



# Cadette Coding for Good

Learn how programmers write code for computers and how they create video games and apps that can help people.

**Badge 1:**  
Coding Basics

**Badge 2:**  
Digital Game Design

**Badge 3:**  
App Development



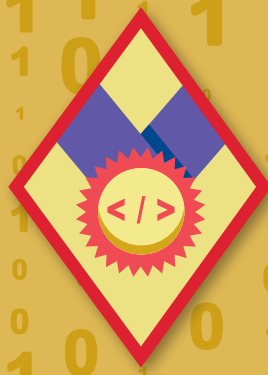
This booklet gives girls an overview of the badge requirements and badge steps for all three Cadette Coding for Good badges. It also includes interesting background information to spark girls' interest in coding. Volunteers can access the Volunteer Toolkit (VTK) to find complete meeting plans, including detailed activity instructions and handouts.

# Welcome to the world of computer coding.

When you've earned these three badges, you'll know how programmers write code to give computers instructions and how computers can be used to solve problems and help others.

- You'll know how to write code for computers in JavaScript.
- You'll know how computer games and apps can be used to help people learn new things or develop healthy habits.
- You'll know some of the contributions women have made to the field of computer science.

Volunteers can access the Volunteer Toolkit (VTK) to find complete meeting plans, including detailed activity instructions and handouts.



# Badge 1: Coding Basics

**H**ave you ever wondered how a smartphone keeps track of all your phone calls or how the computer in a stoplight tells it when to change? Someone wrote step-by-step instructions for the computer in a language it understands. That someone is a computer programmer.

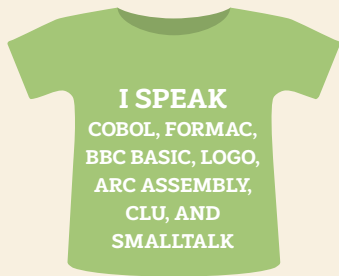
By learning about how computers work and how people write code for them, you'll understand what computer programmers do and be able to do it, too.

## Steps

1. Learn about functions and arguments
2. Explore how memes are created
3. Write pseudocode for a meme
4. Write shareable code
5. Share your meme

## Purpose

When I've earned this badge, I'll know the basics of computer coding and how to create a meme that can have an impact on other people, my community, and the world.



## Parlez-vous Computer?

If coding were a country, it would be the country with the third-most languages spoken in the world.

- 1 The people in Papua New Guinea speak nearly 835 languages! That makes it number one in language diversity.
- 2 Next comes Indonesia, with more than 700 languages.
- 3 Third is Nigeria, with more than 500 different languages.

There are more than 690 widely used computer languages. That means that there are more coding languages than languages spoken in Nigeria! For comparison, about 350 languages are spoken in the United States

Women have developed many of these computer languages, including COBOL, FORMAC, BBC BASIC, Logo, ARC Assembly, CLU, and Smalltalk.

### STEP

# 1 Learn about functions and arguments

**Computers follow directions and can only do exactly what their program tells them to do.** A step-by-step list of instructions for a computer is called an **algorithm**. Algorithms can be very simple, but sometimes computer programmers need them to do more complex tasks. To make more detailed instructions, programmers add **functions** and **arguments** to the steps in their algorithms.

A **function** is a type of instruction in an algorithm that's like a verb: a function does something. An **argument** names the specific thing a function can do. For example, if you wrote an algorithm about homework, it might have a function that says:

- **read()**—This would tell you that you needed to read for school, but not what to read. Do you need to read a textbook? A handout? An article online? You could improve your function by adding **WHAT** you are supposed to read.
- **readTextbook()**—Now you know to read a textbook, but which textbook? Add an argument with that detail.
- **readTextbook("socialstudies")**—You now know you need to read your social studies textbook, but do you have to read the whole textbook?
- **readTextbook("socialstudies", chapter3)**—You only need to read Chapter 3!

You could use this same function, **readTextbook()**, with other arguments, such as ("English", pages 2-13), for other textbook-reading assignments.

What other homework algorithm functions can you think of? How could you answer questions? Write an essay? Collaborate on a project?



# WORDS TO KNOW

**Algorithm** a series of specific instructions. By creating a sequence of instructions that can be applied to many circumstances, you're creating an algorithm.

**Argument** a part of code that makes a function more specific. Adding an argument makes the function reusable in a number of different ways: it adds details to the function that are changeable. In many programming languages, arguments are represented as a list separated by commas inside the parentheses.

**Code** a series of instructions that make up a program directing a computer to do something.

**Computer** an electronic machine that can store and process data. A computer has hardware, which is the machine itself, and software, which is a set of instructions.

**Function** one of the basic building blocks of a program. It's a type of instruction similar to a verb: a function does something. In JavaScript, as in most programming languages, it has a special form: the name of the function followed by '()'. For example, `turnLeft()` and `drawEye()` are two examples of functions. The `()` tells the computer to "do" the named function. "Doing" a function is typically described as "calling" a function or a "function call."

**Going viral** when a meme or other story gets spread rapidly

through social media. The metaphor of a virus spreading is used to explain how images and messages get passed from person to person, and from a large media outlet to many people at once.

**JavaScript** a computer programming language.

**Meme** a humorous image (or video) with text that's copied and shared online, especially on social media. Memes often use a recognizable image (celebrities, scenes from TV/movies, animals, etc.) taken out of context to express opinions and emotions. This can make them a powerful way to spread ideas, which can have either positive or negative effects.

**Pixel** the smallest element of a digital image. Pixel comes from "pix" for picture and "el" for element. Pixels exist on screens in a grid. Technically they come in different colors, but for this badge, they'll be treated as binary (on/off, color/not color, one/zero).

**Programmer** a person who writes algorithms to create programs or code for computers.

**Propaganda** a message that is meant to serve the interests of the messenger or spread information in order to influence public opinion and to manipulate other people's beliefs.

**Pseudocode** a way to plan a computer program using human-friendly language instead

of a computer language like JavaScript. It's not actual programming, but a written description of the key elements of an algorithm or program. It's used as a quick way of thinking about a program without completely writing it out in code.

**Software** the end product of written computer code.

**Syntax** rules for how a program is written. These rules have a purpose similar to written grammar. Just like grammar rules tell you to start a sentence with a capital letter and end a sentence with a period, syntax in coding works in the same way: it's a standard format for writing code that the computer understands. In programming, the syntax needs to be exactly correct for a computer to know what to do. For this reason, programmers often use pseudocode to help them flesh out ideas without the burden of being too exact.

**X-Y coordinates** when programmers put images on screens, they use a grid that represents the screen. Each square in the grid has a reference number like an address. This number is a square's location and can be written as a pair of numbers: the first number is the X (horizontal position), and the second one is the Y (vertical position). The grid's numbers start with the top left corner square as (0,0), which is called the origin.

## STEP

# 2 Explore how memes are created

**Have you ever had pineapple pizza?** Seen a dog that was part dachshund and part cocker spaniel? Worn a frilly dress and big, clunky boots? These combinations are surprising.

Memes similarly use surprising combinations of images and words to send a message. The message can be funny or thought-provoking. The meme's purpose can be just for fun or to inspire people to act. By combining words and an image, you can also get people thinking about an important cause.



DOCKER DOG

## Meme Example

Here's pseudocode to create a meme:

Get the image of a dog in a tuxedo

Use a black marker

Write "THAT FEELING WHEN" on one line at the top in all capital letters

Write "YOU GET YOUR FRIENDS TO RECYCLE" under the dog on one line in all capital letters

This can be written like this in JavaScript:

```
getImage("dog with tuxedo")
```

```
getMarker(black)
```

```
writeText("THAT FEELING WHEN", top)
```

```
writeText("YOU GET YOUR FRIENDS TO RECYCLE", under the dog)
```

## STEP

# 3 Write pseudocode for a meme

**Writing code in a specific computer language, like JavaScript, is complicated.** When programmers are just beginning to work on a new program, they use human language instead of computer language. This is called **pseudocode**. It lets them map out their ideas before they spend time coding. Once programmers have an idea what they want to create, they share their ideas with each other to find out if their algorithms make sense.

Giving and getting feedback is an important part of the design process. Helping each other find weaknesses or mistakes isn't meant to be negative. Instead, it helps the creator make a better product. Constructive feedback helps programmers find confusing spots or errors in their code and fix them.

Check line 3.

Your code is very clear and concise.

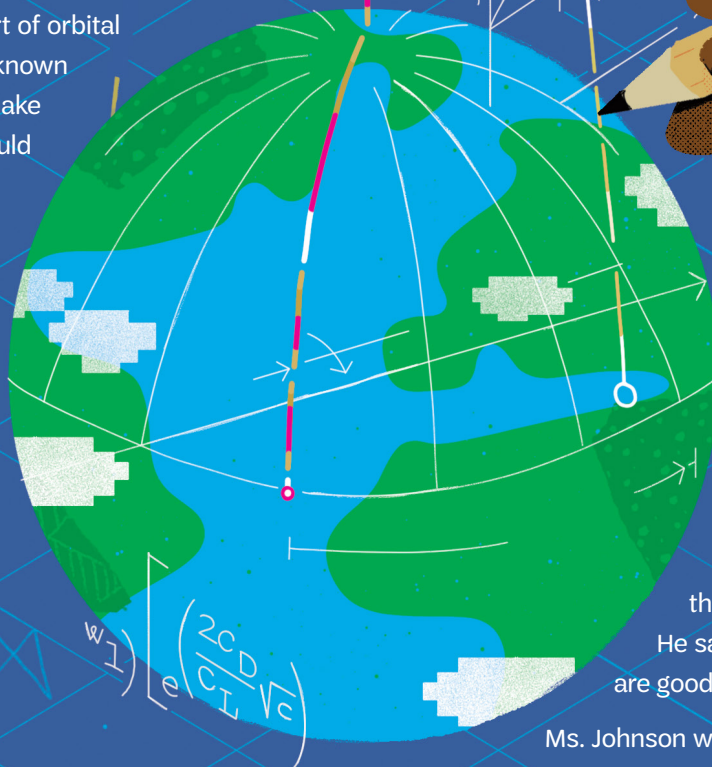
The pseudocode is missing the program definition statement at the beginning. Adding this statement will clarify what you want the program to do.



# Computer Pioneers: KATHERINE JOHNSON

Katherine Johnson worked as a mathematician at NASA starting in 1953. The kinds of calculation Ms. Johnson did are part of orbital mechanics. She's best known for doing the math to make sure that astronauts could return safely to earth.

Before taking off on the Mercury 6 space flight, Astronaut John Glenn didn't trust the computers on the spaceship to calculate the orbital mechanics correctly.



He asked for Katherine Johnson to personally check the calculations by hand. He said, "If she says they are good, I'm ready to go."

Ms. Johnson worked at NASA for more than 30 years, on projects from the first human space flight to the space shuttle and planning a mission to Mars.

## What Do You Meme?

When a story or meme spreads rapidly through social media, people say it has “gone viral” like a virus spreading quickly from person to person. Can you think of any super popular memes? What do you think made them so popular?

When you’re looking at memes or any other online content, think about where the message came from and what it is trying to do.

- Can you figure out who created the meme?
- What kind of message are they trying to send? Positive? Negative? Biased? Neutral?
- Is it just for fun? Is the creator trying to build awareness about a cause?
- Is the meme trying to influence your opinion?

### STEP

## 4 Write shareable code

**Pseudocode is great for planning your program, but computers don’t understand it.** You have to turn it into shareable code.

When you use a programming language, like JavaScript, to write algorithms, you have to follow the rules of the language, or **syntax**. Syntax is like the grammar rules of a programming language. Just as there are rules about punctuation and capitalization in human languages, computer languages have rules, too.

**For example, when you want to write a function with arguments, you need to follow this format:**

```
functionName(argument, argument)
```

When you follow correct syntax, not only will other programmers understand your algorithm, the computers will, too.

### STEP

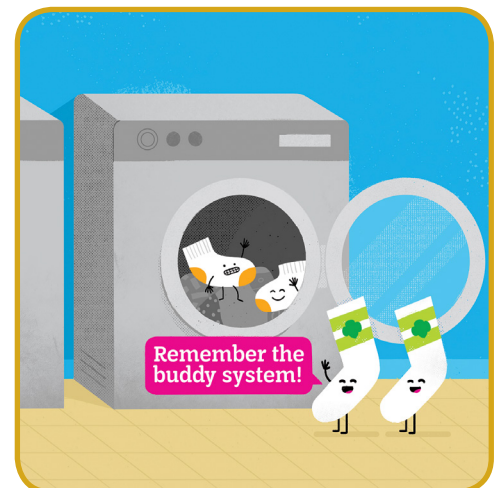
## 5 Share your meme

**If you want to get someone’s attention, use a meme!**

The word “meme” comes from the Greek word *mimēa*, meaning something that is imitated. There are funny memes, like ones with dancing cats and talking dogs. Serious memes try to take on serious topics in a funny way, while mean or snarky memes might use surprise or shock to get people’s attention.

The goal of any meme is to send a message. Some memes are meant for everyone, while others are inside jokes created for a smaller group of people. Think about an experience you have as a Girl Scout that others might not have. You could make a meme about that which would be meaningful and funny to other Girl Scouts, but probably not to anyone else.

Once a meme has been shared on social media, it can take on a life of its own. If you’re trying to build awareness about an important issue, this could be a good thing, because lots of people will see it. But remember, memes can get changed or used in ways the creators didn’t expect.



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

- Making a video about how memes are made and spread.
- Holding a workshop to teach others how to observe social media more critically.
- Creating meme posters about Girl Scouts to recruit more girls to join our troop.

**I'm inspired to:**



# Badge 2:

# Digital Game Design

**L**ots of things go into making a great video game: the story, the challenges, the characters, the graphics, even the music! Game makers use their coding skills to bring the worlds and characters to life for players. Some game makers even go the extra step and design their games to make a difference in the real world.

## Steps

1. Create an avatar
2. Learn how to use arrays to create images
3. Write an array to create an icon
4. Develop a game scenario
5. Play your game

## Purpose

When I've earned this badge, I'll know how programmers develop video games. I'll have designed a game scenario, stored an image with an array, and used JavaScript to create my own character.

## STEP

# 1 Create an avatar

**What's your favorite thing about you?** When your friends describe you, what do they say? "She loves to run!" "She's a great problem-solver." "Her smile lights up the room!" If you created an avatar of yourself, you could put wings on your shoes, a light bulb over your head, or a beautiful smile on your face.

An **avatar** is a digital image that represents someone or something and can be manipulated by a computer. When you create an avatar instead of using a photo, you can add to the image or emphasize elements by using color or making them bigger.



## G.I.R.L. POWER

How will you show G.I.R.L. power in your game character?

Think about her attitude, choices, history, and appearance. As the game designer, YOU get to create her personality and beliefs.

You also have to decide on the choices she'll have to make and problems she'll have to solve.

What kind of attitude does a Go-Getter have? What kind of choices does an Innovator make? What life experiences have shaped a Risk-Taker? What does a Leader look like?

## STEP

# 2 Learn how to use arrays to create images

## It's More Than Just a Game . . .

Game designers can create games that help people build awareness. For example:

The game **Admongo** teaches kids about advertisements. Sometimes ads get built into shows or games without a kid knowing. This app helps kids learn to recognize when there are ads in their games.

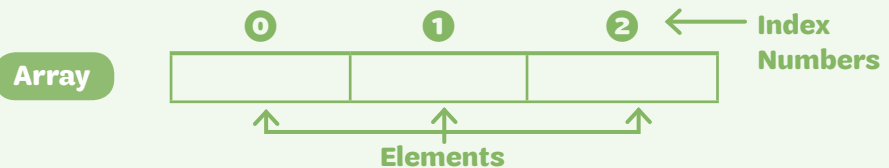
**Auti-Sim** allows players to experience what it's like to have autism. Players spend time on a playground at school, experiencing how a child with autism hears and sees the other kids playing.

What causes do you care about? What kind of game could you create to help people understand it or support your cause?

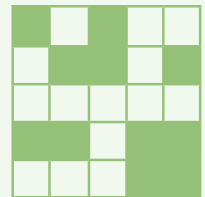
**Computers make images with pixels, little squares of color that are the smallest elements of a digital image.** To make an image, like your avatar, it takes lots of pixels. In coding, the pixels that make up an image are called an array.

## What's an array?

An **array** is a long list of information put in a particular order. To make an image, you tell the computer what color to make each square on a grid. Each grid instruction or part of an array is an **element**.



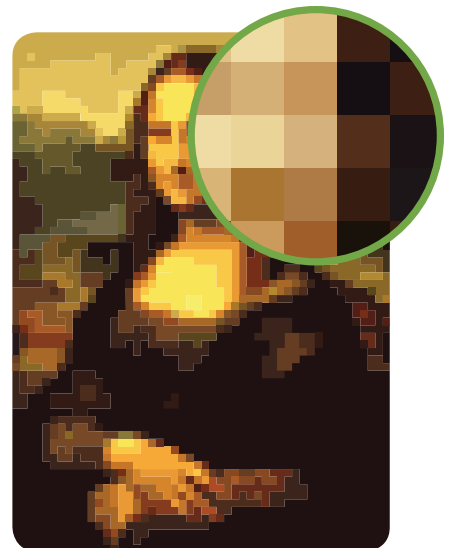
Pixels on a screen use a **binary system**, meaning there are two options for each square on the grid: on/off or one/zero. That means the square is either blank or filled in. By using an array with instructions for how to fill in the squares on each line of the grid, you can create an image by filling in some squares and leaving others blank.



Writing code for a computer in an array makes it more efficient for you to write and easier for the computer to understand. An array in JavaScript might look like this:

```
myArray = [element 1, element 2,
           element 3...]
```

Just imagine how long the array for your avatar would be! Remember, a computer can only do exactly what you tell it to do, so a detailed image would have a very long array.



## STEP 3 Write an array to create an icon

**Grace Hopper is a coding icon.** That means she's a famous person who represents innovation in the world of coding. In programming, icons are small images that represent other things. The little trash can on your screen where you put files you want to delete is an icon. An arrow pointing to the left that means "undo" is an icon, too.

What kind of icons would you create for your favorite band or musician, book, or movie? What about icons for the different chores you have at home or icons for your different family members?

In video games, game makers use icons to represent a lot of different things: life force, skills, resources, and rewards. They create the icons using arrays.



## HELP WANTED! Careers in Game Design

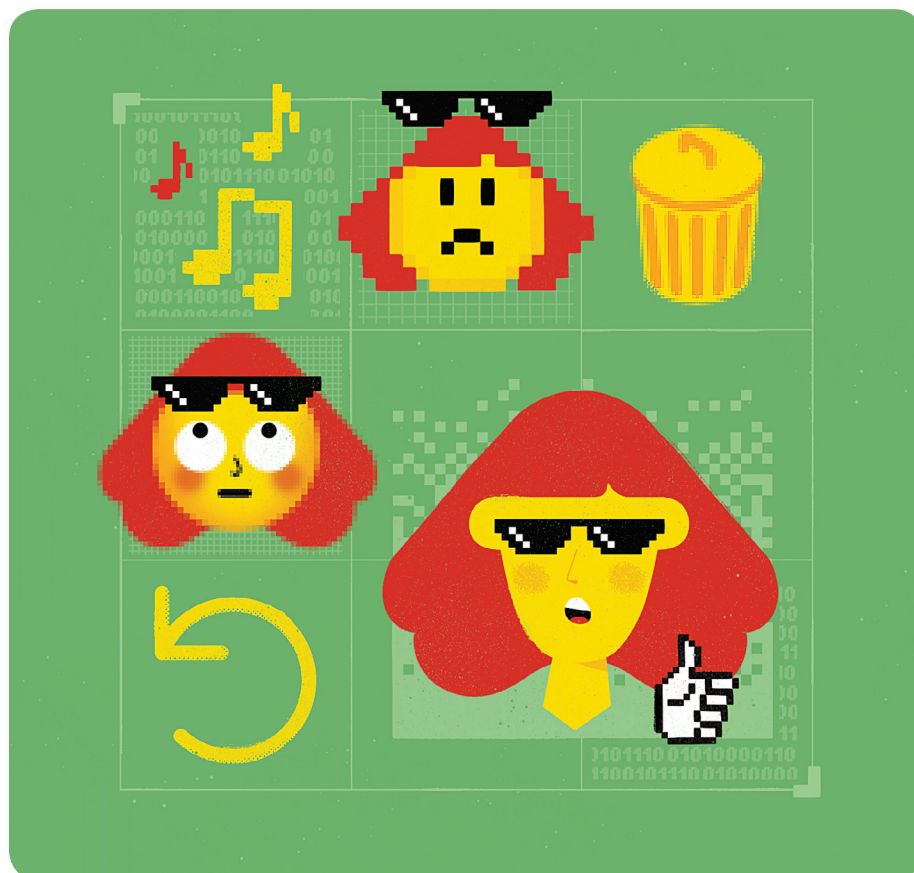
It takes a lot of people to create a video game, not just the programmer. Each part of the game needs to be created, from the front end—what people see and hear—to the back end code that makes the game run. Here are some jobs in game design beyond programming:

**Music composer or performer.** Many video games include music to help create a mood during game play. If you like to perform or compose music, you could use your talents to create the music needed in video games!

**Animator or artist.** Multimedia artists, graphic designers, and animators create the look of a video game. They bring the writer's story to life, creating the world the player sees.

**Game tester.** It's true: some people get to play video games for a living! Game testers look for bugs and places where the designers can make improvements.

**Customer service agent.** If you like solving problems, this could be a great job for you. You'll need to be patient and a good listener to help players when they experience a problem. Speaking more than one language is helpful, too





**game.** One important element is the setup—including the setting of the game and the game narrative. Another element is the **game mechanics**—how you play a game and what you need to do to succeed.

For example, if a local park was always covered with litter, and you wanted to stop that from happening, you could create a scenario much like a video game.

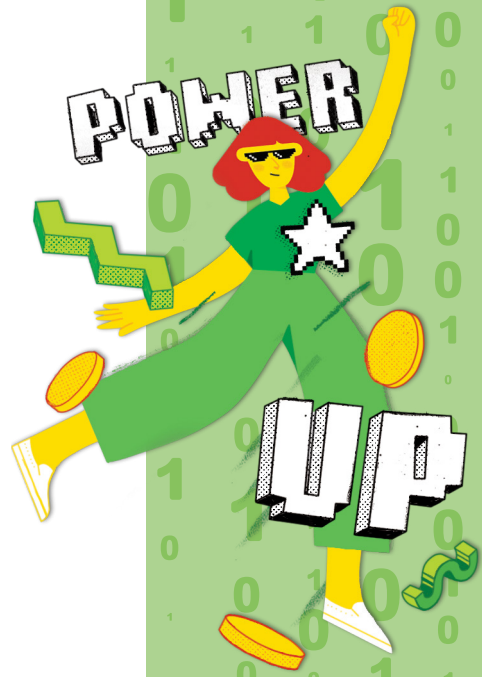
- **What is the location of and situation in the park?** What size and type of trash or litter is there? Where is it? How much trash is there?
- **What are the challenges to cleaning up the park?** Who owns the property? Do you need permission? How do you get permission? What is the terrain like? How is the park getting dirty in the first place?
- **What skills (or resources) do you need to solve the challenges?** Research skills? Strong letter-writing or speaking skills? Scheduling or volunteer management skills?
- **What actions are possible or needed to clean up the park?** Placing new trash and recycling bins? Placing dispensers for pet waste pickup? Creating and placing signs about keeping the park clean? Organizing community members to take turns visiting the park weekly to encourage park visitors to keep the park clean?
- **What are the rewards for developing a plan to keep the park clean?** In the real world, the reward would be having a clean park for your community to enjoy. If this were a video game, you might earn points, some kind of medal, or some kind of special ability or resource.

## STEP

# 5 Play your game

**Game mechanics control how your character can work her way through a scenario.** For example, some games give you bonus points for working together while others give you points for doing tasks alone. Some skills or powers cost a character more energy or life force than others. In a video game, you often get to try and solve the same problem many times, so you can try different approaches.

Choosing how you'll solve a problem in a video game can be a lot like problem solving in real life. Some things you have to handle on your own, but many times working with others is a good choice. Can you think of a scenario in your life and how you might solve it? Would you work on it alone or ask others for help? What kind of skills or resources would you need?



## WORDS TO KNOW

**Array** a type of list that has a particular order, like an index or a shopping list. Each part of an array is called an element. Each element is separated by a comma. At each end of an array are square brackets '[' ].

**Avatar** an electronic image that represents a person or character. Avatars can be manipulated by a computer user, like the player of a video game.

**Binary system** computers work on electrical signals which can be expressed as on/off—on is a one and off is a zero. This is called a binary system because it uses only two units for all information. There are lots of ways to think about binary systems: yes/no, up/down, black/white, etc. Pixels on a screen also work as on/off or one/zero.

**Bit** the smallest unit of digital information. It's often represented as a one or a zero.

**Game mechanics** the instructions given to the computer on how the game is played. They're specific to the type of game: for example, in chess, all the moves relate to the game pieces. In video games, the rules of the world created by the game's designers are game mechanics. This can include how avatars move and how players beat a level.

**Icon** the word used for a small symbol in game design. Icons can be used to symbolize almost anything, but for this badge they'll represent the special skills used in the game.

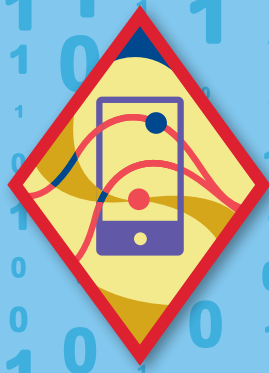
**Scenario** the details of a situation, including settings and sequences of events for a game, scene, or plot. It's part of the setup in many types of games.

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

- Hosting a gaming event at my school's computer lab where I feature games with a positive impact.
- Writing a play based on my game scenario, where the audience gets to choose what the characters do, as if they were playing the game.
- Making a presentation about the different kinds of careers in game design.

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**I'm inspired to:**



# Badge 3:

# App Development

**A**pps have replaced our address books, calendars, to-do lists, flashlights, maps, dictionaries, alarm clocks, and a lot of other things. These powerful little programs on our phones or tablets can also help us change our lives.

Learn how apps collect data and can help people develop healthier habits.

## Steps

1. Learn about data collection and visualization
2. Write an array to store personal data
3. Create a personal data collection plan
4. Learn how to correlate data
5. Develop a prototype for a habit-tracking app

## Purpose

When I've earned this badge, I'll know how to store data with arrays and how to collect and analyze data for personal improvement. I'll have created my own prototype for an app that will help to build a healthy habit.

# 1

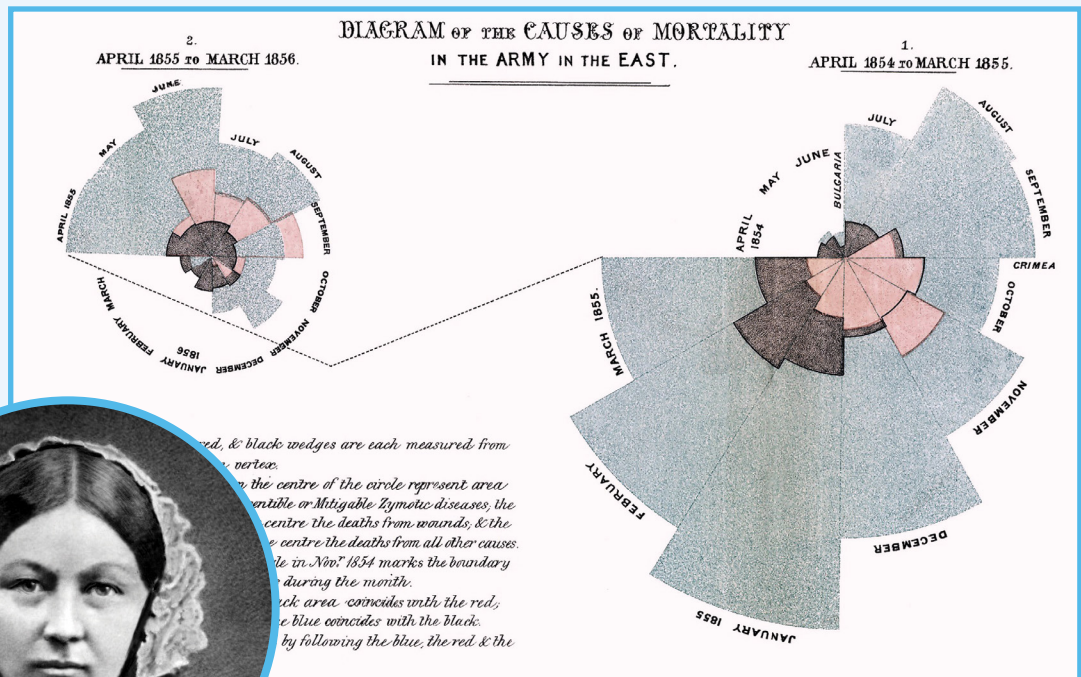
## Learn about data collection and visualization

**Apps can collect lots of information, or data, for you—like how many steps you took or where you walked on a hike.** They also collect data about you—like where you’ve been or what websites you’ve been looking at.

Computer programmers write the code that lets apps, games, and websites collect data. In a tracking app, a designer shows you data about the thing you're tracking in a way that's clear and easy to understand. That process—putting data in an easy to understand visual format—is called **data visualization**: think different kinds of charts, diagrams, or infographics. The type of chart or diagram you choose to show your data will depend on the type of data you gather and what you're trying to show people.

# Saving Lives with Data!

Florence Nightingale was a nurse in the 1850s during the Crimean War. During the war, she collected data over two years at a military hospital showing the causes of death. To help people understand all the information she had collected, she created a data visualization.



She used a polar area diagram (now it's also known as a Nightingale rose diagram) to show a breakdown of the different causes of death. A polar area diagram is like a pie chart, but instead of the slices of pie being wide or narrow, they're all the same width, but extend out from the center more if there's more data.

Because of her research using data and statistics, Ms. Nightingale was able to revolutionize sanitation practices in nursing.

*Florence Nightingale*

# WORDS TO KNOW

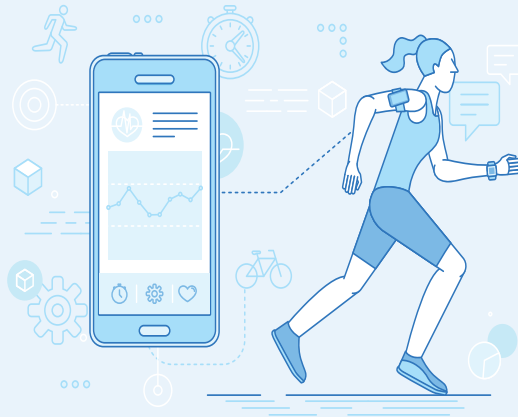
**App** stands for application, used by computer programmers to refer to self-contained software that a user interacts with on different devices. Apps can be used for different purposes like organizing information (such as calendars or to-do lists), providing a service (such as showing a map or tracking the number of steps you walk each day), or providing entertainment (such as playing a game or a video).

**Bar chart** a graphical way to display data using bars of different heights. The type of bar chart you'll be creating is a histogram, where each bar groups numbers into ranges and taller bars show that more data fall in that range.

**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, 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.

**Health/Habit-tracking apps** self-contained software that helps people develop healthy habits. Users can set fitness goals and track nutrition, exercise, sleep, or even moods. They can also share progress on social media to encourage healthy behavior changes.



**Pitch** a business presentation seeking support from people to invest in or buy a new product. It can be an email, letter, or even a conversation. Sometimes a presentation is called a “sales pitch,” because it’s more like a commercial. 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.

**Scatter plot** data visualization that shows the relationship between two variables in a set of data. For example, one variable could be “mood,” and another, “screen time.” By plotting the mood data on one axis, and screen time on another, a scatter plot can show the relationship between an individual’s screen time and emotional state.

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

## Apps are Heathier for YOU

Have you ever made a New Year's resolution? Maybe you wanted to eat more veggies or remember to floss your teeth but found that forming the new habit was hard to do.

Forming a new habit also takes a long time. Some researchers have found that it can take up to two or more months to form a habit!

Lots of apps have been created to help people lead healthier lives. Apps can help you meditate, schedule your time effectively, track your mood, get a good night's sleep, get more exercise, or eat in a more healthful way.

Having these kinds of apps makes it easier to build healthy habits into your everyday life.

### STEP

## 2 Write an array to store personal data

**Programmers code arrays to make digital images on screens.**

They also use arrays to store other kinds of data, like lists of words or dates.

Here's how programmer write arrays:

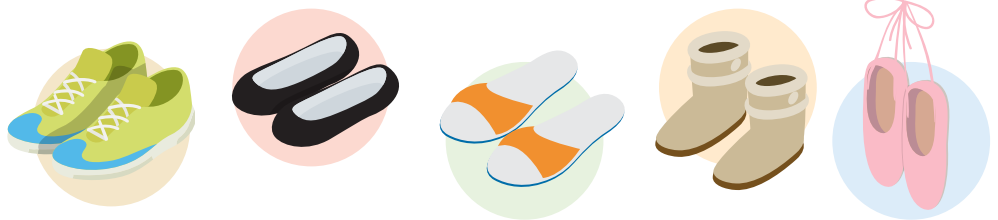
- Each piece of data is called an **element**, and elements are separated by commas in a Javascript array.
- If you use words, you have to put them in quotation marks.
- Arrays in JavaScript start with "var" because JavaScript thinks of arrays as **variables**.

The arrays can include personal data like how many hours you sleep at night, how many steps you take every day, how many glasses of water you drink, or even your favorite shoes!

Here's how a programmer would write an array listing her shoes:

```
var myShoes = ["sneakers", "black flats", "sandals",  
"snow boots", "dance shoes", ...]
```

Now you give it a try! Write an array listing your shoes.



### STEP

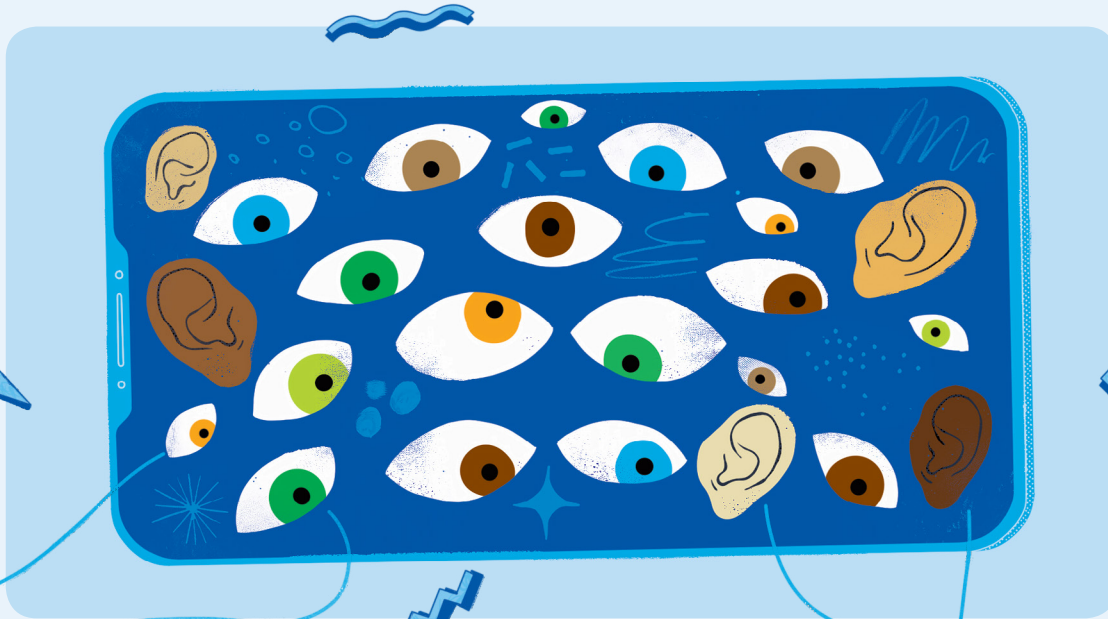
## 3 Create a personal data collection plan

**One way to change or create a new habit is to keep track of what you're doing now.** From that, you can figure out what and how to improve.

The data you collect before you start to work on your new habit let you know where you are (that's called a baseline) and help you decide on your goal.

Healthy habit apps make it easy to collect your data. Once you've collected data, you can set a goal and work towards it. That data could be hours slept, steps taken, glasses of water consumed—things measured in numbers. It could also be how you're feeling or where you've been. Information is power. An app's ability to collect data lets you harness the power of your personal data!

# FOR YOUR EYES ONLY



Our phone is a super computer. It gathers data about you all day long.

For example, your computer collects data about:

- where you are
- who you're talking to or texting
- what photos you take and save on your devices
- what websites you visit and what apps you download
- what stores you shop at
- what music you listen to

What do you think happens to all that information? When you download an app, it might ask for access to some of that data. If you agree, the business that created the app might package your data and sell all of the users' collected data to other businesses for market research, targeted advertising, and more.

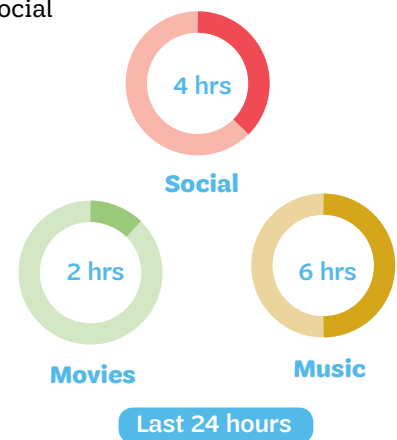
Be careful when you download apps, especially free ones. Be sure to review the privacy settings on your new apps. Turn off things like access to your contacts, calendar, photos, and location. Don't allow the app to post to social media for you. Read the privacy policy so you know exactly what's happening to your private data.

## STEP

# 4 Learn how to correlate data

**If you have two sets of data, like your mood over a week and what the weather was over the same week, and both of those sets of data change at the same time, that's correlation.** So if you love snow, and it snows, you might feel happy. You could say that there's a relationship between snow and your mood. If you tracked the weather and your mood throughout the winter, you could create a data visualization with the two sets of data that would show the correlation.

Apps can make data correlations easier to understand. For example, there are apps that track how you spend time on your device. They collect data about how much time you spend on each type of app (social media, entertainment, etc.), and when you use these apps or sites. The app then will show your data in a visualization, such as a pie chart. You might notice patterns or correlations, like you use Instagram a lot at certain times, or you spend more time on certain apps on the weekend than during the week. By including data visualizations, apps can make it easier for you to see correlations in your personal data.



## STEP

# 5 Develop a prototype for a habit-tracking app

**Making a great app is a big challenge for designers.** Programmers design apps with particular problems or users in mind. Programs are designed with specific purposes, and different designs are more useful or pleasing to different people.

Designing an app can be challenging for a lot of reasons. One of the biggest challenges is figuring out how to develop an app that will both help the user and the user will like. App developers need to consider what the users will want the app to do, what will make the app fun to use, and how the app will address their users' concerns.

The most successful health or habit tracking apps are easy and fun to use and help people work on a personal issue that's important to them. They collect the necessary data and visualize the data in the app in a way that helps the user improve.

What kind of information would you want from users about what they need in a health or habit-tracking app? How could you gather that information? How can you make using the app fun and easy?

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

- Interviewing local health professionals like doctors, physical trainers, and nutritionists about their favorite healthy apps and compiling a list to share in my community.
- Conducting a workshop at a senior center or retirement home about how apps work and how users can protect their privacy.
- Hosting a Bring-Your-Own-Device (BYOD) event at school where we show kids how to use the settings on apps to protect their privacy.

.....

**I'm inspired to:**



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