Xi'an Jiaotong-Liverpool University 西交利物浦大学

| PAPER CODE | EXAMINER | DEPARTMENT | TEL |
|---|---|---|---|
| CSE102 | | Computer Science and Software Engineering | |

**2nd SEMESTER 2017/18 EXAMINATIONS (FINAL)**

**BACHELOR DEGREE – Year 2**

**ALGORITHMIC FOUNDATIONS AND PROBLEM SOLVING**

**TIME ALLOWED: 2 Hours**

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**INSTRUCTIONS TO CANDIDATES**

**READ THE FOLLOWING CAREFULLY:**

1. The paper consists of Part A and Part B. Answer all questions in both parts.
2. Answer all questions in Part A using the Multiple Choice Answer Sheet. Please read the instructions on the Multiple Choice Answer Sheet carefully and use a HB pencil to mark the Multiple Choice Answer Sheet. If you change your mind, be sure to erase the mark you have made. You may then mark the alternative answer.
3. Answer all questions in Part B using the answer booklet.
4. Enter your name and student ID No. on BOTH the Multiple Choice Answer Sheet and the answer booklet.
5. At the end of the examination, be absolutely sure to hand in BOTH the answer booklet AND the Multiple Choice Answer Sheet.
6. All answers must be in English.

**THIS PAPER MUST NOT BE REMOVED FROM THE EXAMINATION ROOM**

## PART B

Question 1 (20 marks)

1. Briefly describe the idea of the divide-and-conquer technique. **3**

2. Given an array A of n numbers, ($n \geq 1$)

   a) Design a divide-and-conquer algorithm for finding values of both the largest and smallest elements in A. **6**

   b) Set up a recurrence relation for the number of key comparisons made by your algorithm and justify it briefly. **5**

   c) For $n=2^k$, solve the recurrence relation set up in b). **4**

   d) What is the worst case time complexity of your algorithm (in big-O notation)? **2**

**END OF THE PAPER**