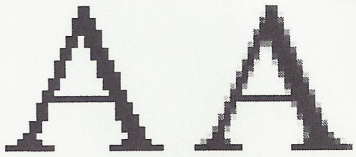
Problem C: AAAA

Forays into Anti-Aliased Ascii Art



Aliasing is the term used for artifacts introduced when digitally sampling an analog source due to the finite resolution of the digital capture. Aliasing is a common problem in computer graphics, where lines and smooth curves appear jagged when plotted as pixels. For example, given an equation of a line to be plotted:

$$y = mx + b$$

a naive attempt to draw this line might result in something like

```
      ***
    **
  ***
***
```

looking more like a staircase than a smooth line.

Aliasing (a.k.a. *jaggies*) can be countered by *anti-aliasing* schemes in which pixels are drawn in varying shades of gray and, sometimes, diffused over neighboring pixels to yield a smoother-looking image when viewed from sufficient distance, as illustrated by the picture at the top of this page.

One scheme for anti-aliasing lines works on the idea of shading two pixels at a time for each value for each x. Given a point (x, y) where $y = mx + b$, let y_w be the "whole part" of y (the largest integer that is less than or equal to y) and let y_f be the "fractional part" of y such that

$$y_w + y_f = y$$

For example, if $y = 23.56$, then $y_w = 23$ and $y_f = 0.56$. Let the *gray level* of a pixel be a number from 0.0 to 1.0 where 0.0 denotes a pure white pixel and 1.0 denotes a pure black pixel. If y_f is zero, then shade the pixel (x, y_w) at a gray level of 1.0. If y_f is non-zero, then shade the pixel (x, y_w) at a gray level of $1 - y_f$ and shade the pixel $(x, y_w + 1)$ at a gray level of y_f.

Write a program to draw anti-aliased lines according to this scheme.

Input

The input set will consist of several cases. Each case is given as a single line, containing two numbers, m and b, denoting the slope and intercept of the line in the formula

$$y = mx + b$$

These numbers will be presented as floating point numbers with no more than 2 digits after the decimal point. m will be in the range 0.00 to 0.50 inclusive and b will be in the range -20.00 to 20.00 inclusive.

A zero value for both m and b signals the end of input and is not plotted.

Output

For each line in the input, produce a separate plot consisting of a 20x20 square of characters. Each character represents a point on the portion of the Cartesian plane defined by $0 \leq x < 20$, $0 \leq y < 20$. Each character position is filled with a character obtained by computing the appropriate gray level as described above, rounding to the closest tenth, and then selecting a character from the following table:

Rounded gray scale:	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Character:	.	:	-	=	+	t	w	*	#	%	@

The characters, if you have difficulty recognizing them, are: period, colon, hyphen, equals, plus, lower-case T, lower-case W, asterisk, hash, percent, at.

Each line of the plot will be printed as 20 characters, immediately preceded and immediately followed by a vertical bar ('|').

After each plot, print a single line containing 22 underscore ('_') characters.

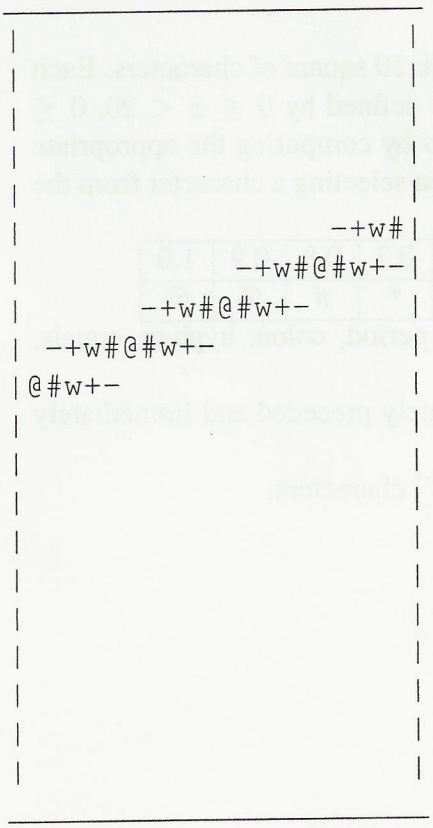
Example

Given the input

```
0.5 0
0.2 10.0
0 0
```

the output would be

```
|                    |
|                    |
|                    |
|                    |
|                    |
|                    |
|                    |
|                    |
|                    |
|                   t|
|                 t@t|
|               t@t  |
|             t@t    |
|           t@t      |
|         t@t        |
|       t@t          |
|     t@t            |
|   t@t              |
| t@t                |
|@t                  |
```


-+w#
-+w#@#w+-
-+w#@#w+-
-+w#@#w+-
@#w+-