

2.1.2 Thinking ahead

OCR A-Level Computer Science (H446) - H446/02 - Exam questions and mark schemes

8 past paper questions, 36 marks in total. Answer each question in the space provided, then check your work against the mark schemes at the end. compsciwizard.com

Question 1 H446/02, June 2024 [4 marks]

A group of students are designing a racing car game. Complete the table by identifying two inputs and two outputs for the game.

Question 2 H446/02, June 2023 [3 marks]

A program is being designed that will allow a user to log into an account on a website using a username and password. Identify two possible inputs and one output this program will need.

Question 3 H446/02 [2 marks]

Taylor is designing a program to simulate earthquakes on major cities in 3D. Identify two different inputs for this program.

Question 4 H446/02 [2 marks]

One decision point in the earthquake simulation program will be to decide if the user inputs are suitable or not. Identify two other example decision points in this program.

Question 5 H446/02, June 2019 [9 marks]

A program is needed to plan the layout of a garden. The programmer is designing the program to make use of caching and re-useable components. Explain and evaluate the use of caching and re-useable components in the design of the garden program.

[illegible]

Question 6 H446/02, June 2018 [9 marks]

Kamran wants to expand a program to handle up to 100,000,000 items and allow searching. Evaluate the use of caching and concurrent processing in this scenario and make a recommendation.

Question 7 H446/02 [3 marks]

A car racing team uses a car simulator to test their drivers. Identify three inputs that will be required to configure the initial conditions for running the simulation.

Question 8 H446/02 [4 marks]

Describe what is meant by caching and explain how caching can be used within an accident and emergency room simulation to train hospital staff.

Mark schemes

One mark per valid point unless the scheme says otherwise. Practice questions are written by Comp Sci Wizard in the style of OCR mark schemes.

Question 1 [4 marks] H446/02, June 2024

Inputs: Arrow key presses / Player name / Vehicle selection / Accelerate/brake input

Outputs: Graphics display / Sound effects / Score / Vehicle position / Collision feedback

(4 marks - 1 per valid input/output)

Question 2 [3 marks] H446/02, June 2023

Inputs: Username, Password, Login button click, Remember me checkbox

Output: Success/failure message, Redirect to homepage, Error message, Session token

(3 marks - 2 for inputs, 1 for output)

Question 3 [2 marks] H446/02

City selection / Earthquake magnitude / Simulation stage selection / Speed setting / Time period / Building data

(2 marks - 1 per valid input)

Question 4 [2 marks] H446/02

Which stage to display / What speed to run simulation / Whether simulation has finished / Whether to loop animation / When to show aftershocks

(2 marks - 1 per valid decision point)

Question 5 [9 marks] H446/02, June 2019

Levels of response (9 marks)

Caching: Storing frequently used data for quick access. Garden program could cache: plant images, common layouts, user preferences. Benefits: faster loading, reduced computation. Drawbacks: memory usage, stale data.

Re-useable components: Modular code used multiple times. Garden program: plant object class, resize function, positioning tools. Benefits: faster development, consistent behavior, easier maintenance. Drawbacks: may not fit all cases perfectly.

Question 6 [9 marks] H446/02, June 2018

Levels of response (9 marks)

Caching: Store frequently accessed items in memory. Reduces disk reads. Cache hit = fast access. Consider cache size vs memory. LRU or LFU policies.

Concurrent processing: Multiple threads searching simultaneously. Divide data into partitions. Reduces search time. Need to manage thread safety. May have diminishing returns.

Recommendation: Use both together for optimal performance. Cache for frequent queries, concurrent processing for large searches.

Question 7 [3 marks] H446/02

Track selection / Car model / Weather conditions / Starting position / Fuel level / Tyre type / Driver profile / Time of day

(3 marks - 1 per valid input)

Question 8 [4 marks] H446/02

Caching: Storing copies of frequently accessed data closer to where it's needed / in faster storage (1 mark)

Reduces time to retrieve data (1 mark)

A&E simulation use:

- Cache patient scenarios that are commonly used
- Store pre-rendered graphics/animations
- Cache frequently used medical data/procedures
- Speed up loading of common emergency situations

(4 marks - 2 for definition, 2 for application)