

2.1.2

THINKING AHEAD

TOPIC WISE EXAM QUESTIONS

A-LEVEL

OCR

2.1.2 Thinking ahead

- a) Identify the inputs and outputs for a given situation.
- b) Determine the preconditions for devising a solution to a problem.
- c) The nature, benefits and drawbacks of caching.
- d) The need for reusable program components.

Candidates need to understand that situations/programs require input and output, and that the outputs can be in digital and/or hard copy format. Candidates may be given a description, diagram, or pseudocode for a scenario, and they will need to demonstrate an understanding of the inputs and outputs required and/or are used in that scenario.

For a description (or similar) of a program, candidates need to be able to determine what additional conditions they need to know before they can produce a solution, and how this information may affect the solution.

Candidates need to have an understanding of the purpose of caching in programming, and how it can be used when writing a program. Candidates need to be able to apply their knowledge of caching to a scenario to demonstrate an understanding of how it can be used. Candidates need to understand the benefits and drawbacks of using caching in a program.

4 A programmer has designed a program that includes a reusable program component.

(c) Give **two** reasons why reusable program components are used in programs.

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[2]

8 A program is being designed that will allow a user to log into an account on a website using a username and password.

(a) Identify **two** possible inputs and **one** output this program will need.

Input 1

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Input 2

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Output

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[3]

2 Taylor is designing a program for a client who would like to simulate earthquakes on major cities around the world in 3D. The client would like to be able to view any stage of an earthquake such as:

1. the build-up of the earthquake
2. the earthquake taking place
3. the aftershocks of the earthquake.

The client would also like to be able to play the simulation at different speeds. For example, a slow, normal or fast speed.

(b) The program will need to accept inputs from the user before playing the simulation.

(i) Identify **two** different inputs for this program.

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[2]

AS - Level

1 (e) Functions and procedures are reusable components.

Give **two** benefits of writing a program with reusable components.

1

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[2]

4 A programmer is developing an aeroplane simulator. The user will sit in a cockpit and the simulated environment will be displayed on screens around them.

(b) Describe how caching can be used in the aeroplane simulator.

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[2]

1 Ruhail owns ten different function rooms which can be hired by different business customers to hold meetings. He would like a program to manage the booking process of each room.

Customers should be able to enter the date they want to hire a function room, and then a list of available rooms will be displayed. Customers can then select which room they want to hire. Customers can then enter their payment details which are then checked and then a confirmation email is sent to the customer.

(f) Ruhail has been told to make use of reusable components when creating his program code.

Explain **two** benefits of using reusable components when writing program code.

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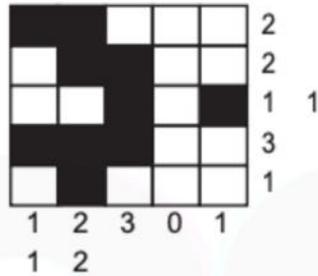
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[4]

AS - Level

- 8 A Nonogram is a logic puzzle where a player needs to colour in boxes. The puzzle is laid out as a grid and each square needs to be either coloured black or left white.

The numbers at the side of each row and column tells the player how many of the boxes are coloured in consecutively. Where a row has two or more numbers, there must be a white square between the coloured squares.



- (iii) Identify **one** input, **one** process and **one** output required for the game.

Input

Process

Output

[3]

1 Janet is designing a piece of software for a furniture company.

The software will allow a user to plan the position of furniture in a room. Users will be able to set the size and shape of a room, and then choose furniture from a library of furniture items. These pieces of furniture will have set sizes and designs and the user will be able to view the room in 3D to see how it looks from a variety of angles.

(b) Janet is planning the inputs and outputs for the software.

(i) Identify **two** inputs that the software will need to take.

1

2 [2]

(ii) Identify **two** outputs that the software will need to produce.

1

2 [2]

(c) Janet is going to decompose the problem to produce a set of subprograms.

Explain the benefits of using subprograms to produce this software.

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..... [4]

(d) The program allows the user to enter dimensions of the room and the furniture. There are preconditions that must be met before the software will draw the room and furniture.

Suggest **two** preconditions that must be met before the software will run.

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2

..... [2]

- 2 A company merger is joining five e-commerce retailers under one company, OCRRetail. Each retailer has a different sales system and OCRRetail wants to develop one computer system that can be used by all the retailers.

Mary's software development company has been employed to analyse and design a solution for the company.

- (d) Mary created the program as a series of sub-programs that can be reused.

Describe **one** benefit of Mary creating reusable program components.

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..... [2]

6 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:

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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

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

1.....

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3.....

[3]

EXTRA

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

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4

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]

- 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]

**If you found this
useful, drop a follow
to help me out!**

THANK YOU!

GCST