



Senior Coding Basics

Badge Workshop

An At-Home Program

GSCCC Senior Coding Basics Badge Workshop (At-Home)



- Explore how computer programming can make a positive difference in the world and write a code you can share with others.

Program Outline:

Materials:

- Computer
- Internet access

Step 1: Use functions to create a self-portrait

Computers are great at following directions but that is all they do. When you write a computer program, you have to tell the computer exactly what to do in the order you want it to do it in. It can't figure the steps out on its own. These instructions are called an algorithm. The parts of the algorithm that tells the computer to do something specific are called functions. When writing an algorithm, programmers often write general algorithms first then add details in the functions, which can be more easily switched out. To write your own algorithm, think of what you do in the morning. What order do you do everything? Write a full list of everything you do in the morning. In addition to the very specific directions that computers need, they also have specific languages they can understand with their own grammar rules called syntax. One of these languages is JavaScript. You are going to write an algorithm for your morning routine. As an example, here are some chores written in JavaScript syntax:

`makeBed()`

`putawayClothes()`

`feedCat()`

`scoopLitterbox()`

`vacuumLivingroom()`

Think about what it would be like if people required very specific directions like computers do. Would it be good? Would it be bad?

Step 2: Write code to create a portrait

Functions make algorithms more specific but that's not always enough. Sometimes computers need even more detailed instructions, called arguments, to understand what it needs to do. Arguments tell the computer more about the task – or function – it needs to complete. Take your list of tasks from step one and give them more specific directions. Continuing the example above, here are some examples of chore functions with arguments to make them more specific:

```
makeBed("guest room", "my room")
```

```
putawayClothes("sister's room", "my room", "brother's room")
```

Just like the functions, arguments need to have proper syntax. In JavaScript, arguments go inside the parenthesis and are separated with commas.

Step 3: Learn about computer logic

Imagine you are given a set of tasks with each task on a separate sheet of paper. Now imagine they are shuffled before you get them. How would you know where to start? You would probably need help to figure out where to start. So do computers. Control Flow is how computers know which order to do tasks. It is the sequence in which the algorithms are done and the order of the different decisions computers can make. Look at your list of tasks you do in the morning. Are they in order? If not, rearrange them so they are in the correct order for how you get ready. Sometimes this won't matter but others times it is very important to distinguish which tasks go first. For example, you can't get dressed if you still have pajamas on.

Step 4: Explore "IF" statements

How do you write an algorithm for a computer if it needs to make a decision? Computers use what's called Boolean logic to know how to react to different conditions. It is basically a true/false decision that the computer makes to figure out how to continue on with the algorithm. These are called Boolean expressions. To code a condition or question, programmers use "IF" statements. And IF statement essentially says: "If one condition is true, do these steps. If it's not true, do these other steps." An example of this in JavaScript syntax is"

```
if (Dishwasher = Clean) {  
    unload  
}  
else {  
    add dirty dishes  
}
```

Try adding some of these to your morning routine algorithm. Are there times when you need to make a decision like this?

Step 5: Use computer logic to create a quiz show

Now that you know how to use IF statements, you can use them to create algorithms with all sorts of conditions. Is there a topic you know a lot about that you can share with your family or friends? Use what you have learned to create questions about your topic that you can use to create a fun quiz show. Write out as many true/false questions about your topic as you can then change them into Boolean statements. You can even change the control flow of your algorithm based on the answers to your questions. Make sure you write your statements in JavaScript syntax.

For more practice with coding visit [Scratch](#) or [Codecademy](#).

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