GCST

2.1.5
THINKING CONCURRENTLY
TOPIC WISE EXAM QUESTIONS

A-LEVEL OCR

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SPEC

2.1.5 Thinking concurrently	a) Determine the parts of a problem that can be tackled at the same time. b) Outline the benefits and tradeoffs that might result from concurrent processing in a particular situation.	Candidates need to understand what is meant by thinking concurrently. They need to be able to work out which parts of a program can be developed to take place (be processed) at the same time, and which parts are dependent on other parts. Candidates need to understand the benefits and trade offs that are brought from concurrent processing, and be able to apply these to a given scenario. For example, candidates need to understand how concurrent processing could be applied to a specific program, why it would be applied to that program, and what problems might arise from using it.

7* **(a)** A program designer needs to decide on an algorithm to use from a choice of three. The table shows the worst-case Big O complexities for each algorithm.

Algorithm	Time Complexity	Space Complexity
1	Linear	Exponential
2	Exponential	Constant
3	Logarithmic	Logarithmic

The program will be used to analyse data that can range from 2 items to 2 billion items.

(b) The program designer is investigating the use of concurrent processing.

(i) Describe what is meant by the term 'concurrent processing'.

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(ii) Give **two** benefits of using concurrent processing.

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[2]

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2021

1 Taylor is creating an online multiplayer game where users can create accounts and build their own circus. Each circus will contain characters such as clowns, animals, magicians and dancers.

Users can set up a new circus in the online world, purchase new characters and visit other users' circuses.

(b) Taylor will make use of concurrent processing within his circus game.

(i) Describe what is meant by the term 'concurrent processing'.

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(ii) Explain why concurrent processing is needed to allow multiple users to log in and interact with game elements at the same time.

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..... **[3]**

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2020

2 OCR-Tickets wants to sell tickets for their concerts, plays and other events online. A customer should be able to create an account and then be able to log into their account. Once logged in, customers should be able to carry out actions such as setting their preferences and purchase tickets.

OCR-Tickets have hired a software development company to create the system for them.

(b)* Discuss the need for concurrent processing in OCR-Ticket's system and the benefits and drawbacks of using this. [9]

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6 Kamran is writing a program to manipulate the data for a set of items.

(c)* Kamran wants to expand the program to allow it to handle up to 100,000,000 items and to allow him to search for data about items. Kamran is worried that the increase in the number of items will cause a decrease in the performance of the program. He decides to investigate the benefits of caching and concurrent processing.

Evaluate the use of caching and concurrent processing in this scenario and make a recommendation to Kamran. [9]

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2017

2 A programmer is developing an ordering system for a fast food restaurant. When a member of staff inputs an order, it is added to a linked list for completion by the chefs.

(f*) The programmer is considering using concurrent programming.

Discuss how concurrent programming can be applied to the food ordering system and the benefits and limitations of doing so. **[9]**

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EXTRA

1. 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.

   Explain what is meant by 'concurrent processing' and describe **one** example of how the simulator could make use of it.

   Concurrent processing _____

   _____

   Example _____

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   _____ [4]

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

THANK YOU!

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