

CS 115 Exam 2, Spring 2010

Your name: _____

Rules

- You may use one handwritten 8.5 x 11" cheat sheet (front and back). This is the only resource you may consult during this exam.
 - Explain/show work if you want to receive partial credit for wrong answers.
 - When a snippet of code is given to you, you can assume
 - that the code is enclosed within some function, even if no function definition is shown
 - that the `main` function is properly defined
 - that the `iostream`, `cstdlib`, `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 assume
 - that your code is enclosed within some function
 - that the libraries listed above 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.
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Grade (instructor use only)

	Earned	Max
Problem 1		30
Problem 2		15
Problem 3		25
Problem 4		30
Total		100

Problem 1: 30 points.

For each part of this problem, assume that the following functions have been declared and defined. However, you should treat each part of this problem independently.

```
void Hello( ) { cout << "Hello\n"; }

void f1(int x){ x = 5; }

int f2(int x) { return 5; }

int f3( ) { return 5; }

int f4(int x) { return x + 1; }

void f5 (int& x) { x++; }

int f6(int& x) { return 2*x; }
```

(a) Given the functions defined above, what does this snippet of code print?

```
Hello( );
```

(b) Given the functions defined above, what does this snippet of code print?

```
int x = 0;
f1(x);
cout << x;
```

(c) Given the functions defined above, what does this snippet of code print?

```
int y = 0;  
f2(y);  
cout << y;
```

(d) Given the functions defined above, what does this snippet of code print?

```
int x = 0;  
f2(x);  
cout << x;
```

(e) Given the functions defined above, what does this snippet of code print?

```
int x = 0;  
cout << f3( );
```

(f) Given the functions defined above, what does this snippet of code print?

```
int x = 0;
cout << f4(f3( ));
```

(g) Given the functions defined above, what does this snippet of code print?

```
int x = 0;
f5(x);
cout << x;
```

(h) Given the functions defined above, what does this snippet of code print?

```
int x = 1;
int y = f6(x);
cout << x << " " << y << endl;
```

Problem 2: 15 points.

For each part of this problem, assume that the following arrays have been declared and defined. However, you should treat each part of this problem independently.

```
string s[5] = {"cat", "dog", "goat", "sheep", "pig"};

// Reminder: this initializes c by row
// That is, each group of 3 elements in curly braces
// is in the same row
char c[3][3] = {
    {'a', 'b', 'c'},
    {'d', 'e', 'f'},
    {'g', 'h', 'i'}
};
```

(a) Given the arrays defined above, what does this snippet of code print?

```
cout << s[4];
```

(b) Given the arrays defined above, what does this snippet of code print?

```
cout << c[2][0] << endl;
cout << c[0][2] << endl;
```

(c) Given the arrays defined above, what does this snippet of code print?

```
for (int i=1; i <= 5; i++) {
    cout << s[i-1] << '\t';
}
```

Problem 3: 25 points.

(a) For an array that has been declared as

```
float floatArr[5][8];
```

write a snippet of code that initializes all elements of the array to 0.

(b) For an array that has been declared as

```
int intArr[100];
```

write a snippet of code that prints YES! if at least one element of the array is greater than 0 and NO! if all elements are less than zero. You should only print YES! or NO! once.

(c) Write a *function* that takes 2 integers as input parameters and returns their sum.

Problem 4: 30 points.

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

- A function, defined below the main function and prototyped above the main function, called `ReadNum` with the following properties:
 - Parameters: none
 - Return value: an integer
 - Description:
 - Asks the user for an integer.
 - If the user enters a non-negative integer, returns that integer.
 - If the user enters a negative integer or an invalid integer, returns -1.

- A function, defined below the main function and prototyped above the main function, called `LoadArray` with the following properties:
 - Parameters:
 - `arr`, an array of integers
 - `N`, an integer (the size of the array)
 - `value`, an integer
 - Return value: none
 - Description:
 - The function will initialize the first element of the array to `value`, the second to `value+1`, the third to `value+2`, etc.

- A `main` function that does the following:
 - Declares an array of 1000 ints
 - Calls `ReadNum` to get a single integer from the user.
 - Exits the program if the user did not enter a positive integer.
 - Calls `LoadArray` to initialize the elements of the array to the user's integer, the user's integer + 1, etc.
 - Looks through the array element by element. For every element whose square is also an element of the array, prints a statement like `___ is the square of ___`.
For example, if the numbers 2, 3, 4, and 9 are elements of the array, you would print:
`4 is the square of 2.`
`9 is the square of 3.`

