CS 11 Fall 2000 — Mid-term

Name: ______________________________________________

1. (10 points) Consider the Java code below and answer the questions that follow.

```java
System.out.println("Enter a value for a: ");
int a = User.readInt();
System.out.println("Enter a value for b: ");
int b = User.readInt();

if (a < 0) {
    a = -a;
}

int i = 0;
while (i < a) {

    int k = 0;
    for (int j = 100; j >= b; j--) {
        k = j * 2;
        System.out.print(k);
        System.out.print('-');
        System.out.println(j);
    }

    k++;
    i = i + 1;
}
```

(a) What is the output of this code if the user enters 2 for a and 98 for b?

(b) What is the output of this code if the user enters −3 for a and 100 for b?
2. (15 points) Again, consider the Java code below. What is its output?

```java
public static void main (String[] argv) {
    int x = 4;
    boolean[] y = new boolean[x];

    foo(x, y);

    System.out.println(x);
    System.out.println(y[1]);
}

public static void foo (int x, boolean[] b) {

    while (x >= 0) {
        if ((x % 2) == 1) {
            b[x] = true;
        }
        x = x - 1;
    }
}
```
3. (25 points) Provide short (at most a few sentences) answers to any two of the three following questions:

(a) What properties are needed for a true random number generator? Which one cannot be obtained by a computer, and why not?

(b) What role does a stack play in recursive method calls?

(c) What is the different between in-place and out-of-place sorting algorithms? Give an example of each.
4. (25 points) Write a method named compare2D that compares two 2-dimensional arrays, and returns true if the arrays are equivalent, false otherwise.
5. (25 points) Consider the following array of characters:

Hello there!

We can say that this array of characters contains the second array of characters, “ello”. We can also say that the first array of characters does not contain “foo”, as those characters don’t appear in that order in the character array. Finally, we can say that the first array of characters does not contain “Hll”; although those letters do appear in that order in the character array, they do not appear contiguously.

Write a method named contains that determines whether or not one character array contains another. Specifically, this method should accept two pointers to characters arrays from the caller. If the first character array contains of the second, then this method should return true; otherwise, it should return false.