



## LESSON 2

# What is Code?

📈 Beginner ⌚ 1 hr 5 minutes

Students will develop an understanding for what code and programming languages by participating in a hands-on learning experience

### OBJECTIVES

- ⚡ Learners will be able to explain how computers follow instructions
- ⚡ Learners be able to explain in their own words what code/programming languages are
- ⚡ Learners will gain an understanding of the different uses of code
- ⚡ Be able to use pseudo code to make basic program

### STANDARDS

- ⚡ **K12 CS:** Computing Systems.Devices, Computing Systems.Hardware and Software
- ⚡ **CSTA:** 3-5: 1B-C-7-9, 1B-C-7-10, 1B-C-6-11
- ⚡ **Common Core:** CCSS.MATH.PRACTICE.MP1

## Introduction

🕒 5 mins

### Linking

What do you think is the difference between hardware and software? Turn and talk to your neighbor for 3 minutes.

Remind learners that a way to help you remember the difference with think of hardware as a physical device. Something you can touch and put in your hands. Software you can't do the same thing. It lives inside your computer or in another device.

🕒 5 mins

### Engage

**What do you think programming is?** (Below is a possible answer)

When you write instructions or steps for a computer to follow. For example, a program for a wedding or a formal event. It is the outline of the structure of the event or day.

**What is a programming language?** (Below is a possible answer)

Programming language is the language of computers. It is where we write in an almost human language steps for a computer to follow to do something very specific.

What are some programming languages we already know about? (Below are possible answers)

Scratch	Coffeescript	Python	Kano Blocks
HTML	Javascript	CSS	

Today, we're going to talk more about what code and programming languages are to get to demystify our computers more!

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### Collect Kanos

🕒 5 mins

Retrieve Computers, Turn On, Log In..

## Exploration Activities

### Challenge 1: Marching Orders

🕒 15 mins

So we talked about programming and programming languages or code earlier, but what do we know about computers? (3 minutes)

Students may give things that use computers, give programming languages, etc.

Tell students to finish your sentence, “computers are super \_\_\_\_\_”

Here are answers. When done say ‘stupid!’

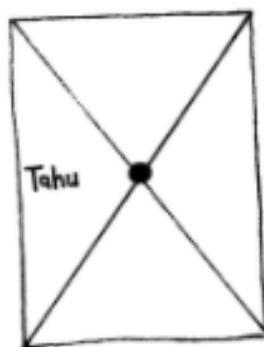
Explain to students that computers need very specific code with details to be able to complete a task. If a door is shut and you tell a human to walk through it, they will stop and open the door. A computer or robot wouldn’t do that. If you said go through the door, it would run into it!

So computers need very specific instructions!

Let’s draw a drawing activity together. Think of yourselves as the computer. I will give you very detailed instructions and you will draw whatever I describe! Make sure you listen very carefully!

- Draw a dot in the centre of your page.
- Starting at the top left-hand corner of the page rule a straight line through the dot finishing at the bottom right hand corner.
- Starting at the bottom left-hand corner of the page rule a line through the dot, finishing at the top right hand corner.
- Write your name in the triangle in the centre of the left-hand side of the page.

Your image should look like this:



Now take another volunteer from the group. This time another student will give instructions and we will all have to draw the image. The volunteer will only say the instruction two times though so make sure you are paying attention!

The drawing they will reference is:



Did our drawings look like what we thought it should be? Was this easy or harder? Why do you think so?

## Challenge 2: Program a Human Robot!

🕒 30 mins

Now again, computers follow very detailed instructions and computers are what (stupid) so we need to give a lot of details and instructions. For example. If I told you, a human to walk through a door and you notice it is closed you will stop to open the door. A robot will full force try to keep going, not trying to open a door because you didn't tell it to!

Now let's see just HOW specific instructions need to be. Split the class into small groups of 3 students each. Place an obstacle course in front of you (it can be a box in front of you or multiple boxes) and tell the learners we have a challenge today. For this challenge one person in our group will be a "robot." Our mission is to program one of our teammates to walk around an obstacle course a very specific way and BLINDFOLDED. To make it harder we have to avoid crashing as much as possible!

Demonstrate the course the robot must walk to complete the exercise. Repeat it a few times so the students understand the start/end points and the direction they need to walk.

All groups will now have 15 minutes to write down the instructions and steps they will give their "robot." Afterwards there will be trial runs to complete the course. Everyone will get 2 chances to complete the course. As well, if during a trial the robot "crashes" 2 times they will have to start over and figure out what went wrong with their code!

### NOTE!

- For this activity do not assign the robot. When the learners are ready to try the obstacle course select a random learner. The code should work for all robots!
- Students may struggle. Mention specific details like 90 degrees, small or large steps are helpful to the blindfolded person. The more details the better!
- When students are done explain computers need very specific details. We may say turn left, but a computer doesn't know what left means. We have to be specific
- There is a cheat in this exercise. We could have said "input intelligence, take off blindfold, complete the course with intelligence!"

## Closing

### Evaluation

🕒 5 mins

We talked a lot about code and programming languages today. In our engineering journals can you write down a summary of what we did today and a definition of what coding and programming languages are?

### Closing/Homework

🕒 5 mins

Tonight think of a really simple task and write down the step-by-step instructions you would need to follow. Is it as easy as you originally thought?

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## Kano Cleanup

🕒 5 mins

Power down and put away Kanos

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Explorer Questions**

**Directions:** Answer the questions below to the best of your ability. Remember to reference what you spoke about during the session today!

What are some examples of coding languages?

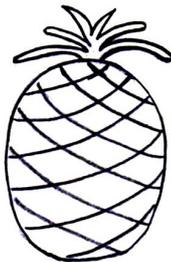
When you did the drawing activity what happened?

When you did the robot activity what happened?

**Programmer Questions**

Why is it important to be detailed when you give instructions?

If you wanted to draw the image below, what instructions would you give someone? Let's try it in class tomorrow!



## Creator Question

Today you had to program one of your team mates like a robot around a simple obstacle course. Why don't you design your own? In the space below draw an obstacle course you would have a robot move around.

## Impact Question

Code and technology has changed the way we interact with the world. From the way we communicate with friends and family to the way we travel. Think about your own life. If you could create a new technology to help you in life what would it be? Why would it be helpful for you? Do you think others would want it and why?