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|--|---------------|----------|
| <p>PROBLEM STATEMENT<br/>This problem contains images</p> <p>Elwood has a little sister named Casey. Although being quite young, Casey not only likes Modern Art, but also creates little pieces of art by herself. Her latest favorites are drawings on squared paper. She wants her new creations to be composed of only one basic shape that is used in all orientations:</p> <p>[Image showing Casey's basic shape in all orientations.]</p> <p>She draws her shapes into rectangles on her paper. For a rectangle of a given size, she wants to fill the entire rectangle in all different ways. Elwood immediately recognizes that even for small rectangles there might be many different fillings. But Casey, like little sisters sometimes do, doesn't believe him, so she asks you to exactly calculate how many drawings she has to do for a rectangle of a given size.</p> <p>[Image showing all four possible fillings of a 3x4 rectangle.]</p> <p>Given an int length and an int width describing the size of Casey's rectangle, return the number of different ways this rectangle can be filled using Casey's basic shape. The rectangle is oriented, so count symmetrical fillings multiple times as done in the example above.</p> <p>DEFINITION<br/>Class:CaseysArt<br/>Method:howManyWays<br/>Parameters:int, int<br/>Returns:double<br/>Method signature:double howManyWays(int length, int width)</p> <p>NOTES<br/>-Reminder:If your result is within 10<sup>-9</sup> of the expected result, your solution will be evaluated as correct.If your result is between (1+10<sup>-9</sup>)*expected and (1-10<sup>-9</sup>)*expected, it will be evaluated as correct.</p> <p>CONSTRAINTS<br/>-length will be between 1 and 18, inclusive.<br/>-width will be between 1 and 15, inclusive.</p> <p>EXAMPLES</p> <p>0)<br/>3<br/>4<br/>Returns: 4.0<br/>This is the rectangle shown in the problem description.</p> <p>1)<br/>4<br/>3<br/>Returns: 4.0<br/>This is the rectangle shown in the problem description rotated.</p> <p>2)<br/>2<br/>2</p> |               |          |

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| <p>Returns: 0.0</p> <p>A rectangle of size 2x2 can't be filled.</p> <p>3)<br/>5<br/>9<br/>Returns: 384.0</p> |               |          |

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## MedalTable.txt

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## PROBLEM STATEMENT

The Olympic Games in Athens end tomorrow.

Given the results of the olympic disciplines, generate and return the medal table.

The results of the disciplines are given as a String[] results, where each element is in the format "GGG SSS BBB". GGG, SSS and BBB are the 3-letter country codes (three capital letters from 'A' to 'Z') of the countries winning the gold, silver and bronze medal, respectively.

The medal table is a String[] with an element for each country appearing in results.

Each element has to be in the format "CCO G S B" (quotes for clarity), where G, S and B are the number of gold, silver and bronze medals won by country CCO, e.g. "AUT 1 4 1". The numbers should not have any extra leading zeros.

Sort the elements by the number of gold medals won in decreasing order.

If several countries are tied, sort the tied countries by the number of silver medals won in decreasing order.

If some countries are still tied, sort the tied countries by the number of bronze medals won in decreasing order.

If a tie still remains, sort the tied countries by their 3-letter code in ascending alphabetical order.

## DEFINITION

Class:MedalTable

Method:generate

Parameters:String[]

Returns:String[]

Method signature:String[] generate(String[] results)

## CONSTRAINTS

-results contains between 1 and 50 elements, inclusive.

-Each element of results is formatted as described in the problem statement.

-No more than 50 different countries appear in results.

## EXAMPLES

0)  
{ "ITA JPN AUS", "KOR TPE UKR", "KOR KOR GBR", "KOR CHN TPE" }

Returns: { "KOR 3 1 0", "ITA 1 0 0", "TPE 0 1 1", "CHN 0 1 0", "JPN 0 1 0", "AUS 0 0 1", "GBR 0 0 1", "UKR 0 0 1" }

These are the results of the archery competitions.

1)  
{ "USA AUT ROM" }

Returns: { "USA 1 0 0", "AUT 0 1 0", "ROM 0 0 1" }

2)  
{ "GER AUT SUI", "AUT SUI GER", "SUI GER AUT" }

Returns: { "AUT 1 1 1", "GER 1 1 1", "SUI 1 1 1" }

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TopCan.txt

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## PROBLEM STATEMENT

This problem contains an image.

TopCan, Inc. is a major producer of food. It produces all kinds of food than can be filled into a can: pineapples, mushrooms, peas, etc. However, business is not going well, so they are looking for ways to make production cheaper. An important expense factor is the amount of material needed for producing the can, which directly depends on the surface area of the can. Currently, cans are produced in all imaginable shapes and sizes, but to reduce cost, the company thinks about producing only cans in the shape of a cylinder (as shown below). So to be able to decide whether production should be changed TopCan wants to know, for a given volume, the minimal surface area possible of such a can. As the company's brightest employee, this task has been assigned to you.

Given an int volume, return a double, the minimal surface area possible of a cylinder that has the given volume.

## DEFINITION

Class:TopCan

Method:minSurface

Parameters:int

Returns:double

Method signature:double minSurface(int volume)

## NOTES

-Consider the material the can is made of to be infinitely thin.  
 -Some formulas for your convenience:  
 $r$ : radius of the circle being the base of the cylinder  
 $h$ : height of the cylinder  
 $V = h * \pi * r^2$   
 $S = 2 * \pi * r * (r + h)$   
 -If not provided by a library, use the value of  $2 * \text{acos}(0)$  for  $\pi$ .  
 -Reminder: If your result is within  $10^{-9}$  of the expected result, your solution will be evaluated as correct. If your result is between  $(1+10^{-9}) * \text{expected}$  and  $(1-10^{-9}) * \text{expected}$ , it will be evaluated as correct.

## CONSTRAINTS

-volume will be between 1 and 100000, inclusive.

## EXAMPLES

0)  
10

Returns: 25.694955950835347

For a volume of 10, the cylinder has a height of about 2.3351 and the base circle has a radius of about 1.1675.

1)  
20

Returns: 40.78820010663257