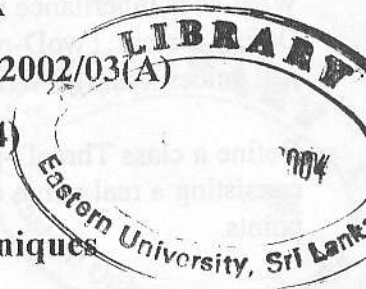


EASTERN UNIVERSITY, SRI LANKA  
FIRST EXAMINATION IN SCIENCE 2002/03 & 2002/03(A)  
SECOND SEMESTER (April/May, 2004)

CS104 – Object Oriented Programming Techniques



Answer All Questions

Time Allowed: 01 Hour

Q1

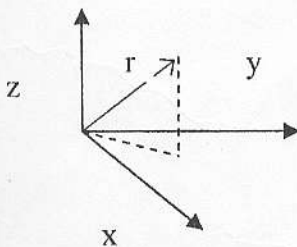
- a.  
What is information hiding? What is encapsulation?  
Describe the role of the constructor and destructor.

A combination lock has the following basic properties. The combination (a sequence of three numbers) is hidden; the lock can open by providing the combination; the combination can be changed but only by someone who knows the current combination.

Design a class with public member functions **open** and **change\_comb** and private data members that store the combination. The combination should be set in the constructor.

- b.  
What is operator overloading?

A vector, in three-dimensional space, **r** is a set of three coordinates, denoting a position in space. The coordinates are (x, y, z) in Cartesian space.



Develop a class for a three dimensional vector. Include member functions to add a pair of vectors and to form the cross product between a pair of vectors.

Hint: Let  $\underline{a} = (a_x, a_y, a_z)$        $\underline{b} = (b_x, b_y, b_z)$

If cross product of vector  $\underline{a}$  and vector  $\underline{b}$  is vector  $\underline{c}$  :

$$\underline{c} = \underline{a} \times \underline{b}$$

$$\text{Let } \underline{c} = (c_x, c_y, c_z)$$

Where,

$$c_x = a_y b_z - a_z b_y$$

$$c_y = a_z b_x - a_x b_z$$

$$c_z = a_x b_y - a_y b_x$$

Q2.

What does inheritance means? Explain with examples.

Define a class TwoD-point to represent a two-dimensional space coordinate point consisting of real values x and y. Write a member function to compute the distance between two TwoD-points.

Define a class ThreeD-point to represent a three-dimensional space coordinate point additionally consisting a real value of z. Write necessary code to compute the distance between two ThreeD-points.



Hint: Let  $g = (a_1, a_2, a_3)$  and  $f = (b_1, b_2, b_3)$

If cross product of vector g and vector f is vector g:

$$g = g \times f$$

$$\text{Let } g = (a_1, a_2, a_3)$$

What