

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