UCF "Practice" Local Contest — Aug 24, 2013

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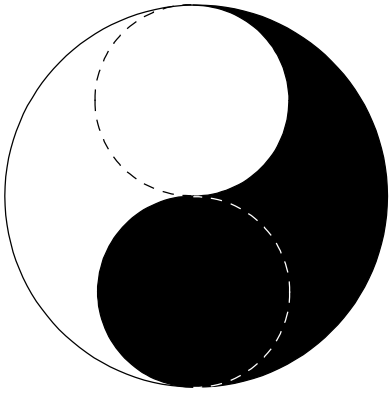
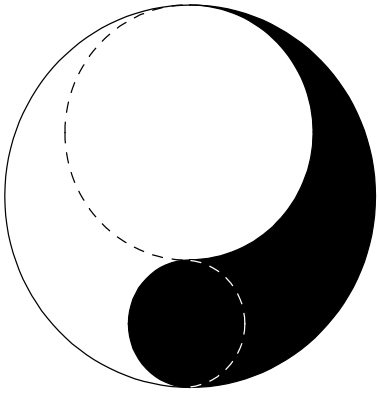
filename: `yinyang`

The Chinese Taijitu symbol, also known as the Yin and Yang, symbolizes the duality and balance of everything. It appears in many contexts, including ancient Confucian writings, martial arts, and even the national flag of South Korea. The Taijitu is always shown with the yin (dark side) and the yang (light side) in balance. But, what happens when they are unbalanced?

The typical Taijitu has the dark (yin) and light (yang) side separated by a specific curve that is related to the apparent path of the sun around the earth (the ecliptic), but for the purposes of this problem, we'll simply use two connected semicircles as shown below. In the image on the left, the Taijitu is balanced, with an equal area of yin and yang. The image on the right has significantly more yang (because the upper semicircle has a larger radius than the lower semicircle), and is therefore unbalanced.





Note: Each side is usually depicted with a "seed" (a small dot) of the opposite color. For simplicity, we will ignore this.

The Problem:

Given the overall radius (in centimeters) of the Taijitu, and the radius (in centimeters) of the upper semicircle (as shown in the images above), determine the total area of yin and yang in the corresponding Taijitu. Note that the yang (the light side) always appears on the left side of the Taijitu, and the two semicircles defining the division are always oriented as shown above.

Use a value of 3.14159 for π (pi).

The Input:

There will be multiple Taijitu(s). Input begins with an integer, n ($1 \le n \le 50$), on a line by itself, indicating the number of Taijitu(s) to examine. On each of the next n input lines will be two integers, a and b ($1 \le b < a \le 100$), where a represents the overall radius of the Taijitu, and b represents the radius of the upper semicircle.

The Output:

For each Taijitu in the input, print a line of the form "`Taijitu #`*t*`: yin `*x*`, yang `*y*", where *t* is the Taijitu number (starting from 1), *x* is the area of the yin (the dark side) in square centimeters, and *y* is the area of the yang (the light side) in square centimeters. Round the area to the nearest two decimal places (examples: 1.274 would round to 1.27 and 1.275 would round to 1.28). Leave a blank line after the output for each data set. Follow the format illustrated in Sample Output.

Sample Input:

```
2
10 5
12 7
```

Sample Output:

```
Taijitu #1: yin 157.08, yang 157.08

Taijitu #2: yin 188.50, yang 263.89
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