NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
JULY SUPPLEMENTARY EXAMINATIONS 2005

SUBJECT: OBJECT ORIENTED SOFTWARE CONCEPTS AND DEVELOPMENT
CODE: SCS4102

INSTRUCTION TO CANDIDATES

Answer any 5 questions
All questions carry equal marks
Include UML class diagrams in your responses whenever possible
Total marks 100

Time: 3 hours

QUESTION ONE

Below is the outline for a Book class.

```
public class Book {
        private String author;
        private String title;
        public Book(String bookAuthor, String bookTitle) {
                author = bookAuthor;
                title = bookTitle;
        }
}
```

(a) Add two methods, printAuthor and printTitle, to the outline Book class. These should print the author and title fields, respectively, to the terminal window. [3]

(b) Add a further field, pages, to the Book class to store the number of pages. This should be of type int, and its initial value would be passed to the single constructor, along with author and title strings. Include an appropriate accessor method for this field. [5]

(c) Add a method printDetails to the Book class. This should print details of the author, title and pages to the terminal window. [3]

(d) Add a further field, refNumber, to the Book class. This field can store a reference number for a library, for example. It should be of type String and initialized to the zero length string in the constructor. Also, define an appropriate mutator method. [5]

(e) Modify your printDetails method to include printing of the reference number. However, the printDetails method should only print the reference number only if it has been set. [4]

QUESTION TWO

Create a class that represents a square matrix. Include the following operations: add, subtract, multiply and transpose.

[20]

QUESTION THREE

Use a set of class definitions to illustrate the concept of inheritance. Your explanation should explicitly explain the concepts of overloading, overriding and access modification.

[20]

QUESTION FOUR

Write a program that instantiates objects from a hierarchy of classes designed to represent different types of geometric shapes. The objects instantiated from this hierarchy of classes should include a method that returns the name of the shape represented by the object, the area of the shape, as well as appropriate mutator and accessor methods for all necessary instance variables. [20]

QUESTION FIVE

(a) Write a Java program to print out a 10 column by 10 row multiplication table.

[5]

(b) Write a Java program to print out a table of numbers with two columns. The first column should contain a sequence of numbers increasing from 1 to n, where n is an int which is accepted as input from the user of the program. The second column should contain the cube of the number in the first column.

[5]

(c) Define the following:

(i) instance [2]
(ii) signature [2]
(iii) parameter [2]
(iv) state [2]
(v) method [2]

QUESTION SIX

(a) What is a Java interface? Why is it used?

[6]

(b) Write a program to demonstrate how you might make use of an interface. [14]

QUESTION SEVEN

Explain the following:

(a) Inner class [3]
(b) Exception [2]
(c) Anonymous instantiation [3]
(d) ActionListener [2]
(e) MouseListener [3]
(f) MouseAdapter [2]
(g) WindowListener [3]
(h) WindowAdapter [2]

END OF QUESTION PAPER