



EASTERN UNIVERSITY, SRI LANKA

DEPARTMENT OF MATHEMATICS

FIRST YEAR EXAMINATION IN SCIENCE-2014/2015

FIRST SEMESTER (AUG. / SEP. , 2016)

CS 103 – INTRODUCTION TO PROGRAM DESIGN AND PROGRAMMING

PROPER & REPEAT

Answer all questions

Time allowed: 2 Hours

- Q1. Algorithm is the step by step process to solve a particular problem, represented in two ways: Flow chart and Pseudo code.
- Briefly describe the following terms:
 - Source Code,
 - Compiler,
 - Linker.
 - A salesperson leaves his home every Monday and returns every Friday. He travels by company car. Each day on the road, the salesperson records the amount of petrol put in the car. Given the starting odometer reading (that is, the odometer reading before he leaves on Monday) and the ending odometer reading (the odometer reading after he returns home on Friday), design an algorithm to find the average kilometers per litre. Sample data is as follows:

Odometer reading before he leaves on Monday	:	68723
Odometer reading after he returns home on Friday	:	71289
Amount of petrol Monday to Friday	:	15.75, 16.30, 10.95, 20.65, 30.00

(Hint: Odometer- an instrument for measuring the distance traveled by a vehicle.)
 - Write C++ statement(s) that accomplish the following.
 - Declare the variables **num1**, **num2**, and **newNum** of type int; **name** of type string; and **hoursWorked** of type double.

- b. Prompt the user to input two integers and store the first number in `num1` and the second number in `num2`.
 - c. Multiplies the value of `num1` by 2, adds the value of `num2` to it, and then stores the result in `newNum`. Then, outputs the value of `newNum`.
 - d. Prompt the user to enter a person's last name and then store the last name in a variable `name`.
4. What are the differences between machine languages and high-level languages?

Q2. The programming language's rules, symbols, and special words enable you to write programs to solve problems.

1. Explain the following operators using suitable examples:
 - a. Logical operators,
 - b. Conditional Operator,
 - c. Increment Operators,
 - d. Decrement Operators.
2. What is the output when the following code fragment is executed?

```
int i = 5, j = 6, k = 7, n = 3;
cout << i + j * k - k % n << endl;
cout << i / n << endl;
```

3. Briefly explain three predefined functions used in C++ programming with an example.
4. Suppose that `sale` and `bonus` are double variables. Write the C++ statements that prompt the user to enter the sales value and write an if...else statement that assigns a value to `bonus` as follows: If `sale` is greater than Rs.20,000, the value assigned to `bonus` is 10%; If `sale` is greater than Rs.10,000 and less than or equal to Rs.20,000, the value assigned to `bonus` is 5%; otherwise, the value assigned to `bonus` is 0.

Q3. C++ has three repetitions, or looping, structures that let you repeat statements over until certain conditions are met.

1. Describe the control structures selection and iteration.

2. Consider the following code fragment.

```
int x, y, z;
x = 4; y = 3;
z = y + 1;
do
{
cout << z << " ";
z = z + 5;
}
while (((z - x) % 4) != 0);
```

- a. What is the output of the code fragment?
- b. Rewrite the code fragment to for loop and while loop that have the same output.

3. Write C++ statements for the following:

- a. an array of floating point values with size 5;
- b. Prompt the user to enter the array values;
- c. Find the sum of the floating point values in the array.

4. Consider the following program in which the statements has mistakes and which are in the incorrect order. Rearrange the statements and correct the mistakes. The program prompts the user to input the non-negative number and check whether the entered number is negative. If the number is negative the statements will repeat until a positive number entered.

```
int main
{
while (n < 0);
{
cout << "Enter a non-negative integer: ";
if (n < 0)
getch;
cout << "The integer you entered is negative." << endl;
cin >> n;
}
int n
do
#include <iostream>
using namespace std;
```

Q4. C++ program is a collection of one or more subprograms, called functions. Some called predefined and other are called user-defined functions.

1. Using suitable example explain the parameter passing techniques.
2. Briefly explain the three parts in a function with suitable example.
3. Write a float function called **GetArea()** to obtain the area of a circle.
4. What is meant by structured programming?
5. Write C++ statements for the following:
 - a. Define a struct, **checkingAccount**, to store the following data about account: **account holder's name** (string), **account number** (int) (double), and the **interest rate** (double).
 - b. Declare a **checkingAccount** variable and write C++ statements to store the following information: **account holder's name** - Miller, **account number** - 17328910, **balance** - 24476.38, **interest rate**—2.5%.