

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING
Department of Computer Engineering

Midterm Examination: Semester 1

Academic Year: 2003-2004

Date: 3rd August, 2003

Time: 13.30 – 15.30 (2 hours)

Subject Number: 240-424

Room: R 201

Subject Title: Introduction to Java Programming

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 (...).

Question 1

(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 brief `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 2% 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 100,000 Baht then the interest is set to 10%, if greater than 10,000 Baht then 5%, otherwise 2% is used. (8)
- e) Write a brief `main()` method showing how `InterestAccount` and `GoldAccount` objects can be used. (5)

Question 2

(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 is the purpose of the `protected` keyword? (10)

Each answer should include diagrams and **small** code fragments where possible. You **should** refer back to your answers in Question 1.

Question 3

(50 marks; 50 minutes)

- a) Explain in words the *six* steps for creating a `JFrame` GUI in Java.
Note: do **not** include any Java code. (10)
- b) Write a Java **application** which contains two text fields. The user can enter a string into the first text field. The string should contain two integers separated by spaces (e.g. "7 27"). The application should tokenise the string, extract the integers, add them, and display the result in the other text field.

Comment your code to show where the six steps of part (a) appear. (35)
- c) Draw an *event model diagram* for your program of part (b). (5)

--- *End of Examination* ---