Calliope mini as a mini piano

Lio and the mini piano

Lio wants to play music with friends during the parade.
They play guitar, trumpet and piano.
But carry a piano through the city? That's too difficult!
A mini piano for your pocket would be a solution.

The mini piano

Your Calliope mini must turn into a mini piano,
that can produce different sounds. This mini piano
works much like an electronic piano.
A sound is played when a pin and the ⊙-pin are touched
and therefore the circuit is closed.

The code

As soon as Pin***** 0 and the ⊙-Pin of the
Calliope mini is touched, a tone is to be
played. This is how the code looks like for
a mini piano that can play a single note.

1. Program this code in the NEPO® editor (beginner) ☐
Proceed step by step.

- In order for the notes to be played not just once, but over and over again, you need an infinite loop.*****.
  Control → "Repeat indefinitely / do"

```
+  start
repeat indefinitely
do
```
↑ infinite loop

- If a pin is touched (if), a sound shall be played (do). For this you need a branch*****.
  Control → "if /do"
  Insert the block into the infinite loop.

```
+  start
repeat indefinitely
do      +  if
        do
```
← branch

- If pin 0 is touched, a tone shall be played.
  → "pin 0 pressed?" Add the block as a condition (blue area) to the branch.

```
+  start
repeat indefinitely
do      +  if      pin  0 ▼  pressed?
        do
```
↑ condition

A branch always needs a condition!

- A sound shall be played when pin 0 is touched and the condition is true.
  Action → "play whole note c'"
  Add the block as a condition to the branch.

```
+  start
repeat indefinitely
do      +  if      pin  0 ▼  pressed?
        do    play   whole ▼  note   c'
```
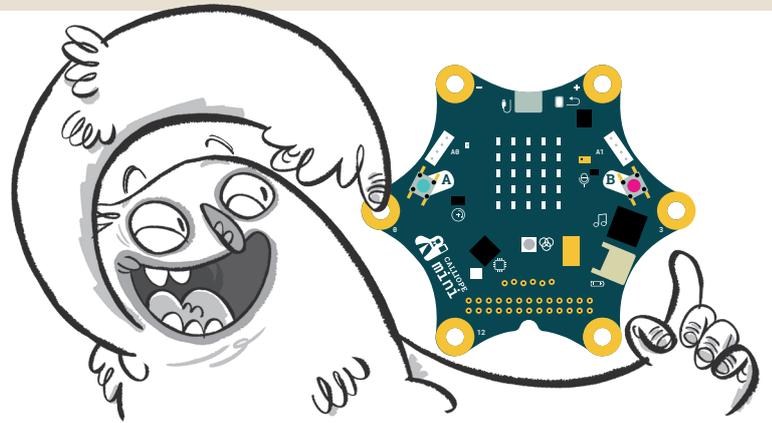
2. ▶ Transfer the code to the Calliope mini and run the program. As long as the status light***** is flashing, the transfer to the Calliope mini is not yet complete.

3. a) Draw where Lio must hold the other finger on the Calliope mini to produce a sound.

b) Why do you need two fingers on the Calliope mini to play a sound?

4. Expand the program so that the other three pins (1, 2, 3) can also play sounds. Proceed step by step.

- When touching more pins (1, 2, 3), a different sound shall be played in each case.
  Each new note requires a further branch.
  To create another branch, click on the "+" next to the "if".

← branch

- If pin 1 is touched, another sound shall be played.
  Sensors → "pin 0 pressed?"
  Append this block to the new branch.
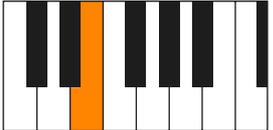 Click with the mouse on the pin "0". A drop-down menu opens. Choose here pin "1".

- **Action** → "play whole note c'".
  Append this block to the branch.
  Click with the mouse on the "c'".
  A drop-down menu with a piano
  keyboard opens. For example,
  select the tone "e'" here.

- Continue this way and assign
  further tones to pin 2 and pin 3
  as well.

5. a) ▶ Transfer the code to the
Calliope mini and run the program.
Remember that you have to touch
the ⊙-pin.

b) Try to close the circuit with two
or more people.
Through how many people can the
current flow?

_____

_____

_____

6. In order to see which tone is currently being played, the names of the sounds should be displayed on the LED screen*.

a) Mark the correct code for the display of the letters.
Only one of them is correct.
In the other codes there is an error hidden. Circle the errors.

b) Now add the letters for the according tones to your program.
Action → "show image"
In the pink block, click on the boxes you want to light up later.
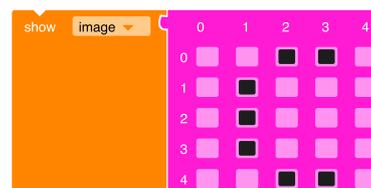
7. ▶

The small coding encyclopedia

instruction (= command)	When you receive an instruction, you can execute it. For example: "Hang the wet socks on the clothes horse to dry." The same is true for the computer. It executes instructions that clearly describe what it should do. A code/program is built from instructions.
loop with a condition	A loop allows a sequence of instructions to be executed over and over again. For example: "Hang up socks as long as there's laundry in the basket." The **loop** is: "Hang up socks as long as (repeat) …" The **condition** of the loop is: "Is there still laundry in the basket?" Answer: "Yes!" In the loop, **four instructions** are executed one after the other: 1. Take a wet piece of laundry 2. Hang the piece of laundry on the clothes horse 3. Use two clothespins 4. Fasten the piece of laundry with the clamps If the answer to the condition "Is there still laundry in the basket?" is "No!", the program continues behind the loop: "Bring the basket to the bathroom."
infintite loop	An infinite loop **has no condition** und and will run until the Calliope mini is switched off.
variable	A variable is a container for a specific value (number, word, etc.), image or something else that is set at the beginning of the program. Each variable needs a unique name and you have to decide if the variable should store a number, a word (→ string), an image or something else.
branch with a condition	Every branch in a program needs a condition. The condition defines the next instructions in the program. There are two ways of doing this, for example: Condition: "Is the laundry on the clothes horse still wet?"

branch

If yes -
then: "Wait an hour"

If no -
then: "Take off the laundry"