

# ***FLOW* BLOCKS: BOOLEANS & LOGICAL STATEMENTS**

## ***BOOLEANS? I'VE SEEN THOSE BEFORE***

A boolean is a type of data that can only hold one of two values: TRUE or FALSE.

As you have already seen in the previous subsystem, booleans are often found when assessing the validity of a statement. For example, let's look at the statement  $A < B$

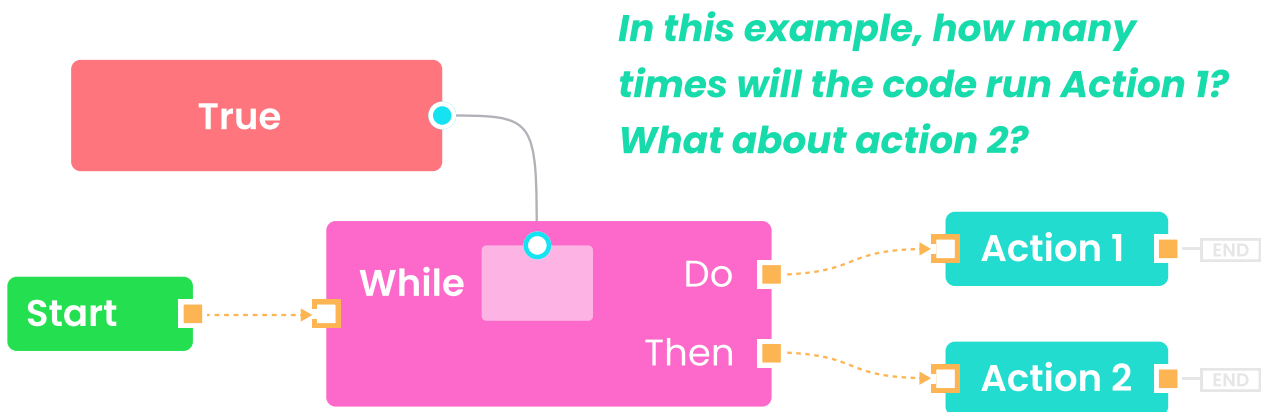
- If  $A = 1$  and  $B = 2$ , then this statement is correct. 1 is less than 2. We can say that this statement is TRUE.
- If  $A = 2$  and  $B = 1$ , then this statement is not correct. 2 is not less than 1. We can say that this statement is FALSE.

You can use a boolean constant block in your code if you want to use the boolean value TRUE. Combine the TRUE block with a NOT block to get a value of FALSE.



True

If we want to repeat a piece of code forever, we could connect a TRUE value directly to the WHILE block condition, like so.



This might be useful in our simulations, because once the task has successfully been completed, the robot will stop running all of its current code.

For example, let's suppose that we wanted our robot to keep performing a single action fifty times to complete a task. We could either connect fifty action blocks together (booooring), or we could add a single action block to an infinite while loop. Once the task has been successfully completed, the code will stop running anyway.

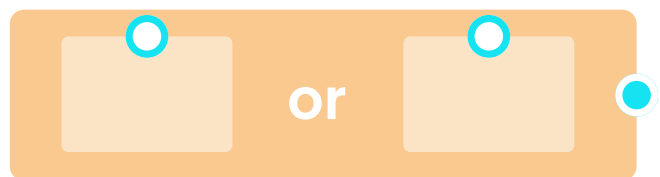
## LOGICAL BLOCKS

Logical blocks let you take one or more boolean inputs, perform an operation on, and then return a new boolean. The most common logical operations are AND, OR, and NOT.



The AND block outputs TRUE if both inputs are TRUE. Otherwise, it outputs FALSE.

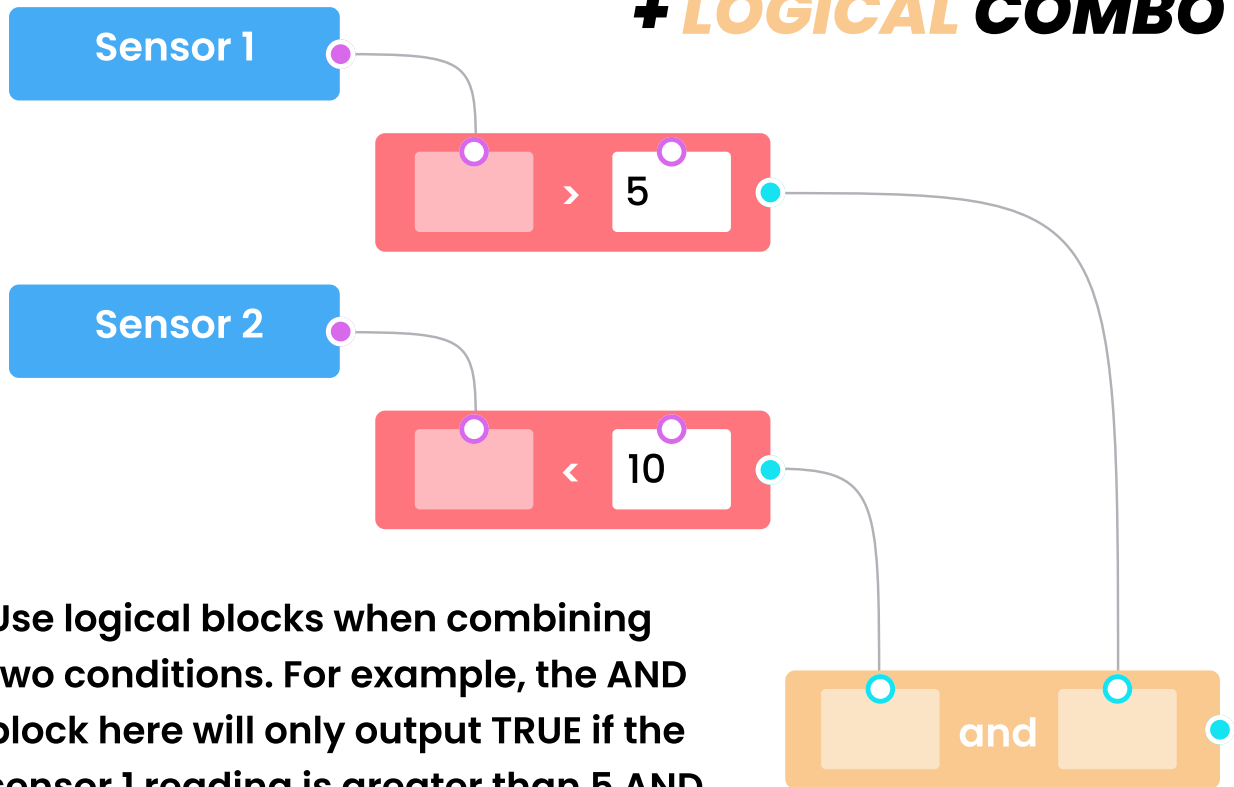
The OR block outputs TRUE if one or both inputs are TRUE. Otherwise, it outputs FALSE.



The NOT block outputs TRUE if the input is FALSE, and outputs FALSE if the input is TRUE.

Logical blocks take *booleans* (TRUE or FALSE) as input and also output *booleans*.

## SENSING + COMPARISON + LOGICAL COMBO



Use logical blocks when combining two conditions. For example, the AND block here will only output TRUE if the sensor 1 reading is greater than 5 AND sensor 2 reading is less than 10. Otherwise, the output is FALSE.