PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Department of Computer Engineering

Midterm Examination: Semester 2 **Academic Year**: 2006-2007

Date: 16th December, 2006 **Time**: 13:30 – **15:30 (2 hours)**

Subject Number: 240-321 **Rooms**: A 201

Subject Title: Advanced Computer Programming Techniques

Lecturer: Aj. Andrew Davison

Exam Duration: 2 hours

This paper has 2 pages.

Authorized 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 (...).

b) Explain the three main steps in programming with *regular expressions* (RegExprs) in Java. Your answer should include **small** code fragments. (10)

--- End of Examination ---

Question 1 (20 marks; 20 minutes)

Describe in words the main *advantages* and *disadvantages* of Java. Answer in point form. Code examples should **not** be included. *Note*: when I answered this question, I came up with more than 10 answers.

Question 2 (35 marks; 35 minutes)

a) Write a `BankAccount` class which stores a bank account number and the current balance. There should be methods to deposit and withdraw money, to get the current balance, and account number. (10)

b) Write a main() method showing how a `BankAccount` object can be used. (5)

c) Write a subclass of `BankAccount` called `InterestAccount`. It should include a method to add 5% interest to the account balance. There should also be methods to get and set the interest value. (7)

d) Write a subclass of `InterestAccount` called `GoldAccount`. It will automatically calculate the interest value based on the current account balance. If the balance is greater than 200,000 Baht then the interest is set to 20%, if greater than 20,000 Baht then 10%, otherwise 5% is used. (8)

e) Write a main() method showing how `InterestAccount` and `GoldAccount` objects can be used. (5)

Question 3 (35 marks; 35 minutes)

a) What are the differences between a class and an object? (10)

b) What is a *polymorphic* data structure? (15)

c) What are packages and JAR files? (10)

Each answer should include diagrams and **small** code fragments where possible. You may refer back to your answers in Question 2 for examples if you want.

Question 4 (30 marks; 30 minutes)

a) Write a Java **applet** that starts by reading in a string from an input dialog box. The string should contain two integers separated by spaces (e.g. "23 5"). The applet should tokenise the string, extract the integers, add them, and display the result using its `paint()` method. (20)

b) Explain the three main steps in programming with *regular expressions* (RegExprs) in Java. Your answer should include **small** code fragments. (10)

--- End of Examination ---