C COMPUTER PROGRAMMING (II) (1042) : Midterm

Cheng-Wen Ko.Ph.D, Associate Professor
E-Mail: cwko@cse.nsysu.edu.tw
Department of Computer Science and Engineering
National Sun Yat-sen University

April 21, 2016, 09:30~ 11:30

NAME: _____	Student ID Nr.: _____
Instructor: _____	

General instructions:

1. Do not open this exam until you are told to begin.
2. This exam has 4 pages including this cover. There are 7 questions.
3. Show an "appropriate amount" of work for each problem. Short answer is preferred.
4. No calculator nor translator can be used.
5. Do NOT use pencils but black or blue ball pens on your answer sheets.
6. Please hand in both of the exam and the answer sheets when you finish.
7. Please turn off all cell phones and remove all headphones.

1. (10%) Consider the following function and code segment. After the call to **One(j, k);** what are the values of j and k? Why?

```
1 void One( int first, int & second )
2 {
3 first = 17;
4 second = first + 1;
5 }
6 int main()
7 {
8 // other code ...
9 int j = 4;
10 int k = 3;
11 One(j, k);
12 // other code ..
13 }
```

2. (10%) Why does this version of the **`swap`** function fail to work? Explain it in short and provide your fix for this function.

```
1 void swap(int & lhs, int& rhs)
2 {
3    lhs = rhs;
4    rhs = lhs;
5 }
```

3. (10%) Given the definition and code fragment in the following. What is the output value of `matrix[0][0]` ?

```
1 int matrix[2][3];
2 int k = 0;
3 for(int i =0; i < 2; i++)
4     for (int j=0, j < 3; j++)
5         matrix[i][j] = k++;
```

4. (20%) Here are several different initializations of a structure variable. State what happens in each initialization.

```
struct WeatherData
{
  int temperature;
  int windChill;
  int windSpeed;
};
```

a) WeatherData prediction ={ };

b) WeatherData prediction ={40};

c) WeatherData prediction ={40, -10, };

d) WeatherData prediction ={40, -10, 20 };

5. (20%) Given the program, which of the following class member accesses in the **`main`** function (Line 19 ~ 23) are legal and explain why the others are not legal.

```
 1 #include <iostream>
 2 using namespace std;
 3
 4 class DayOfYear
 5 {
 6 public:
 7   void input();
 8   void output();
 9   // other public members
10 private:
11   int month;
12   int day;
13   // other private members
14 };
15 int main()
16 {
17   DayOfYear birthDay;
18   //class member access
19   birthDay.input();
20   birthDay.day = 25;
21   cout << birthDay.month;
22   cout << birthDay.output();
23   if(birthDay.month == 1)
24     cout << "January\n";
25
26   return 0;
27 }
```

6. (15%) Write a function definition for a function called `inOrder` that takes three arguments of type `int`. The function returns `true` if the arguments are in increasing order left to right; otherwise `inOrder` returns `false`. For example, `inOrder(1, 2, 3)` returns `true`, whereas `inOrder(1,3,2)` returns `false`. No `if-else` statement can be used, just evaluate the Boolean expression and return it.

7. (15%) Suppose your program contains the following class definition:

```
class CellPhone
{
     public:
          void setPrice(double newPrice);
          void setProfit(double newProfit);
          double getPrice( );
     private:
          double price;
          double profit;
          double getProfit();
};
```

and suppose the **`main`** function of your program contains the following declaration and that program somehow sets the values of all the member variables to some values:

```
CellPhone nokia, samsung;
```

Which of the following statements are then allowed in the main function of your program? Also, explain the other statements why they are illegal.

```
(a)nokia.price = 1299.99;
(b)samsung.setPrice(2000.97);
(c)double aPrice, aProfit;
(d)aPrice = samsung.getPrice();
(e)aProfit = samsung.getProfit();
(f)aProfit = nokia.getProfit();
(g)nokia = samsung;
```

End of the exam.