Instructions

When you are given an instruction – from you teacher at school or from a family member at home, you're responding to an algorithm. An algorithm is a way to describe how we complete an instruction. You've used a lot of algorithms today! What is your routine to get up in the morning? What are the steps you followed to make your breakfast? How did you get to school? I'm sure you've been given the instruction of 'Clean your room!' As a human you understand the expectations and tasks involved to complete this instruction. Without thinking too much you know what you should and should not do. Humans have the ability to infer and 'read between the lines' we hear an instruction.

Algorithms

Algorithms are the instructions we give a digital system to follow. A computer needs to be told exactly what to do, every instruction needs to be explicitly stated. Without each step properly defined, digital systems may not complete the required task. Can you imagine what a robot would do if it was given the instruction of 'Clean your room!' It might start washing EVERYTHING like washing your bed with everything still on it, washing the carpet, it could throw EVERYTHING out because then it's clean!

Algorithms will become complex when you move from a set of instructions to giving the user options to decide how to complete the task. This is called user input. Ever read a choose your own adventure book? You decide which path the character takes. Have you played a video game and controlled the character? That's user input because, you have made the decision on the tasks that will be completed.

Branching means the algorithms have more than one option and the direction of the algorithms (the instructions) will have to change depending on the direction. You have the choice of two prizes and they are in two different boxes. If you pick Box 1 you'll get a different prize than if you picked Box 2. When you are writing the instructions, you need to make sure you have different options available. If both boxes contain the same prize, what was the point in choosing?

Some instructions will be repeated, just like the instructions of making your breakfast every morning. Instead of repeating the same algorithm over and over – one algorithm can be written to repeat the same task. This is called a repeat or iteration. Instead of writing out the instructions to make breakfast everyday (365 times) you write down the instructions once, and keep using those same instructions – which is easier, and which would you choose?

Next time you are using a digital system (specially playing a game) look at how you are controlling the which algorithms are being used, see what is repeated. You'll be surprised at just how many algorithms are used in digital systems!

Video Resources

Watch the videos to understand more about if statements (branching) and loops (repeats or iteration).

Bill Gates (the founder of Microsoft) explains when we use branching in our everyday life when we make a decision.

Video Source: Code.org

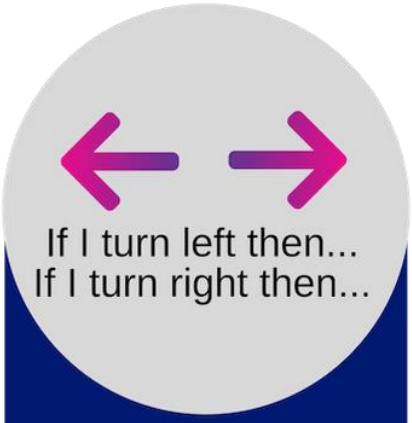
Mark Zuckerberg (the founder of Facebook) explains how Facebook uses the algorithms to wish all the users a happy birthday.

Video Source: Code.org

ALGORITHMS

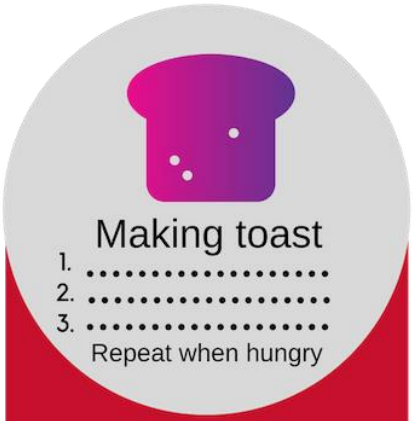
Explicit instructions that a computer uses to complete a task

Algorithms are the instructions a digital system uses to complete a task or function



BRANCHING

Branching shows multiple options and outcome for one command



ITERATION

Iteration repeats the same command without rewriting the algorithm.

USER INPUT

User input controls the data and guides the direction of the algorithm.

Branching, iteration and user input are used when an algorithm becomes more complex.