EECS2011-N&Z Winter 2022 Fundamentals of Data Structures Example Exam Questions April 26, 2022 Time Limit: 180 Minutes

This exam contains 6 pages (including this cover page) and 3 problems.

Check to see if any pages are missing.

Do not detach any question pages from the booklet.

Enter all requested information on the top of this page before you start the exam, and put your initials on the top of every page, in case the pages become separated.

Attempt all questions. Answer each question in the boxed space provided.

The following rules apply:

- NO QUESTIONS DURING THE EXAM.
- If a question is ambiguous or unclear, then please write your assumptions and proceed to answer the question.
- All answers must appear in the boxed areas in this booklet.
- Only writings within the designated answer boxes will be graded. Plan your answers on the sketch paper provided.
- Write in valid Java syntax wherever required.
- Where descriptive answers are requested, use complete sentences and paragraphs. Be precise and concise.
- Organize your work, in a reasonably neat and coherent way, in the space provided. Work scattered all over the page without a clear ordering will receive very little credit.
- Mysterious or unsupported answers will not receive credit. A correct answer, unsupported by calculations or explanation will receive no credit; an incorrect answer supported by substantially correct calculations and explanations might still receive partial credit.

Do not write in this table which contains your raw mark scores.

Problem	Points	Score
1	20	
2	30	
3	50	
Total:	100	

1. Consider the following fragment of Java code:

```
boolean containsDuplicate (int[] a, int n) {
for (int i = 0; i < n; ) {
  for (int j = 0; j < n; ) {
    if (i != j && a[i] == a[j]) {
      return true; }
    j ++; }
  i ++; }
return false; }</pre>
```

Derive, in the worst case, the number of primitive operations executed to return the result.

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	why an <i>inorder</i> t		ary search tre	e produces a s	sequence of en	tries whose	
keys are	sorted in an inc	reasing order.					

• *O*(*n*)

3. (a) Consider the following classes of functions:

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or Part (b) to Part (d), consider the following statement	3:	
A) $3n + 7$ is $O(n \cdot log(n))$ B) $3n + 7$ is $O(n)$		
C) $3n + 7$ is $O(1)$		
(2) $3n + 7$ is $O(2^n)$ (2) $3n + 7$ is $O(\log(n))$		
F) $3n + 7$ is $O(n^2)$		
Which of the above statement or statements are <i>correct</i> ? I sou make a mistake.	Oo not guess: you lose all ma	arks if
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mong the above statement or statements that are <i>correc</i>	t, which one is the most <i>accu</i>	
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