

Badge 3:

App Development

Computers can help us do things big and small, like send rockets to the moon or get directions to a friend's house. The programs on your phone or tablet are called applications or apps.

Learn how programmers break down the big challenge of developing an app into smaller steps. Then, design your own idea for an app that solves a problem for someone else.

Steps

1. Discover how apps can be used “for good”
2. Decompose the needs of your app user
3. Design your app screens
4. Create algorithms for your app that include events
5. Share and improve your app with user feedback

Purpose

When I've earned this badge, I'll know about user-centered design and the process computer scientists use to develop apps.

STEP 1 Discover how apps can be used “for good”

Teams of programmers are coming up with apps that help people every day.

Animal shelters and animal rescue groups use apps to help dogs and cats get adopted. People who are far apart use apps to stay in touch with video chats or written messages. Apps help people turn their exercise (biking, running, walking the dog) into donations to charities.

If you could create an app to help others, what would it do?



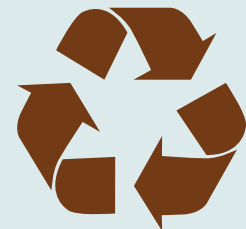
Green Apps for a Green Planet

Do you want to help protect plants and animals? Do you want to have clean air and water? Apps can help you protect our world from pollution.

Earth-friendly apps can help people:

- Learn how to recycle trash
- Buy things made out of recycled materials or buy things that don't have lots of plastic wrappers
- Find a farmers' market to buy fruit and vegetables that were grown nearby
- Ride a bus or train, or join a carpool, to use less gasoline and create less air pollution

These apps help people take care of our earth.



WORDS TO KNOW

App App is short for application. This is a software program that runs on your computer, tablet, or phone. Apps can be entertaining, like when you play a game or watch a movie. They can be helpful, like giving you directions from your house to the soccer field. They can also teach you something new, like a language you want to learn.

App features These are the parts of an app. They could be things like using the camera, a welcome video, a help page, or a way for app users to connect with friends.

Decomposition This is when you break down a problem into smaller steps or pieces to solve.



Development This is when you create something new. When you develop something, you create a plan before you begin building. Then, after you build it, you test to see how it works and find ways to make it even better!

User needs These are what potential or current users need to solve the problem your app is meant to solve.

User-centered design When programmers create an app, they try to include their user at many stages of the development process. For example, they'll talk to their user before they start planning or have the user test the app once it's built. This helps programmers develop apps that are easy to use and helpful to others.

STEP 2 Decompose the needs of your app user

When you make a plan to do something, you think about the steps to do it. You can solve problems the same way! If you take a big project, like building a snow fort, and break it into smaller steps, it makes it easier to do.

- ▶ You call some friends to help you.
- ▶ You gather shovels and buckets to use to make your fort.
- ▶ You put on warm clothes to go out in the snow.
- ▶ You meet your friends outside and choose a place for your fort.
- ▶ Some of you dig in the snow with shovels to make a floor for the fort.
- ▶ Some of you make snow bricks by filling the bucket with snow and then tipping it upside down.
- ▶ You and your friends stack up your snow bricks to make the walls of your fort.

When you break a big problem or project into smaller steps, it's called **decomposition**. When programmers find a problem with a program they've written, they use decomposition to make the problem easier to solve.

How can you use decomposition to design an app?

Apps for a Better YOU

Some apps have been created just to help kids.

Apps can help kids stay active by challenging them to get moving. The apps might show their character run, jump, or spin every time the kid does.

Digital diary apps give kids questions to write about. This can help them think about how they feel.

Some apps even help kids understand bullying and friendships.

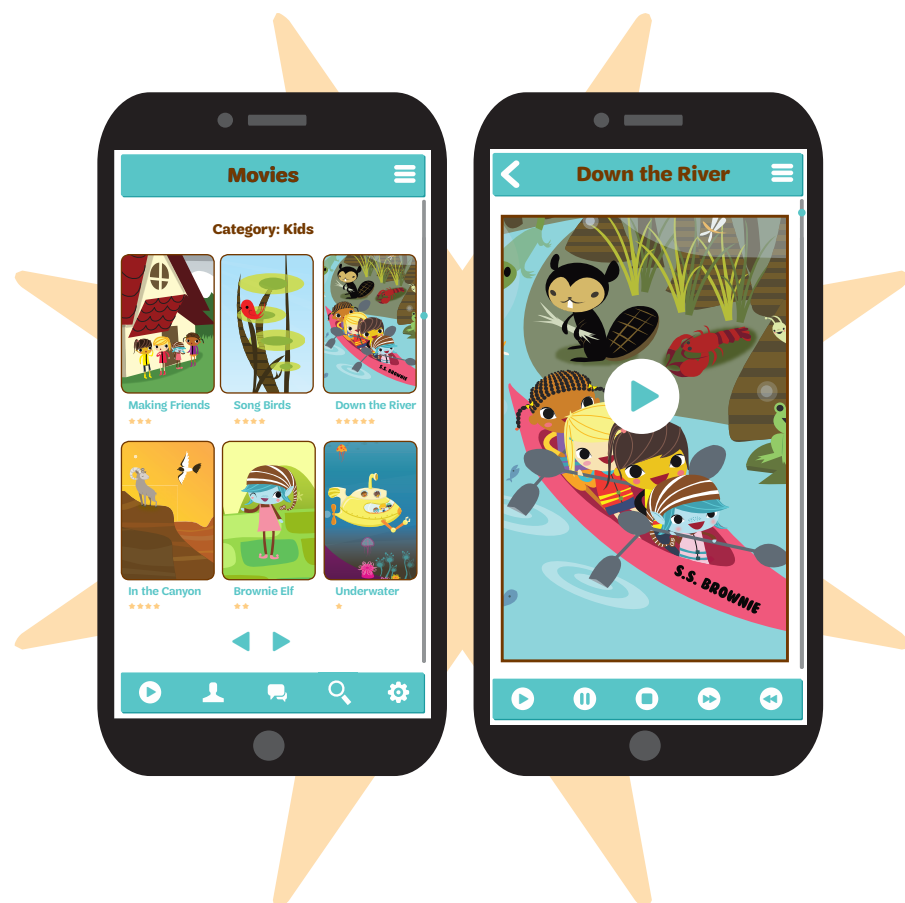
What other kinds of things do kids need help with?

STEP 3 Design your app screens

When app developers have an idea for a new app, they draw it on paper first. They show their drawings to other people and ask for ideas on how the app idea could be better. This helps the programmers to try different ideas before they start coding.

Think of app screens like a storyboard that shows how an app user would move through the app.

For example, if you're choosing a movie to watch on an app, you might first see an app screen showing all the different options for movies and TV shows. Then, you click on a movie, and it appears on the screen for you to watch! If you were to sketch it out, this would be two different pictures: one of the first screen with all the movies and another of the movie playing.



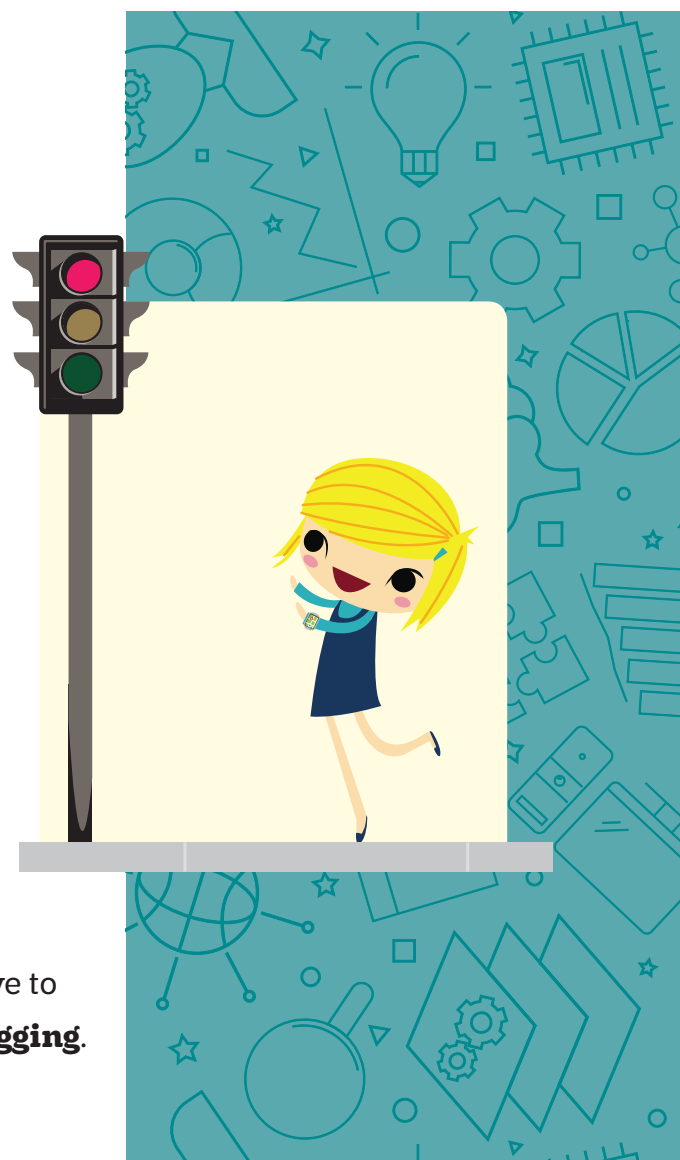
STEP 4 Create algorithms for your app that include events

Algorithms are made up of steps.

An algorithm for going to a friend's house might include steps like choose a time with your friend to meet, get directions to her house, and walk to her house.

You can add events to make algorithms more interesting. Events in the algorithm might be “stoplight turns red” (so you have to wait to cross the street) and “knock on her door” (and wait for her to answer).

When app developers test their apps, they might also have to find and fix errors in their programs—this is called **debugging**.

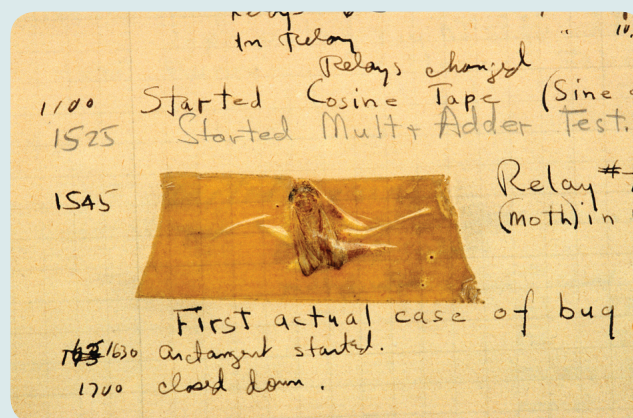


There's a Bug in My Computer

In the early 1900s, Thomas Edison used the word “bug” to describe problems with his inventions. Grace Hopper was the first person to use the word “bug” about computer programming.

When she was working on the Mark 1 computer, the computer kept making mistakes. Her team opened up the computer to see what was wrong and found a moth. They taped it into a log book where they wrote down all the things that happened with the Mark 1.

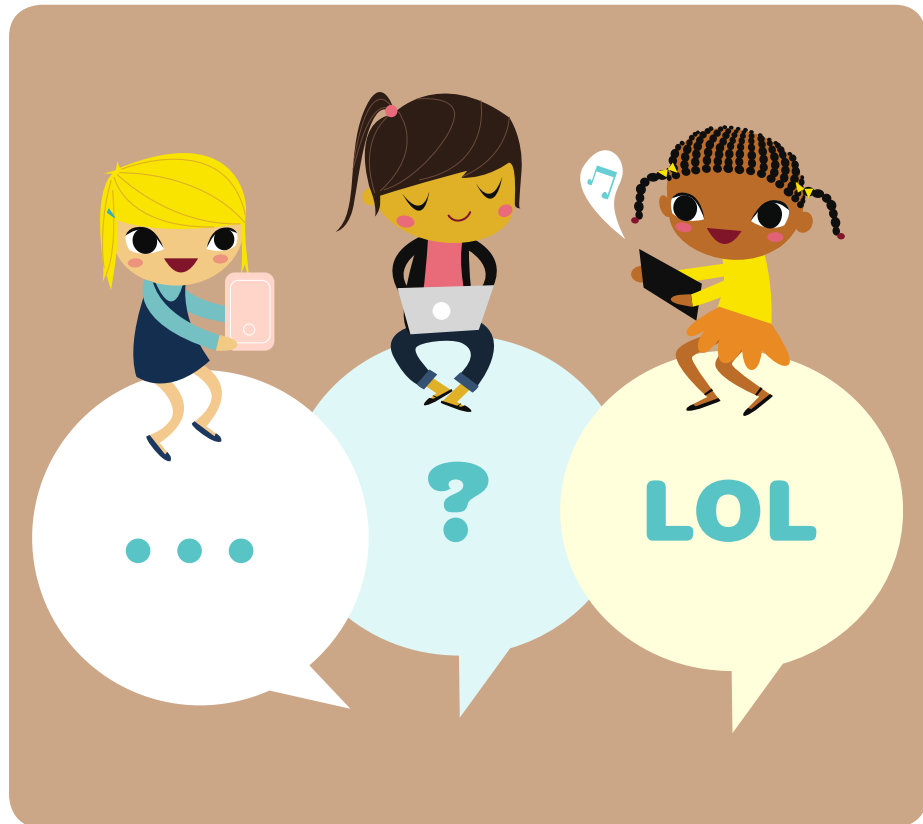
When Grace saw the moth—a real bug, not just a mistake in Mark 1's program—she wrote, “First actual case of bug being found” next to it in the log book. That's why people today still say they need to “debug” their computers!



STEP 5 Share and improve your app for user feedback

What's better than coming up with an idea, working hard to make it great, and then sharing it with people? When you show your app to others, they try it out and give you feedback.

When someone else uses your app, you'll find out if it works the way you want it to. The tester's feedback can help you make your app even better. You can use their ideas to make improvements to your app.



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

- Explaining where “computer bug” comes from.
- Teaching others how to solve big problems by breaking them into smaller parts.
- Telling my friends or family what I learned about coding.

I'm inspired to: