

1(a). A car has a feature in its engine management system that is intended to save fuel and emissions produced when the car is waiting at traffic lights or in a traffic jam. The default option is that if the gears are disengaged and the car is not moving, the engine is switched off. There is a display on the dashboard that indicates when the engine has been switched off in this way.

However, sometimes it is necessary to keep the engine running even when the car is stationary, in order to provide electric power to charge the battery, run the heater, run the air conditioning system or keep the lights on. This, in turn, is affected by the external and internal temperatures, the settings chosen by the driver and the intensity of light outside.

Identify **four** inputs needed by this feature of the engine management system.

For each one suggest a suitable data type for its storage.

Input	Data type

[8]

(b). Identify **two** outputs from this engine management feature.

-----  
-----  
-----

[2]

2. Julie wants to earn her living by being a successful app developer.

Before she even writes any code, she thinks it would be sensible to find out some basic facts about app development and the market for apps in order to maximise her chances of being successful.

State **four** items of data that she could obtain in order to make a sensible choice of an app development project.

1

-----

2

-----

3

-----

4

-----

[4]

3. A flight simulator allows a user to take control of a simulated aeroplane. The user can fly the plane in an environment that can simulate different weather conditions and additional planes in the sky.

Identify **three** pieces of information that would need to be researched in order to design this simulator.

1

---

---

2

---

---

3

---

---

[3]

4. A cruise liner company has to produce daily documentation for passengers. The passengers speak a number of different languages. Currently, bilingual members of the crew translate and type different versions of documentation. The company decides to automate the translation process.

The company's system analyst follows a systems lifecycle approach.

The next stage involves establishing the requirements from potential users.

Describe **three** methods that could be used to gather requirements in this scenario.

Method 1 \_\_\_\_\_

-----  
-----  
-----  
-----

Method 2 \_\_\_\_\_

-----  
-----  
-----  
-----

Method 3 \_\_\_\_\_

-----  
-----  
-----  
-----

[6]

5. A car racing team uses a car simulator to test their drivers in a range of cars on different race tracks.

Identify **three** inputs that will be required to configure the initial conditions for running the simulation.

1

-----

2

-----

3

-----

**[3]**

6. Dexter is leading a programming team who are creating a computer program that will simulate an accident and emergency room to train hospital staff.

Dexter has been told he should make use of caching in the simulation.

Describe what is meant by caching and explain how caching can be used within the simulation.

-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----  
-----

[4]

7. A group of A-level students are working together to program a computer game.

In the game, the player controls a character who moves through a virtual world. The game starts with a load-up screen. The player can select which area to move to on an on-screen map, and then they control the movements of their character using a keyboard to solve puzzles on the screen.

Identify **two** inputs that the user could enter to control the character and describe each input's function.

Input 1 -----

use -----

Input 2 -----

use ----- [4]

8. A software developer is creating a Virtual Pet game.

The user can choose the type of animal they would like as their pet, give it a name and then they are responsible for caring for that animal. The user will need to feed, play with, and educate their pet.

The aim is to keep the animal alive and happy, for example if the animal is not fed over a set period of time then the pet will die.

- The game tells the user how hungry or bored the animal is as a percentage (%) and the animal's intelligence is ranked as a number between 0 and 150 (inclusive).
- Hunger and boredom increase by 1% with every tick of a timer.
- When the feed option is selected, hunger is reduced to 0.
- When the play option is selected, bored is reduced to 0.
- When the read option is selected, the intelligence is increased by 0.6% of its current value.

An example of the game is shown:

```
What type of pet would you like? Fox or Elephant?  
Fox  
What would you like to name your Fox?  
Joanne  
Joanne's stats are  
Hunger: 56%  
Bored: 85%  
Intelligence: 20  
What would you like to do with your pet? Play, Read or Feed?
```

Fig. 1.1

Identify **three** inputs that the user will have to enter to start, and / or play the game.

1 -----

2 -----

3 -----

[3]



END OF QUESTION PAPER

Question		Answer/Indicative content	Marks	Guidance
1	a	<ul style="list-style-type: none"> <li>• Target temperature (1 – AO 2.1) integer / floating point (1 – AO 3.1).</li> <li>• Wheel movement (1 – AO 2.1) Boolean (1 – AO 3.1).</li> <li>• Engine running (1 – AO 2.1) Boolean (1 – AO 3.1).</li> <li>• Internal temperature (1 – AO 2.1) integer / floating point (1 – AO 3.1).</li> <li>• External temperature (1 – AO 2.1) integer / floating point (1 – AO 3.1).</li> <li>• External light level (1 – AO 2.1) integer / floating point (1 – AO 3.1).</li> <li>• Heating on (1 – AO 2.1) Boolean (1 – AO 3.1).</li> <li>• Air conditioning on (1 – AO 2.1) Boolean (1 – AO 3.1).</li> <li>• Gears engaged (1 – AO 2.1) Boolean (1 – AO 3.1).</li> </ul>	8	<p>Up to 4 marks (AO 2.1) one mark for each correct identification of input.</p> <p>Up to 4 marks (AO 3.1) one mark for identifying the correct data type.</p> <p>Any example of driver choices / settings related to something switched on (1 – AO 2.1)</p> <p>Boolean (1 – AO 3.1).</p> <p>Any example of driver choices / settings related to a level being set (1 – AO 2.1) integer / floating point (1 – AO 3.1).</p>
	b	<ul style="list-style-type: none"> <li>• Start engine (1), stop engine (1), signal to dashboard display (1).</li> </ul>	2	1 mark for each correct identification up to a maximum of two identifications.
		<b>Total</b>	<b>10</b>	
2		<ul style="list-style-type: none"> <li>• Popularity data (1).</li> <li>• Platforms available (1).</li> <li>• Sales of existing similar apps (1).</li> <li>• Prices charged (1).</li> <li>• Does it exist already? (1).</li> </ul>	4	1 mark for each correct identification up to a maximum of four identifications.
		<b>Total</b>	<b>4</b>	
3		<p>1 mark per data item, accept any appropriate, sensible suggestions</p> <ul style="list-style-type: none"> <li>• Number of other planes that could be in the sky (1)</li> <li>• Speed (1)</li> <li>• Flight path (1)</li> <li>• Altitudes (1)</li> <li>• Rate of acceleration (1)</li> </ul>	3	
		<b>Total</b>	<b>3</b>	

Question		Answer/Indicative content	Marks	Guidance
4		<ul style="list-style-type: none"> <li><input type="checkbox"/> Questionnaire... [1]</li> <li><input type="checkbox"/> ...set of questions given out to potential users to fill in and return [1]</li>   <li><input type="checkbox"/> Interview... [1]</li> <li><input type="checkbox"/> ...face to face discussions where potential users are asked questions. [1]</li>   <li><input type="checkbox"/> Observation... [1]</li> <li><input type="checkbox"/> ...Where users of the existing system are observed using it. [1]</li>   <li><input type="checkbox"/> Meeting... [1]</li> <li><input type="checkbox"/> ...Group of users sit down with analyst to discuss current system [1]</li> <li><input type="checkbox"/> Existing documentation... [1]</li> <li><input type="checkbox"/> ...used in the system is examined [1]</li> </ul> <p><i>(Max 3 for methods named, Max 3 for their descriptions)</i></p>	6	<p><b>Examiner's Comments</b></p> <p>Most candidates could state three methods for gathering requirements but in some cases descriptions lacked clarity.</p>
		<b>Total</b>	<b>6</b>	
5		<p>e.g.</p> <ul style="list-style-type: none"> <li>• Track name</li> <li>• Car type</li> <li>• Driver name</li> </ul>	3	<p>Allow any reasonable alternative</p> <p><b>Examiner's Comments</b></p> <p>Many candidates answered well, but some misread the question and identified input devices that could be used within the simulation, rather than initial starting parameters as required.</p>
		<b>Total</b>	<b>3</b>	

Question		Answer/Indicative content	Marks	Guidance
6		<p>2 marks for definition, max 2 for application</p> <p>Caching:</p> <ul style="list-style-type: none"> <li>• Data that has been used is stored in cache/ram in case it is needed again</li> <li>• Allows faster access for future use</li> </ul> <p>Application: e.g.</p> <ul style="list-style-type: none"> <li>• Store patients' details/conditions/appearance</li> <li>• Design of people in the simulation</li> <li>• Design of specific rooms</li> </ul>	4	<p>Allow any reasonable example</p> <p>A well-developed example can gain two marks</p>
		<b>Total</b>	<b>4</b>	
7		<p>1 mark per input, 1 for description e.g.</p> <ul style="list-style-type: none"> <li>• w/up arrow[1]</li> <li>• ...to allow the character to move up</li> <li>• s/down arrow[1]</li> <li>• ...to allow the character to move down</li> <li>• a/left arrow[1]</li> <li>• ...to allow the character to move left</li> <li>• d/right arrow[1]</li> <li>• ...to allow the character to move right</li> </ul>	<p>4</p> <p>AO2.2 (4)</p>	<p>Answers must relate specifically to the <i>character</i> control, which is via a keyboard.</p> <p><b>Examiner's Comment:</b> Many candidates scored two marks for identifying a keyboard input and related character action. Some candidates failed to read the scenario in the stem clearly enough and identified different input devices rather than specific inputs.</p>
		<b>Total</b>	<b>4</b>	

Question		Answer/Indicative content	Marks	Guidance
8		1 mark per input to max 3 <ul style="list-style-type: none"> <li>• Choice of pet</li> <li>• Pet name</li> <li>• Feed</li> <li>• Play</li> <li>• Read</li> </ul>	3 AO2.1 (3)	Allow any reasonable input to this system  <b>Examiner's Comment:</b> Nearly all candidates achieved full marks after analysing the requirements in the stem of the question.
		<b>Total</b>	<b>3</b>	