The Open University of Sri Lanka

B.Sc. Degree Programme: Level 04

Final Examination 2006

CSU 3279- Object Oriented Programming – Paper I

Duration: **Two and Half Hours**

043

Date:18/11/2006 Time: 9.30 am –12.00 noon

Answer **FOUR** questions only.

Q1.

(a) The following identifiers are written in C++ and some of them are syntactically incorrect.
Find these identifiers and precisely write down each error.

(i) return (ii) Default (iii) Avogadro's_Number
(iv) inline (v) enum

(b) What data types would you use to represent the following data items? Briefly explain the reason for selecting a particular data type for each of them.

(i) Gender of a person
(ii) Population of a city
(iii) Planck's constant ($6.62559\text{x}10^{-27}$)
(iv) Number of executive-employees in a company
(v) The average rainfall for the month of January

(c) Rewrite the following C++ program correcting all the errors.

```
#include<stdio.h>
static int C= =0;
int Sum(int a, int b)
Void main[]
{
  int x,y,s;
  Cin<< x;
  Cin<< y;
  S=Sum(x,y);
  Cout>>S>>"\n";
}

int Sum (int a, int b)
{
  static int C;
  C= =a+b+C;
  return(C);
}
```

Q2.

(a) Write C++ expressions for the following mathematical formulae. Do not write unnecessary parenthesis.

(i) $\frac{1}{\left(\frac{1}{x^2}+2x+1\right)}$ (ii) $a*-(b+c)$ (iii) $\frac{a-b}{a+bc}d$ (iv) $\frac{1}{\sqrt{(y^2-1)}}$

(b) Briefly explain the effect of each of the following expressions:

(i) c = (a<b) ? a : b

(ii) x = &y

(iii) sizeof ((x+y) * 7.0);

(iv) I = m+n = 20

(c) Bracket the following logical expressions to show the order of evaluation of the operators.

(i) a+d >= c-b

(ii) c = = a+b || c = = d

(iii) a != 7 && c >= 6 || a+c <= 20

(iv) !(b <= 12) && a % 2 = = 0

(v) !(a > 5) || c < a+b

(d) State whether the following statements are ***TRUE*** or ***FALSE.***

(i) The return type of a function is `int` by default.

(ii) A local variable defined inside a function can be accessed by the calling program.

(iii) The keyword `long` is used to double the size of the storage used for the variable.

(iv) The `short` keyword can be used with `int` and `float` fundamental types.

(v) The number of elements in an array can be determined both at compile and run time.

Q3.

(a) What is the major difference between the 'while' statement and 'do-while' statement?

(b) (i) Study the following program. There are no comments in it. There are two loops; one inside the other, and every time the first loop is executed, the second is executed ten times. Add appropriate comments to the program and explain what it does.

```
#include<iostream.h>
Void main()
{
  int x=0;
  int y=0;
  while (y<10)
  {   x=0;
     while(x<10)
         { cout<<'*';
           x=x+1; }
  cout<<endl;
  y=y+1;
  }
}
```

(ii) Change the above program (in part –b (i)), letting the user to enter the dimensions of the shape that is drawn. (They should not be large so that the resulting shape would not fit on the screen)

(c) State whether the following statements are ***TRUE*** or ***FALSE.***

(i) A pointer variable can hold the addresses of variables of different data types.

(ii) 'Strcpy' can be used to copy a string into an array.

(iii) An identifier must start with an alphabetic character, digit or an underline character.

(iv) Pointers may be redirected to different objects of the class or to NULL.

(v) Messages are sent to dynamic objects using the 'arrow' operator (->) which de-references the pointer.

Q4.

(a) (i) How does information be supplied as input to a function?

(ii) How can information be conveyed back to the calling program?

(b) What is an ***inline function*** and ***when*** would you make a function ***inline.***
Write an inline function named as cal_Salary, which takes three parameters namely, ***number of days, number of hours*** and ***hourly pay-rate*** and return the ***total monthly salary.***

(Hint: ***total monthly salary*** = ***number of hours*** × ***hourly pay-rate*** × ***number of days***)

(c) (i) What is the difference between the following two versions of functions?

```
#include<iostream.h>
void fun(int x);
void fun(int x);
{ x=42 ;}
main()
{
int v;
v=0;
fun(v);
cout<<v;
}
```

version (a)

```
#include<iostream.h>
void fun(int& x);
void fun(int& x);
{ x=42 ;}
main()
{
   int v;
   v=0;
   fun(v);
   cout<<v;
   }
```

version (b)

(ii) Write down the outputs of the above two versions of the function and explain them.

(iii)Identify the problem in ***version (a)*** and briefly explain how it has been overcome in ***version (b).***

Q5.

(a) What are ***storage classes***? Briefly explain using examples.

(b) Write a program 'fragment' to merge the contents of two words in such a way that the letters are taken alternately from one word and then from the other.

Hint: Do not forget to account for the null character correctly, and you will have to decide what to do if the strings are of unequal length.

(c) What is wrong with each of the following program fragments involving a call to the function `square`? Explain briefly.

```
(i)    int x[10];
       x=square (10);

(ii)   int x;
       x=square ("10");

(iii)  int x;
       x=square (10, 2);

(iv)   int x[10];
       square (10)=x;
```

Q6.

(a) What is a ***reference variable***?
Why do we pass arguments by reference instead of by value, when the passing structure variables are very large?

(b) (i) Write a program to test the two versions of the 'square' function; one passing a parameter by value, the other by reference. The values to be squared should be input from the keyboard. Remember that the functions must be either fully declared or prototyped before the main function to allow static type checking to take place.

(ii) What happens if we pass data types other than an integer to the function?

(c) Define a structure template to store the information of an employee in XYZ Company. It should include the following information.

- employee no.
- name of the employee
- monthly salary of the employee

(i) Suppose that there are 15 executive employees and 150 non-executive employees appointed for a new foreign project of that company. How would you declare an array to store this information?

(ii) Write C++ codes to read employee (executive and non-executive) information into the structure declared above.

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