

# CS 115 Midterm 1B Solutions

October 7, 2008

Your name: \_\_\_\_\_

## Rules

- You must briefly explain your answers to receive partial credit.
- All snippets of code can be assumed to be enclosed within `int main()`. You can assume that the `iostream`, `fstream`, `iomanip`, `string`, and `cmath` libraries have been included at the beginning of the program.
- When you are asked to write *a snippet* of code, you may also assume that it is enclosed within `int main()` and that any necessary libraries have been included.
- When you are asked to write *a complete program*, you must write the `#include` statements, the `int main()`, etc. in your solution to receive full credit.
- A line consisting solely of “...” represents one or more unspecified C++ statements, some of which may change the values of program variables.
- You are encouraged to use the backs of these pages for scratch paper. If you want answers written there to be graded, they must be very clearly labeled on this page and noted on the main test, e.g. “See the back of page 1 for 3a.”

## Grade (instructor use only)

Problem 1	
Problem 2	
Problem 3	
Problem 4	
<b>Total</b>	

### Problem 1: 25 points.

What is the output of each of the following snippets of code?

(a)

```
char c = 'q';  
cout << "c = " << c << endl;
```

**Answer:** c = q

(b)

```
int a = -2;  
cout << ++a;
```

**Answer:** -1

(c)

```
bool b1 = true;  
bool b2 = false;  
bool b3 = b1 || b2;  
cout << b3;
```

**Answer:** 1

(d)

```
if (false) {  
    cout << "peach";  
}  
else {  
    cout << "plum";  
}
```

**Answer:** plum

(e)

```
int x = 1;  
while (x <= 5) {  
    cout << "carrot" << endl;  
    x += 2;  
}
```

**Answer:**

carrot

carrot

carrot

(f)

```
for (int i = 1; i <= 2; i++) {
    for (int j = 1; j <= 3; j++) {
        cout << i+j << " ";
    }
    cout << endl;
}
```

**Answer:**  
2 3 4  
3 4 5

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**Problem 2: 25 points.**

State whether each snippet of code is valid C++. If it is not valid C++, correct it.

(a)

```
int i;
...
if (i > 0 || < 2) {
    cout << "banana";
}
```

**Answer:** Invalid. Correct *if* statement to  
if ((i > 0) || (i < 2))

(b)

```
int i;
...
do {
    cout << "grape";
} while (--i);
```

**Answer:** Valid.

(c)

```
int i;
...
if (i == 0) {
    cout << "salt";
}
else (i != 0) {
    cout << "pepper";
}
```

**Answer:** Invalid. Delete "(i != 0)" after "else".

(d)  
string s, t;  
...  
cout << s+t;  
*Answer: Valid.*

(e)  
char c;  
...  
if (c == "z") {  
 cout << "tomato";  
}  
*Answer: Invalid. Correct if statement to  
if (c == 'z')*

---

### Problem 3: 25 points.

Write short snippets of code to accomplish the following tasks:

(a) Input a floating-point value from the user. If the input is invalid, print "FAIL".

*Answer:*  
float input;  
cin >> input;  
if (cin.fail()) {  
 cout << "FAIL";  
}

(b) Print "Election year!" if the integer variable `year` is a multiple of 4. You may assume that `year` is already declared and defined.

*Answer:*  
if (year % 4 == 0) {  
 cout << "Election year!";  
}

- (c) Repeatedly ask the user to type an integer until the user enters 5. You may assume that the user always types a valid integer.

*Hint:* Using a do-while loop may make your code simpler.

*Answer:*

```
int input;
do {
    cout << "Enter an integer: ";
    cin >> input;
} while (input != 5);
```

- (d) For an integer variable K that is already declared and defined, write code that computes and prints the sum of the integers between 3 and K, inclusive. You may assume that K is greater than or equal to 3.

(Note: please actually do the additions rather than using a mathematical shortcut.)

*Hint:* Using a for-loop may make your code simpler.

*Answer:*

```
int total=0;
for (int i=3; i<=K; i++) {
    total += i;
}
cout << total;
```

#### Problem 4: 25 points.

For this problem, you must write a **complete program** that contains the following:

- A function named SquarePlus that takes an integer input and returns one plus the square of that integer as output. For example, for an input of 2, SquarePlus would return 5.
- A main function that uses the SquarePlus function to print one plus the square of every integer between 0 and 25, inclusive. Each result should be on a new line.
- A function prototype for SquarePlus (even if you put SquarePlus above the main program).

*Answer:*

```
#include <iostream>
using namespace std;

int SquarePlus(int num);

int main( ) {

    for (int i=0; i<= 25; i++) {
        cout << SquarePlus(i) << endl;
    }

    return 0;
}

int SquarePlus(int num) {
    return (num*num+1);
}
```