Topic 7 Nested Loops Case Study

"Composing computer programs to solve scientific problems is like writing poetry. You must choose every word with care and link it with the other words in perfect syntax. There is no place for verbosity or carelessness. To become fluent in a computer language demands almost the antithesis of modern loose thinking. It requires many interactive sessions, the hands-on use of the device. You do not learn a foreign language from a book, rather you have to live in the country for year to let the language become an automatic part of you, and the same is true for computer languages."

James Lovelock

Based on slides for Building Java Programs by Reges/Stepp, found at http://faculty.washington.edu/stepp/book/

Nested For Loops Case Study

Drawing complex figures

- Write Java code to produce the following output.
 - Write nested for loops to capture the repetition.
 - Use a constant so that the size of the figure could be changed simply by modifying one line of your program.



(it's supposed to look like an hourglass...)



Nested For Loops Case Study



How easy is it to change program to produce this output?

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Pseudo-code

- **pseudo-code**: A written English description of an algorithm to solve a programming problem.
 - Writing pseudo-code for a complicated program can help us get the main idea of how the problem should be solved, so that we can try to find a working algorithm.
- Example: Suppose we are trying to draw a box of stars on the screen which is 12 characters wide and 7 tall.
 - A possible pseudo-code for this algorithm:

```
draw 12 stars.
for each of 5 (7-2) lines,
    draw a star.
    draw 10 (12-2) spaces.
    draw a star.
draw 12 stars.
```

Tables to examine output

#******	#

*	
*	

#*******	#

line	spaces	stars	spaces
1	1	7	1
2	2	5	2
3	3	3	3
4	4	1	4