

# Lesson 4.03: Nested For Loops ## Learning Objectives Students will be able to... \* Define and identify: **\*\*nested for loops\*\***, **\*\*stack trace\*\*** \* Use nested for loops via a function and a for loop \* Use nested for loops via two loops nested \* Use a stack trace to understand and demonstrate the flow of nested for loops ## Materials/Preparation \* [Do Now] \* [Lab - Nested For Loops] ([printable lab document]) ([editable lab document]) \* Read through the Do Now, lesson, and lab so that you are familiar with the requirements and can assist students \* Video Explanation of Nested For Loops ([!Nested For Loops](https://img.youtube.com/vi/fyP4SXpkYG4/0.jpg))(https://youtu.be/fyP4SXpkYG4) ### Day 1 Pacing | **\*\*Duration\*\*** | **\*\*Description\*\*** | |-----| |-----| | 5 Minutes | Do Now | | 10 Minutes | Lesson | | 35 Minutes | Lab | | 5 Minutes | Debrief | ### Day 2 Pacing | **\*\*Duration\*\*** | **\*\*Description\*\*** | |---|---| | 5 Minutes | Do Now | | 10 Minutes | Review | | 35 Minutes | Lab | | 5 Minutes | Debrief | ## Instructor's Notes ### 1. Do Now \* Display the Do Now on the board. \* Students use nested for loops to create a square star pattern. ### Lesson ##### Go over part 1 of the Do Now \* Discuss the output of the program - were the students able to guess the output without typing it? \* Go over how to read for loops if students are struggling (drawing the [loop diagram]). \* Make sure students are understanding loops and string concatenation. \* If students continue to struggle, take 5 minutes to go over the loop syntax and practice. ##### Go over part 2 of the Do Now \* Ask a students to write the `print\_star\_square` function on the board. \* Define **\*\*nested for loop\*\***: a loop within another loop. \* For each iteration of the outer loop the inner loop is iterated through completely. \* Draw a diagram (**\*\*stack trace\*\***) of the for loop (e.g. something like [loop diagram]) \* Ask students to draw the nested part of the state diagram (should be inside the outer loop but look the same as the outer loop) ##### Go over part 3 of the Do Now \* If students were unable to finish this, give them 5 minutes to practice in groups before calling them back to go over this part. \* Ask a couple students to write on the board how they did this \* Ask them how treating the loop as it's own function made it easier or harder. \* Ideally this should make it easier as a way of abstracting knowledge of looping. ### 3. Lab \* The lab asks students to write functions that produce different outputs using nested for loops. ### 4. Debrief \* Inform students that there will be a Unit 4 Quiz after Lesson 4.04. \* Go over common questions the students had. \* On the second day, if time allows, go over the bonus and discuss how students solved the problem. ### Accommodation/Differentiation \* If students need extra time for lab there is another day in the schedule for that. \* This topic is often confusing for students new to the concept, so build in time for frequent individual checks for understanding. \* **\*\*Bonus Lab Problem\*\*** This is a bit more difficult and should allow students who are moving quickly a challenge ## Forums discussion [Lesson 4.03: Nested For Loops (TEALS Discourse Account Required)](https://forums.tealsk12.org/c/unit-4-looping/lesson-4-03-nested-for-loops) [Do Now]: do\_now.md.html [Lab - Nested For Loops]: lab.md.html [loop diagram]: http://etutorials.org/shared/images/tutorials/tutorial\_169/F05um02.jpg [printable lab document]: https://github.com/TEALSK12/2nd-semester-introduction-to-computer-science/raw/master/units/4\_unit/03\_lesson/lab.pdf [editable lab document]: https://github.com/TEALSK12/2nd-semester-introduction-to-computer-science/raw/master/units/4\_unit/03\_lesson/lab.docx