Abstraction

Papers Dock

COMPUTER SCIENCE 9618 PAPER 2

Abstraction

Abstraction is the process of simplifying complex problem by focusing on the essential features and ignoring irrelevant details.

Need And Benefits Of Abstraction

The solution is simplified and makes the problem easier and quicker to design

The system is tailored to the need of user

(b) A system is being developed to help manage book loans in a library.

Registered users may borrow books from the library for a period of time.

(i) State **three** items of data that must be stored for each loan.

1 .....

2 .....

3 .....

[2]

(ii) State **one** item of data that will be required in the library system but does not need to be stored for each loan.

..... [1]

(iii) One operation that manipulates the data stored for each loan, would produce a list of all overdue books.

Identify **two other** operations.

Operation 1 .....

.....

Operation 2 .....

.....

[2]

2(a)(ii)	Number of outputs: 1 Current state: S2	**2**
2(b)(i)	Answers include: • User ID / Username • Book ID • Date of loan / return date One mark for 1 correct Two marks for all 3 correct **Note: Max 2 marks**	**2**
2(b)(ii)	Many examples but must be data that is NOT required for a loan, but which COULD be required somewhere by the library system. Note: must be data relating to users, books or loans Answers include: • Users name / address / phone number / DOB • Book title / author / publisher / library rack number / ISBN number / price • Date of loan / return date (if not already given in part (i)) • The length of the loan (assumed to be the same for all books)	**1**
2(b)(iii)	Many examples including: • Create loan / borrow book • Return book • Send letter / email / contact a user ref an overdue book • View the loan history for a given book • View the loan history for a given user One mark for each **Note: Max 2 marks**	**2**

(c) An airline wants to provide passengers with information about individual flights and allow them to book their flight using an online booking system.

(i) Tick (✓) **one** box in each row of the table to indicate whether each item of information would be essential for the customer when making the booking.

Information	Essential	Not essential
Departure time		
Flight number		
Departure airport		
Aircraft type		
Ticket price		
Number of seats in aircraft		

[3]

(ii) Identify the technique used to filter out information that is not essential when designing the booking system **and** state one benefit of this technique.

Technique .....

Benefit .....

.....

[2]

(iii) Identify **two additional** pieces of essential information that a passenger might need when booking a flight.

1 .....

2 .....

[2]

<table>
<tr>
<td>1(c)(i)</td>
<td>
<table>
<tr><th>Information</th><th>Essential</th><th>Not essential</th></tr>
<tr><td>Departure time</td><td>✓</td><td></td></tr>
<tr><td>Flight Number</td><td></td><td>✓</td></tr>
<tr><td>Departure airport</td><td>✓</td><td></td></tr>
<tr><td>Aircraft type</td><td></td><td>✓</td></tr>
<tr><td>Ticket price</td><td>✓</td><td></td></tr>
<tr><td>Number of seats in aircraft</td><td></td><td>✓</td></tr>
</table>

One mark for two rows correct
Two mark for four rows correct
Three mark for all rows correct
</td>
<td>3</td>
</tr>
<tr>
<td>1(c)(ii)</td>
<td>One mark for technique and one for benefit, Max 1 mark for 'Benefit'

Technique: Abstraction

Benefit:
• The solution is simplified so easier / quicker to design / implement
• The system is tailored to the need of the user</td>
<td>2</td>
</tr>
<tr>
<td>1(c)(iii)</td>
<td>Answers include:

• Destination / arrival airport
• Arrival time / flight duration
• Date of flight
• Seat number
• Seat availability

Max 2 marks</td>
<td>2</td>
</tr>
</table>

3 The manager of a cinema wants a program to allow users to book seats. The cinema has several screens. Each screen shows a different film.

(a) Decomposition will be used to break the problem down into sub-problems.

Describe **three** program modules that could be used in the design.

Module 1 .....

.....

.....

Module 2 .....

.....

.....

Module 3 .....

.....

.....

[3]

(b) Two types of program modules may be used in the design of the program.

Identify the type of program module that should be used to return a value.

..... [1]

3(a)	One mark per description of appropriate sub-problem for given scenario. Examples include: • Allows the user to search for films being shown // input name of film they want to see • Allows the user to search for available seats • Calculate cost of booking • Book a given number of seats for a particular screening	**3**
3(b)	Function	**1**