Agenda / Learning Objectives:

1. Review the answers for rand and sqrt questions from lab 15.
2. Extract lab16.tar in your venus account after running the following command (note the dot at the end):

   cp ~ctse/cs111/lab16.tar .

3. Understand how to answer title lines questions
4. Review/Learn about the following Unix commands:
   a. Redirect console output to a file
   b. tail -f <filename>

Lab work – functions

Every function **prototype/title-line** must have the following 3 things:
i) Function's name
ii) Function's return type (in CS111: int, double, bool, char, string, void)
iii) A list of parameters (it can be an empty list with no parameter all the way up to a large amount)

Here are some examples:

```
bool greaterThan(int a, int b);
void do_something();
```

Note: In a C++ function, you can only use the return type to **return at most** one "thing" (Be it a simple data type such as an int or a char. Or it can be an entire array or a more complex object.) You cannot pass more than 1 thing back to the calling function.

When you answer the questions about title lines in the exams, you should have a **checklist** similar to the following:

a) What is the `function name`? Write it down.
b) How many `input parameters` are there? You must write out the data type for every parameter even if they are the same type. Separate each input parameters by a **comma**.
   - Do I need to use passed by reference for some of the inputs?
c) What is the `return type` of the function?
   If a function is not returning a value, use **void** as the return type.
   Here are some ways to determine if a function should return a value:
   Assignment:
   ```
   int x = fun1(5);
   ```
   Printing:
   ```
   cout << fun2(x) << endl; //Check the comment such as: Print Hi
   ```
   As part of the conditional statement:
   ```
   while (fun3(9) == 7) {//fun3 has int as return type
   if (fun4(x)) {//fun4 has bool as return type
   ```

Practice with plenty of prac2.pdf questions in order to master this part
of the exam.

1) Write **title lines** for the functions that are called by the following main program. **Do not supply the
blocks for the functions.**

```
int main() {
  int x = 2;
  string s; char c = 'A';
  cout << sqrt(x + 1.5) << endl;          // (a)
  cout << allTrue(x, 5) << endl;          // (b) prints FALSE
  biggest(3.14, 2.718, 1.5);              // (c) prints 3.14
  s = asString(c); cout << s <<endl;      // (d) prints A
  if ( mystery(s) == x) cout << "Bye";   // (e)
  return 0;
}
```

2) Practice using the switch statement by completing the beer.cpp program in lab16.tar. (starting at
line#74)

Ninety-Nine Bottles of Beer (Absolute C++ chapter 3 question 8)
Write a program that outputs all 99 stanzas of the "Ninety Nine Bottles of Beer on the Wall" song.
Your program should print the number of bottles in English, not as a number. For example:

Ninety nine bottles of beer on the wall,
Ninety nine bottles of beer,
Take one down, pass it around,
Ninety eight bottles of beer on the wall.

…
One bottle of beer on the wall,
One bottle of beer,
Take one down, pass it around,
Zero bottles of beer on the wall.

Your program should not use ninety nine different output statements!

Hint: Write a function that takes as input an integer between 0 and 99 and outputs that value in English.
Use / and % to extract the tens and the ones digit so you know what number to output in English.

Hint: You may need to test specifically for numbers such as 0, 10-19.