



# Badge 3:

# App Development

**S**ome apps are all about storing and displaying data. Calendar apps keep track of your appointments. Photo apps take and store pictures for you. Fitness apps might keep track of your steps, sleep, water intake, and food choices.

Apps aren't just for individuals, though. Some apps, like the ones school systems use to let families know about snow days or ones that help people find and adopt pets, are useful ways to connect communities. Apps can let you collect and use data for community engagement.

## Steps

1. Learn to collect and visualize community data
2. Write objects to organize and store data
3. Design a community data collection plan
4. Analyze your community data
5. Develop a prototype for a social app

## Purpose

When I've earned this badge, I'll understand JavaScript syntax, how to use objects to store community and social data, and how to display data with visualizations.

## STEP

# 1

## Learn to collect and visualize community data

**Collecting data from a community, organizing it, analyzing it, and presenting it in an easy-to-understand way is a big job. Data**

means any set of facts or statistics collected for analysis. **Data visualization** is a way of presenting data in a graphic way. Sometimes people use charts, graphs, or maps to convey data. Visualization lets the person looking at the data see the results of the analysis, like patterns or relationships.

In data collection and visualization, it's important to make sure the data you collect and share is accurate. It's also important that you find an effective way to share your findings, so that people can understand and use the information you've gathered.

What community issue is important to you? How would you gather data on that issue to inform any action you might take? And how would the type of data you gather impact your choice of data visualization tools?



## Friendly Neighborhood Apps

Apps can strengthen communities by helping people connect or share information.

- **Freecycle** lets people give away unwanted items to others who need them.
- **Meetup** helps people with common interests connect.
- **Facebook Safety Check** lets people experiencing an emergency check in with friends and family.
- Some communities use apps to report graffiti, or potholes that need filling
- School districts use apps to notify families about snow days or emergencies.

What other apps do you know of that solve community issues?

## Everybody Counts, So Count Everybody!

Every ten years, the federal government conducts a census. That means they collect information about all the people who live in the country by conducting a survey. What they learn affects how seats in the US House of Representatives are apportioned and how the government decides where and what to spend money on, like highways, medical research, or education. The US Census also collects facts about people, like where they live, how much money they make, and if they're in school or are veterans.

Collecting community data can also help leaders make informed policy choices. For example, community surveys can be used to measure **sentiments** (feelings or opinions)

about issues such as the need for a new park. They can gather data and opinions from community members about issues like whether a student representative should be added to the school board.



## Is Your Data Safe?



Before you install an app, make sure you know what kind of data it will collect from your phone *and* what it will do with it. Many apps ask for access to your camera and microphone, to track your location, or read your emails and texts. Some even ask for access to your contacts.

### Before you install an app, ask yourself:

- What kind of information is the app requesting access to?
- Am I comfortable sharing my information with this app developer?
- Does the app really need all the permissions it's asking for?

Then, read the privacy policy. It will tell you what the developer plans on doing with your private data. After that you can go to the privacy settings and turn off access to things like your contacts, calendar, photos, or location sharing. Some apps even want to make posts to social media for you. Say “no” to that, if you aren’t comfortable with the app making posts.

## STEP 2 Write objects to organize and store data

**Computers are great “number crunchers.”** That means that a computer can sort or analyze large sets of data very easily.

**Data objects** are one way app developers can store and use the data they collect. They’re a kind of container that can store lots of different types of information.

When coding an object, it’s important to know that objects are made out of **key-value pairs**. Each pair is separated by a comma.

You start with the object, then include data information inside the { and close with }. These are called **curly brackets**—they show the computer the beginning and end of the object.

Objects should have one name, but they can be made of more than one word without spaces. The name of an object must not have spaces and cannot start with a number or use special characters (\*, %, &, etc.). Many coders create names from two words that relate to the data the object contains; the first word is lowercase, and the second word is capitalized. This is the typical way of writing an object in JavaScript, but it’s not necessary.

For example, this code shows how a computer programmer might represent community data that answers the question, “Is the environment important?” in a data object:



```
var theEnvironmentIsImportant = {  
  No: 0,  
  Somewhat: 3,  
  Yes: 13  
}
```

The “var” at the beginning stands for **variable**. You have to add ‘var’ before the name because JavaScript syntax rules require you to call out your object as a variable.



## STEP 3 Design a community data collection plan

**A great app hits a “sweet spot,” providing just the right service to a certain group of people.** When designing a great app for a community, developers have to do some research first. To gather data from a community, app teams think through the process before they start asking questions.

- **Define the community and goal.** Who are they asking and what do they want to know? What issue or issues will they focus on?
- **Decide how to organize or quantify findings.** The type of questions researchers ask will shape the kinds of data they gather.

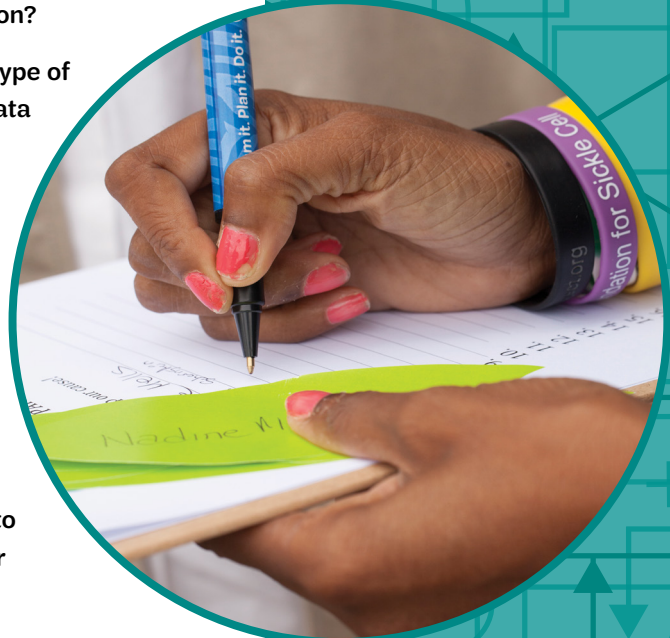
For example, will they ask, “On a scale of one to five, with 1 being not important and 5 being important, how do you feel about the issue?” or will they ask, “Which current community issue is the most important to you? A, B, C, or D?”

- **Decide what questions to ask.** Researchers need to decide what kinds of questions and how many to ask. They need to decide if they’re going to ask only questions about issues or if they’re also going to ask questions about the person answering, like their age, gender, or zip code.

Information about the people taking the survey can provide interesting ways to analyze the data. For example, researchers might find that people living in a certain zip code think school overcrowding is most important, or that women are most concerned about housing costs.

- **Share the data collection plan and ask for feedback.** Researchers will share their plan and surveys with coworkers before they use it with the public. For example, they’ll ask if their questions make sense and if they’ve identified the right community in which to collect data.

The more carefully you think through the process of data collection before you start to gather data, the easier it will be to organize, analyze, and present it when you’re done.





# WORDS TO KNOW

**App** stands for application, used to refer to self-contained software that a user interacts with on different devices. Apps can be used for different purposes like organizing information (such as research notes or to-do lists), providing a service (such as giving map directions or translating between languages), or providing entertainment (such as playing a game or a video).

**Bar chart** a graphical way to display data using bars of different heights.

**Data** any set of facts or statistics collected and analyzed or used for reference. Data can be in many forms and include information like steps taken, photos shared, or emails and messages sent. It can also include information collected from a cell phone or other device, such as the location history, internet browsing history, or login names and passwords.

**Data visualization** a way data scientists, computer programmers, designers, and others communicate information clearly and efficiently. Data visualization uses statistical graphics, plots, information graphics, and other tools. Effective visualization helps users analyze and think about data. It makes complex data more accessible, understandable, and usable.

**Empathy** the ability to understand how someone else feels.

**Leading question** a question that prompts a particular answer and will likely result in skewed answers. For example, “Since the lunch food is unhealthy, how likely are you to buy lunch outside of school?” is a leading question because it implies that you **SHOULD** buy your lunch outside of school because the food is unhealthy.

**Object** a way of storing lots of different types of data. In most programming languages, objects are represented with curly braces {}, with the content of the object between them. Objects are based on the idea of **properties** and **values**. When you code an object, each property-value pair is separated with a comma. Think of objects as being like a dictionary: a word to look up and a definition of it. Properties are the word to look up, and values are the definition.

**Pie chart** a type of data visualization that represents data as slices of a pie. Pie charts are best used to show the relationship between a data point and the whole. In other words, they’re good at showing the percentage.

**Pitch** a business presentation seeking support from people to invest in a new or buy a new

product. It can be an email, letter, or even a conversation. Sometimes the presentation can be a “sales pitch,” where the goal is to get a user to buy a product.

**Prototype** a first version of a product which is built to be tested so that changes can be made before production.

**Sentiment** a view or attitude toward a situation or event; an opinion. Programmers have many ways to collect and analyze sentiment data from social media.

**Social media (Social apps)** technology based on the creation and sharing of information, ideas, interests, and other forms of expression. They’re built using the internet and can work on their own or be part of another website or web-based service. Social media users usually create profiles and share content like text posts, comments, digital photos, and videos. Social apps can help the development of communities by connecting a user’s profile with those of other individuals or groups.

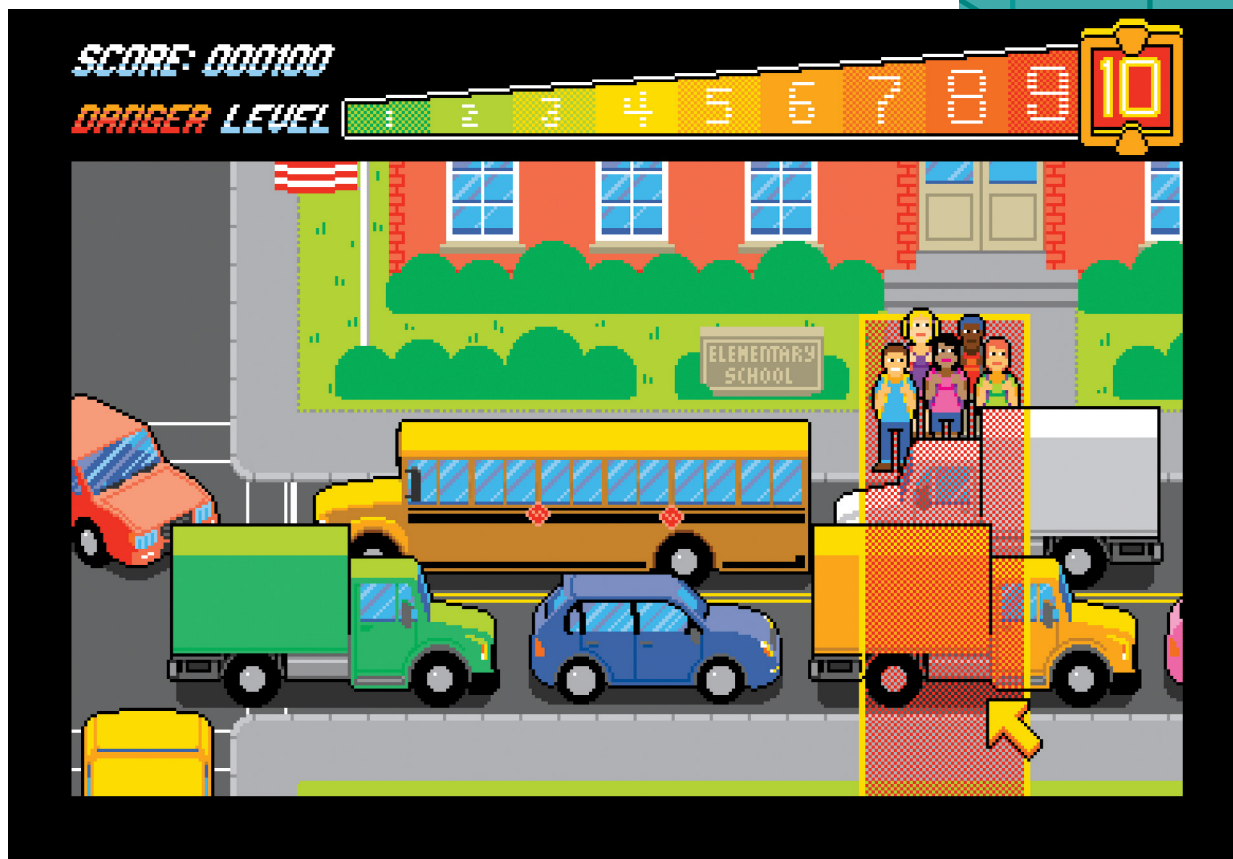
**User interface** the visual elements of a program through which a user controls or communicates with an app. Often abbreviated UI.

## STEP 4 Analyze your community data

**You've gathered great data.** Now what? Once app developers have collected data, they need to organize and analyze it before they can make a great app. That means they'll look at their data to see if they can find any patterns or relationships. They may use data visualizations to show their main findings. All the information they've gathered will inform their app design.

When trying to analyze their data though, they might find they don't have enough data, or that their questions weren't specific enough, to draw any conclusions. Or they might find that the question they asked influenced the answers they got. That's called a **leading question**.

For example, if you asked, "On a scale of 1 to 10, how do you feel about the dangerous intersection in front of the school?" you might have influenced people to think the intersection is more dangerous than they would have otherwise. This leading question may have skewed, or influenced, their answers, but if you asked, "On a scale of 1 to 10, rank the safety of the intersection in front of the school, with 1 being very safe and 10 being very dangerous," you might get less biased responses.



## STEP 5 Develop a prototype for a social app

### You've got the data, now go for it and design your app!

Once developers have gathered data from the people who would use an app, they use the data to help shape their app design.

When developers start working on their app, they need to identify

- what they want the app to do,
- the data they will collect, how they will collect it, and what kind of data visualization they'll create for users to see and understand the data,
- the **user interface**, or the visual elements of the app that the user controls, like the design of the landing page, icons, or buttons, and
- any additional features like ways to connect with friends or community members and access to GPS or calendars.

When they've identified all these elements, they can start writing the computer code to create their app.

What kind of app could you create to address a community issue? How could you use data visualization to help people understand an issue better? What features could you include to design your app to build awareness about an issue or build support for positive change?



**Now that I've earned this badge, I can give service by:**

- Creating a video that shows people how to limit the data collected by apps by using the privacy settings.
- Using social apps to share positive messages and raise awareness of issues that are important to me.
- Organizing an “Apps for Good Hackathon” where students can develop apps to address community issues and learn more about coding from local programming professionals.

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**I'm inspired to:**