

Lesson 4: Private Methods

45 minutes

Overview

How does making a method `private` change its functionality?

Students revisit access modifiers to explore the accessibility of methods and constructors in a program. Students identify scenarios for using a `private` method and constructor and practice writing and using `private` methods using the console or The Theater. Students then finalize their planning for their Creative Coding with The Theater Project and participate in a peer review to receive feedback on their work.

Standards

Full Course Alignment

CSA Conceptual Framework

- **MOD-2** - Programmers use code to represent a physical object or nonphysical concept, real or imagined, by defining a class based on the attributes and/or behaviors of the object or concept

Agenda

Warm Up (10 minutes)

CS Bingo

Activity (25 minutes)

Private Methods

Planning Program Structure

Wrap Up (10 minutes)

Peer Review and Feedback

Assessment: Check for Understanding

AP Classroom Topic Questions

Objectives

Students will be able to:

- Explain the accessibility and functionality of `private` methods and constructors
- Identify scenarios for using a `private` method or constructor
- Write and call `private` methods

Preparation

- Print copies of the Project Planning Feedback handout (one for each student)
- Check the **Teacher's Lounge** for verified teachers on the CSA Forum to find additional strategies or resources shared by fellow teachers

Links

Heads Up! Please make a copy of any documents you plan to share with students.

For the students

- **CS Bingo Cards** - Handout
- **Project Planning Feedback** - Handout
- **U7L4 Extra Practice** - Handout

Teaching Guide


Warm Up (10 minutes)


CS Bingo

Remarks

We have learned a lot of new terms so far! Let's review some of these terms through a game of CS Bingo.

 **Distribute:** Give each student a unique CS Bingo Card.

 **Do This:** Review the instructions for playing CS Bingo.

 **Do This:** Play the music clip to cue the CS Bingo activity. Choose a random definition and read it aloud to the class. Give students a moment to check their bingo card for the correct term, then state the correct term. Repeat until a student yells "Java."

Teaching Tip


To allow for multiple students to "win" the game, continue pulling definitions until a couple more students win as well.

Activity (25 minutes)


Private Methods (15 minutes)

Remarks

We have used access modifiers like `private` to implement data encapsulation so other classes cannot directly modify the values stored in instance variables. We have also used `public` with constructors and methods so other classes can create instances of a class and use its methods. The `private` access modifier can be used to prevent access to methods and constructors from outside a class.

 **Do This:** Review the lesson objectives.

Group: Place students in pairs.

 **Do This:** Direct students to Level 1 on Code Studio to investigate the program with a partner. Students make the changes to the program as prompted.

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Investigate: Private Methods


 **Discuss:** Click through the animated slide to display the prompts.

- *What do you notice about the code in this program?*
- *What do you wonder about the code in this program?*

Discussion Goal: Students notice that the `private` keyword is used with methods and constructors, which prevents them from being used outside the class. Students also notice that the `private` methods and constructors can be used within the class. Students may wonder when they would use a `private` method or constructor or about the similarities and differences between `private` methods and constructors and `private` instance variables.

 **Display:** Show the video - *Private Methods*.

 **Do This:** Click through the animated slide to demonstrate the functionality of a `private` method.

 **Discuss:** Click through the animated slide to display the prompts. Use the Retrieve-Pair-Share strategy to discuss the prompts.

- Why would we want to use a `private` method?
- Why would we want to use a `private` constructor?

Discussion Goal: Students suggest using a `private` method as a helper method to perform a task within the class. Students identify that a `private` method can help keep a `public` method easy to read and maintain since specific tasks can be decomposed into `private` and `public` methods. Students suggest using a `private` constructor in the same way as a `private` method.

💡 Teaching Tip

Ask additional guiding questions to help students make this connection. For example:

- *Let's say the Project Mercury Pastries Food Truck business wants to automatically apply a discount to all orders that have more than six desserts. How could a `private` method be used in this scenario?*
- *We wrote overloaded constructors in our `Dessert` class to provide different alternatives for creating desserts. How could that code be refactored using a `private` constructor?*

Do This: Direct students to Level 2 on Code Studio. Students complete a choice level to write and use a `private` method using the console or The Theater.

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Writing Private Methods

Planning Program Structure (10 minutes)

🎤 Remarks

You now have time to continue your planning for your project. Remember, your planning might include outlines, rough drafts, flowcharts, UML diagrams, or pseudocode for key algorithms in your program. Take a look at your Project Planning Board to decide what task you need to tackle first.

Do This: Review the first benchmark.

Do This: Have students work on their Creative Coding with The Theater Project.

Do This: Have students update their Project Planning Board and Project Backlog with any tasks they completed, changed, or added.

Wrap Up (10 minutes)

Peer Review and Feedback


🎤 Remarks


Before working towards the next benchmark, it is helpful to assess your achievement of this benchmark and to get feedback on your ideas and planning.


Group: Place students in pairs.

Distribute: Give a copy of the Project Planning Feedback handout to each student.

Do This: Review the feedback process.

 **Do This:** Have students identify a question to frame the feedback session.

 **Do This:** Have students ask their framing questions and share feedback. Students should take notes on their Project Planning Feedback handout.

 **Do This:** Have students individually respond to the prompts on their Project Planning Feedback, identify the user stories that will make up their second benchmark, and post tasks they want to complete for the second benchmark in the "To Do" column of their Project Planning Board.

 **Do This:** Review the concepts covered in this lesson.

Assessment: Check for Understanding

Check For Understanding Question(s) and solutions can be found in each lesson on Code Studio. These questions can be used for an exit ticket.



Check for Understanding

AP Classroom Topic Questions

To assign questions from the AP Classroom Question Bank that align with this lesson, create a custom quiz in AP Classroom by searching the Question Bank for the Essential Knowledge statements listed at the top of this lesson plan. You can find instructions and video demonstrations to do this on **AP Central**.



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