Vavuniya Campus of the University of Jaffna

First Examination in Information and Communication Technology - 2017

First Semester - September/October 2018

ICT1132 Introduction to Program Design and Programming

Answer Four Questions Only

Time Allowed : **Two** hours

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

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

   (c) List down five programming paradigms. [20%]

   (d) State what is type casting in C++. [15%]

   (e) Rewrite the following C++ program after removing all the syntactical errors:

```
include<iostream>
define PI=3.14
void main( );{
        double r;a;
        cout<<'enter any radius';
        cin<<r;
        a==PI*pow(r,2);
        cout<<"Area="<<a }
```

[30%]

2. (a) Briefly explain the importance of logical operators in C++ with the aid of examples. [20%]

(b) Consider the following C++ code:

```
grade= marks >= 75 ? 'G' :  marks >= 50 ? 'O' : marks >= 35 ? 'N' : 'F';
```

Rewrite the above code by replacing with a suitable if-else statement. [20%]

(c) Describe the switch structure using an example. [15%]

(d) Consider the problem to compute the factorial of a given number N (i.e., N!). where N! = 1 * 2 * 3 * 4 *.....N-1 * N and 0!=1.

i. Write an algorithm and draw a flowchart to solve this problem. [30%]

ii. Write a C++ code segment for this task. [15%]

3. (a) Consider the following players' goal list obtained in FIFA 2018 world cup:

Name of the Player	Country	Number of Goals
Griezmann	France	4
Kukaku	Belgium	4
Mbappe	France	4
Rane	England	6
Ronaldo	Portugal	4

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

i. Store the above goal list information in an array. [10%]

ii. Find the highest goal player and print his name and country. [15%]

iii. List the France players' name. [10%]

[This question is continued on the next page]

(b) Trace and write down the output of the following program:

```
#include <iostream>
using namespace std;
void Changethecontent(int Arr[], int Count) {
   for (int C=1;C<Count;C++)
      Arr[C-1]+=Arr[C];
}
void main() {
      int A[]={3,4,5},B[]={10,20,30,40},C[]={900,1200},L;
      Changethecontent(A,3);
      Changethecontent(B,4);
      Changethecontent(C,2);
      for (L=0;L<3;L++)
          cout<<A[L]<<"#";
      cout<<endl;
      for (L=0;L<4;L++)
          cout<<B[L] <<"#";
      cout<<endl;
      for (L=0;L<2;L++)
          cout<<C[L] <<"#";
}
```

[30%]

(c) Write a function in C++ to verify whether a given integer matrix with size 5x5 is a symmetric. [20%]

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

4. (a) Discuss the user defined function types and how to call those functions in a program. [20%]

(b) Explain the following terms with the aid of an example.

i. Local and Global variables

ii. Formal and actual parameters

iii. Function prototype and Function signature [30%]

(c) Consider the following C++ code to find the cube for a given integer:

```
#include<iostream>
using namespace std;
void main(){
   int N = 6;
   for (int i = 1,i <= N,i++)
          cout<<i " " <<cube(i)<<endl
}
int cube(int i){
   j = i * i * i;
   return j;
}
```

Identify the syntax errors, Rewrite the corrected program and its final output. [25%]

(d) Write a recursive function to reverse the digits in a given integer. [25%]

5. (a) Explain how *struct* is different from *class*. [20%]

(b) Write C++ statements to accomplish each of the following tasks:

i. Define a struct, `checkingAccount`, to store the following data about a checking account: `account holders name (string), account number (int),balance (double)`, and `the interest rate (double)`. [15%]

[This question is continued on the next page]

ii. Declare a `checkingAccount` variable and store the following information: `account holders name - Vavuniya Campus, account number - 17328910, balance - 2405476.38, interest rate - 10.5%.` [10%]

iii. Write a function to print `checkingAccount` information. [15%]

iv. Write a return function to read `checkingAccount` information from a user and return its value. [20%]

(c) Consider the following C++ code:

```
#include <iostream>
using namespace std;
void Division(const double a, const double b);
int main(){
   double op1=10, op2=0;
   try{
      Division(op1, op2);
   }
   catch (const char* Str){
      cout << "\nBad Operator: " << Str;
   }
   return 0;
}
void Division(const double a, const double b){
   double res;
   if (b == 0)
      throw "Division by zero not allowed";
   res = a / b;
   cout << res;
}
```

i. Trace and write down the output.

ii. Find the output of the above code if `op1=0` and `op2=10`. [20%]