Pyramid of Letters

The Pyramid is a structure found in many cultures. This shape is often associated with supernatural power. You are asked to write a program that accepts a single character from "A" through "Z" and produces an output in the shape of a pyramid composed of the letters up to and including the letter that was input. The top letter in the pyramid should be an "A". and on each level, the next letter in the alphabet should fall between the letter that was introduced in the level above it.

EXAMPLE: (bolded values denote user input)
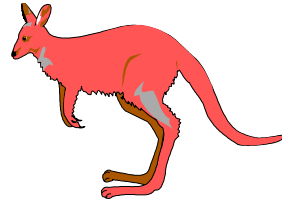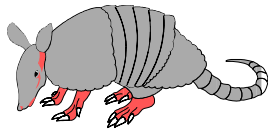
Please enter the letter of choice:

E

Your pyramid is as follows:

```
        A
       ABA
      ABCBA
     ABCDCBA
    ABCDEDCBA
```

Are there more letters? Enter Yes or No

(High School Java -- 30 points)

Armadillo vs. Kangaroo

Although most have heard of the tortoise and the hare, the most exciting race in history was between the armadillo and a kangaroo. These contenders begin the race at "square 1" of a 70 square course.   Each square represents a possible position along the race course. The finish line is at square 70. The first contender to reach or pass square 70 is rewarded with a fresh pail of their favorite food. (This would of course be worms and insects for the armadillo, and carrots and lettuce for the kangaroo.) The course weaves its way up the side of a slippery mountain, so occasionally the contenders lose ground.

Your program should simulate this race. Assume there is a clock that ticks once per second. With each tick of the clock, your program should adjust the position of the animals according to the following rules:

Animal	Type of Move	Percent of Time	Actual Move
Armadillo	Fast plod	50%	3 squares forward
	Slip	20%	6 squares to backward
	Slow plod	30%	1 square forward
Kangaroo	Sleep	20%	Does not advance
	Big hop	20%	9 squares forward
	Big slip	10%	12 squares backward
	Small hop	30%	1 square forward
	Small slip	20%	2 squares backward

Begin the race by displaying: **Bang!!!!**
And they're off !!!!

Then, for each tick of the clock (each iteration of a loop), display a line divided into intervals representing the 70 squares. On this line indicate the current position of the armadillo and the kangaroo. Occasionally, the contenders will land on the same square. In this case, the armadillo bites the kangaroo and your program should display **OUCH!!!**

 At the end of the race display a message declaring the winner.

(High School Java -- 30 points)

Balls In the Box
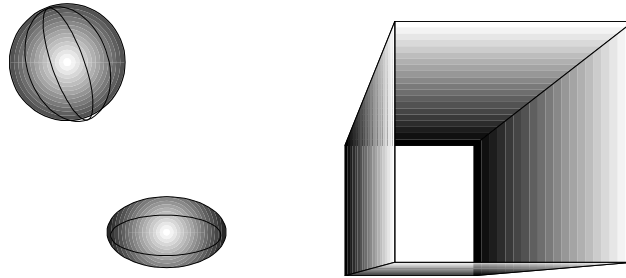
Pelican Sports needs your help to solve a problem that they face when mailing balls to their customers. These balls range in size from the smallest ball bearings found in roller blades, to large medicine balls that measure more than one meter in diameter. The store manager, who could put Scrooge to shame, has decided that rather than buy boxes of the appropriate size and shape, the employees should scrounge the dumpster owned by the local 7- Eleven. Specifically, they want you to write a program that will determine how many balls can be placed into a box of a given size. Greatly simplifying the problem is the fact the the only balls in stocks are spherical in shape. Assume that all measurements are in centimeters.   Your program should perform the following:

    a.   Prompt the user for the diameter of the ball..   Assume that this diameter represents an outside measurement and ranges from .5 cm. to 150 cm.

    b.   Prompt the user for the box width. Widths range from 1 cm. to 2 meters.

    c.   Prompt the user for the box length. The length can range from 10 cm to 2 meters.

    d.   Prompt the user for the box depth. The depth can range from 10 cm to 2 meters.

    e.   Display the maximum number of balls that can be placed into the box. In those cases where the size of the ball exceeds the size of the box display an error message. Assume that all box dimensions are inside measurements.

    f.   Ask the user if they want to continue.

Formulas for Volumes:

    a.   Rectangular Prism: Volume = width * length * depth

    b.   Sphere: Volume = 3 / 4 * pi * r * r * r

(High School Java -- 40 points)