

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING
Department of Computer Engineering

Final Examination: Semester 2

Academic Year: 2004-2005

Date: 21st February, 2005

Time: 9:00 – 12:00 (3 hours)

Subject Number: 240-321

Room: R 200

Subject Title: Advanced Computer Programming Techniques

Lecturer: Aj. Andrew Davison

Exam Duration: 3 hours

This paper has 3 pages.

Authorised Materials:

- Writing instruments (e.g. pens, pencils).
- Books (e.g. dictionaries) and calculators are **not** permitted.

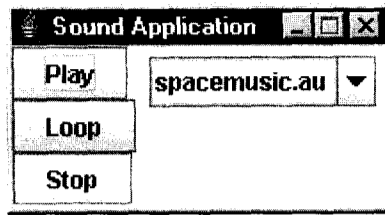
Instructions to Students:

- *Answer questions in English.* Perfect English is **not** required.
- Attempt all questions.
- Write your answers in an answer book.
- Start your answer to each question on a new page
- Clearly number your answers.
- Any unreadable parts will be considered wrong.
- When writing programs, use good layout, and short comments; marks will not be deducted for minor syntax errors.
- The marks for each part of a question are given in brackets (...).

Question 1

(70 marks; 70 minutes)

Implement an application that plays `AudioClip` sounds. Its interface should have the form:



Four sounds are listed in the combo box on the right hand side. The 'Play', 'Loop', and 'Stop' buttons are in a single column on the left of the GUI. The 'Play' button plays a selected sound once, 'Loop' makes the sound play repeatedly, and 'Stop' stops the sound.

Question 2

(20 marks; 20 minutes)

- Explain the differences between images and `ImageIcons` in Java. Use small code fragments in your answer. (10)
- What is a `MediaTracker`? Use small code fragments in your answer. (10)

Question 3

(50 marks; 50 minutes)

- Write a `Scorer` class which stores a single integer called `score`. The integer's value can be changed by a call to `updateScore(int num)`, which changes `score`'s value to `num` only if `num` is greater than the current `score` value. When a `Scorer` object is created, `score`'s initial value is `-1`.
`Scorer` also contains a `getScore()` method that return the `score` value. (5)
- Write a threaded class called `ScoreAdjuster` which calls `updateScore()` in the `Scorer` object. It updates the score with a number supplied in the constructor call to `ScoreAdjuster`. (5)
- Write a `main()` method which creates 100 `ScoreAdjuster` threads. `main()` waits until all the threads have finished, then prints the current `score` held in the `Scorer` object. (10)
- Explain in words the output produced in part (c). Use diagrams to help your explanation. (10)
- Explain in words how any problems with the application can be fixed. Use diagrams and **small** code fragments to help your explanation. (10)
- Explain in words the advantages **and** disadvantages of threads. Do **not** use code fragments in your answer. (10)

Question 4

(40 marks; 40 minutes)

- a) Write a `main()` method that reads in a single integer from the keyboard. Do **not** use the `Console`, `EasyIn`, or `Scanner` classes. (10)
- b) Write a `main()` method that uses the `Scanner` class to read in floats from a text file. The floats should be added, and printed to standard output. (10)
- c) Explain the `DecimalFormat` class. (10)
- d) Explain how formatted output is carried out with `System.out.printf()`. (10)

Use small code examples, and diagrams, in your answers to parts (c) and (d).

--- *End of Examination* ---