NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF APPLIED SCIENCE
COMPUTER SCIENCE DEPARTMENT
DECEMBER EXAMINATIONS 2004

SUBJECT: OBJECT ORIENTED SOFTWARE CONCEPTS AND DEVELOPMENT
CODE: SCS4102

INSTRUCTION TO CANDIDATES

Answer any 5 questions
All questions carry equal marks
Total marks 100

Time: 3 hours

QUESTION ONE

The total inventory cost C in a large store is given by $C = \frac{c_s q}{2} + \frac{c_d r}{q}$, where c_s is the unit storage cost per unit time; c_d is the cost per delivery; q is the number of items in each delivery (the lot size); and r is the rate at which the item is sold (the demand rate). The optimal lot size q_0 (i.e. the lot size that minimizes the total cost is given by $q_0 = \sqrt{\frac{2c_d r}{c_s}}$. Assuming that the unit storage cost per week and the delivery rate are constant, write a program to read in the current lot size and demand rate and to calculate:

(a) The current inventory cost. [6]
(b) The optimal inventory cost. [6]
(c) The saving if the optimal lot size is used. [8]

QUESTION TWO

Frequency data has been collected and is arranged in the form $x_1 f_1 \quad x_2 f_2 \quad \ldots \quad x_n f_n$ where each observed value x_i occurs f_i times. Write a program to calculate the mean $\bar{x}$ given by $\bar{x} = \frac{f_1 x_1 + f_2 x_2 + \ldots + f_n x_n}{f_1 + f_2 + \ldots + f_n}$. [20]

QUESTION THREE

Create a Swing graphical user interface (GUI) that allows a user to enter a sequence of up to ten numbers. The user interface should calculate and report the following:

(a) Sum, $\sum_{i=1}^{n} x_i$, [8]

(b) Average $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$ and [4]

(c) Standard deviation $\sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$ [8]

of the numbers that have been entered, when a button marked "Calculate" is clicked.

QUESTION FOUR

Write a program that instantiates objects from a hierarchy of classes designed to represent different types of employee in an organization. The program should test the methods implemented in the classes. The expected output of the program should be included in the response to this question. [20]

QUESTION FIVE

Using a class that implements the collection interface, show how an iterator object can be instantiated and used to traverse the elements in a collection object. [20]

QUESTION SIX

Show how a JTable Swing control is populated, by extracting data from an appropriate array of objects and displaying this data using a JTable. [20]

QUESTION SEVEN

Explain the following:

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

END OF QUESTION PAPER

GOOD LUCK!