

CS 115 Midterm 1A 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 and also 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	
Total	

Problem 1: 25 points.

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

(a)

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

Answer: c = z

(b)

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

Answer: 3

(c)

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

Answer: 1

(d)

```
if (false) {  
    cout << "apple";  
}  
else {  
    cout << "orange";  
}
```

Answer: orange

(e)

```
int x = 1;  
while (x < 5) {  
    cout << "carrot" << endl;  
    x += 3;  
}
```

Answer:

carrot

carrot

(f)

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

Answer:

2 3

3 4

4 5

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 an integer value from the user. If the input is invalid, print "FAIL".

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

(b) Print "Not a leap year!" if the integer variable year is not a multiple of 4. You may assume that year is already declared and defined.

Answer:
if (year % 4) {
 cout << "Not a leap year!";
}

- (c) Repeatedly ask the user to type an integer until the user enters 0. 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 << "Type an integer: ";
    cin >> input;
} while (input != 0);
```

- (d) For an integer variable N that is already declared and defined, write code that computes and prints the sum of the integers between 1 and N, inclusive. You may assume that N is greater than or equal to 1.

(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=1; i<=N; 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 Cube that takes an integer input and returns the cube (that is, the third power) of that integer as output
- A main function that uses the Cube function to print the cube of every integer between 1 and 25, inclusive. Each cube should be on a new line.
- A function prototype for Cube (even if you put Cube above the main program).

Answer:

```
include <iostream>
using namespace std;

int Cube(int num);

int main( ) {
    for (int i = 1; i <= 25; i++) {
        cout << Cube(i) << endl;
    }
    return 0;
}

int Cube(int num) {
    return num * num * num;
}
```