Name		**Student ID Number**		**Signature**		**Mark**	

1. This is an **open-book** in-class test, but the open-book materials are for the candidates' personal use only.
2. There are **TEN** single-choice questions (**Q1-Q10**) in this test and the test duration is **15-mins**.
3. Electronic devices are not allowed except non-programmable calculators.
4. Total marks available are 10, with 1 mark for each question. This test will count for 5% in the overall grade of this module.
5. Please write your answer directly in the bracket before the question number (any answer written somewhere else will not be considered), e.g.:

(**A**) Q0. The email address of INT202 module leader this semester is:

A. R.Yang@xjtlu.edu.cn B. Rui.Yang@xjtlu.edu.cn C. None of above

START OF IN-CLASS TEST 1

( ) Q1. Let function $\mathrm{f}(n)$ denotes the running time of algorithm on input of size n, and $\mathrm{f}(n) = n^2(1 + \sin(\frac{\pi}{4}n))$, the time complexity of $\mathrm{f}(n)$ is:

A. $\mathrm{O}(\mathrm{n})$ B. $\Omega(\mathrm{n})$ C. None of above

( ) Q2. Let function $\mathrm{f}(n)$ denotes the running time of algorithm on input of size n and $\mathrm{f}(n) = \log n + \log\log n$, the time complexity of $\mathrm{f}(n)$ is:

A. $\Theta(\log n)$ B. $\Theta(\log\log n)$ C. None of above

( ) Q3. The height of a (2, 4) tree storing n items is:

A. $\Theta(\log n)$ B. $\Theta(n)$ C. None of above

( ) Q4. How many binary search trees composed of the nodes {3, 5, 8, 12} can be formed?

A. 10 B. 14 C. None of above

( ) Q5. The answer of the expression given in postfix notation "5 7 * 3 4 1 + * -" is:

A. 151 B. 20 C. None of above

( ) Q6. Where can an item with largest key be stored in a min-heap?

A. Root B. Any external node C. None of above

( ) Q7. The array [20 15 18 7 9 5 12 3 8 2] forms:

A. A max-heap B. A min-heap C. None of above

( ) Q8. Is the given binary tree in Fig. 1 an AVL tree?

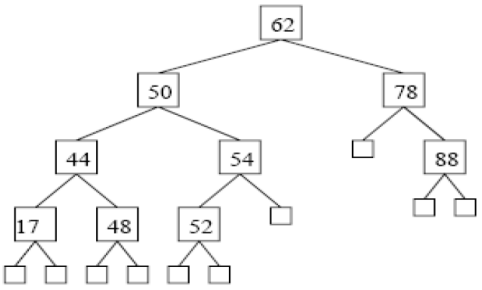

Fig. 1

A. Yes B. No C. None of above

( ) Q9. For the following instance of the 0-1 Knapsack Problem with four items shown in Table 1 with the maximum allowed weight is W = 10, the optimal solution is:

Table 1

i	1	2	3	4
b_i	25	15	20	36
w_i	7	2	3	6

A. 51 B. 61 C. None of above

( ) Q10. Let S = {a,b,c,d,e,f,g} denote a set of objects with weights and benefits as given in the Table 2 below. What is an optimal solution to the fractional Knapsack problem for S assuming that we have a knapsack that can hold objects with total weight 18?

Table 2

item	a	b	c	d	e	f	g
benefit	12	10	8	11	14	7	9
weight	4	6	5	7	3	1	6

A. 49.4 B. 49.5 C. None of above

END OF IN-CLASS TEST 1