CS 2250 Programming Assignment #4
Loops and Branches

Problem #1

Create a number guessing game that generates a pseudo random number in the range 0 to 99. (A pseudo random number is a number that “looks” random – i.e., passes certain statistical tests for randomness – but which is generated deterministically or non-randomly.) The game should enter an infinite loop and do the following:

1. generate the pseudo-random number
2. prompt the user to enter a guess between 0 and 99
3. read the guess
4. if the guess and the random number are equal
   a. the program will print a success message (e.g., “Right” or “You Win”)
   b. exit the program (i.e., exit(0);) or break out of the loop
5. if the guess is less than the random number, the game will print “Low” and return to step 2
6. if the guess is greater than the random number, the game will print “High” and return to step 2
7. if the guess is less than 0, the game will terminate (a way to quit early).
8. Create a flowchart of the game logic with Visio (name the file appropriately).
9. Write a program named “guess” from the flowchart

Generating Pseudo Random Numbers

The standard C/C++ library provides a function named rand that will generate pseudo random numbers, one per call, in the range of 0 to RAND_MAX (some big number). The sequence of numbers produced by a pseudo random number generator eventually repeats. A seed number determines where in the cycle the generator starts. A second function named srand seeds or initializes the random number generator. It is common to use the current system time, a value that is constantly changing, to seed the generator. The following code fragment demonstrates how to generate a pseudo random number between 0 and 99:

```c
#include <stdlib.h>
#include <stdio.h>
#include <time.h>

int main()
{
    srand((unsigned)time(0));
    int number = rand() % 100; // numbers [0..99]
    ...
    ...
    }
```
Problem #2

Design (i.e. flowchart with Visio) and write a program named “tree” that draws a pine tree of a specified height as illustrated below.

How tall should the tree be?: 6

```
  /
 /\  /
/  \
/    \
/      \
----------------
     ||
     ||
     ||
```

- Prompt the user of the height of the cone of the tree
- Read the height from the keyboard into a variable named `height`
- If the cone height is less than 3 or greater than 15 (3 is okay and 15 is okay), then the program prints an error message and terminates
- Draw the cone with three for-loops (two loops nested within an outer loop); follow the pyramid example, which will be worked out in class
- I suggest implementing and testing in this order
  1: prompt and read the height
  2: test for height in bounds
  3: draw the base
  4: draw the trunk
  5: draw the cone
- The image below shows the relationship between all of the parts of the tree for a tree with a height of 6: