Homework #2 (10 points)

1) Write pre and post condition statements for the following function (note: assume the rand( ) method returns an int value between 0 and 32767)

public int bingo (char letter)
{
    switch (letter)
    {
        case 'B':
            return rand( ) % 10 + 1;
        case 'I':
            return rand( ) % 10 + 11;
        case 'N':
            return rand( ) % 10 + 21;
        case 'G':
            return rand( ) % 10 + 31;
        case 'O':
            return rand( ) % 10 + 41;
    }
}

Precondition:

Postcondition:

2) Write the definition of the method described below that conforms to the given pre and post conditions. Enforce the precondition using a conditional statement or thrown exception.

public void getEven (int num);
Precondition: num is a positive integer between 1 and 1000
Postcondition: If num is divisible by 2, method nextFunction is called with num as its argument; otherwise, method nextFunction is called with num + 1 as its argument.
3) Each expression below represents the number of operations in some algorithm. Express each one in Big O notation:
   a) \( 4(\log_2 N + 5) \)
   
b) \( N - 100 \)
   
c) \( 7 \)
   
d) \( N(N - 1) \)

4. Count the number of operations in each of the methods below, and show your results in terms of total number of operations and big-O:

public void drawSquare(int N)
{
   int x, y;
   for (y = 1; y <= N; y++)
   {
      for (x = 1; x <= N; x++)
      {
         cout << "* ";
         cout << endl;
      }
   }
}

public int evalAnswer (char answer, char correct)
{
   if (Character.islower(answer)) // islower( ) method contains 1 operation; returns true if argument is a lowercase letter, false if not
      answer = Character.toUpperCase(answer); // toUpper method contains 3 operations
   
   if (answer == correct)
   {
      System.out.print("Correct" + \n’); // Method contains 1 operation
      return 1;
   }
   System.out.print( "Incorrect answer." + \n; // Methods contain 1 operation
   return 0;
}