

Now you_
Draw your robot:

1_Data

Name your robot. The name can be numbers, letters, any key on the keyboard, for example:
"Robo_Me"

A name of numbers, letters or any key on the keyboard is called a **string**. Strings are always put in quotation marks (" ").

Now you_ Name your robot: " " " "

There are different types of data:

- numbers,
- strings and
- **Boolean variables.**

You have already gotten to know numbers and strings. Boolean variables are data, which have one of two possible values (true or false).

Describe your robot.

for example	true	false
My robot has two arms.		
My robot has arms and legs.		
My robot has arms or legs.		
My robot doesn't have a green nose.		

Now you_ - Create <u>Boolean variables</u> : Write down 5 statements, which are true or false about your robot. - Challenge: use <i>and/or/doesn't have/isn't ...</i> - Let a partner find out which statements are true.
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Statement	true	false



2_Computational Thinking

Every big problem can be broken down into smaller pieces. In order to solve problems or tasks, computers follow instructions by programmers. The solutions to a difficult problem can be used to help others with other problems, too.

This is how a computer thinks; this is called computational thinking.

The only way to learn something new is to try and make mistakes!

3_Programming

If you want to teach your robot something, you need to

- break down a difficult problem, event or task into smaller pieces.

This is called: **decomposition**.

- write a list of smaller steps.
This is called **programming**.

This list of small steps to finish a difficult task is called an **algorithm**.

The steps have to be in a specific order. You cannot leave out any steps.

This specific order is called a **sequence**.

If you want to teach your robot, how to dance the “Macarena“ by Los Del Rio, programming an algorithm could look like this, for example:

Task: dancing Los Del Rio's "Macarena"

Things you need: left arm, right arm, left hand, right hand, left shoulder, right shoulder, left hip, right hip, head

Definitions (*new vocabulary the computer has to learn*):

"bring out your arm" = your arms are parallel to the floor; your palms face down

Steps:

Step 1: when the lyrics of the song start playing: "bring out your right arm" in front of you;

Step 2: "bring out your left arm" in front of you;

Step 3: turn your right palm up;

Step 4: turn your left palm up;

Step 5: place your right hand on your left shoulder;

Step 6: place your left hand on your right shoulder;

Step 7: put your right hand at the back of your head;

Step 8: put your left hand at the back of your head;

Step 9: bring your right hand to your left hip;

Step 10: bring your left hand to your right hip;

Step 11: move your right hand to your right hip;

Step 12: move your left hand to your left hip;

Step 13: move your hips around in a circle;

Step 13a: move your hips around in a circle;

Step 13b: move your hips around in a circle;

Step 14: jump up, at the same time: turn around 90 degrees to the left;

Step 15: clap your hands;

Step 16: if the lyrics continue, then repeat this dance sequence; if the lyrics stop, then stop dancing.

Now you_ Decompose something you can do really well (e.g. skateboarding, making pizza, ...). Program an algorithm.

Look up vocabulary you need and write it in the box below.

Task:

Things you need:

Definitions:

Steps:

Step 1:

...

useful vocabulary for _____ :
verbs:

nouns:

Now you_
Get up. Get together with a partner.

One of you is the programmer, one of you is the robot.
The programmer reads out his/her sequences of his/her algorithm,
The robot completes this complex task, following the programmers algorithm. Make mistakes, if
the steps are not clear enough.

Change roles.

3a_Programming: loops

In a **loop** the computer does a sequence of steps again and again; it **repeats** this sequence until one specific piece of the difficult task is finished. For example, let's take a closer look at Steps 13-13b:

“Step 13: move your hips around in a circle;

Step 13a: move your hips around in a circle;

Step 13b: move your hips around in a circle;“

The loop can look like this:

Step 13: “repeat three times: move your hips around in a circle;“

In the programming tool ‘Scratch’ the loop looks like this:



Now you_
Go through your algorithm and program loops, if possible.

3b_Programming: selection

If there are different conditions and different options to react, this is called a **selection**. For example, let's take a closer look at Step 16:

“Step 16: if the lyrics continue, then repeat this dance sequence; if the lyrics stop, then stop dancing“

There are two conditions:

condition 1: the lyrics continue

condition 2: the lyrics stop

There are two options to react:

option 1: repeat this dance sequence

option 2: stop dancing

one condition matches one option:

condition 1 matches option 1;

condition 2 matches option 2.

If condition 1 happens, then option 1 must be done.

If condition 2 happens, then option 2 must be done.

If “the lyrics continue“, then “repeat this dance sequence “.

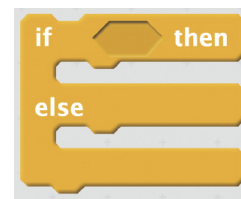
If “the lyrics stop“, then “stop dancing“.

A selection combines the conditions and options to react in a conditional sentence, using: if, then, or else.

The selection for Step 16 can look like this:

*Step 16: “**if** the lyrics continue, **then** repeat this dance sequence; **or else**: stop dancing;“*



In the programming tool ‘Scratch’ the selection looks like this:



Now you_

Go through your algorithm and program a selection, if possible.

Extra_Now you_
For more information on coding basics watch: <https://candy.codes>.
Visit <https://scratch.mit.edu> to take first steps in programming a computer.

description	link	QR code
video "Candy and coding" - further information about programming basics:	https://candy.codes	
First steps in programming with the program 'Scratch':	https://scratch.mit.edu	



Define the following vocabulary

vocabulary	English definition
data	
string	
Boolean variables	
decomposition	
algorithm	
programming	
sequence	
selection	
loop	