Philadelphia University

Faculty of Engineering

Student Name:

Student Number:

Dept. of Computer Engineering
Final Exam, Second Semester: 2010/2011

Course Title:	Programming Language	**Date:**	01/06/2011
Course No:	630203	**Time Allowed:**	2 Hours
Lecturers:	o Dr. Emad Khalaf o Dr. Qadri Hamarsheh o Dr. Ali Al-Khawaldeh	**No. Of Pages:** **Section:**	5 ( )

Information for Candidates

   1.*This examination paper contains 6 questions totaling 50 marks.*

   2.*The marks for the questions are:*

Question 1   (10 marks),   Question 2   (15 marks), Question 3   (5 marks),
Question 4   (6 marks),   Question 5   (5 marks),   Question 6   (9 marks)

Advice to Candidates

   1.   You should attempt ALL requested parts.

   2.   *You should write your answers clearly.*

I.   **Basic notions**. *The aim of the questions in this part is to evaluate the required minimal student knowledge and skills. Answers in the pass category represent the minimum understanding of basic concepts of C++ programming language concept: input and output streams, syntax and control structures (Sequence, Selection and Repetition structures) such as if, case , while and for structures, functions, mechanisms used to pass information between functions, functions and calling mechanisms.*

Question 1: <u>**Choose the most appropriate answer(s) among the options for each branch:**</u>   *(10 marks)*

1. Variables that can be accessed and altered only within the function in which they are defined are called:
         `a) User defined variables`   `b) Static variables`
         `c) Local variables`   `d) Global variables`

2. What character is used to indicate that a function parameter is call-by-reference?
`a) &`   `b) [ ]`   `c) *`   `d) %`

3. Suppose **x** is **5** and **y** is **7**. Choose the value of the following expression:
     `(x != 7) && (x <= y)`
     `a. false`   `c. 0`
     `b. true`   `d. null`

4. The data type returned by a function is dictated by its:
`a) prototype`   `b) constructor`   `c) return statement`   `d) address`

5. Which of the following is not allowed in overloading a function?
        `a) Two functions can have the same name.`
        `b) Two functions have the same name and the same type of parameters, but one function takes two parameters while the other takes only one parameter.`
        `c) Two functions have the same name and one takes parameters of type integer while another takes parameters of type double.`
        `d) Two functions have identical parameter lists but different return types.`

6. The C++ data type that can take on either one of only two possible values is known as:
`a) binary`   `b) character`   `c) short`   `d) boolean`

7. Consider the following C++ program.
           `int a[10] = {1,3,2,0,5,-2,6,8,7,11};`
           `int sum, p;    int c = 1;   sum = p = a[0];`
           `for ( int i = 1; i < 10; i++){`
                 `if (a[i] > p) {`
                   `sum += a[i];  p = a[i]; c++; } }`
           `cout << c << " " << sum;`

Which of the following is the resulting output?
`a) 10 41`   `b) 9 30`   `c)4 7`   `d)6 34`

8. What gets output when the following statement executes? cout« (2 * 3 / 5);

a) 0   b) 1   c) 2   d) 8

9. Which of the following is a valid use of cin or cout, assuming that var is a variable of type int?

     a)cout » ~Hello World!";   b)cin « ~Hello World!";

     c)cin » var;   d)cout » var;

10. Given the following function prototype: **int myFunc(int, int);** which of the following statements is valid? Assume that all variables are properly declared.

        a. `cin >> myFunc(y);`

        b. `cout << myFunc(myFunc(7, 8), 15);`

        c. `cin >> myFunc('2', '3');`

        d. `cout << myFunc(myFunc(7), 15);`

Question 2: **What is the output when the following code fragments are executed?**   *(15 marks)*

a)	Code	Output
1.	```int x = 55; int y = 5; //2 marks
switch (x % 7)
{
case 0:
case 1: y++;
case 2:
case 3: y = y + 2;
case 4: break;
case 5:
case 6: y = y - 3;
}
cout << y << endl;```	
2.	```count = 1;num = 25; //2 marks
while (count < 25)
{
num = num - 1;
count++;
}
cout << count << " " << num << endl;```	
3.	```int alpha[5] = {2, 4, 6, 8, 10}; //2 marks
int j;
for (j = 4; j >= 0; j--)
cout << alpha[j] << " ";
cout << endl;```	
4.	```int main() //2 marks
{
double F[5]={6,-2,-8,2,-5};
int i;
for (i=1; i < 4 ; i ++)
F[i] = F[i] * i;
for (i=0; i < 5 ; i ++)
cout << F[i] << endl;
return 0;
}```	
5.	```include <iostream> //2 marks
using namespace std;
int SomeFunA(int x);
int SomeFunB(int y);
int SomeFunC(int z);
int main()
{int rc=3;   int n = 3;
rc = SomeFunA(n);```	

```
        cout << "The result is " << rc << "\n";
        return 0;   }
int SomeFunA(int x)
    {x = x + 3;
     x = SomeFunB(x);
     return x;   }
int SomeFunB(int y)
     {y = y + 3;
      y = SomeFunC(y);
      return y;   }
int SomeFunC(int z)
     {z = z + 3;
      return z; }
```

b) For the following questions assume these declarations: *(5 marks)*

```
        int   qqsv[] = {2, 3, 1, 5};
        float nums[] = {3.5, 1.0, 1.5};
        float wips[] = {200, 30, -55, 0.0, 1.99};
```
What is printed by these statements?
```
    1.  cout << qqsv[2];                    Output: _____

    2.  cout << nums[qqsv[2]];              Output: _____
    3.  int n = 1;
        for (int i=0; i<3; i++)

        {n = n + qqsv[i]; }

        cout << n;

                                           Output: _____


    4.  int n = 0;
        for (int i=0; i<4; i++)

        {if (wips[i] > wips[i+1])

        {n++;}

        }

        cout   << n;                       Output: _____

  5. int n = 0;
       for (int i=0; i<3; i++)
       { if (nums[i] > wips[i])
       break;
       n++;
       }
       cout << n;
                                           Output: _____
```

Answer the following questions with true ☑ or false ☒:

	The default case is optional in the switch statement.
	After a break statement executes, the program continues to execute with the first statement after the structure.
	An array can store many different types of values.
	The following statement creates alpha to be a two-dimensional array of 25 rows and 10 columns. int alpha[10][25];
	Function overloading refers to several functions with different names but the same set of parameters.

Question 4: _(6 Marks)_

Rewrite each of the following code in other way, as required, to get the same results:

	The Given Code	The corresponding required Code:
| 1. | ```
for(int i=0; i<5; i++)
    cout<<"test"<<endl;
``` | **Using while statement only:** |
| 2. | ```
if( x < 30)
    if(y == 20)
        if( z !=  10)
            cout<<"Help";
``` | **Using one if statement only:** |
| 3. | ```
switch(category)
{
   case 1:
      cout << "Class 1";
      break;
   case 2:
      cout << "Class 2";
      break;
   case 3:
      cout << "Class 3";
      break;
   default:
      cout << "error";
}
``` | **Using if..else statement only:** |

4.	`while(f < 5)` `cout<<++f;`	**Using do/while only:**

II. **Familiar and Unfamiliar problems solving:** *the aim of the questions in this part is to evaluate that the student has some basic knowledge of the key aspects of the lecture material and can attempt to solve familiar and unfamiliar problems of C++ programming language concept: input and output streams, syntax and control structures (Sequence, Selection and Repetition structures) such as if, case , while and for structures , mechanisms used to pass information between functions, functions and calling mechanisms, storage classes and scopes rules.*

Question 5:   *(5 marks)*
Write a complete C++ program that implements the following equation,

$$z = y^5 + (2\ x + y)^7$$

In your code, use the function called "`calFun`" which takes 2 arguments of type **int**: **x, y** from the main program (use **cin** and **cout** statements for **x,y** values) and returns **z** of type **int**.

Question 6 **Write C++ program to display the menu choices**   *(9 marks)*

```
                    Main Menu


    1. Find the Minimum of all numbers in the array
    2. Calculate the average of all numbers in the array
    3. Odd number
    4. Exit Program.
Enter Your Choice: _____
```

Then implement each menu option in a separate function; as follows:
  ♣ Function, **findMin**, to return the minimum of the numbers in the array of integers.
  ♣ Function, **calcAver**, to return the average of all numbers in the array of integers.
  ♣ Function, **IsOdd**, that takes one argument of type int. The function returns the boolean value true if its argument is odd and returns false otherwise. Your function should NOT print anything to cout - it should only return the correct value.
The Program should also:
  ♥ **Print the result** of each menu option on screen.
  ♥ **Repeat to run** each time the user enters one of the menu choices: 1, 2, or 3.
  ♥ Any invalid input value it must display **"Invalid Input value"** message to the user.
  ♥ Finally, when the user enters **4**, the **program should stop**.

Hint: declare suitable array of integers and initialize the array with suitable data.

Good Luck