

# Lesson 11: Functions Make

## Overview

Using Programming Patterns and a step-by-step approach students make their own version of a Quote Maker app. At the beginning of the lesson students are able to explore a working version of the app. They are then given the design elements of the app but begin with a blank screen. Students use an Activity Guide to go through the high level steps they should use to develop their app but leaves it to them to decide how to write the code. At the end students submit their apps which can be assessed using a provided rubric.

## Purpose

This lesson is an opportunity for students to take on the "blank screen" and build the code that runs an app entirely from scratch. Guidance provided throughout the lesson helps students break down the large task of "building an app" into more incremental steps that they can use on future projects, including this unit's final project and the Create PT.

## Standards

Full Course Alignment

### CSTA K-12 Computer Science Standards (2017)

- **AP** - Algorithms & Programming

## Agenda

### Lesson Modifications

#### Warm Up (2 minutes)

##### Anticipating Functions

#### Activity (38 minutes)

##### Build the Quote Maker App

#### Wrap Up (5 minutes)

##### Assessment: Make Project

## Objectives

Students will be able to:

- Implement a function using programming patterns while developing a functional app
- Recognize the need for a function to reduce repeated code while developing a functional app
- Use debugging skills as part of developing an app
- Write comments to clearly explain both the purpose and function of different segments of code within an app

## Preparation

- Review the Activity Guide to decide if you will use it with your students

## Links

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

For the teachers

- **CSP Unit 4 - Variables, Conditionals, and Functions** - Slides
- **Guide to Make Lessons** - Video

For the students

- **CSP Functions Make - Quote Maker App** - Activity Guide

## Teaching Guide

## Lesson Modifications



**Attention, teachers!** If you are teaching virtually or in a socially-distanced classroom, please read the full lesson plan below, then click **here** to access the modifications.

## Warm Up (2 minutes)

### 💡 Teaching Tip

**When to Make Functions:** The end of the previous lesson and the beginning of this lesson both emphasize a transition students will go through in making functions. Early on they are likely to either not use functions or only realize the need one after they've already written duplicate code. As they get more experienced as programmers, however, they will likely realize sooner and sooner in the process that a function will be necessary. As students grow more experienced they should actually be able to anticipate and write their functions from the beginning of designing their program. Use this brief introduction to reinforce that language.

## Anticipating Functions

### 🎤 Remarks

For the past few days, we've learned a lot about using functions to simplify code and make it easy to edit. So far we have learned how to use functions to remove repeated code in our programs. Early on it's common to realize you need a function only after you've completely written the same chunk of code in two places. As you get better, however, you'll realize sooner and sooner in the process that you're likely going to need a function, and will be able avoid writing repeated code before putting it inside a function. Eventually you'll want to anticipate what your functions are going to be even before you start programming. These are the "during" and "before" levels we read about yesterday.

In today's Make lesson and the following project you'll have a chance to practice this. See if sometimes you can work that "during" or "before" category.

## Activity (38 minutes)

### Build the Quote Maker App

**Group:** Make a determination as to whether this project will be completed in pairs or individually. You may even choose to let students decide.

**Do This:** Have students explore the working Quote Maker App in Level 1.

If students are not working in pairs they should still discuss the prompts with a neighbor.

### 🗨️ Discuss:

- *What does this app do?*
  - Display a quote with user-defined fonts and background colors.
- *What are the inputs?*
  - The dropdowns for background color and font family.
  - The quote text field
  - The slider to generate the font size
- *What are the outputs?*
  - The fully designed quote displayed at the bottom of the screen

- *How could a function be used in this app?*
  - Students may struggle with this question, and it's ok to not have it fully answered before beginning the project.
  - A function can be used to update the screen.
  - The function contains the conditional that is checked everytime the user interacts with the screen.

 1

## Quote Maker App

### 💡 Teaching Tip


**Supporting Students:** While students are working on their apps, circulate the room and check in with students who need a little help. Encourage students to collaborate and discuss bugs with each other.


**Debugging:** Review with students steps they can use to debug if they get stuck:

- Run the code on turtle mode
- Add the variables to the watcher
- Explain the code to a friend

### Remarks

Now let's build the this app. The screen has been set up for you - it's your job to add the code!

 **Do This:** Direct students to level two where they complete the Quote Maker App. An optional Activity Guide is provided if students would like guidance in creating the app. The most relevant programming pattern is displayed on a slide. Review this pattern quickly with students, if needed.

 **Submit:** Encourage students to check the rubric on the last page of the Activity Guide before submitting.

 2

## Make the Quote Maker App

## Wrap Up (5 minutes)

### Remarks

 Awesome work today! Make sure to submit your project when you're done with it!

### 💡 Teaching Tip

**Maximize Work Time:** The wrap up is short to allow the maximum amount of time for students to complete the activity.

## Assessment: Make Project

Use the rubric provided with the project to assess student projects.

