



Building an App

Project-Based Learning Curriculum by Jobs for the Future (JFF) and Beyond School Bells (BSB)

Contents:

- Overview
- Eleven 30- to 60-minute lessons
- Supporting Materials
- Computer Science Career Posters

Afterschool Curriculum:

This curriculum was developed by Jobs for the Future in collaboration with Beyond School Bells.

This project-based learning (PBL) curriculum provides fun, hands on activities and detailed instructions to help students in grades 8-12 learn about the world of coding and software engineering, as well as design their very own app using Code.org.

We encourage you to be intentional about connecting this project to technology careers by partnering with real computer science professionals, sharing the JFF career posters with students (included in this curriculum packet), and giving students time to explore topics in which they have a particular interest.



JFF



Beyond School Bells
nebraskachildren

Overview

Your team's mission is to imagine, create, and market an idea for a mobile app that meets a real need of real people.

Students will need devices with internet access to do:

- [Code.org Classic Maze](#) tutorial (each student required to be 13+)
- [Code.org](#) to build their app as a team (requires an email address and password)

L1. Introduction-IT Career Gallery Walk

L2. The World of Coding

L3. Coding Apps

L4. Looking Critically at Apps

L5. Building Apps To Meet Needs

L6. Wireframing 101

L7. Coding Your App

L8. Testing Your App

L9. Marketing and Branding

L10. Presenting Your App

L11. Closing Reflection

Other Resources:

- [Worksheets and Supporting Materials](#)
- [Computer Science Career Posters](#)





Building an App

L1 Introduction-IT Career Gallery Walk

Big Questions: What might interest me in Information Technology (IT)?

Setting the Stage: Have you noticed how many things in our lives are controlled by computers? Have you ever thought of working with computers? In this lesson, you'll find out about the many different kinds of career options there are in the field of computing, which is also called information Technology or IT. Let's look at five snapshots of the diversity of the IT field.



Time: 60 min



Materials:

- **Career Gallery Walk slides** (5 careers)
- **Career Posters** (7 careers) —see pages 58-65.
- Paper and pen or pencil



Activity:

1. Read Setting the Stage
2. Split students into small groups of 2-3 and assign each group to a career (each has 2 slides).
3. Give students 3-5 minutes to look at their career slides and write down and/or discuss:
 - Things they already know about that career
 - Things they see in the image and how the career relates to those images
 - Things about that career they might like
4. Have groups swap careers and repeat. Continue rotating until all groups have seen all the careers.
5. Complete the "Reflection".

Reflection:

1. Ask students to share:
 - Three things about IT they are most excited to learn about
 - Two careers that interest them most
 - One thing from the career slides that surprised them





Building an App

L2 The World of Coding

Big Questions: What Does It Take to Speak Computer?

Career Spotlight: Software Developer

Setting the Stage: Congratulations! You've been hired at Information Technology Operations—or IT Ops for short. You have joined a bunch of other young programmers from various careers with different levels of education and experience. You'll watch a short video and then use a tutorial to learn how computer coding works. You'll also learn about software development career opportunities and the creative environments in which coders work.



Time: 45 min



Materials:

- Devices with internet access
- **Three Lenses Slides**
- **Take A Stand document** - Software Developer and Systems Software Careers



Activity:

1. Read Setting the Stage
2. Watch **Intro to Hour of Code video** (2 mins)
3. Set each student up to do **Code.org Classic Maze**, a tutorial that will guide students through the basics of coding with videos and practice activities (students must enter an age of 13 or higher to access the Classic Maze exercise).
4. Watch the video **Software Developers Applications Career** from Careeronestop (1 min 29) or the video **Introduction to Software Development Life Cycle** from Simplilearn (5 mins 32).
5. Watch the video **Schools App Challenge Finals 2017** from Conexus Healthcare Ltd (4:26).
6. Review the **3 Lenses** students can use to think about different careers:
 - **Self:** Your identity, talents, skills, interests, values
 - **Security:** Your lifestyle choices, free from potential harm and financial worry
 - **Society:** How you engage with and support the people around you, from your family and community, to your country and the world
7. Complete the "Reflection" by splitting students into small groups of 2-3 and handing out the **Take A Stand** document.
 - a. Instruct students to take 5 mins to fill out on their own
 - b. Discuss their responses together for 5 minutes.

For more free coding tutorials visit [Code.org](https://code.org) or [Studio.Code.org](https://studio.code.org) for more tutorials to explore on your own.

Reflection:

Take a Stand: Software Developer and Systems Software Careers

Individually: Read each statement about systems software development careers and then indicate on the line how important the statement is to you by selecting the preferable spot on the line. For example, if you LOVE being detail oriented, you would select a spot close to the "Very Important" end of the line. Think of it as a 0-100 space where you can fill in all of the quantities in between.

As a small group: Discuss how you responded and why.

NOTE: The value of the Take the Stand activity is not for students to determine if the career "is for them," but rather to begin to understand their own values around careers. By explicitly connecting the activities of each lesson to future careers and opportunities, students are encouraged to think with an exploratory mindset and in a future-ready way.





Building an App

L3 Coding Apps

Big Questions: What is Coding Like?

Career Spotlight: App Developer

Setting the Stage: What's it really like to write code?

This lesson will introduce you to coding for apps and the key vocabulary necessary to begin writing code. You will also explore more careers in information technology.



Activity:

1. Read Setting the Stage
2. Watch the video [App Lab-Getting Started](#) (2 mins 47)
3. Set each student up on [Code.org—Intro to App Lab](#) to learn more about JavaScript, the coding language of the internet, and experiment with building a real app.
4. Watch the video [Day in the Life](#) (2 mins 24) or the video [A day as an iOS Developer at SIXT](#) (6 mins 33).
5. Complete the "Reflection"
 - a. Split students into small groups of 2-3 and hand out the [Taking A Stand document](#).
 - b. Instruct students to take 5 mins to fill out on their own and then discuss their responses together for 5 minutes.



Time: 45 min



Materials:

- Devices with internet access
- [Take A Stand document](#) - Software Developer, Applications

Reflection:

Take a Stand: Software Developer, Applications

Individually: Read each statement about systems software development careers and then indicate on the line how important the statement is to you by selecting the preferable spot on the line. For example, if you LOVE being detail oriented, you would select a spot close to the "Very Important" end of the line. Think of it as a 0-100 space where you can fill in all of the quantities in between.

As a small group: Discuss how you responded and why.





Building an App

L4 Looking Critically at Apps

Big Questions: What Are the Qualities of a Good App?

Setting the Stage: What makes people download and then actually use an app? Apps have to both meet people's needs and function well, or consumers won't use the apps after they are downloaded. This lesson asks you to think about what makes an app usable. You'll identify some criteria and then share your ideas about what makes a good app with your colleagues.



Activity:

1. Read Setting the Stage
2. Watch two videos ([School Vehicle Tracking](#) and [Life Text Demo](#)) about apps created by young people and think about these questions:
 - What problem is the app solving? What is its purpose?
 - Who is the audience for the app?
 - What kinds of things make this app appealing?
3. Looking critically at 2 apps: either work as a whole group or in small groups to review: [Pokémon GO - Apps on Google Play](#) and [Fabulous: Daily Routine Planner](#) OR allow students to pick two different apps they would like to review.
4. For each app, have students discuss and/or respond in writing using this [handout](#) to:
 - a. Briefly describe the app
 - b. What need was the app designed to meet?
 - c. The audience for this app is _____.
 - d. What are some of the positive aspects of the app based on the reviews?
 - e. Is this app interesting to you? Why or Why not?
5. Optional~Have students find an app on the app store page that has lower ratings (one or two stars) and review that in the same way. Pay special attention to what users don't like about it in the reviews.
6. Complete the Reflection.



Time: 45 min



Materials:

- Devices with internet access
- Optional~[App Notecatcher](#) handout

Reflection:

Ask students to share:

- What did you discover that makes an app usable and appealing?
- What are one or two things you discovered that people don't like about poorly rated apps?
- How do you think this will connect to building your own app?





Building an App

L5 Building Apps To Meet Needs

Big Questions: How Can I Determine A Need?

Setting the Stage: Our first question as app designers is: “What do people need?” According to Entrepreneur Magazine, the most common reason apps fail is because the creators made incorrect guesses about their potential audience’s needs. Today, you’ll begin working in your design teams to think about a real need people have and imagine an app that could satisfy that need.



Activity:

1. Read Setting the Stage
2. **Split students into small design teams of 2-3. They will stay together for the remainder of the project.**
Share **Design Team Roles** handout (see page 39) and have students assign roles in their groups.
3. As a whole group, watch the video: **What is Design Thinking?** (1 min 50)
4. Tell the design teams it’s time to brainstorm a need they want to design an app to address. Distribute and go over page 1 of the **App Ideas Notecatcher**:
 - What are some needs that you experience as a young person that could be solved by mobile technology?
 - Or think bigger—what are some broader issues in your family, community, or the world that mobile technology could address with a well-crafted app?
 - Or think about making an existing idea better: Of the apps you currently use, what annoys you most about the way they function? How would you improve them? How would you personalize them more?
5. Next, teams will develop design ideas for their app—what the apps “do” (apps embody an action). Ask each team to assign a Recorder to fill out page 2 of the **App Ideas Notecatcher**:
 - What need do you think your app can meet?
 - Who are your target users, that is, your audience?
 - What will your app actually do?
 - How will you get paid for your app? Ads? Subscriptions? Purchases through the App and Play Stores?
6. Complete the “Reflection”.



Time: 60 min



Materials:

- **App Ideas Notecatcher**
- **Design Team Roles** handout
— see page 39

Reflection:

Ask teams to share:

- What’s the elevator pitch for their app?

Hint: *Imagine you’re riding in an elevator and you only have a minute or 2 to explain your app to a potential user.*

Answer: Elevator pitches are short presentations that are concise enough to convey the story of your app and the needs it addresses in just 1 or 2 minutes.

For example an elevator pitch does three things:

- Explains what the app does.
- Conveys your unique selling proposition (USP) — the hole that your app is filling in the marketplace.
- Engages the listener or reader.





Building an App

L6 Wireframing 101

Big Questions: What Does It Take to Build an App?

Setting the Stage: Believe it or not, most apps start as just rough sketches! This lesson introduces the concept of storyboarding of an app, also known as wireframing. You will practice wireframing and then wireframe some screens for your own app.



Activity:

1. Read Setting the Stage
2. Watch the video [Storyboarding for People Who Can't Draw \(Like me!\)](#) (6 mins 31) OR the video [How to Create Your First Wireframe](#) (just play from 0:30 to 2:15) Optional discussion questions:
 - How are storyboards/wireframes used?
 - Why don't you have to be good at drawing to create storyboards/wireframes?
 - Why would we use storyboarding/wireframing to map out an app?
3. Watch the video [Mobile Application Design: Paper Prototype](#) (1 min 16)
4. Distribute index cards and have students practice storyboarding these [Pokémon GO screenshots](#)
5. **Put students back into their app design teams** to sketch a wireframe for three screens. Review the [team roles](#) (see page 39). Remind them to think about what the app will do. Just try to show which elements you will include—text, buttons, images, menus, etc. – and where they would go on the screen.
6. Optional~have each team share their wireframe sketches and briefly explain how each page will function.
7. Complete the “Reflection”.



Time: 60 min



Materials:

- Paper and a pen or pencil for sketching
- 5" x 7" index cards
- [Pokémon GO screenshots](#)
- [Design Team Roles](#) handout (see page 39)

Reflection:

Ask students to share:

- How did you feel about sketching the screens for your app? Excited? Intimidated?
- Do you enjoy the idea of being focused on the details of how people interact with your app?





Building an App

L7 Coding Your App

Big Questions: What Will our App Look Like When It's Coded?

Setting the Stage:

Now that you have thought of a need—the purpose for your app—and considered what your app might do and look like, it's time to create a prototype—a first draft of how your app will look and function. You'll return to Code.org and use their App Lab to build your app, and when you are done, you'll be able to see what it looks like on your device and share it with others.

Activity:

1. Read Setting the Stage.
2. Rewatch the video [App Lab-Getting Started](#) (2 mins 47)
3. **Put students back into their app design teams.** Direct them to [Code.org](#) to build their app (creating a free account is required). They should refer back to their notes in the [App Ideas Notecatcher](#) from Lesson 5 and consult their wireframing sketches.
4. Remind students to select the Share button at the top of the page to share their app when finished so they can see it on their device phone and share it with others as well!
5. Complete the [Exit Ticket: My Coding Experience](#) as a Reflection.



Time: Will vary based on students and apps. Expect one to three 60-minute club meetings to complete this lesson.



Materials:

- Devices with internet access
- More info on [Code.org's App Lab](#) (for instructor)
- Completed [App Ideas Notecatcher](#) for each group from lesson 5
- Wireframing index card sketches for each group
- [Exit Ticket: My Coding Experience](#)

Reflection:

Exit Ticket: My Coding Experience

Additional reflection questions:

- How was your group successful in building your shared vision? Where did you struggle?
- Did you find this experience more rewarding or challenging? Why?





Building an App

L8 Testing Your App

Big Questions: Will Someone Use Our App?

Setting the Stage:

In this lesson, we'll think back to when our big question was: *What Are the Qualities of a Good App?* Your teams will conduct usability testing by pairing with another team to administer a walk-through of your app. Essential questions include: How does the user interact with a design? What makes the design work or not work well?



Activity:

1. Read Setting the Stage
2. Review **User-friendly Design Criteria**:
 - Intuitive
 - Efficient
 - Ease Of Navigation
3. Hand out **What Makes an App Great (To Me)?** and ask students to choose at least 2 apps that they like and why keeping in mind the criteria.
4. Optional~Think-Pair-Share~have students briefly discuss which apps they prefer for each category. *Are your choices the same? Is your reasoning the same?*
5. Usability Testing~pair up design teams
 - a. Start with one team introducing their app (think elevator pitch) in 1-2 minutes
 - b. One member of the opposite team will move through the app, while another will record their feedback in the **Usability Testing Questions** handout.
 - c. Presenting team can respond to questions or feedback and take notes on the **3-2-1 Reflection sheet**.
 - d. Teams switch
6. Optional~Choose a reflection activity



Time: 60 min



Materials:

- **User-Friendly Criteria** handout
- **What Makes an App Great (To Me)?** handout
- **Usability Testing Questions** handout
- **3-2-1 Reflection** sheet
- **Take a Stand document** - Software Quality Assurance Engineers

Reflection:

Option 1:

- Watch video on **Software Quality Assurance Engineers and Testers** (1 min 21)
- Do the **Take a Stand** classroom activity to engage students in considering these careers

Option 2:

Ask students to share:

- What was it like to have your app tested by a user? Did it reveal anything you hadn't noticed before?
- What do you like or not like about this kind of detailed work?





Building an App

L9 Marketing and Branding

Big Questions: What is in a logo?

Career Spotlight: Marketing Manager

Setting the Stage:

In this lesson, you will begin to think about a logo for your app, an important part of marketing and branding. We'll start by learning about logo design and color psychology in two videos, and then your design team will begin to design your own logo.



Activity:

1. Read Setting the Stage
2. Watch two videos:
 - a. the first 2 minutes of **What Makes a Truly Great Logo** (stop video at 2 mins 5)
 - b. the whole of **Color Psychology** (2 mins 28)
3. Logo: **Put students back into their app design teams to work on a logo.** Make sure each group has a supply of writing/drawing implements. Prompts: *Will you use words? Images? A design you create? What colors would be most appropriate for the brand image you want your app to convey?*
 - a. Students can use this resource to generate colors for their logo: **Coolors**
4. Have teams take turns sharing their initial logo designs and the reasons behind their design decisions.
5. Complete the "Reflection": **Take A Stand:** Marketing Manager.



Time: Will vary based on students and apps. Expect one to two 60-minute club meetings to complete this lesson.



Materials:

- Paper
- Writing and drawing implements e.g., pens, pencils, colored pencils, markers, and/or crayons
- **Taking a Stand document** - Marketing Manager

Reflection:

- Watch the video on **Product Marketing explained by an Ex-Googler** (3 mins 54)
- Have students complete the **Take A Stand:** Marketing Manager





Building an App

L10 Presenting Your App

Big Questions: What Will People Think of My App?

Setting the Stage:

You've already designed a logo—a very important part of any brand. Now, you'll focus on composing a catchy 100-word description for the app stores that will help to market your app. The first three lines of an app description are the most important, as one often has to select "More" to read the rest of the description. Your first three lines should make someone want to read the rest.



Activity:

1. Read Setting the Stage
2. Share the 4 primary techniques:
 - Answer the question "If I use this app, what's in it for me?"
 - Appeal to the emotions.
 - Tell a story.
 - Use a catchy phrase that tells what the app does.
3. 100-word description: **Put students back into their app design teams to work on a logo.** Provide the **100 Word description & Presentation** handout and ask each team to assign a recorder. Review the prompts:
 - Why did you create this app?
 - What is unique about your app?
 - What need do you think your app is meeting for people?
 - How does your app meet that need?
 - Who is your target consumer, and why would they want to use your app?
4. Once teams have completed the description, direct them to the Presentation Notes section of the handout to outline a presentation where you share some of the highlights and ideal next steps for your app.
5. Presentations: Each team will present with each member of the team taking the lead on a portion of the presentation.
 - a. Sharing the name of your app and the description.
 - b. Explain your app design and how it works
 - c. Share what your next steps would be if your team were to continue working on the app.



Time: Will vary based on number of groups. Expect one to two 60-minute club meetings to complete this lesson.



Materials:

- **100 Word description & Presentation** handout

Reflection:

- Optional—Students provide feedback following each team's presentation.





Building an App

L11 Closing Reflection

Big Questions: What Have I Learned About Information Technology?

Setting the Stage: For the last piece of this project, you will take some time to reflect on your work and learning.



Activity:

1. Read Setting the Stage
2. Reflection Part 1. Engage students in discussing:
 - How interested were you in information technology when you began this project?
 - How did your interest in IT change over the course of your learning?
3. Reflection Part 2. Distribute the **IT Reflection: Self, Security, Society** handout
4. Invite students to share some of their reflections and the similarities and differences



Time: 30 min.



Materials:

- **IT Reflection: Self, Security, Society** handout



Information Technology Gallery Walk

When you hear “information technology,” what do you think? Often, people think “geeks and hackers,” but the IT sector is much more diverse.

*Some IT professionals deal with **computer programming, cybersecurity, and hackers** and work in environments that look like office buildings. Other professionals deal with **advanced computer hardware and robotic technology** and work in spaces that look more like machine shops or garages.*

*Some IT professionals enter the field with a **certificate** that took 6 months to obtain, and others have a **degree** that required 6 or more years of effort.*

Whether you like fast-paced and high-pressure work or more relaxed customer care, the information technology field offers something for everyone—and many opportunities in today’s job market and in the future.

Systems Software Developer



```
"index.html">Home</a></li>
"home-events.html">Home Events</a></li>
"multi-col-menu.html">Multiple Column Menu on Larger Viewports
has-children"> <a href="#" class="current">Header Options</a>
<a href="tall-button-header.html">Tall Button Header</a></li>
<a href="image-logo.html">Image Logo</a></li>
class="active"><a href="tall-logo.html">Tall Logo Image</a>
has-children"> <a href="#">Carousels</a>
<a href="variable-width-slider.html">Variable Image Width Slider</a>
<a href="testimonial-slider.html">Testimonial Slider</a>
<a href="featured-work-slider.html">Featured Work Slider</a>
<a href="equal-column-slider.html">Equal Column Slider</a>
<a href="video-slider.html">Video Slider</a></li>
<a href="mini-bootstrap-carousel.html">Mini Slider</a>
```


Systems Software Developer

JOB DESCRIPTION

Systems programmers build the operating systems that run the computers in everything we use from medical devices and cars to refrigerators and airplanes. Software engineering jobs can be found in computer and electronic manufacturers, aerospace, medical device manufacturers, telecommunications and so much more! They combine skills in computer science with a knowledge of engineering disciplines, science, and electronics.

Educational Pathway: Most have bachelor's or advanced degrees in engineering, math, or computer science.

Average Salary: The annual salary is an average of \$107,600.

Application Software Developer



Application Software Developer

JOB DESCRIPTION

An application developer develops and implements software applications. They frequently work with social media companies that have a large web presence.

Educational Pathway:

- **Knowledge Required:** Computers, math, logic, English
- **Skills:** Programming, artistic, and graphic design skills are essential. Since many employers are social media companies, communication skills are important to have.

Average Salary: Average annual salaries are \$87,500, but in certain locations like California, salaries can be as high as \$100,500

Graphic Designer



Graphic Designer

JOB DESCRIPTION

Graphic designers combine art and technology. They create the images and layout of websites, applications, and print items.

Educational Pathway: Graphic designers have a bachelor's degree in graphic design or a related field.

Average Salary: The average annual salary for graphic designers is \$52,110.

Marketing Researchers and Managers



Marketing Researchers and Managers

JOB DESCRIPTION

Marketing researchers and managers generate sales by planning and managing marketing to customers. They test the level of interest in new products or services, plan social media and other marketing campaigns to get the word out, and manage budgets and advertising contracts.

Educational Pathway: Fifty-six percent of marketing managers have a 4-year degree and another 24% have their master's degree.

Average Salary: The median salary for marketing managers is \$132,230.

Software Quality Assurance Engineers & Testers



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Software Quality Assurance Engineers & Testers

JOB DESCRIPTION

Software quality assurance engineers monitor and test software to ensure it meets company standards. They oversee the software development process and ensure that any problems are brought back to the development team. They help ensure that software production stays on time and within a budget.

Educational Pathway: Jobs in this field usually require at least a bachelor's or master's degree in software design, engineering, or computer science.

Average Salary: The median annual salary is \$88,510.

Possible Futures Career Exploration

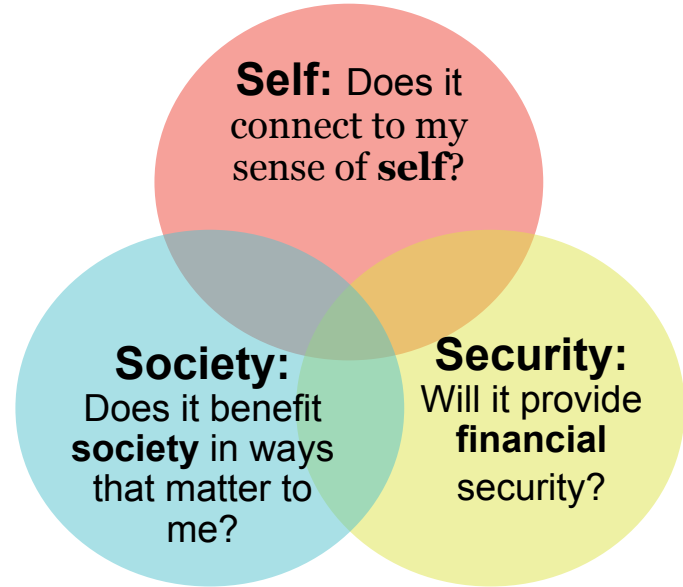
Rewards of a Career

Ask: What makes the worker feel connected to their sense of **self**?

Ask: What benefits does the worker feel their career has for **society**?

Ask: In what ways does this particular career provide the worker with **security**?

Lenses on the Future



LENSES: INFORMATION AND AGENCY

Given the dynamic world, young people need a strong framework to make informed decisions.

Self: What talents, skills, and values do they bring?

Society: What challenges does their community/generation face and how are they part of the solution?

Security: What lifestyle is important to them, what real opportunities exist, and what realities do they need to thoughtfully navigate?





Take a Stand: Software Developer and Systems Software Careers

Read each statement below about systems software development careers and then indicate on the continuum how important the statement is to you by selecting the preferable spot on the line.

For example, if you LOVE being detail oriented, you would select a spot close to Very Important end of the line. Think of it as a 0-100 space where you can fill in all of the quantities in between.

SELF

1. **Systems software developers have to constantly modify operating systems to update them for the newest computer or cell phone hardware.**

I like being detail oriented, using logic, and solving problems to make things that already exist better.



Not important

Very important

2. **Software developers specializing in systems-level software use lots of science and math in their jobs to make sure that the things they design are optimized or the best they can be.**

I like designing and developing things using science and math to make predictions and solve problems.



Not important

Very important

SECURITY

3. **Systems software developers typically live and work near big cities, but some software developers work remotely from their homes, which can be anywhere as long as they have internet access.**

I like the idea of living near a big city, but it also might be nice to work all over the country.

Not important

Very important

4. **The median salary for software developers who specialize in systems-level software is \$107,600.**

A median pay of \$107,600 would offer me the lifestyle I want.

Not important

Very important

5. **Seventy percent of application developers have a 4-year degree and another 17% have a master's degree. Only 4% have a 2-year associate's degree.**

I would like to attend 4 years of college after high school and possibly even more.

Not important

Very important

SOCIETY

6. **Systems software developers create and work on all sorts of systems-level software from operating systems like Windows, MacOS, Android, and iOS to game engines like Unreal and Half-Life.**

I like working on things that affect lots of people, even though they may not realize it.

Not important

Very important



Take a Stand: Software Developer, Applications

Read each statement below about system software development careers and then indicate on the continuum how important the statement is to you by selecting the preferable spot on the line. For example, if you LOVE being detail oriented, you would select a spot close to the “Very important” end of the line.

One end of the continuum is “very important”, the other “Not important”—think of it as a 0-100 space where you can fill in all of the quantities in between.

SELF

1. **Application developers often modify existing software to correct errors or update it for the newest computer or cell phone hardware.**

I like being detail oriented, using logic, and solving problems to make things that already exist better.



2. **Software developers who specialize in applications use lots of science and math to make sure that the things they make will work.**

I like designing and developing things using science and math to make predictions and solve problems.



SECURITY

3. **Application developers typically live and work near big cities, but some software developers work remotely from their house, which can be anywhere as long as they have a good internet connection.**

I like the idea of living near a big city, but it also might be nice to work all over the country.

Not important

Very important

4. **The median salary for a software developer who specializes in applications software is \$101,790.**

A median pay of \$101,790 would offer me the lifestyle I want.

Not important

Very important

5. **Eighty percent of application developers have a 4-year degree, and another 16% have a master's degree. Only 3% have a 2-year associate's degree.**

I would like to attend 4 years of college after high school and possibly even more.

Not important

Very important

SOCIETY

6. Application developers create all sorts of applications that bring value into people's lives.

I like creating things that add value to peoples' lives by helping them be healthier, eat better, or just feel entertained.

Not important

Very important



App Notecatcher

After reviewing Pokémon GO and Fabulous: Daily Routine Planner, answer the following questions:

Pokémon GO app

1. Briefly describe the app.

2. What need was this app designed to meet?

3. The audience for this app is

4. What are some of the positive aspects of the app based on the reviews?

- a. _____
- b. _____
- c. _____

5. Is this app interesting to you?

Yes No

Why or why not?

Fabulous: Daily Routine Planner

1. Describe the app.

2. What need was this app designed to meet?

3. The audience for this app is

4. What are some of the positive aspects of the app based on the reviews?
 - a.
 - b.
 - c.

5. Is this app interesting to you?
Yes No

Why or why not?

My choice of an unpopular app is

1. Describe the unpopular app you've chosen.
2. What need was this app designed to meet?
3. The audience for this app is
4. What are some of the negative aspects of the app based on the reviews?
 - a.
 - b.
 - c.
5. Can you think of something that might improve the app?



My App Ideas Notecatcher

What Need Am I Filling?

Choose either #1 or #2 and describe the need(s) your app will be designed to address.

1. What are some needs that you experience as a young person that could be solved by mobile technology? Or think bigger—what are some broader issues in your family, community, or the world that mobile technology could address with a well-crafted app?

OR

2. What apps do you currently use? What annoys you most about the way these apps function? How would you improve them? How would you personalize them more?

What Is My Concept

Answer the following questions about your app concept:

- What need do you think your app can meet?
- Who are your target users, that is, your audience?
- What will your app actually do? That is, can you name two or three features of your app?
- How will you get paid for your app? Ads? Subscriptions? Purchases through the App and Play Stores?
What will your app actually do? That is, can you name two or three features of your app?

Design Team Roles

Taskmaster	Ensures the team remains on task at all times and focuses on the user experience.
Organizer	Helps the team organize their thoughts into a logical storyboard that makes sense to the user.
Artist	Takes notes throughout the brainstorm process and draws a draft of the storyboard with input from the team.
Communicator	Ensures the draft storyboard is ready for presentation and shares the storyboard with the class

Note: In teams of 4 each student takes a role, in smaller or larger teams students can share or double up on roles.

Wireframing: Intro to modeling activity.

- Look at *Pokémon Go*!
- Draw the homepage on one of your index cards

Screen 1



Screen 2



Screen 2



Screen 2 or Screen 3







Exit Ticket: My Coding Experience

1. I thought programming an app was

fun

ok

boring

2. I thought using code to build an app was

easy

kind of hard

difficult

3. The coolest thing about building my own app was

4. The hardest thing about building my own app was

5. I'd like to try more coding!

Yes

No

Maybe

User-friendly Design Criteria

Criteria	Definition
INTUITIVE	<p><i>Easy to get started from the first screen.</i></p> <p><i>Very little practice is needed to use the app.</i></p> <p><i>You don't need instructions.</i></p> <p><i>Anyone can use it.</i></p>
EFFICIENT	<p><i>The app has a good structure; it flows.</i></p> <p><i>The app is useful and meets its purpose.</i></p> <p><i>You only need to give a minimum amount of time investment to achieve a result.</i></p> <p><i>It gets its job done.</i></p>
EASE OF NAVIGATION	<p><i>The app only needs a minimum amount of button pushing in a short amount of time.</i></p> <p><i>Simple design.</i></p> <p><i>The user doesn't get confused trying to navigate through different screens.</i></p>

What Makes an App Great (To Me)?

<p>Name of app</p>	<p>Why do you like this app?</p> <p>What features make it likeable? convenient? fun?</p>
<p>Music</p> <p>_____</p>	
<p>Connecting with friends</p> <p>_____</p>	
<p>Research (finding information)</p> <p>_____</p>	
<p>Health</p> <p>_____</p>	

Usability Testing Questions

Name of App: _____

Questions	Features Analysis
<p><i>Is the app intuitive?</i></p> <ul style="list-style-type: none"> • <i>Is it easy to get started from the first screen</i> • <i>Do I need a lot of practice to use the app?</i> 	<p>Answers:</p>
	<p>Examples:</p>
<p><i>Is the app efficient?</i></p> <ul style="list-style-type: none"> • <i>Is the app useful?</i> • <i>Does the app have a good structure?</i> 	<p>Answers:</p>
	<p>Examples:</p>
<p><i>Is the app easy to navigate?</i></p> <ul style="list-style-type: none"> • <i>Is it easy to move around in the app?</i> • <i>Do users get confused?</i> • <i>How much time does it take to perform functions?</i> 	<p>Answers:</p>
	<p>Examples:</p>

3-2-1 Protocol Worksheet

3 things you learned about your app:

2 changes you would include in your next prototype:

1 question you still have for the work ahead:

Take a Stand: Applying Your Lenses to the Software Quality Assurance Engineers and Testers Career (10 min)

Share the “Take a Stand” protocol. *A) After each statement is read, you will line up on a continuum based on how important the statement is to you. B) One end of the room is very important, the other not important—think of it as a 0-100 space where you can fill in all of the quantities in between. C) As each statement is read, reflect on how important each idea is to you and line up accordingly—fill in all along the line to reflect gradations of importance.*

Read the following statements aloud.

After the first sentence, pause and allow students to reflect and select their stance.

Once they have settled on the line, share the second sentence about how the statement connects to the career.

SELF

- I like figuring out how to testing things and then testing them to see if I can get them to break.
 - Software Quality Assurance Engineers and Testers find and make details records of errors in code so that other engineers can correct them.
- I like being detail oriented, systematic and very thorough.
 - Software Quality Assurance Engineers and Testers have to meticulous in their testing and record keeping, even when they are testing things like video games!

SECURITY

- I like the idea of living near a big city but it also might be nice to work all over the country.
 - Software Quality Assurance Engineers and Testers typically live and work near big cities but some work remotely, from their house which can be anywhere as long as they have internet.
- A median pay of \$85,510 would offer me the lifestyle I want.
 - That is the median salary for a Software Quality Assurance Engineers and Testers.
- I would like to attend four years of college after high school and possibly even more.
 - 70% of Application Developers have a 4-year degree and another 15% have their Master’s degree. Only 7% have a two-year Associate’s degree.

SOCIETY

- I like knowing that the work I do makes things better for end users.
 - Software Quality Assurance Engineers and Testers are responsible for finding and reporting defects, or bugs, in computer code.



Take a Stand: Applying Your Lenses to the Marketing Manager Career

Read each statement below about systems software development careers and then indicate on the continuum how important the statement is to you by selecting the preferable spot on the line.

For example, if you LOVE being detail oriented, you would select a spot close to the “Very important” end of the line. Think of it as a 0-100 space where you can fill in all of the quantities in between.

SELF

1. Being strategic and analytical and trying to predict things before they happen are part of being a marketing manager.

I like being strategic and analytical and trying to predict things before they happen.



2. Marketing managers often have to balance company objectives and customer satisfaction.

I work well with all sorts of people.



SECURITY

3. Marketing managers can work for companies anywhere there is a market.

I like having the ability to work all over the world.

Not important

Very important

4. The median pay for a marketing manager is \$132,230.

A median pay of \$132,230 would offer me the lifestyle I want.

Not important

Very important

5. Fifty-six percent of marketing managers have a 4-year degree and another 24% have their master's degree. Only 11% have a professional degree.

I would like to attend at least 2 but likely 4 years of college after high school and possibly even more.

Not important

Very important

SOCIETY

6. Marketing managers promote positive messages and public awareness of products and services.

I like promoting positive messages about my organization and increasing public awareness about what my company does.

Not important

Very important



100-Word App Description

Now it's time to write the app store description for your app! Here are some suggestions:

1. *Aim for as close to 100 words as you can.*
2. *Try to address each of the questions below in your description.*
3. *You can use bullet points or phrases to answer each question but strive for full sentences if you can.*
4. *Think about a future user of your app as you write — your goal is to get them to click that Install button and download your app!*

Use these questions to help guide your 100-word description:

- *Why did you create this app?*
- *What is unique about your app?*
- *What need do you think your app is meeting for people?*
- *How does your app meet that need?*
- *Who is your target consumer, and why would they want to use your app?*

Presentation Notes

1. The name of my app is

2. My app is designed for (who is your audience?)

3. In a nutshell, my app (what does your app do?)

4. If I were to keep working on this app, I would want to

a.

b.

c.



Portfolio Reflection

Select one or two questions in each category below to respond to. You can write in full sentences or use bulleted phrases. Work to show reflection by

- *showing your growth and learning over the course of the unit;*
- *showing something that you are particularly proud of and explaining why you are proud of it; and/or*
- *showing a change in your thinking over the course of the curriculum.*

Information Technology

- *How interested were you in information technology sciences when you began this unit?*
- *What is one thing you learned about yourself during the lessons about information technology sciences?*
- *How did your interest in information technology sciences change over the course of your learning?*

Self

- *What did you learn about your interests?*
- *What skills did you build in your skills bank?*
- *Which skill did you improve? How do you know you improved? Why is the skill important?*
- *What did you find most interesting and engaging? What questions do you still have?*
- *Which of the careers we explored would be a good match for you based on your **SELF** lenses?*

Society

- *What are important challenges or problems in your community that are important to you?*
- *How can you help people as a member of this professional community?*
- *Which of the careers we explored would be a good match for you based on your **SOCIETY** lenses?*

Security

- *What are the next steps you might take to be future ready?*
- *What choices would you need to make it into this field?*
- *What skills are important in this field/career?*
- *Which of the careers we explored would be a good match for you based on your **SECURITY** lenses?*

INTERESTED IN A HIGH-TECH CAREER? CHECK OUT 7 COMPUTER SCIENCE JOBS!

PRESENTED BY JOBS FOR THE FUTURE

Computer science is a high-wage field with many job openings across the country. JFF created seven computer science job profiles, including cybersecurity and networking positions, to support young people in better understanding this field and example occupations. The job profiles include key information such as common job tasks, necessary skills, median salary, alternative job titles, and preferred education levels. For more information about computer science, check out the [industry overview resources](#) we developed—one for [high school students](#) and one for [high school educators](#).

The job profiles include seven positions in the computer science industry: computer user support specialist, software developer, website developer, information security analyst, vulnerability analyst, computer network support specialist, and computer and network systems administrator. A computer user support specialist is a great initial job in computer science because workers develop a broad knowledge base and better understand their specific skills and interests. While many computer science jobs prefer a bachelor's degree, it is possible to be hired as a computer user support specialist with on-the-job experience and/or an in-demand credential such

as a certificate or associate's degree related to computer science. Strong computer user support specialists can be promoted to higher-paying positions as they further develop their technical knowledge and skills. Another example of an opportunity for promotion in this field is advancing from computer network support specialist to a network systems administrator.

The data for these profiles, including national wage data, is from the U.S. Department of Labor's Occupation Information Network (O*Net) and the U.S. Bureau of Labor Statistics' Occupational Outlook Handbook.

The contents of this resource were developed under a grant from the U.S. Department of Education's Education Innovation and Research (EIR) Program.. However, those contents do not necessarily represent the policy of the U.S. Department of Education, and you should not assume endorsement by the federal government.



COMPUTER USER SUPPORT SPECIALIST



WHAT THEY DO

- Provide technical assistance to computer users by resolving problems and answering user questions
- Support users with hardware and software needs, such as printing, installation, word processing, email, and operating systems

ALTERNATIVE JOB TITLES

- Computer specialist
- Computer support specialist
- Computer technician
- Desktop support technician
- Help desk analyst
- Technical support specialist

KEY EMPLOYABILITY SKILLS

- Customer service
- Active listening
- Critical thinking

KEY TECHNICAL SKILLS

- Set up and repair computer equipment
- Technical instruction/support
- Computer system maintenance

MEDIAN SALARY



Hourly
\$28.82/hour



Salary
\$47,460/year

PREFERRED EDUCATION

- Bachelor's degree, but some businesses are open to an associates degree or on-the-job experience

SOFTWARE DEVELOPER



WHAT THEY DO

- Create, maintain, and fix computer software
- Code and design software, applications, and programs
- Modify software to correct errors, adapt to new systems, or improve performance

ALTERNATIVE JOB TITLES

- Application developer
- Infrastructure engineer
- Software architect
- Software engineer

KEY EMPLOYABILITY SKILLS

- Critical thinking
- Problem solving
- Communication

KEY TECHNICAL SKILLS

- Software development and management
- Programming
- Coding

MEDIAN SALARY



Hourly
\$52.95/hour



Salary
\$110,140/year

PREFERRED EDUCATION

- Bachelor's degree



WEBSITE DEVELOPER



WHAT THEY DO

- Design, build, and maintain websites
- Write and revise code to ensure the website is functional on different browsers, devices, and operating systems
- Communicate regularly with clients to ensure the website meets user needs

ALTERNATIVE JOB TITLES

- Technology application engineer
- Web architect
- Web designer

KEY EMPLOYABILITY SKILLS

- Communication
- Critical thinking
- Attention to detail

KEY TECHNICAL SKILLS

- Digital media development and design
- Programming
- User experience and user interface design

MEDIAN SALARY



Hourly

\$37.12/hour



Salary

\$77,200/year

PREFERRED EDUCATION

- Bachelor's degree



INFORMATION SECURITY ANALYST



WHAT THEY DO

- Protect digital files against accidental or unauthorized modification or destruction
- Monitor and update virus protection systems
- Assess computer-system security risks and implement risk mitigation strategies

ALTERNATIVE JOB TITLES

- Information security officer
- Information security specialist
- Network security analyst

KEY EMPLOYABILITY SKILLS

- Problem solving
- Judgment and decision making
- Critical thinking

KEY TECHNICAL SKILLS

- Firewall protection
- Data encryption
- Risk management

MEDIAN SALARY



Hourly
\$49.80/hour



Salary
\$103,590/year

PREFERRED EDUCATION

- Bachelor's degree



VULNERABILITY ANALYST

```

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  <div class="date">15.02.2004 -
  15.05.2004</div>
</div>
<div class="mb-0">Rocket Science
Course</div>
<span class="text-muted">NASA</span>
</div>
<div class="col-sm-6">
  <div class="testimonial-1">
    <div class="text">
      These two years were
      excellent</div>
      I learned so much.
    </div>
    <div class="text">
      I can't wait to
    </div>
    <div class="text">
      I love the stars/
      avatar01.jpg"
      avatar"></div>
  </div>

```



WHAT THEY DO

- Test security level of computer systems to determine protection plan
- Simulate cyberattacks to show clients where their systems may be vulnerable
- Design security solutions to ensure systems are protected

ALTERNATIVE JOB TITLES

- Penetration tester
- Application security analyst

KEY EMPLOYABILITY SKILLS

- Problem solving
- Communication
- Teamwork

KEY TECHNICAL SKILLS

- Information security
- Penetration testing
- Vulnerability assessment

MEDIAN SALARY



Hourly
\$44.65/hour



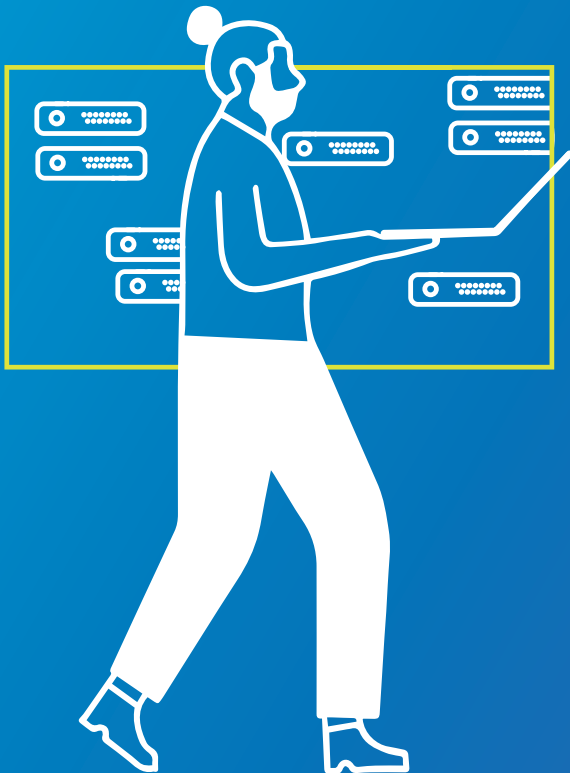
Salary
\$92,870/year

PREFERRED EDUCATION

- Bachelor's degree



COMPUTER NETWORK SUPPORT SPECIALIST



WHAT THEY DO

- Analyze, test, and troubleshoot network systems such as local area networks (LAN), wide area networks (WAN), cloud networks, and servers
- Perform maintenance to ensure the networks operate properly without interruption
- Create an electronic data backup process to avoid loss of information

ALTERNATIVE JOB TITLES

- Computer network specialist
- Information technology consultant
- Network specialist
- Network support specialist
- Network technical analyst

KEY EMPLOYABILITY SKILLS

- Critical thinking
- Judgment and decision making
- Active listening

KEY TECHNICAL SKILLS

- Software installation
- Network maintenance
- Electronic data backup

MEDIAN SALARY



Hourly
\$31.47/hour



Salary
\$65,450/year

PREFERRED EDUCATION

- Bachelor's degree



COMPUTER AND NETWORK SYSTEMS ADMINISTRATOR



WHAT THEY DO

- Install, configure, and maintain computer networks and related technology including both hardware and software
- Implement security measures for the network
- Manage electronic data backups to avoid losing information

ALTERNATIVE JOB TITLES

- Information analyst
- Information systems manager
- Information technology specialist
- Local area network administrator
- Network administrator

KEY EMPLOYABILITY SKILLS

- Critical thinking
- Judgment and decision making
- Problem solving

KEY TECHNICAL SKILLS

- Manage network hardware and software
 - Scripting and automation tools
 - Data protection and security
-

MEDIAN SALARY



Hourly
\$40.70/hour



Salary
\$84,810/year

PREFERRED EDUCATION

- Bachelor's degree

