The player moves one cell to the east which triggers a trap that wakes the monster. The player is then shown the position of the monster in the cavern. The monster then makes its first move and the new state of the cavern is shown. It then makes its second move and the updated state of the cavern is shown. It is then the player's turn to move.

Figure 3

	*					

The position of the player is shown.

		*				

The player moves to the east.

				M		
		*				

This sets off a trap and wakes the monster up.

		*		M		

The monster makes a move.

		*	M			

The monster makes another move. Now it is the player's turn again.

Turn over ►

In the **Skeleton Program** there is a menu containing five options: "start new game", "load game", "save game", "play training game" and "quit". If the user chooses "load game" then the contents of a user-specified file are loaded and the user will start playing MONSTER! from the game state saved in the file. If the user chooses "save game" then they will be asked to enter a name for the file and then the current state of the game will be stored in a file with the name supplied by the user. If the user chooses "play training game" then the user will start playing MONSTER! from the game state shown in **Figure 4**.

Figure 4

			M			
						T
				*		
				T		
					F	

"F" denotes the position of the flask; "T" denotes the position of a trap. The flask, traps and monster are not displayed to the player when the training game starts.

Notes

Your chosen programming language may use arrays with a lower bound value of 0. If so, array cells with indices of 0 are **not** used.

END OF PRELIMINARY MATERIAL