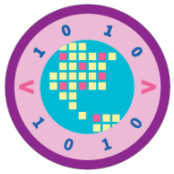

Junior Coding Basics Badge

Pillar: STEM
Outcomes: Strong Sense of Self, Challenge Seeking

When you've earned this badge, you'll know how programmers make computers do useful things and how computers can be used to help people.

Juniors will earn their badge by:

1) Create algorithms for a computer that follow a sequence
    a) An **algorithm** is a detailed, step-by-step process (directions) followed (especially by computers) in order to accomplish a specific task or to solve a specific problem. The order of the directions is called a **sequence**. Algorithms aren't only used for the kinds of computers we're used to –they can be any set of detailed steps you or someone else will follow to complete a task. Watch this video to learn more.
    b) Create a dance routine that someone in your household will have to follow and write it down. Be as detailed as possible, so the algorithm can be followed without any explaining on your part. When computer programmers code, they don't have the option of getting to talk their computer through the algorithm while the computer follows it. That's why it's challenging; they can only do what is specifically written down. How did that person do? Did you write down a good algorithm for them to follow?

2) Use loops to improve their algorithm
    a) A **loop** is part of the algorithm that gets repeated a few times. When you take turns and follow the rules of a game over and over again, that's a loop. Watch this video to learn more.
    b) Are there any parts in your dance routine that repeat? If so, it'll be a little easier for your dancer to remember, and it will make your code a little shorter and easier to understand too! Rewrite the dance routine algorithm using loops.
    c) You can also practice loops with these websites at: https://code.org/student/elementary and https://www.tynker.com/.

3) Keep your code interesting with conditionals
    a) **Conditionals** are statements that only run under certain conditions or situations. Conditionals are written with **IF/ELSE Statements**. This means that programmers write programs that say IF one thing happens, do this. If it doesn't, do that. For example, IF it's snowing, wear a warm coat. ELSE wear a light jacket. This makes the program more interesting and flexible to react to different situations.
    b) Listen to "If I Were a Rich Man" from Fiddler on the Roof. Have a discussion with an adult in your house about what the main character would do if he were rich. Now, brainstorm the ELSE, in case he doesn't get rich by the end of the musical.

4) Create your own set of commands that use conditionals

a) Being a leader means you have to make lots of decisions. So, when you're a leader, it's a good idea to prepare for what could happen and how you would react to all kinds of situations and surprises. Programmers do the same thing when they write conditionals in their code. They think about different situations in the program and tell the computer what to do IF that situation comes up.
b) One of the biggest conditionals we experience in everyday life is the weather and how we dress for it! Without looking at the weather first, write down instructions, with conditionals, to help your family members get dressed for a family walk and make each family a different command with conditionals. For a sibling, you might write, "IF the temperature is above 65 degrees, wear short sleeves and shorts. Or ELSE if it's lower than 65, wear short sleeves and pants," or for a parent you might say, "IF the chance of rain is above 50 percent, bring an umbrella, or ELSE if it's not, leave the umbrella at home."
c) Once you've written your conditionals, check the weather! How many family members used the IF option, and who had to use the ELSE option?

5) Learn about women in Computer Science
   a) Click on this link to learn about Margaret Hamilton and how she saved the Apollo 11 mission for NASA. She also came up with the idea of "computer software" which means the programs that make computers do things.
   b) Part of being a leader is thinking ahead, imagining what problems might come up, and figuring out how to solve them. The first computer program was written by a woman, and women have been leading the way ever since! They've designed and built new kinds of computers, invented new programming languages, and even used computers to design ships and send people to the moon! What kind of problems would you like to solve with the help of computers?

When you're finished: Congratulations, you have earned your badge! You can purchase by emailing shopdept@gsksmo.org or at https://www.girlscoutshop.com/JUNIOR-CODING-BASICS-BADGE

No shipping charges apply at this time.
