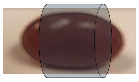
Programming Project 2 – Jelly Bean Jar

Note: When you turn in an assignment to be graded in this class, you are making the claim that you neither gave nor received assistance on the work you turned in (except, of course, assistance from the instructor or teaching assistants).

Write a program called **JellyBeans** that calculates number of jelly beans in a jar.

The jar holds a specific volume, to determine the number of jelly beans in the jar, we can consider the usable volume of the jar divided by the volume of a single jelly bean. The jelly beans leave some empty spaces in the jar, so let's say they take up 69.8% of the total volume of the jar. Multiply the capacity of the jar by this percentage (LOAD_FACTOR) to estimate the usable volume.



The shape of the jelly beans is not a cylinder, but more like a prolate spheroid (https://en.wikipedia.org/wiki/Spheroid) so the volume of a single jelly bean can be estimated with the formula $\frac{\pi}{6} \times A^2 \times C$ where A is the equatorial diameter and C is the polar diameter (or length). These values can be determined by lining up a sample of the given jelly beans

and measuring the distance, as shown below.

The program will display specific identifying information grouped together in a block of code. In the code block, write Java statements that output to the console the following:

- your name
- the course number and section
- the Java file name and the project number

Your program will prompt the user for the length and diameter of a jelly bean (in cm), along with the size of the jar (in mL). It will display the estimated number of beans in the jar.

The number displayed should be rounded to the nearest whole number. Here is a typical program run. The sample user input is shown in blue italics.

Sara Student
CMSC 255, 002
JellyBeans.java - Project #2
Enter the jelly bean length (cm): *1.27*
Enter the jelly bean diameter (cm): *0.635*
Enter the jar size (mL): *150*
There are approximately 390 beans in the jar.

Reminder: this program and all programming projects in this course must include a comment block at the beginning of the source code file that contains:

- your name
- course and semester information
- project number and name
- a brief description of what the program does along with instructions for the user

Your program must compile and execute correctly using the command prompt or Terminal. Test your application to be sure that it produces the correct output in a visually pleasing arrangement. You may find that you need to adjust the load factor.

Document your tests using the form shown below. Then, submit your Java source code file (JellyBeans.java) and test documentation (TestPlan.docx) by uploading the files to the Assignment link in Blackboard.

Ask questions about any part of the programming project that is not clear!

Test Plan:

Expected output *(or Oracle)* – expected test results against which the output of the test is compared.

Test Name	LOAD_FACTOR	Jar Size (mL)	Length (cm)	Diameter (cm)	Expected Output	Actual Output

Rubric for Programming Project 2 – 50 points

Rubric	pts	
Program file named **JellyBeans.java** and submitted as specified	5	
Header comment block included with other appropriate comments	5	
Appropriate choice of variable names	5	
Documentation block of code is inside the main method	5	
User prompts are in the correct order and clearly written	5	
Appropriate validation of user input	5	
Output is correct	10	
Documentation of test plan submitted	10	
Total	50	