Xi'an Jiaotong-Liverpool University

西交利物浦大学

PAPER CODE	EXAMINER	DEPARTMENT	TEL
CPT102	S. Guan	Computing	1501

2nd SEMESTER 2021/2022 RESIT EXAMINATIONS

BACHELOR DEGREE – Year 2

DATA STRUCTURES AND ALGORITHMS

TIME ALLOWED: 2 Hours

INSTRUCTIONS TO CANDIDATES

1、 This is an open-book exam. Please tick the integrity disclaimer *immediately after you initiate the online/onsite exam* and complete the assessment independently and honestly.

2、 Total marks available are 100.

3、 Answer all questions. There is NO penalty for providing a wrong answer.

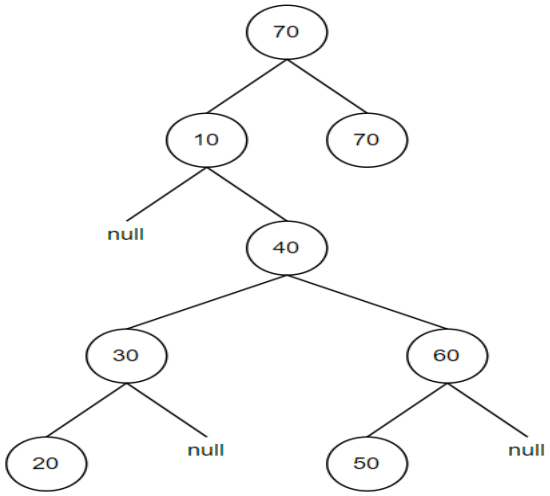
4、 Only answers in English are accepted.

5、 The duration is *2 hours*. Where there are any major problems preventing you from continuing the exam or submitting your answers in time, please do not hesitate to email the Module Examiner (steven.guan@xjtlu.edu.cn) or Assessment Team of Registry (assessment@xjtlu.edu.cn).

THIS PAPER MUST NOT BE REMOVED FROM THE EXAM HALL.

PART II. 25 marks – Answer all questions.

31. A Binary Search Tree (BST) was created by inserting these integers in the following sequence: 70, 10, 40, 30, 60, 50, 70, 20 (i.e. "70" gets inserted first and "20" inserted last, and that there are two "70"s in the sequence).



Drag-and-drop (for online test) or write the correct sequence of integers (for on-site test) when traversing the tree using **Pre-order Depth First Traversal**.

Note that your sequence must absolutely match the index numbers to the left-most column of the table otherwise 2 marks will be deducted for each incorrect match.

The answers for the first 3 indices have been provided. Complete the rest.

(Total 10 marks, i.e. each correct integer sequence worth 2 marks.)

	Correct Integer Sequence	**Pick Integers From Here**
Index 0	70	10
Index 1	10	20
Index 2	40	30
Index 3		40
Index 4		50
Index 5		60
Index 6		70
Index 7		70

32. **Drag-and-drop (for online test) or write the correct sequence number (for on-site test)** in implementing the *remove elements* function of a *bag* abstract data type.

Note that your sequence must absolutely match the step numbers to the left-most column of the table otherwise 3 marks will be deducted for each incorrect match.

(Total 15 marks, i.e. each correct number sequence worth 3 marks.)

	Correct Number Sequence	**Pick Numbers From Here**	
Step 1		1	If element not found upon reaching end of collection, return false.
Step 2		2	Otherwise, copy last element onto target element's location and reduce collection's index by 1.
Step 3		3	Loop to check each element in the collection against target value.
Step 4		4	If element is found upon reaching end of collection, return true.
Step 5		5	Otherwise, remove element that matches target value.
		6	Repeat steps 2 to 3 for remaining target values.
		7	User enters target values to remove.
		8	Repeat steps 2 to 5 for remaining target values.

END OF PAPER