CS16—Midterm Exam

E01, W15, Phill Conrad, UC Santa Barbara

Wednesday, 02/02/2015

Name: _____

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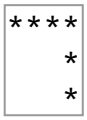
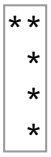
- Please write your name **above AND AT THE TOP OF EVERY PAGE**
- Be sure you turn in every page of this exam.
  - Each exam is numbered (e.g. Exam #137).
  - Each pages is numbered (e.g. Page 1, Page 2, etc.)
  - The last page clearly says "End of Exam".
- This exam is **closed book, closed notes**, **closed mouth, cell phone off**
- You are permitted **one sheet of paper** (max size 8.5x11") on which to write notes
- These sheets will be collected with the exam, and might not be returned
- Please write your name on your notes sheet

1. (10 pts) Write a complete function definition (BUT NOTHING ELSE) for a C++ function called areaRect that takes two parameters of type int called length and width and returns their product (i.e. the area of a rectangle). Choose an appropriate data type for the function's return value.

2. (10 pts) Write a complete C++ main program that takes two command line parameters (i.e. reads values from argc)converts to integer values, and then calls the function areaRect that you defined in problem 1, and then prints out the value returned by the function call. INCLUDE A FUNCTION PROTOTYPE for areaRect before your main, but DO NOT REPEAT THE FUNCTION DEFINITION.

3. (20 pts) In lab04, you were given this code for the function `starL`. Note that I am omitting headers such as `#include` etc. I've also removed some comments to force you to actually read the code. Your job: write a similar function, in the space to the right, that makes a number 7 that is similar. That is, it should produce output like this:

Function call	Output	Function call	Output	Function call	Output	Function call	Output
star7(1,1)		star7(2,1)		star7(3,1)		star7(4,1)	
star7(1,2)		star7(2,2)		star7(3,2)		star7(4,2)	
star7(1,3)		star7(2,3)		star7(3,3)		star7(4,3)	
star7(1,4)		star7(2,4)		star7(3,4)		star7(4,4)	

If you need extra space, use the next page

```
string starL(int width, int height {

 string result="";
 if ((width<2) || (height < 2))
   return result;  // return without printing anything

 for (int row=1; row<=height-1; row++) {
   result += "*";
   for (int col=2; col<=width; col++) {
     result += " ";
   }
   result += "\n";
 }

 for (int col=1; col<=width; col++) {
   result += "*";
 }
 result += "\n";
 return result;
}
```

Extra space for question 1

4. (10 pts) Suppose you have a simple C++ program in a file on the CSIL lab computers called hello.cpp. Write a sequence of unix commands to compile and execute that file.

5. (10 pts) Suppose your current directory is `~/cs16` and you want to create a directory called `~/cs16/lab05` that does not yet exist. Write down a unix command, or sequence of unix commands that will accomplish this.

6. In our labs and homework exercises we've seen functions that return type int, type void and type string. Give an example (just describe it in English, don't write the C++ code) of a situation where you might write a function returning each of these types.

   a. (4 pts) `function returning int`

   b. (4 pts) `function returning int`

   c. (4 pts) `function returning int`

7. Assume the `main` function in the program `runIt.cpp` starts with:

```
int main(int argc, char *argv[]) {
...
```

Further, suppose this program is invoked with the following command line:

```
./runIt lime lemon
```

a. (2 pts) What is the value of `argc` in this case? 3

b. (2 pts) What is the value of argv[2][3]? o

c. (2 pts) What is the value of argv[1][0]? l

d. (2 pts) What is the value of argv[0][5]? I

8. (20 pts) For each of the for loops below:

a. Circle **infinite** if it is an infinite loop, or **finite** if it NOT an infinite loop

b. Put a check the in the **no output column (☑)** if the loop has no output

c. If the loop has output, write that output in the box.
Note: if the output will be infinite, just write the **output of the first three times through the loop**, then put three dots like this: ...

code	Infinite or finite?	No output?	write the output here (if any)
`for (int i=0; i<5; i+=2;)` `  cout << i << endl;`	infinite finite	□	
`for (int i=2; i<5; i++)` `  cout << i << endl;`	infinite finite	□	
`for (int i=1; i<=3; i++)` `  cout << i << endl;`	infinite finite	□	
`for (int i=5; i>=3; i--)` `  cout << i << endl;`	infinite finite	□	
`for (int i=3; i<=5; i--)` `  cout << i << endl;`	infinite finite	□	

End of Exam

total points=100