



Lesson 9.1: Abstraction

https://codehs.com/course/9975/lesson/9.1

Description	In this lesson, students will learn about abstraction. Abstraction is the act of managing complexity by dissociating information and details in order to focus on relevant concepts.
Objective	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Understand abstraction as the different levels of detail and complexity • Understand the importance of abstracting away complexity to solve problems more efficiently
Activities	<p>9.1.1 Video: Abstraction 9.1.2 Check for Understanding: Abstraction 9.1.3 Example: Abstracting Away draw_square() 9.1.4 Free Response: Abstracting Your Day 9.1.5 Free Response: Reflection: Abstraction 9.1.6 Free Response: Abstraction in Tracy</p>
Prior Knowledge	<ul style="list-style-type: none"> • Ability to create a logical Tracy program • Defining and calling functions • Proper syntax for typing commands • Understanding of top-down design and decomposition
Planning Notes	<ul style="list-style-type: none"> • Review the slides and the exercises in the lesson. • There are three free response activities in this lesson. These can be completed on paper or in a journal to reduce screen time. They can also be completed in pairs or small groups. Students can brainstorm individually and then come together to frame their thoughts into one shared response. • This is a shorter lesson with time available for review, enrichment or to move ahead to the next lesson.
Standards Addressed	
Teaching and Learning Strategies	<p>Lesson Opener:</p> <ul style="list-style-type: none"> • <i>Motivation:</i> Use this link to write your name on the board in binary. See if the students can figure out what the code means. Let them display their name in binary using the link as well. [5 mins] • Have students brainstorm and write down answers to the discussion questions listed below. Students can work individually or in groups/pairs. Have them share their responses. [5 mins] <p>Activities:</p> <ul style="list-style-type: none"> • Watch the lesson video and complete the corresponding quiz. [5-7 mins] • Let students play around with the <i>Abstracting Away draw_square()</i> example. Encourage them to scroll down and use the different <code>draw_square()</code> functions by commenting and uncommenting the code (comments can be 'toggled' by highlighting the entire section and pressing CTRL + / or Command ⌘ + /). Challenge them to build a different <code>draw_square()</code> function that would still work. [5-10 mins] • Complete the <i>Abstracting Your Day</i> free response activity. [5-10 mins] • Complete the <i>Reflection: Abstraction</i> free response activity. [5-10 mins] • Complete the <i>Abstraction in Tracy</i> free response activity. [5 mins]

	<p>Lesson Closer:</p> <ul style="list-style-type: none"> • Have students reflect and discuss their responses to the end of class discussion questions. [5 mins]
<p>Discussion Questions</p>	<p>Beginning of Class:</p> <ul style="list-style-type: none"> • What do you think is actually happening when you give Tracy the <code>forward()</code> command? <ul style="list-style-type: none"> ◦ <i>Answers may vary.</i> ◦ Students may have all different thoughts about this. Summarize ideas and write them on the board. The answer will be given in the video. • What kinds of messages can a computer read? <ul style="list-style-type: none"> ◦ <i>Computers only read in ones and zeros or offs and ons (binary).</i> • How are humans able to “speak” to computers? <ul style="list-style-type: none"> ◦ <i>Humans write code which gets broken down into binary code for the computer to understand.</i> <p>End of Class:</p> <ul style="list-style-type: none"> • So, what is actually happening when you give Tracy the <code>forward()</code> command? <ul style="list-style-type: none"> ◦ <i>The <code>forward()</code> command is broken down into assembly code and then broken down further into binary so that the computer can understand the command.</i> • Why is abstraction important in programming? <ul style="list-style-type: none"> ◦ <i>Many details are hidden so that the programs are shorter and more readable.</i> • How are things in your everyday life abstracted? <ul style="list-style-type: none"> ◦ <i>Answers may vary.</i>
<p>Resources/Handouts</p>	

Vocabulary

Term		Definition
<p>Modification: Advanced</p>	<p>Modification: Special Education</p>	<p>Modification: English Language Learners</p>
		<ul style="list-style-type: none"> • Print out the video slides for students to take notes • Provide students with translation tools, have them translate English words they don't know