

# Lesson 7: Storage

45 minutes

## Overview

This lesson introduces the final component of the unit's model of computing: storage. After trying out an "outfit picker" app, students discuss what information should be stored in the app versus input every time the app is run. They then look at a series of apps and use their decisions about what should be stored to create guidelines for deciding what information to store. They then review the four components of this chapter's model of computing: input, output, storage, and processing. Afterward, they have one last opportunity to revise their decisions about which items should be classified as a "computer" from earlier in the chapter. The lesson ends with a reflection on their own app ideas and how storage could be used.

**Question of the Day:** Why is storage an important part of the computing process?

## Standards

Full Course Alignment

CSTA K-12 Computer Science Standards (2017)

- ▶ **AP** - Algorithms & Programming
- ▶ **IC** - Impacts of Computing

## Agenda

Warm Up (5 minutes)

Analyzing an App (Outfit Picker)

Activity (35 minutes)

Apps with Storage

Outfit Picker

Friend Finder

Choose a Kid's Movie

Guidelines

Introducing the IOSP Model

Wrap Up (5 minutes)

Journal

## Objectives

Students will be able to:

- Determine which information in a computing problem should be stored for later use.
- Identify guidelines regarding what information should and should not be stored as part of the computing process.
- Use the input-output-storage-processing model to describe a computing process.

## Preparation

- Print a copy of the activity guide for each student
- Check the "**Teacher's Lounge**" forum for verified teachers to find additional strategies or resources shared by fellow teachers
- If you are teaching virtually, consider checking our **Virtual Lesson Modifications**

## Links

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

For the teachers

- **Apps with Storage** - Slides  
▼ Make a Copy

For the students

- **Apps with Storage** - Activity Guide  
▼ Make a Copy
- **What Do Computers Do** - Video  
(Download)

## Vocabulary

- **storage** - saving information to use in the future

## Teaching Guide

### Warm Up (5 minutes)

#### Analyzing an App (Outfit Picker)

**Journal Prompt:** Go on Code Studio to look at the outfit picker app. What is one input, one output, and one kind of processing it might use? Let's say you used this app every day. What information would you want this app to remember?

**Circulate:** The first part of this reflection serves as a review of input, output, and processing. As students reflect on the prompt, check their answers to ensure that they understand how input, output, and processing are used in the app.



Content Corner



Students may identify the weather, favorite color, or season as the input, and the pictures of outfits as the output. Although the exact processing of the app may not be clear, students may point out that there are several likely if/then scenarios ("If the weather is rainy, then include an umbrella.") or matching between the user's input and features of the outfits.

**Discuss:** Ask students to share out what information they thought should be stored and why.

**Discussion Goal:** While it's not important that students agree on the answers, this discussion introduces them to the idea of storing information for later and prompts them to think about what information should and should not be stored in an app.



#### Remarks

This example app asks for some information that won't change very often, such as your favorite color. Instead of being required to enter this data every time, it would be helpful if the app could remember our answers by storing it. All computers can save information for later and read saved information through **storage**.

#### Key Vocabulary:

- **Storage** - saving information to use in the future

**Question of the Day:** Why is storage an important part of the computing process?

### Activity (35 minutes)

#### Apps with Storage



#### Remarks

We're going to look at a few apps that use a few kinds of information. We want to identify which information could be stored so that we don't have to enter it every time.

**Group:** Put students in groups of 2-3. Each group will need access to one computer for this activity.

**Distribute:** Give each group one copy of the activity guide.

As a class, complete the first section of the activity guide, which references the outfit picker app used in the warm-up.

Send students to Code Studio to see the sample apps.

**Circulate:** Allow students to complete the rest of the activity guide in their groups. As they fill out the charts, ask them to elaborate on why they thought each input should be stored or not.

✓ Assessment Opportunity ▲

There is some flexibility about what should and shouldn't be stored, since that is a choice that the app designer could make. The most important part is their explanation. They should be reasoning about whether that information will change frequently.

## Outfit Picker

The first app asks users to input their favorite color, the current season, and the weather, then outputs a picture of an outfit based on the user input.



App: Outfit Picker

## Friend Finder

The second app asks users to input which friends should be on their friends list, then outputs a map that displays the locations of the friends on the list.



App: Friend Finder

## Choose a Kid's Movie

The third app asks users to input several preferences around movies, then outputs a movie recommendation based on the user's preferences.



App: Choose a Kid's Movie

## Guidelines

As groups move on to the final activity, you may need to briefly explain what a guideline is and what the question is asking for. Make sure that all groups have time to come up with guidelines, even if they have to skip parts of the earlier chart.

**Circulate:** If groups get stuck writing their guidelines, ask them about which inputs they said should be stored in the other apps. Ask them to see if they can find any similarities between which inputs were stored and were not stored. Remind them that they can also write guidelines about which inputs were not stored.

✓ Assessment Opportunity ▲

Student answers may vary, but in general, they should realize that whether information should or should not be stored relates to how frequently it changes, if changes at all.

Once most of the groups are done writing their guidelines, bring the class back together and ask if any group would like to share one of their guidelines.

## Introducing the IOSP Model

### Remarks

Now we can understand a computer as a machine that does four things: input, output, storage, and processing

 **Display:** Show students the [\*\*What Do Computers Do\*\*](#) video in the slides which introduces the IOSP model.

Prompt for discussion with two discussion questions.

💡 Teaching Tip ▲

If you are using journaling, prompt the students to write their answers down in their journals.

To encourage active engagement and reflection, use one or more of the strategies discussed in the [\*\*Guide to Curriculum Videos\*\*](#).

1. Think of something you do on the computer. What sort of input, output, storage, and processing are happening?
2. What kinds of input, output, storage, and processing are used in a modern smartphone?

Finally, look at the poster from the "What is a Computer?" lesson and check to see if any of the machines should be reclassified as computers or not computers based on this new IOSP model.

✓ Assessment Opportunity ▲

You can use the two journal prompts here to assess students' ability to identify the different parts of IOSP in an app they commonly use and in a smartphone.

## Wrap Up (5 minutes)

### Journal

**Prompt:** Think of an app you would like to make. What information would it store?

**Share:** Time permitting, allow students to share out their ideas.

**Discussion Goal:** As student share their ideas, ensure that they are using the key vocabulary of the lesson:

- **storage** - saving information to use in the future



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