

Name: _____

Student ID: _____

Signature: _____

The University of New South Wales
Session 2, 2012

Sample Final Examination

COMP9024 **Data Structures and Algorithms**

- Time allowed: Three Hours
- Reading time: 10 minutes
- Number of Questions: **8** questions in **Part-A**, and **10** questions in **Part-B**
- Total number of marks: **100**
- Answer **All** Questions (using the space provided on this pink question paper)
- Questions are **not** worth equal marks
- No examination materials permitted
- Calculators may not be used
- This paper may **not** be retained by the candidate.

Answers must be written in ink. Except where they are expressly required, pencils may be used only for drawing, sketching or graphical work.

::::::::::::: **Part-A: Multiple Choice Questions** (12 marks) :::::::::::::::

There are **eight** multiple choice questions in this section. Each question in this section is worth **1.5 marks**. There is no additional penalty for answering a question incorrectly. Each question has one possible answer. Please select the most suitable answer.

Please **put a tick (✓)** next to the correct answer. In case you change your mind, please clearly erase (cross-out) the previous answer(s).

A question with **more than one tick** and/or an **ambiguous tick** will result in **zero** mark.

- Multiple choice questions are based on **all the topics** covered in the course (**Week-1 to 13**)
- See “**Sample Multiple Choice Questions**” at the **end of this document**.

::::::::::::: **Part-B** (88 marks) :::::::::::::::

Q1 (10 marks)

Questions based on the following (and other related) topics:

- Conceptual questions on **Trees** (**ALL** types of trees)

Q2 (6 marks)

Questions based on the following (and other related) topics:

- **Priority Queues** and **Heaps** (lecture notes and exercises)

Q3 (6 marks)

Questions based on the following (and other related) topics:

- **AVL Trees** (lecture notes and exercises)

Q4 (6 marks)

Questions based on the following (and other related) topics:

- **B Trees** (lecture notes and exercises)

Q5 (10 marks)

Questions based on the following (and other related) topics:

- **Select the most suitable ADT,**
- **Sorting**

Q6 (10 marks)

Questions based on the following (and other related) topics:

- **Graph** (a question based on Week-9_10 Exercises)

Q7 (10 marks)

Questions based on the following (and other related) topics:

- **Pattern Matching/Text Processing** (a question based on Week-13 exercises)

Q8 (10 marks) (Nominated question for ass2)

Questions based on the following (and other related) topics:

- **Ass-2**

Q9 (8 marks)

Questions based on the following (and other related) topics:

- **Sorting** (lecture notes and exercises)

Q10 (12 marks)

Questions based on the following (and other related) topics:

- **Graphs** (lecture notes and exercises)

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Sample Multiple Choice Questions

- Multiple choice questions are based on all the topics covered in the course (Week-1 to 13)

M1: If, in a given computing environment, data moves are very expensive and comparisons are cheap, which sorting method is likely to be best for a medium-large file?

- A) selection
- B) heap
- C) insertion
- D) merge
- E) quick

M2: A certain quadratic time algorithm uses 500 elementary operations to process an input of size 10. What is the most likely number of elementary operations it will use if given an input of size 1000?

- A) 40
- B) 500
- C) 50000
- D) 1000000
- E) 5000000

M3: When the entries 7, 4, 6, 1, 2, 3, 8, 5 are successively inserted into an initially empty binary search tree, what is the height of the resulting tree?

- A) 4
- B) 3
- C) 7
- D) 2
- E) 1

M4: For a graph ADT, which one of the following is true?

- A) A simple path is a circular sequence of alternating vertices and edges.
- B) A simple path must contain all the vertices of the graph.
- C) In a DFS algorithm, each edge is labelled once only.
- D) In a DFS algorithm, each vertex is labelled once only.
- E) In a DFS algorithm, each edge is labelled twice.

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