

University of Swaziland
Department Of Computer Science
Main Examination December 2015

Title of paper : **C under Linux**

Course number : **CS344**

Time Allowed : **Three (3) hours**

Instructions:

- **Answer ALL Questions in section A.**
- **Answer any two (2) questions in section B.**

This paper may not be opened until permission has been granted by the invigilator.

Section A

QUESTION 1 [25 marks]

- i. What is Linux Command Shell and BASH? [2]
- ii. Discuss about Linux different directory layout. [3]
- iii. Write description of the following Linux commands: [5]
 - a) shutdown -r now
 - b) mountb -t msdos /dev/hdd/mnt/ddrive
 - c) ls -l
 - d) rpm -i -force package
 - e) cat /proc/cpuinfo
- iv. Fill in the blanks in the following (Note: Just write down the missing words) [15]
 - a) Pascal, BASIC, and C are p___ languages, while C++ is an o ___ language.
 - b) The two major components of an object are ___ and functions that _____.
 - c) The ability of a function or operator to act in different ways on different data types is called _____.
 - d) A C++ instruction that tells the computer to do something is called a _____.
 - e) The expression 11%3 evaluates to _____.
 - f) The closing brace of a structure is followed by a _____.
 - g) In general, an inline function executes _____ than a normal function, but requires _____ memory.
 - h) Storage class is concerned with the _____ and _____ of a variable.
 - i) A constructor's name is the same as _____.
 - j) The only technical difference between structures and classes in C++ is that _____.
 - k) An array name, used in the source file, represents the _____ of the array.
 - l) In the UML, member data items are called _____ and member functions are called _____.
 - m) Composition is a _____ form of _____.
 - n) Of the three ways to pass arguments to functions, only passing by _____ and passing by _____ allow the function to modify the argument in the calling program.
 - o) An STL algorithm is _____.

QUESTION 2 [25 marks]

- i. Explain the following terms: **[10]**
- a) Class and objects
 - b) Encapsulation
 - c) Inheritance
 - d) Polymorphism
 - e) STL
- ii. Distinguish between the following (Note: write down with appropriate example): **[15]**
- a) Private class and Publics base class.
 - b) Overloading and Overriding.
 - c) Call by value and Call by reference.
 - d) Public and Private Inheritance.
 - e) Operation polymorphism and Inclusion Polymorphism.

Section B

QUESTION 3 [25 marks]

- i. Write the C++ syntax and draw the activity diagram for the following statements. [9]
- a) For loop
 - b) If.....else statement
 - c) Switch statement

- ii. If you have two fractions, a/b and c/d , their sum can be obtained from the formula [4]

$$\frac{a}{b} + \frac{c}{d} = \frac{a*d + b*c}{b*d}$$

For example, $1/4$ plus $2/3$ is

$$\frac{1}{4} + \frac{2}{3} = \frac{1*3 + 4*2}{4*3} = \frac{3 + 8}{12} = \frac{11}{12}$$

Using C++, write a program that encourages the user to enter two fractions, and then displays their sum in fractional form. (You don't need to reduce it to lowest terms.) The interaction with the user might look like this:

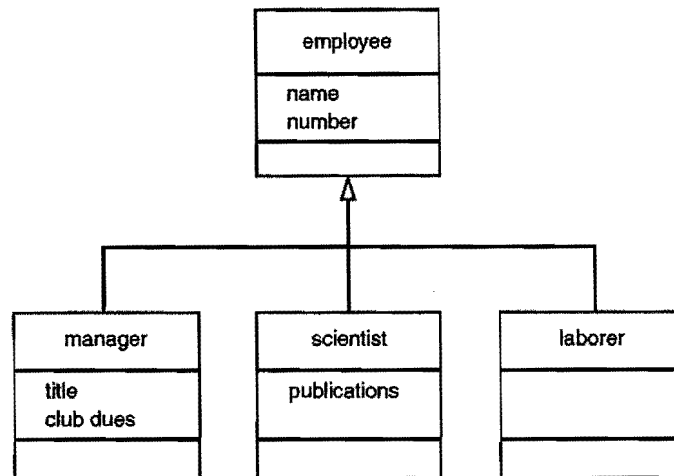
Enter first fraction: 1/2

Enter second fraction: 2/5

Sum = 9/10

iii. Consider the following UML class hierarchy diagram for Widget Company.

[12]



Using C++ notation implement the above class hierarchy. Your implementation must be as close as possible to the above design. A sample output after insert data is:

Data on manager 1:

Name: Dlamini

Number: 10

Title: President

Golf club dues: 5000

Data on Laborer 1:

Name: Sifiso

Number: 201

QUESTION 4 [25 marks]

i. What do you mean by inline function? Explain with a suitable example program. [5]

ii. Create a class called employee that contains a name (an object of class string) and an employee number (type long). Include a member function called getdata() to get data from the user for insertion into the object, and another function called putdata() to display the data. Assume the name has no embedded blanks. [10]

Write a main() program to exercise this class. It should create an array of type employee, and then invite the user to input data for up to 100 employees. Finally, it should print out the data for all the employees.

- iii. Create a class called publication that stores the title (a string) and price (type float) [10] of a publication. From this class derive two classes: book, which adds a page count (type int); and a tape, which adds a playing time in minutes (type float). Each of the three classes should have a getData() function to get its data from the user at the keyboard and a putData() to display the data.

Write a main() program that creates an array of pointers to publication. In a loop, ask the user for data about a particular book or tape and use new to create an object of type book or tape to hold the data. Put the pointer to the object in the array. When the user finishes entering the data for all books and tapes, display the resulting data for all the books and tapes entered, using a for loop and a single statement.

QUESTION 5 [25 marks]

- i. Using C++, explain about derived class and base class with a suitable example. [7]
- ii. What is linked list? Write an example program to explain how to add a destructor [10] to the LINKLIST program. It should delete all the links when a linklist object is destroyed. It can do this by following along the chain, deleting each link as it goes. You can test the destructor by having it display a message each time it deletes a link; it should delete the same number of links that were added to the list.
- iii. Write a program that applies the sort() algorithm to an array of words entered by the [8] user, and display the result. Use push_back() to insert the words, and the operator[] and size() to display them.

End of Question Paper