Vavuniya Campus of the University of Jaffna

First Examination in Information and Communication Technology - 2015

First Semester - August/September 2016

ICT1132 Introduction to Program Design and Programming

Answer Four Questions Only

Time Allowed : **Two** hours

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1. (a) State what is a computer program. [10%]

   (b) Explain why would you prefer to write a program in a high-level language rather than a machine language. [15%]

   (c) Differentiate a *Compiler* and an *Interpreter.* [20%]

   (d) State clearly the concept of scope of an identifier with aid of suitable examples. [15%]

   (e) Write a C++ statement to accomplish each of the following tasks:

   i. Declare integer type variables *c*, *thisIsAVariable*, *q76354* and *number.* [05%]

   ii. Read three integers from the keyboard and store them in the variables x, y and z. [10%]

   iii. Compute the product of the three integers contained in variables x, y and z, and assign the result to the variable *result.* [05%]

   iv. Print *"The product is "* followed by the value of the variable *result.* [05%]

   (f) Briefly describe exception handling. [15%]

2. (a) Briefly describe the usage of logical operators in C++.

(b) Write C++ statements that output `Male` if the *gender* is `M`, `Female` if the *gender* is `F`, and `invalid gender` otherwise.

(c) For the shipment purpose, each *storage drive* is stamped with a code from `1` to `4`, indicating the *storage drive* capacities as follows:

Code	Capacity
1	2 GB
2	4 GB
3	16 GB
4	32 GB

Write C++ statements that accept the code number as an input value, and based on the value entered, display the correct storage drive capacity.

(d) Write C++ statements for each of the following cases using 'for' loop:

i. The loop control variable named `j` that has an initial value of `1`, a final value of `100`, and an increment of `5`

ii. The loop control variable named `count` that has an initial value of `20`, a final value of `1`, and an increment of `-1`

(e) Write C++ statements that display the numbers from `100` to `110` using 'while' loop structure .

(f) Consider the following program segment:

```
const int NUM_TIMES = 4;
int loopNum = 0;
do{
    loopNum++;
    cout << "Ball " << loopNum << endl;
}while(loopNum < NUM_TIMES);
```

[This question is continued on the next page]

i. Identify the loop control variable? [05%]

ii. How many times does this loop execute? [05%]

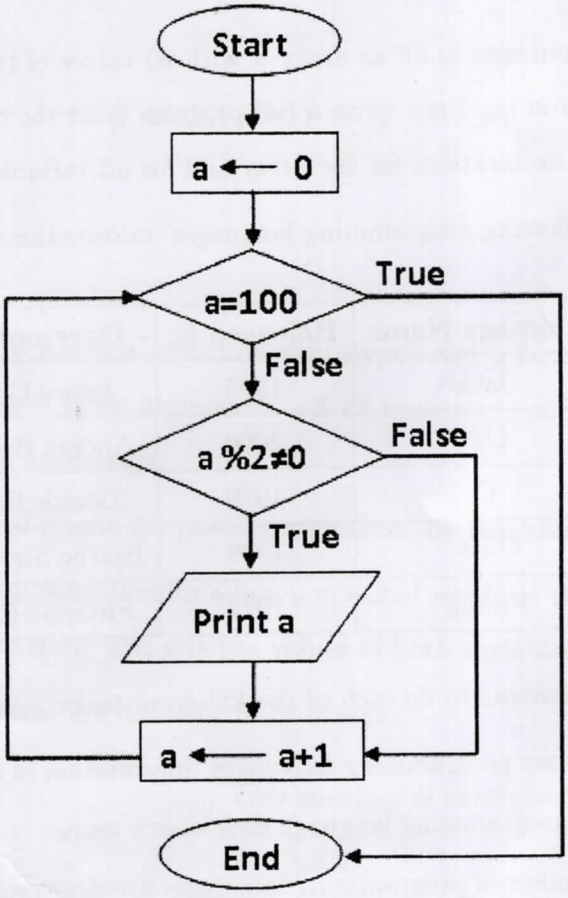
iii. What is the output of this program segment? [05%]

iv. Is the output different if the statement in the body of the loop, `loopNum++` comes immediately after the output statement? Justify your answer. [05%]

3 (a) Define the concept of flowchart. [10%]

(b) Draw a flowchart to add numbers and input the numbers until the sum exceeds 1000. [20%]

(c) Write an algorithm for the following flowchart:



[20%]

[This question is continued on the next page]

(d) Write an algorithm and draw a flowchart for the following block of code:

```
int main(){
    int a=1;
    while(a<=100){
        if(a%5==0)
            cout<<a<<" ";
        a++;}
return 0;
}
```

4. (a) Write C++ statements to fill an array `a` with 20 values of type `int` read in from the keyboard. You need not write a full program (just the code to do only this) but do give the declarations for the array and for all variables.

(b) Consider the following programming languages' information:

Language Name	Released in	Developed by
Java	1995	James Gosling
C#	2000	Anders Hejlsbers
C	1970	Dennis Ritchie
C++	1979	Bjarne Stroustrup
Prolog	1972	Philippe Roussel

Write C++ statements to do each of the following tasks:

i. Store the above programming languages' information in an array.

ii. Print C++ programming language developer's name.

iii. Find the number of programming languages are developed before *2000*.

[This question is continued on the next page]

(c) Describe the concept of pointers with the aid of an example. [15%]

(d) Write down the output for the following code segment written in C++.

```
int x = 5, y = 3, *p = &x, *q = &y;
cout << "x = " << x << ", y = " << y << endl;
x = y;
cout << "x = " << x << ", y = " << y << endl;
x = 7;
cout << "x = " << x << ", y = " << y << endl;
*p = 10;
cout << "x = " << x << ", y = " << y << endl;
p = q;
*p = 20;
cout << "x = " << x << ", y = " << y << endl
```

[15%]

5. (a) Write a function declaration (function prototype) and a function definition for a function that takes *three* arguments, all of type *int* , and that returns the summation of three arguments. [20%]

(b) Discuss the principal reason for passing arguments by reference. [15%]

(c) Write a void function definition for a function called *zeroBoth* that has *two integer type reference parameters*, and sets the values of both variables to *0*. [15%]

(d) Explain how *structures* are different from *arrays*. [15%]

[This question is continued on the next page]

(e) Assume that you have the following definition of a *struct*:

```
struct partsType{
        string partName;
        int partNum;
        double price;
        int quantitiesInStock;
       };
```

i. Declare a variable ***printer*** of type **partsType**.

ii. Declare an array, ***inventory***, of *100* components of type **partsType**.

iii. Write code to store the following data in ***printer***: `partName` : *LexMark*, `partNum` : *5090*, `price` : *28500.00*, and `quantitiesInStock` : *5*.

iv. Write code to initialize each component of ***inventory*** as follows: `partName` to *null* string, `partNum` to *-1*, `price` to *0.0*, and `quantitiesInStock` to *0*.