Name:

CSC 130, Spring 2011 Final Exam
50 points total. Answer 5 out of the 7 problems, and **cross out** the 2 you don't want to count.
Some useful methods/classes/objects:

- For an object `s` of type `String`: `s.length()` returns the length of `s`, `s.charAt(i)` returns the character at position `i` (starting from 0), `s.contains(x)` returns true if the string `x` is part of `s`, `s.equals(x)` returns true if the string `x` is the same as `s`.

- For an object `scan` of type `Scanner`: `new Scanner(in)` creates a new `Scanner` that reads from input stream `in`, `scan.nextLine()` returns the next line of input, `scan.nextInt()` returns the next integer of input, `scan.hasNextLine()` returns true if there is another line of input.

- `System.in`, `System.out`: objects that represent standard input and output streams, respectively. `System.out` has methods `print` and `println` that are used to print to the console.

- `ArrayList<T>` is a dynamic array that holds objects of type T. For example, `ArrayList<String>` is an array of `String`s. It has methods `add(x)` to add a new entry `x` to the end of the list, and `get(i)` to get the element at index `i`.

1. (10 points) Write a function that takes an `ArrayList` of `String`s as input, and returns an `ArrayList` consisting of all elements that start with "x".

2. (10 points) Write a function that takes an array of integers as input, and returns the **index** of the largest element. For example, if the input is {`5, 10, 2`}, the output should be `1`.

3. (10 points) What is the output of the following program?

```
String[][] words = {
  {"big", "green", "small"},
  {"slimy", "smelly", "fuzzy"},
  {"pig", "rat", "monkey"}
};
for (int r = 0; r < 3; r = r + 1) {
  for (int c = 0; c < 3; c = c + 1) {
    if (r == c) {
      System.out.println(words[r][c]);
    }
  }
}
```

4. (10 points) Write a program that reads lines of input from the keyboard, prints only those lines that contain the word "cheese", and quits when the line contains the word "bacon".

5. (10 points) Define a class that represents a bank account. Include the following:

   (a) Instance variables that are appropriate for representing the associated data.

   (b) A constructor that initializes the balance to a given amount.

   (c) A method called `deposit` that adds a given amount to the current balance.

6. (10 points) Consider the following class:

```java
public class Student {
  public String name;
  public int examScore;
  public Student(String n, int score) {
    name = n;
    examScore = score;
  }
}
```

Write a method that takes two Students as input and prints the name of the student with the higher exam score.

7. (10 points) Consider the following program, which reads and processes a file called "input.txt":

```java
FileReader in = null;
try {
    in = new FileReader("input.txt");
} catch (FileNotFoundException ex) {
    System.out.println("File not found");
    System.exit(1);
}
Scanner s = new Scanner(in);
int count = 0;
while (s.hasNextLine()) {
    String line = s.nextLine();
    count = count + 1;
    System.out.println(count + ": " + line);
}
```

(a) What is the output of the program if the file "input.txt" does not exist?

(b) Describe in plain English what the program does when "input.txt" does exist.