

Open book and notes. For partial credit, show all of your work clearly in the space provided or on the additional page at the end of the exam. If the additional page is used, be sure to clearly label the content for each problem. Be sure to *read each problem carefully*. You should answer all 5 questions. Note that the exam is double sided.

1. (15 pts) Identify at least four errors in the following program that would cause a compiler error.

```
1 // Name: Convenience store owner (conva.cpp)
2 // Version: 1.1 (ANSI C++ version)
3 // Purpose: Convert the price of an item in U.S. pennies per
4           pound to Canadian dollars per kilogram.
5
6 #include <iostream>
7
8 using namespace std;
9
10 int main()
11 {
12     const float theOutput; // Answer displayed to the user
13     float dollarsPerKg;    // Item's cost in Canadian $ per kilogram
14     int theInput;         // Input entered by the user
15     int penniesPerLb;     // Price in U.S. pennies per lb of an item
16
17     // Get the input
18     cout << "Enter item's price per pound" << endl;
19     cin >> theInput;
20
21     penniesPerLb = theInput
22
23     const float LbPerKg = 2.2;           // No. of lbs in a kilogram
24     float dollarsCanPerUS = 1.48;      // No. of Canadian $ per
25                                         // U.S. $ (exchange rate
26                                         // as of Noon EST 12-14-99)
27     const int penniesPerDollar = 100;  // No. of pennies per U.S. $
28
29     dollarsPerKg = penniesPerLb*LbPerKg
30                 * dollarsCanPerUS/penniesPerDollar;
31
32     theOutput = dollarsPerKg;
33
34     // Display the answer
35     cout << theOutput << endl;
36 }
```

2. (15 points) Use parentheses to indicate the precedence for the operators (the order in which the operations take place) for the following expressions.

(a) $1 + 2 == 3 \% 4$

(b) $a + b + c / d * e$

(c) $! a < b < - c + d$

(d) $a || b \&\& ! c + d$

(e) $a + 1 == b * 4 \&\& 5 / 6 == d$

3. (15 points) Consider the following `switch` statement where `i` and `j` are integers

```

switch (i*j) {
2   case 1: case 2: case 3: case 6:
      cout << '1' << endl;
4   case 5:
      cout << "2" << endl;
6   break;
      case 10:
8     cout << '3' << endl;
      break;
10  default:
      cout << "4" << endl;

```

What is the output if `j=2` and:

(a) `i=11`?

(b) `i=1`?

(c) `i=5`?

4. (25 points) Consider the following C++ program:

```
#include <string>
2 #include <iostream>

4 using namespace std;

6 int main ()
{
8     string Phrase1 = "Blanche_will_measure_items_larger_than_her_shoe.";
    string Phrase2 = "2.54_centimeters_in_an_inch.";
10    string Phrase3 = "Give_a_donkey_oats_and_sugar.";
    int i=5, j=18;

12    Phrase1 = Phrase1.substr(i, j) + ".";

14
    if(i<j) {
16        j++;
        Phrase2 += "..\n";
18    } else {
        --j;
20        ++i;
    }
22    Phrase1 = Phrase3.substr(j, i) + Phrase1;
    Phrase3 = Phrase3.substr(0,7) + "skeptic" + Phrase2.substr(j, j);
24    Phrase3 += Phrase1;

26    cout << Phrase3 << endl;

28    return 0;
}
```

What would you expect the output of this program to be? (Show your work for partial credit.)



5. (30 points) Write a program that indicates the correct change. The program should prompt the user for the actual price of the item(s) purchased and the actual amount given as payment. Your program interaction should look something like this:

```
Enter the cost of item(s) purchased: 3.12
Enter the amount paid: 5.00
```

```
The customer should get:
1 dollar(s),
3 quarter(s),
1 dime(s),
0 nickel(s), and
3 penny(ies).
```

Hint: First convert the floating point input values to integers representing the amounts in terms of pennies.

Due to time constraints, it is not necessary to include comments in your code.



Additional work area for any problem. Clearly identify to which problem the work on this page is related.



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