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.

Now you\_

* Create Boolean variables: Write down 5 statements, which are true or false about your robot.
* Challenge: use *and/or/doesn’t have/isn’t …*
* Let a partner find out which statements are true.

|  |  |  |
| --- | --- | --- |
| 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. |  |  |

|  |  |  |
| --- | --- | --- |
| 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;

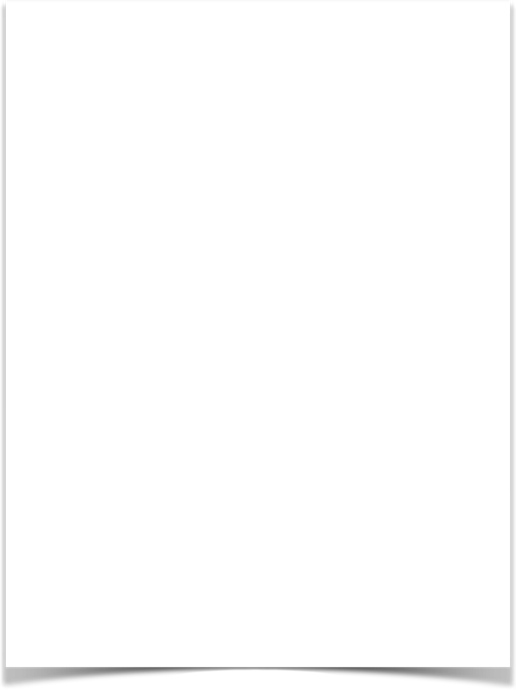
Step 13a: move your hips around in a circle;

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.



useful vocabulary for :

verbs:

nouns:

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:

…

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;“*

3

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](http://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](http://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 |  |