953103 Programming Logic Thinking

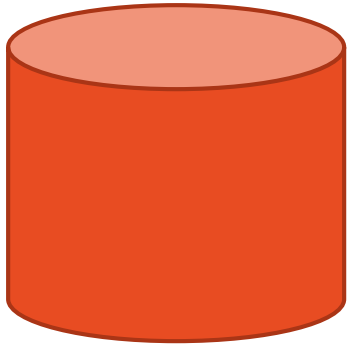
Arrays

CAMT Digital School

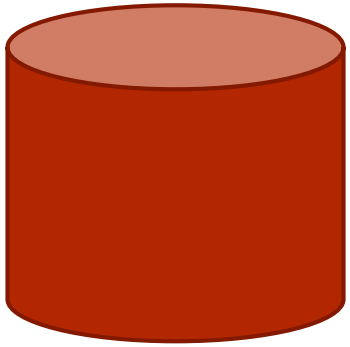
Review of Variable

- Variable is a place in the memory to hold a value.
  - Only a value

numberOfStudent



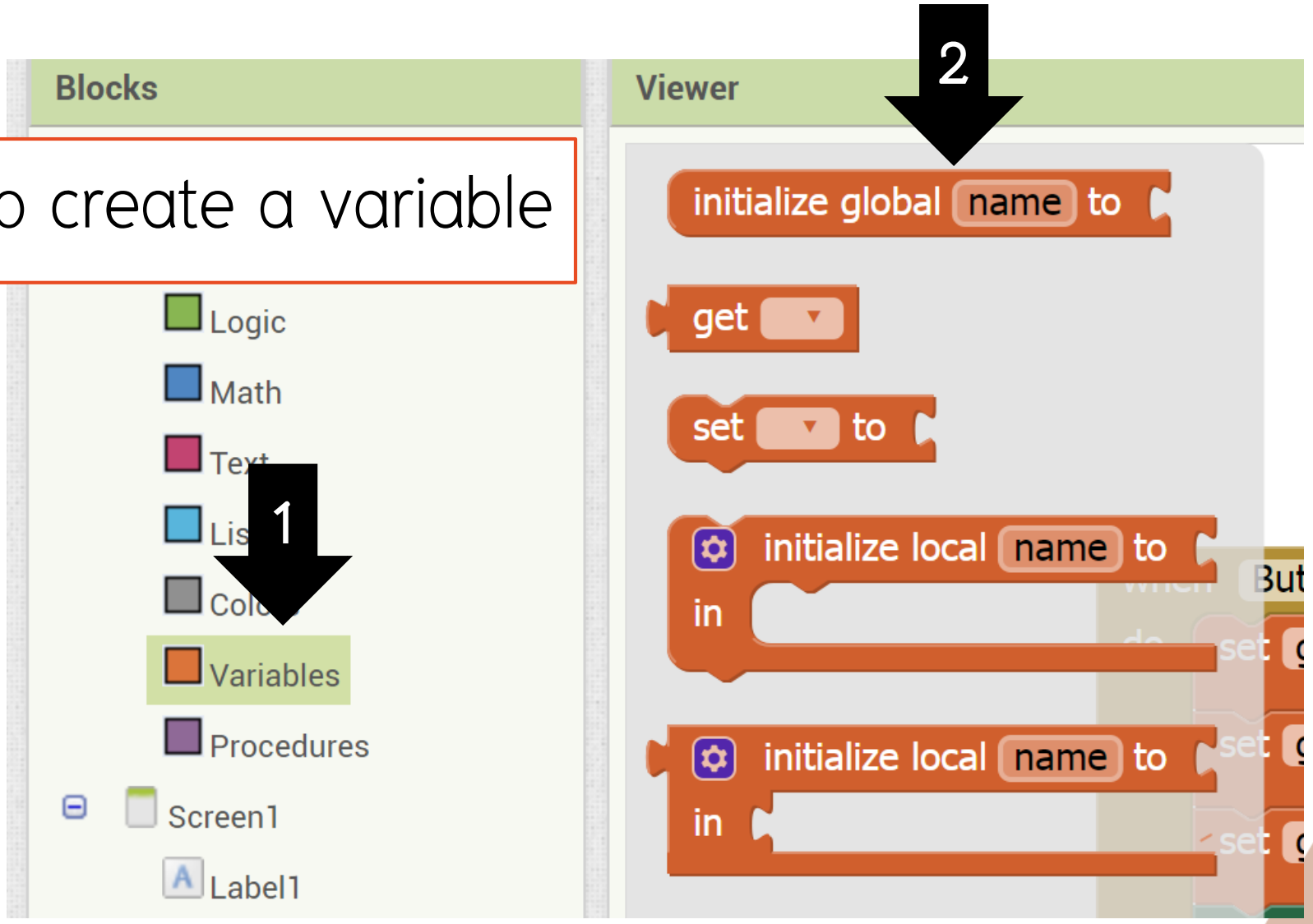
amountOfWater



heightOfStudent

Only a **"SINGLE"** value

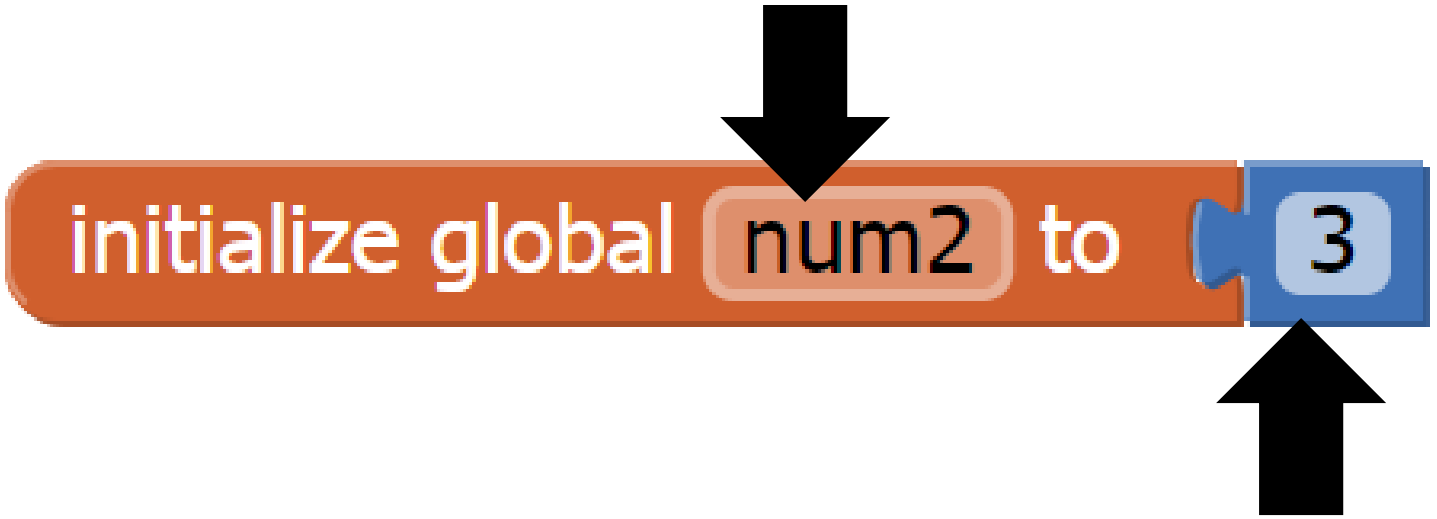
To create a variable



CAMT Digital School

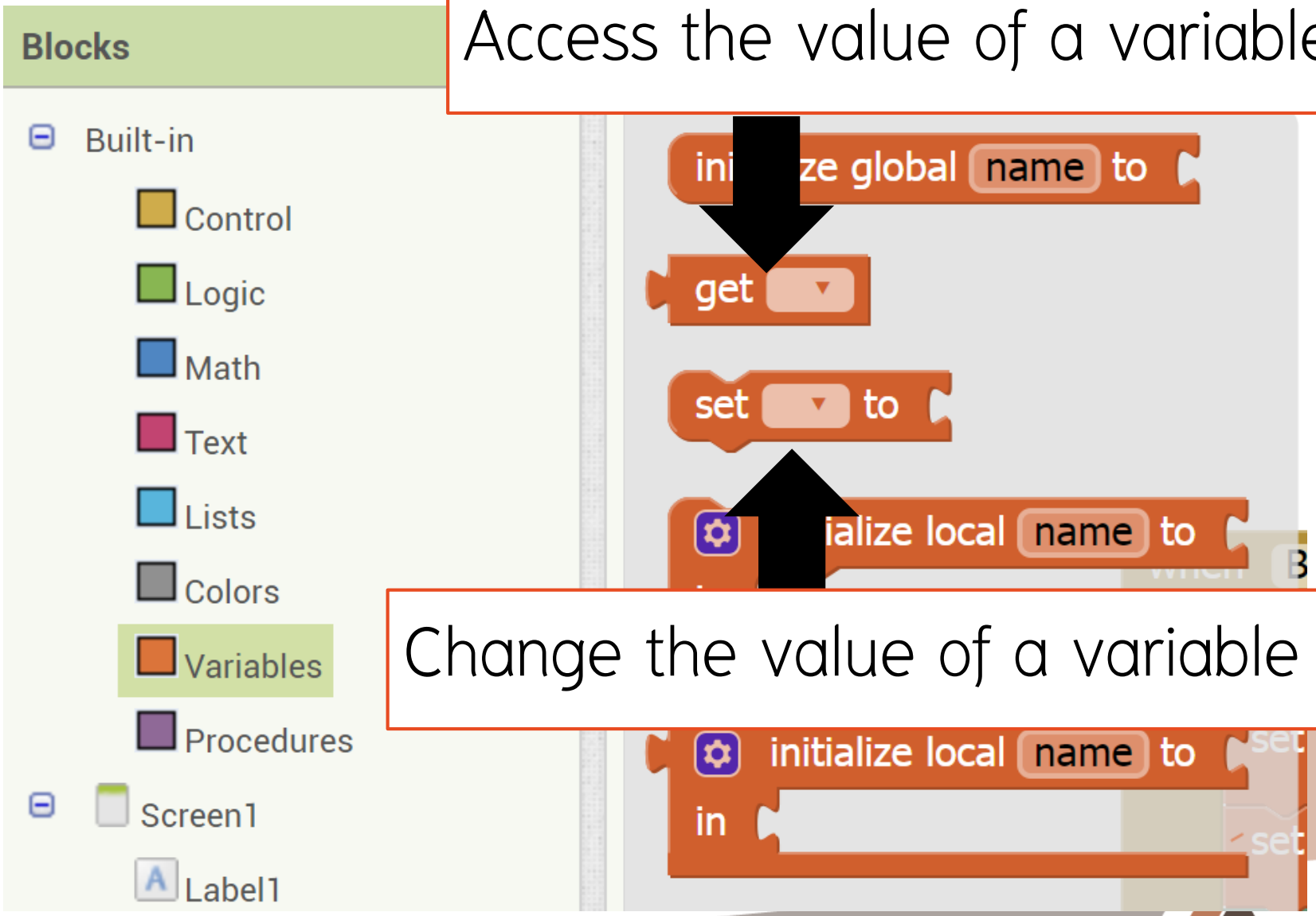
To initialize a variable

Name of the variable



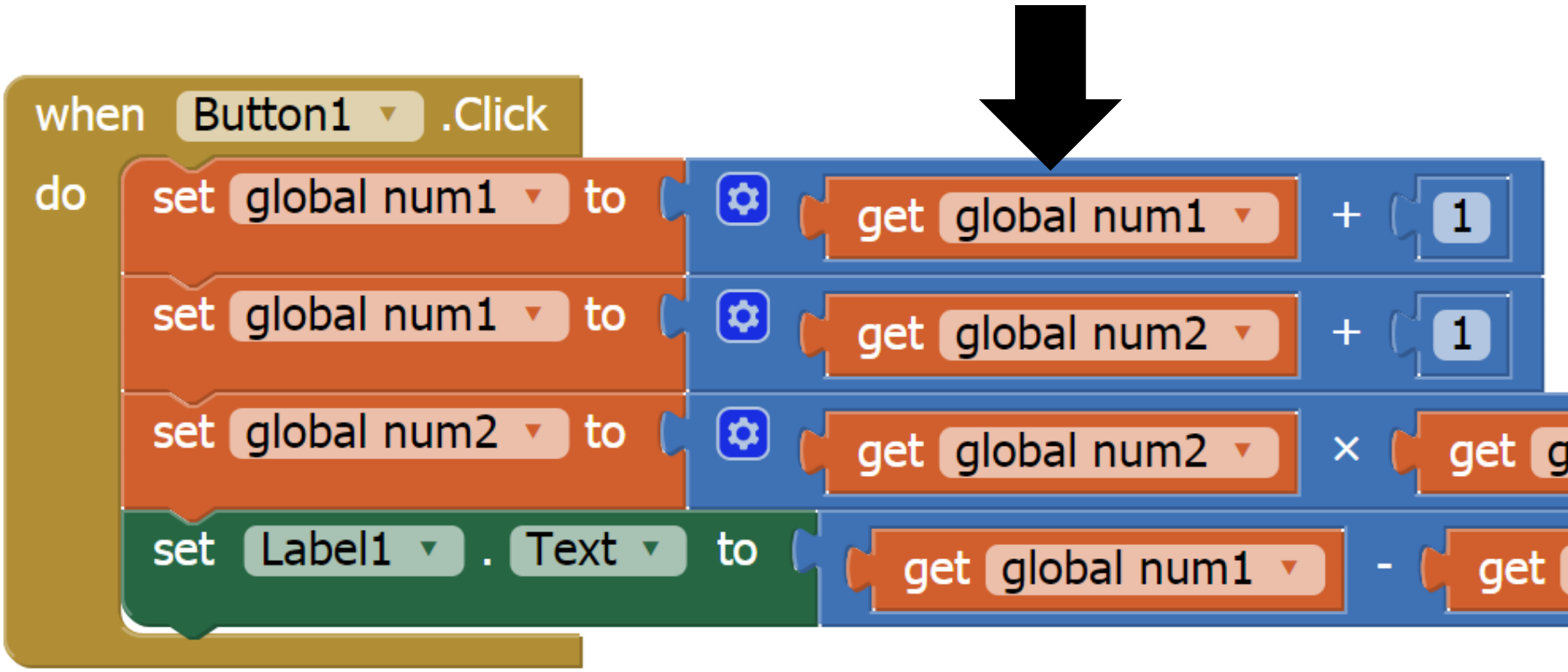
Initial value of the variable

Access the value of a variable



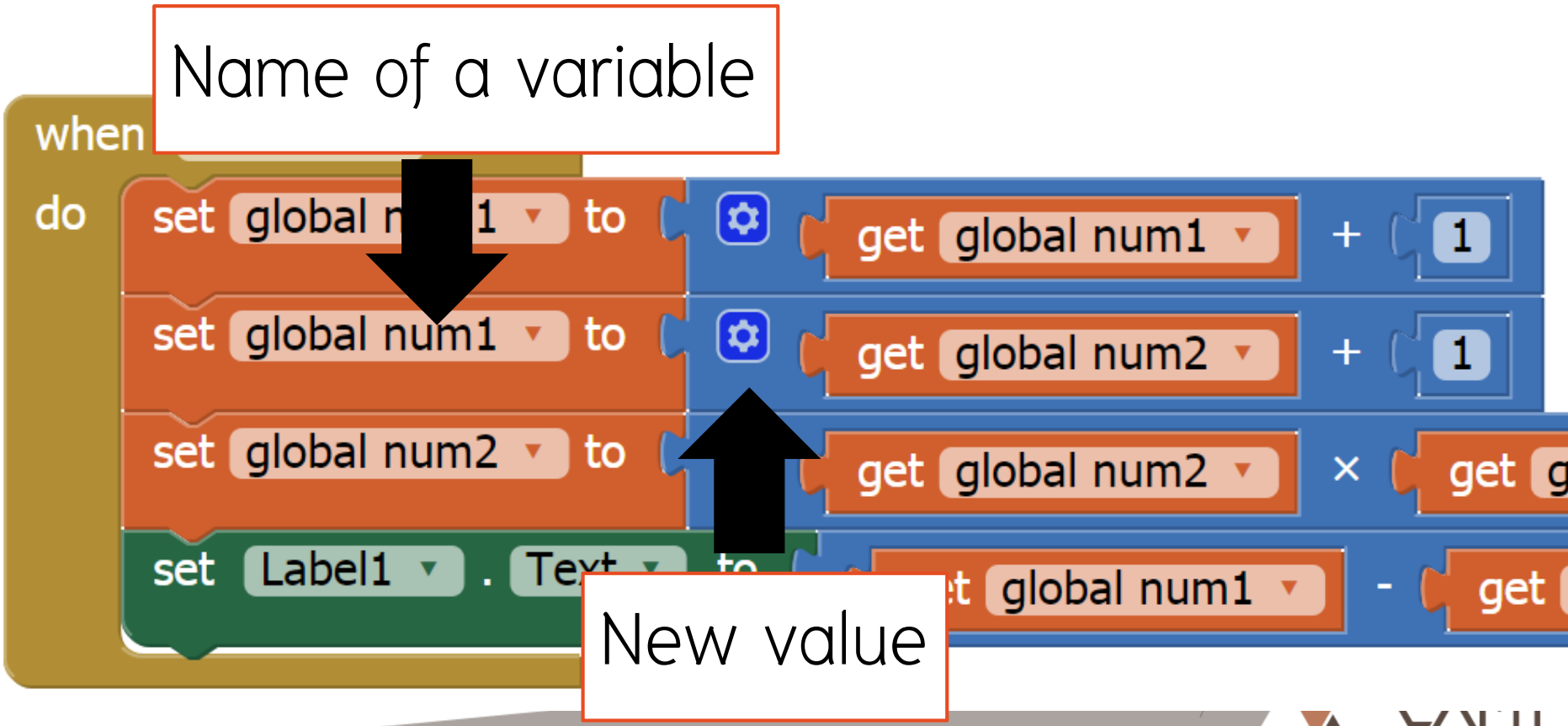
Change the value of a variable

Access the value of a variable



Change the value of a variable

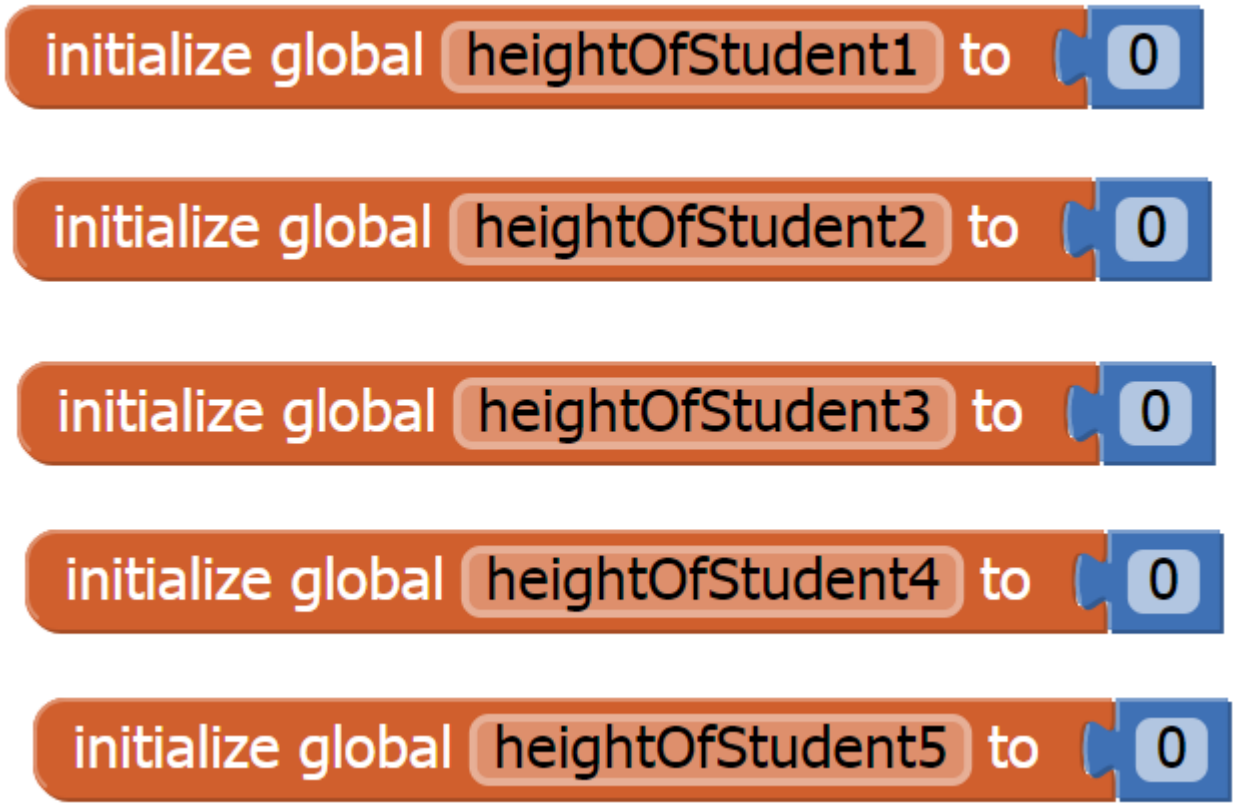
(AKA Assignment)



What if I want to store the height of all student in class.

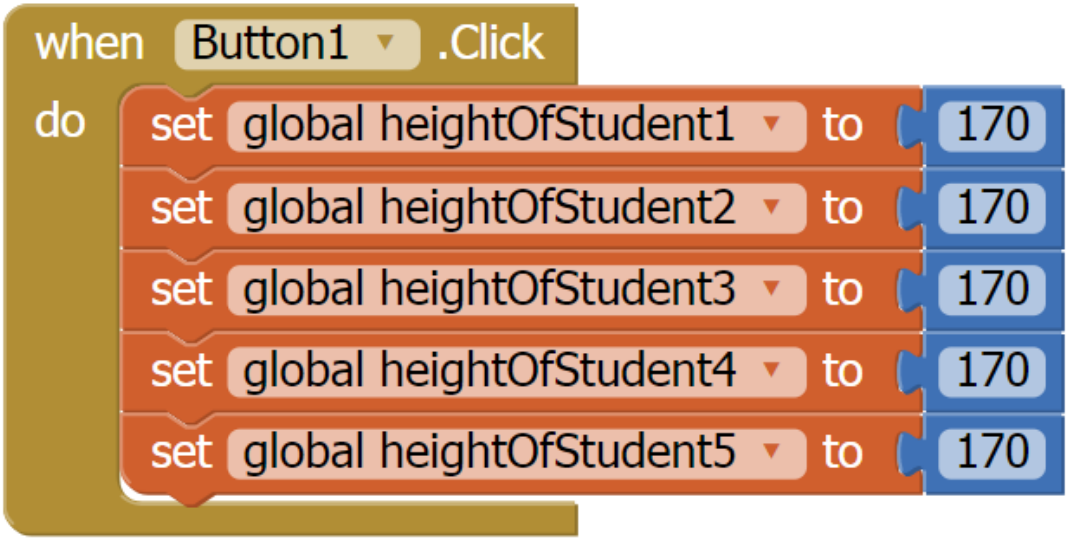
How many variables do I need?

A Class has 5 students



Problems

- It is a waste of time in creating variable**s**.
  - You have to repeatedly create variable**s**.
- It is hard to access and use the value
  - You have to do it separately. One variable at a time.

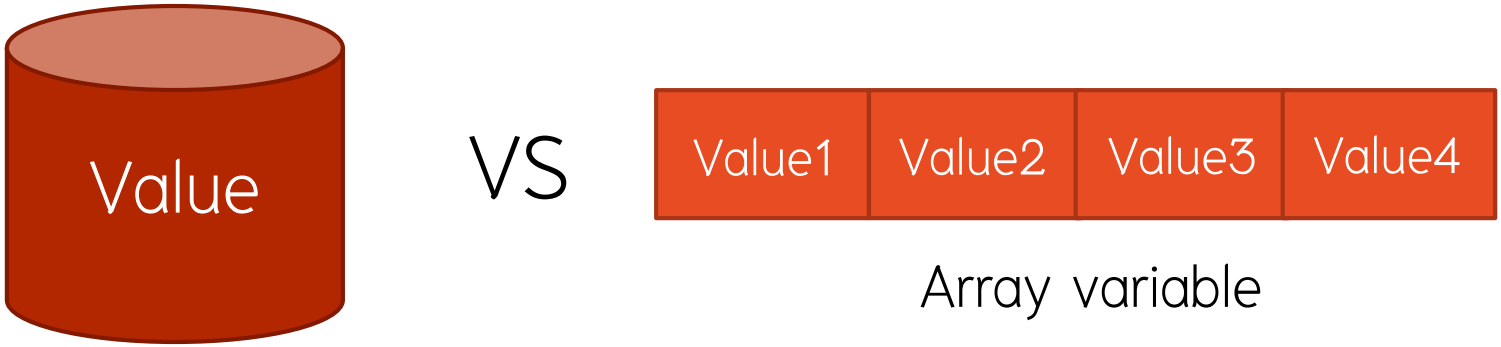


Array

What is arrays

- One name for many data.
  - One variable to store the height of each student in the class

- An *array* is a named sequence of variable capable of holding a *collection* of data of the same type.

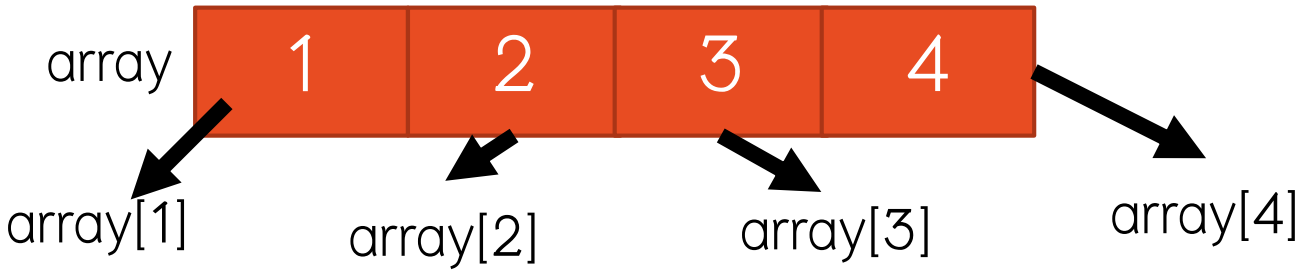


Traditional variable

Characteristics of Array

- It is a type of variable.

- For each element in the array, we can access it by using index.
  - Index = an integer to represent the position of data.

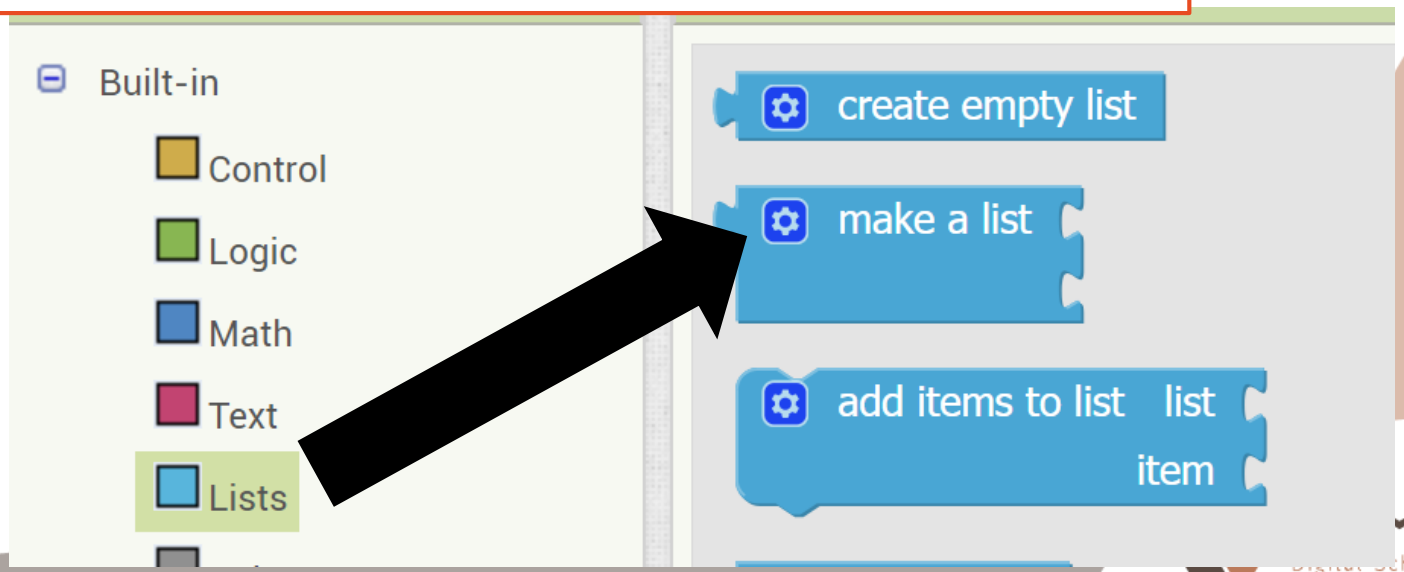


- Normally, the element in an array has the **same data type**.

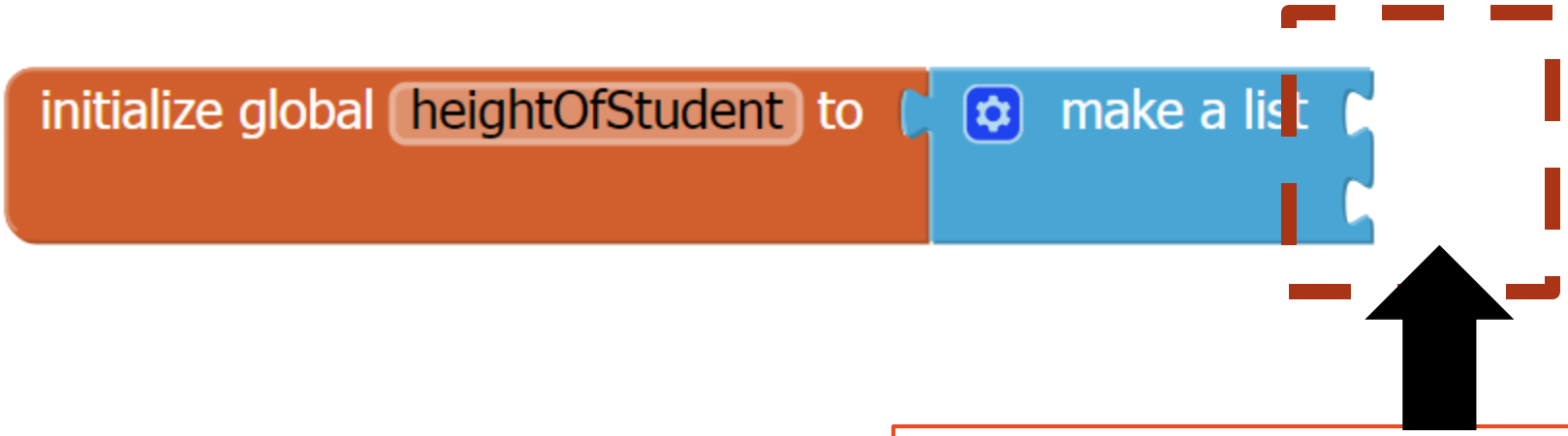
Array Creation

1. Create a variable

2. Use “make a list” block to create array



Array Creation

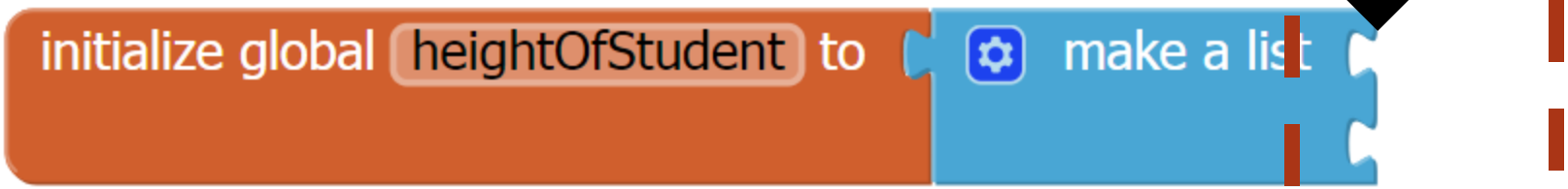


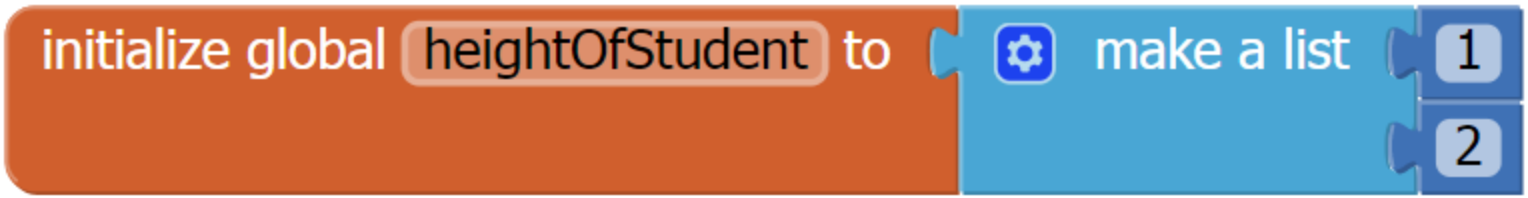
We need to initialize the array.

Init

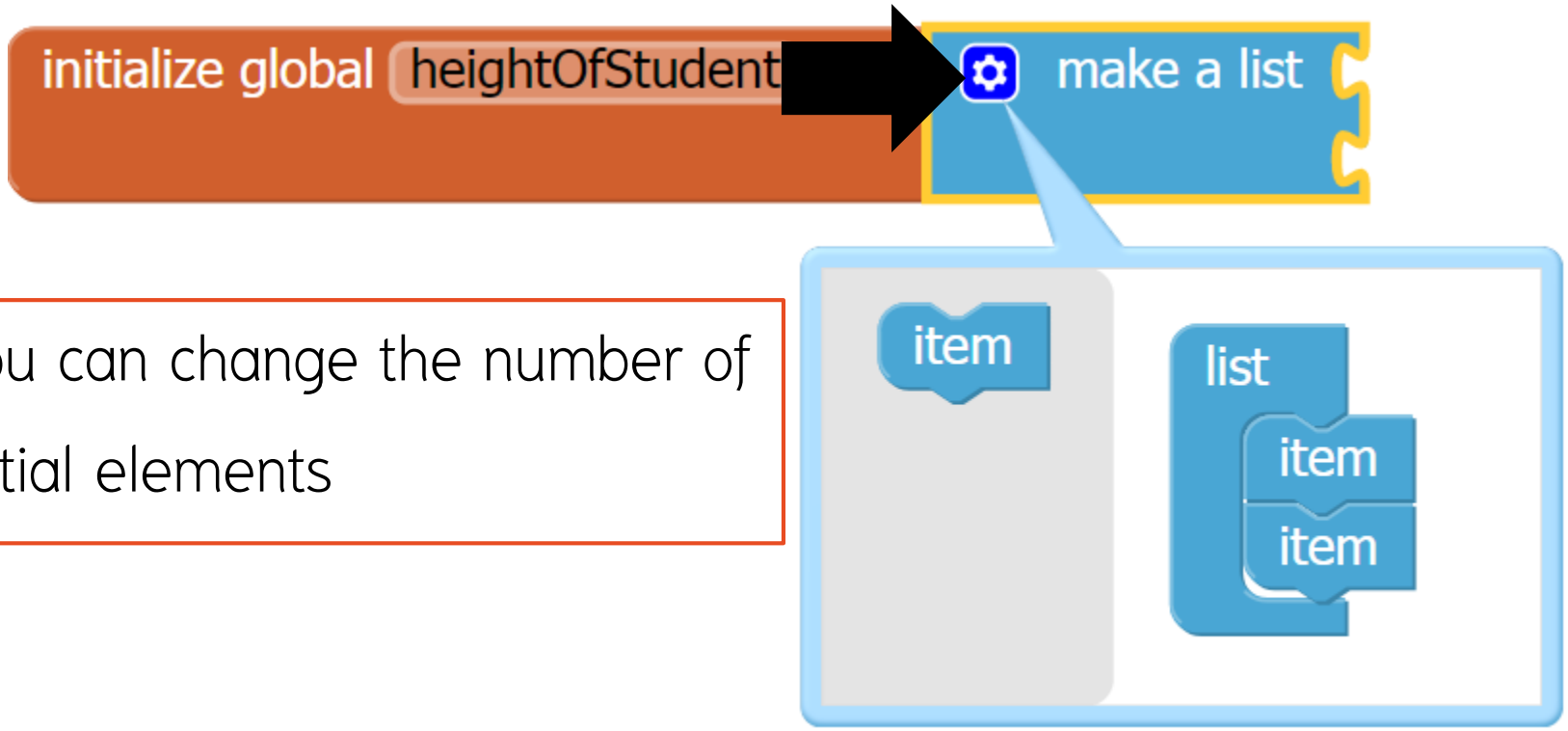
Array Initialization

Drag the value into the slot.



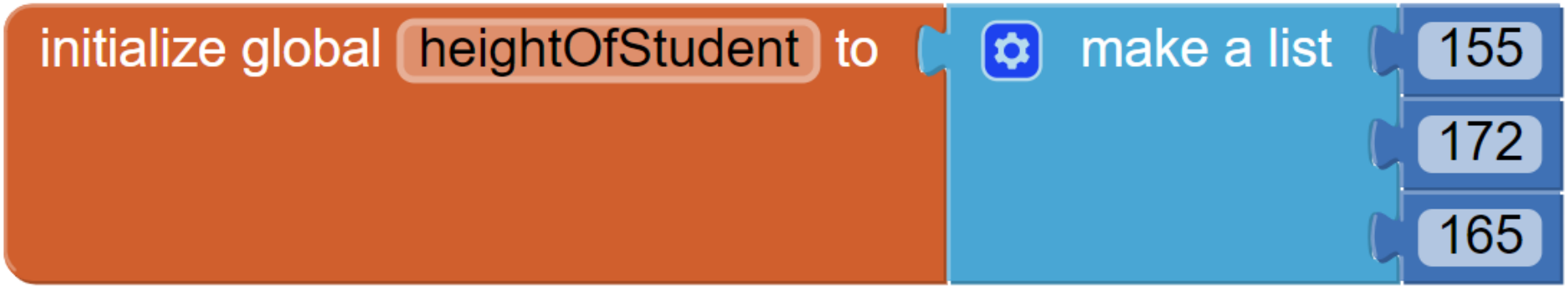


Array Initialization



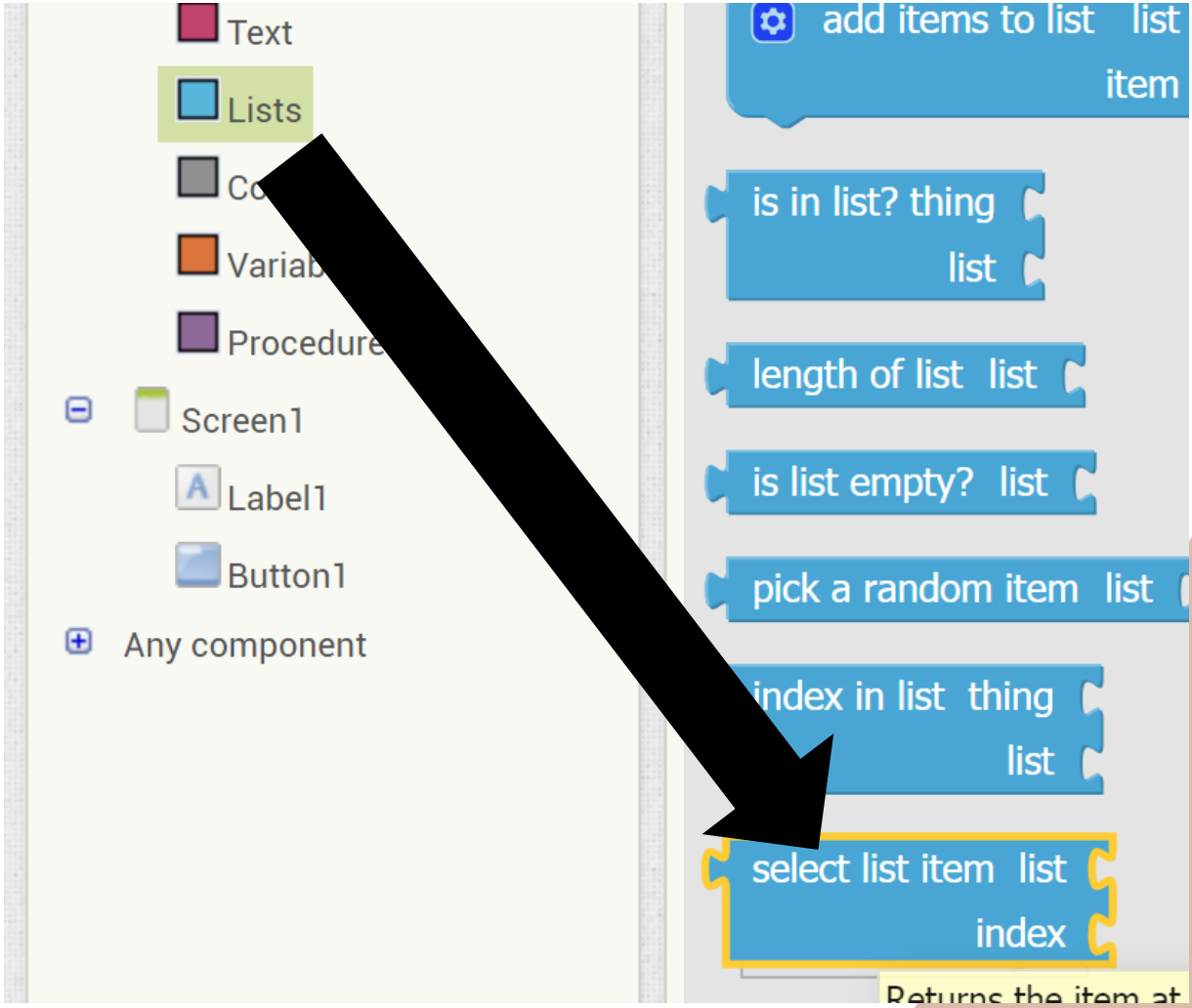
You can change the number of initial elements

Array Initialization

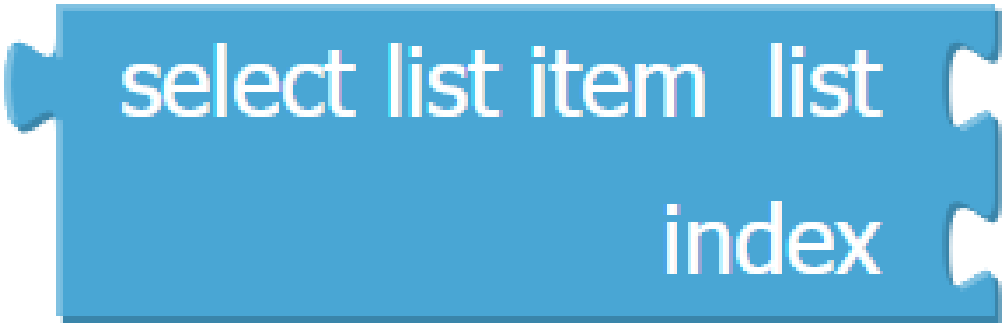


Array Access

- You will need 2 things.
  - Array variable
  - Index
- The index of array starts from 1 .
- Other language may be different.
  - Starts from 0 .



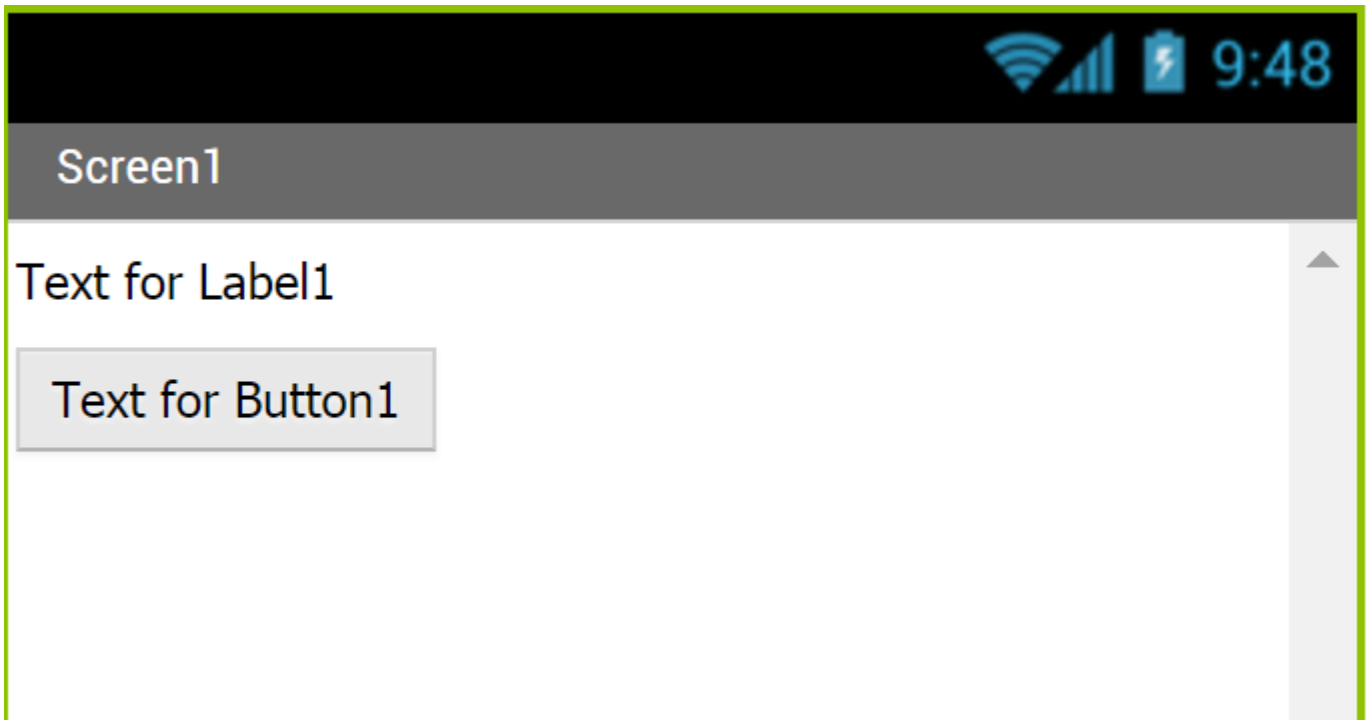
Array Access



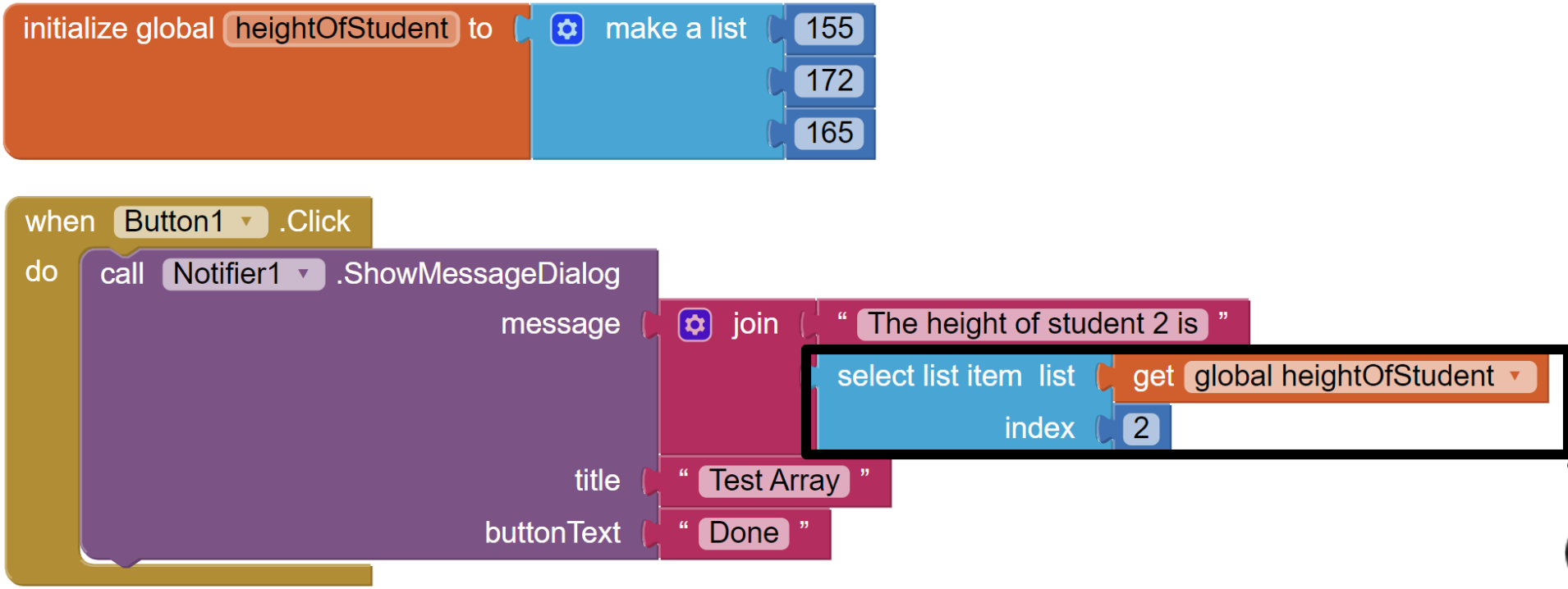
Name of the array

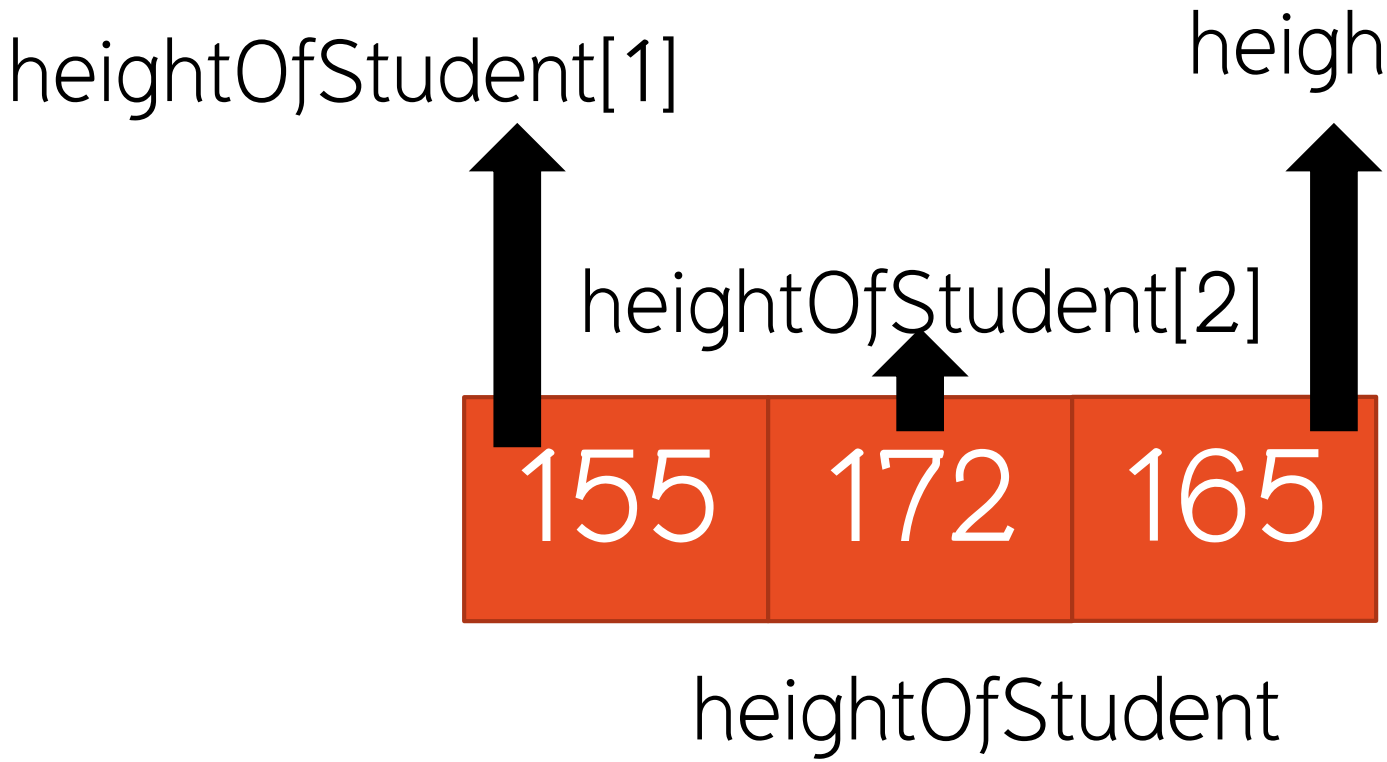
The index of element

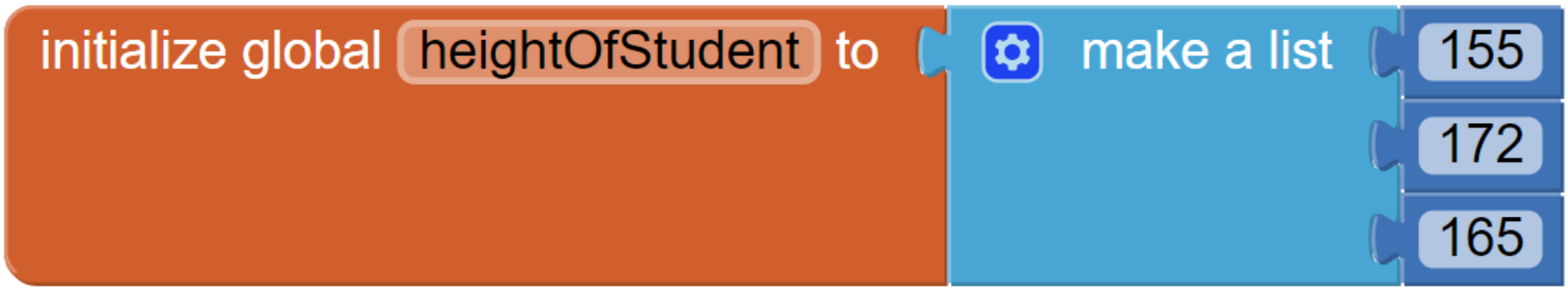
Example



Example

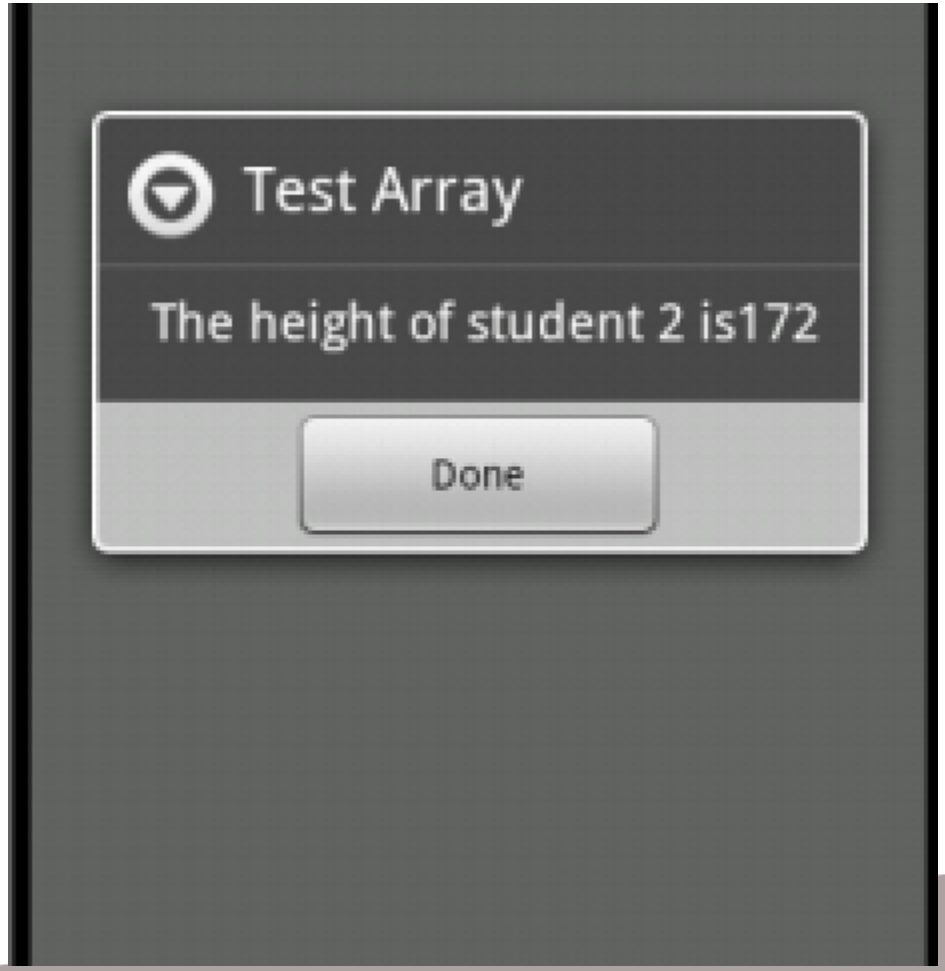



heightOfStudent[1]
heightOfStudent[3]
heightOfStudent[2]
155
172
165
heightOfStudent

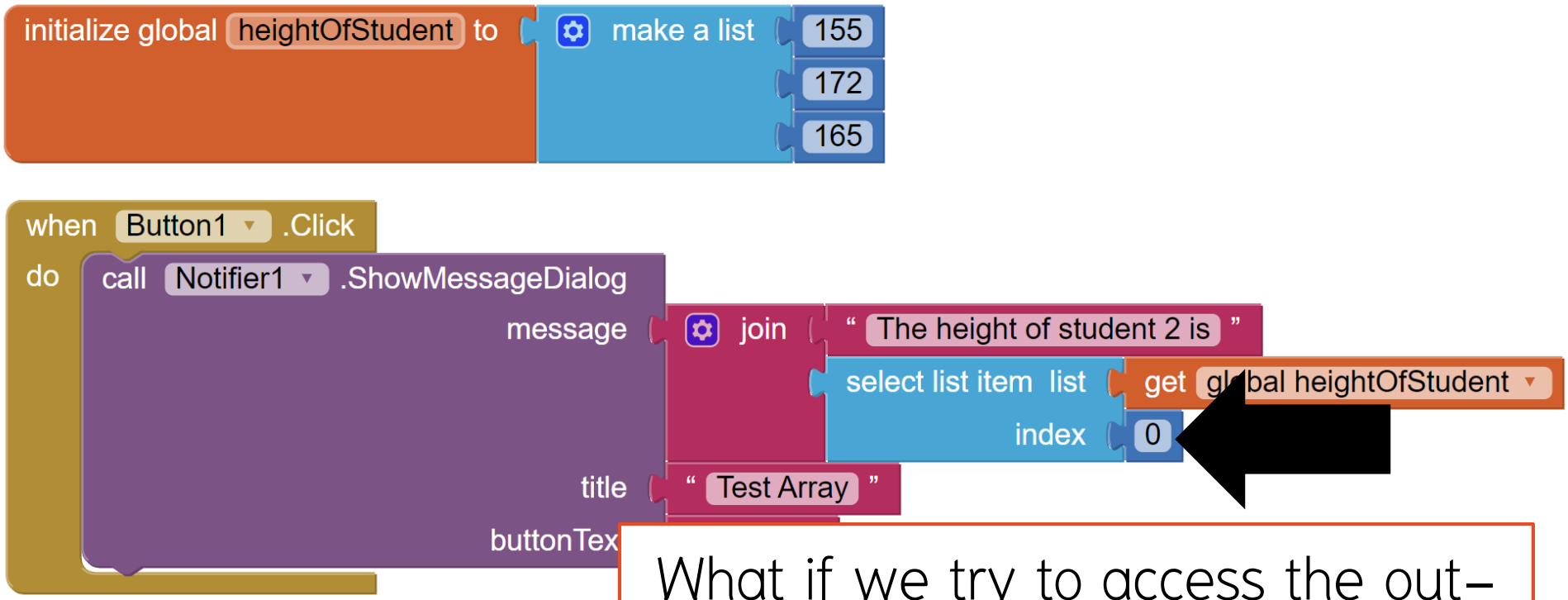

initialize global heightOfStudent to
make a list
155
172
165

Example

- The result of the program is as follows.



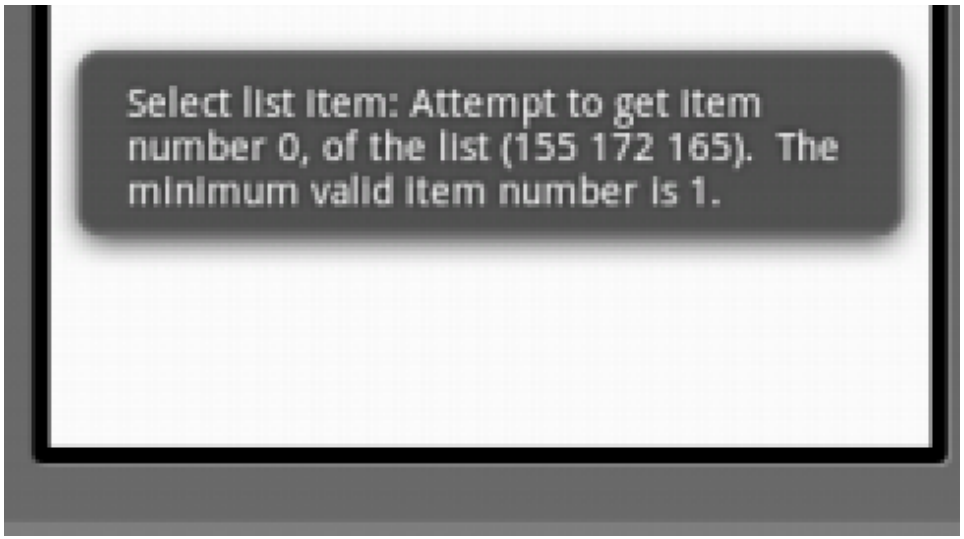
Example 2



What if we try to access the out-of-bound elements

Example 2

- The error message will pop up.



Runtime Error

Select list item: Attempt to get item number 0, of the list (155 172 165). The minimum valid item number is 1.
Note: You will not see another error reported for 5 seconds.

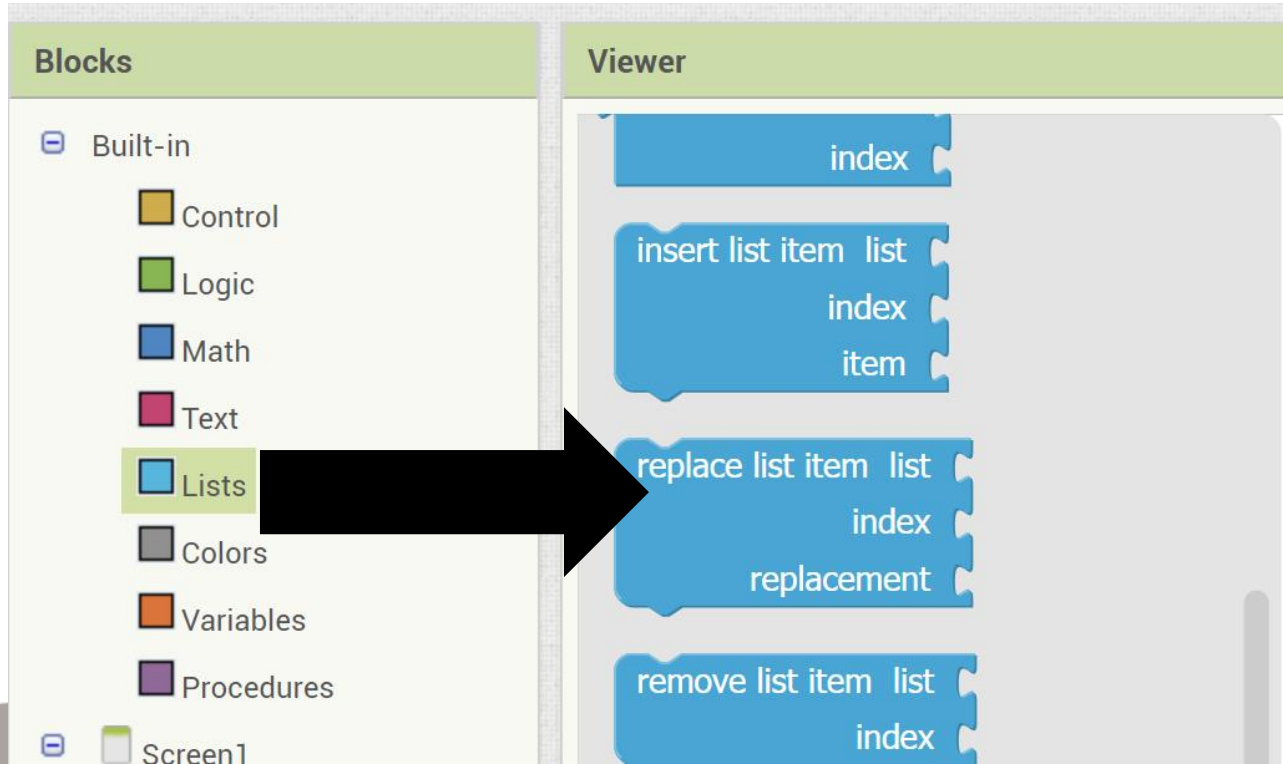
Dismiss

Example 2

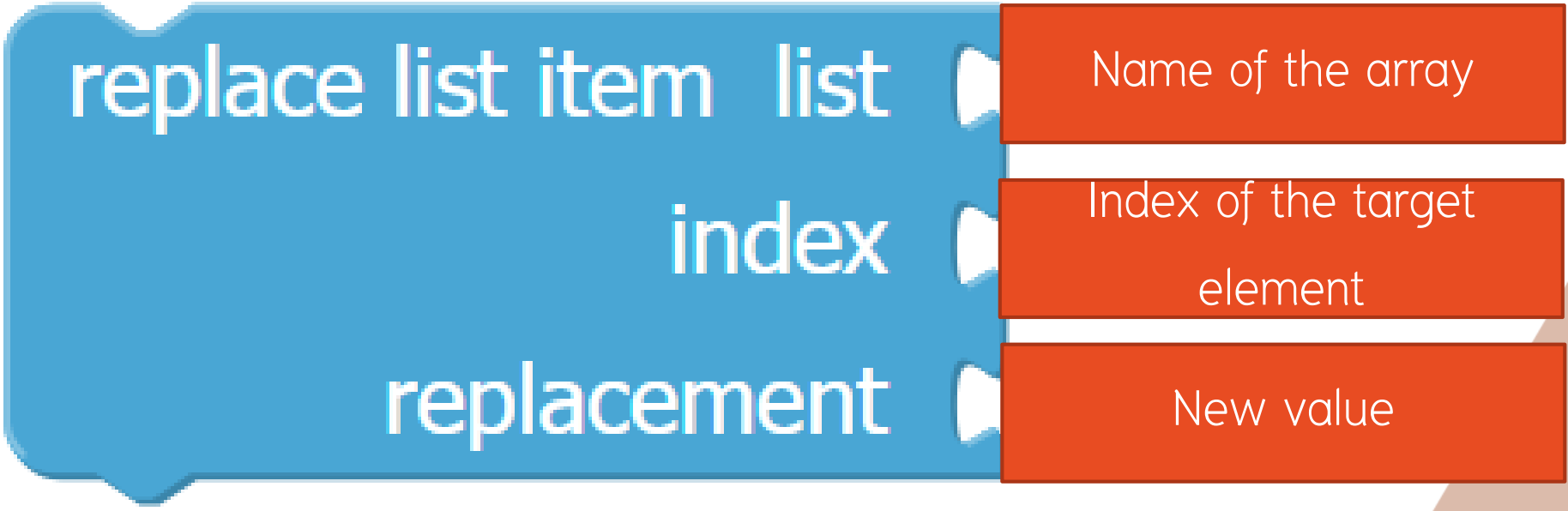
- Index-out-of-Bound error
- Runtime error
- This error will show when you try to access the element of the array that is beyond the scope of the array.

Value Assignment in Array

- You will need 3 things.
  - Array variable
  - Index to assign a new value
  - The target value

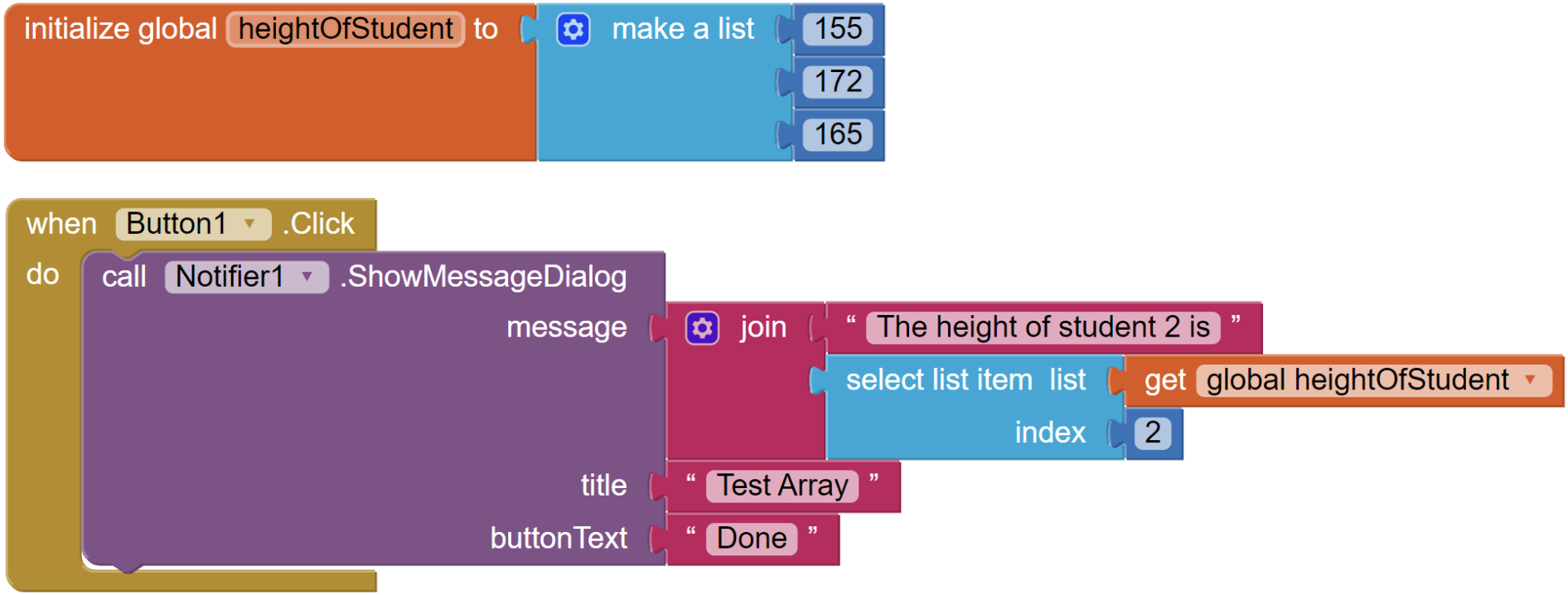


Value Assignment in Array



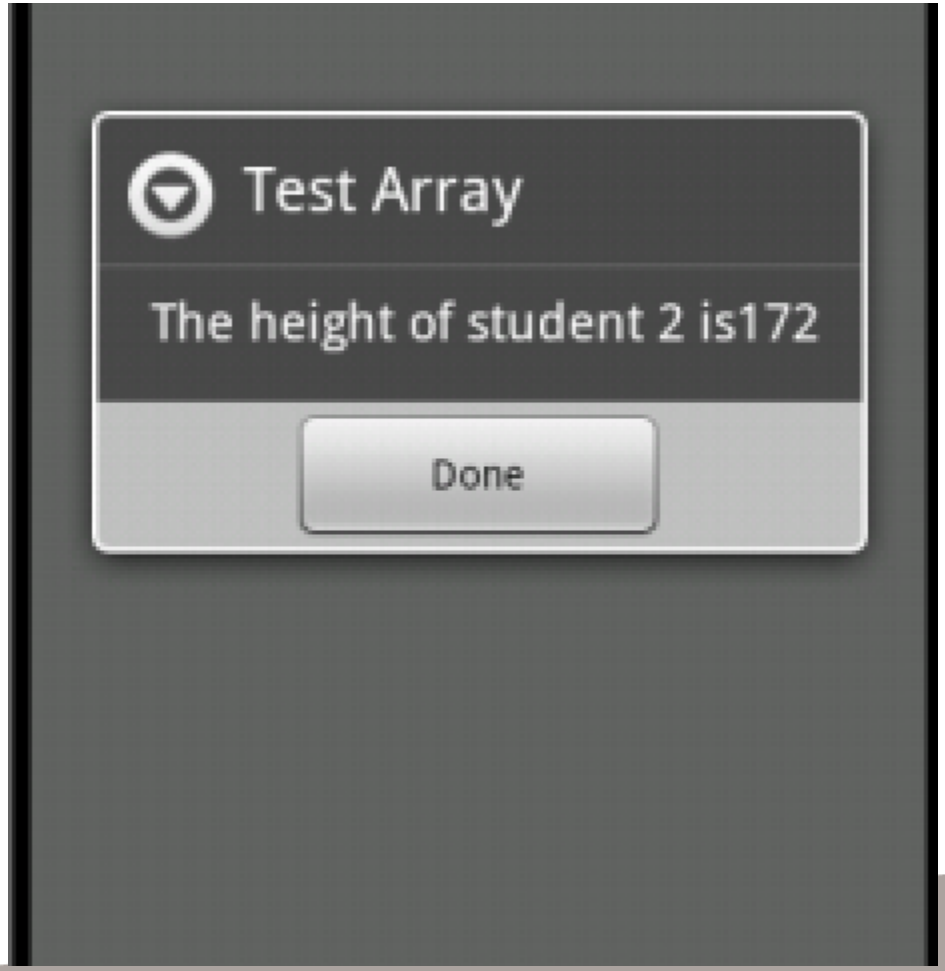
Example

- Using the same user interface

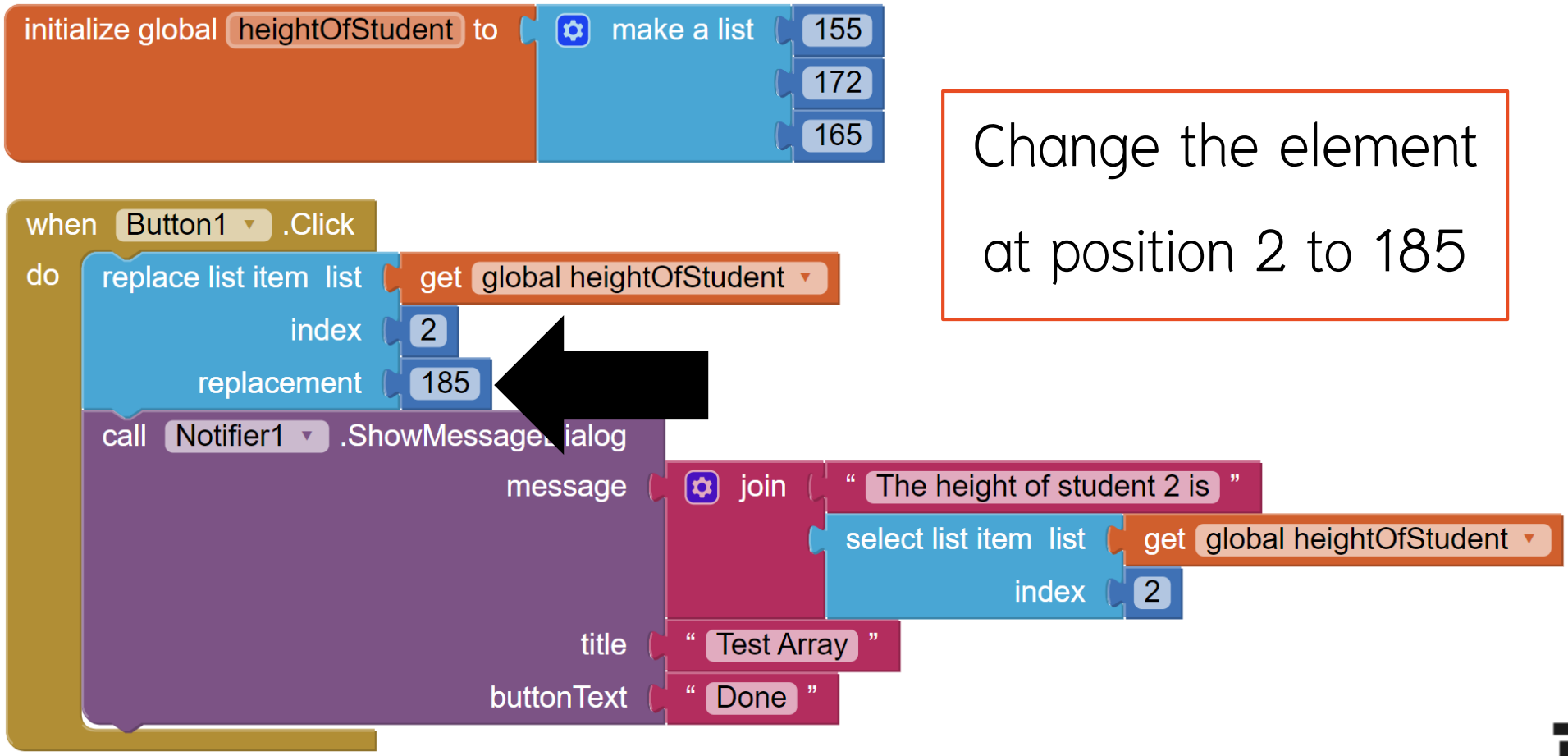


Example

- The result of the program is as follows.

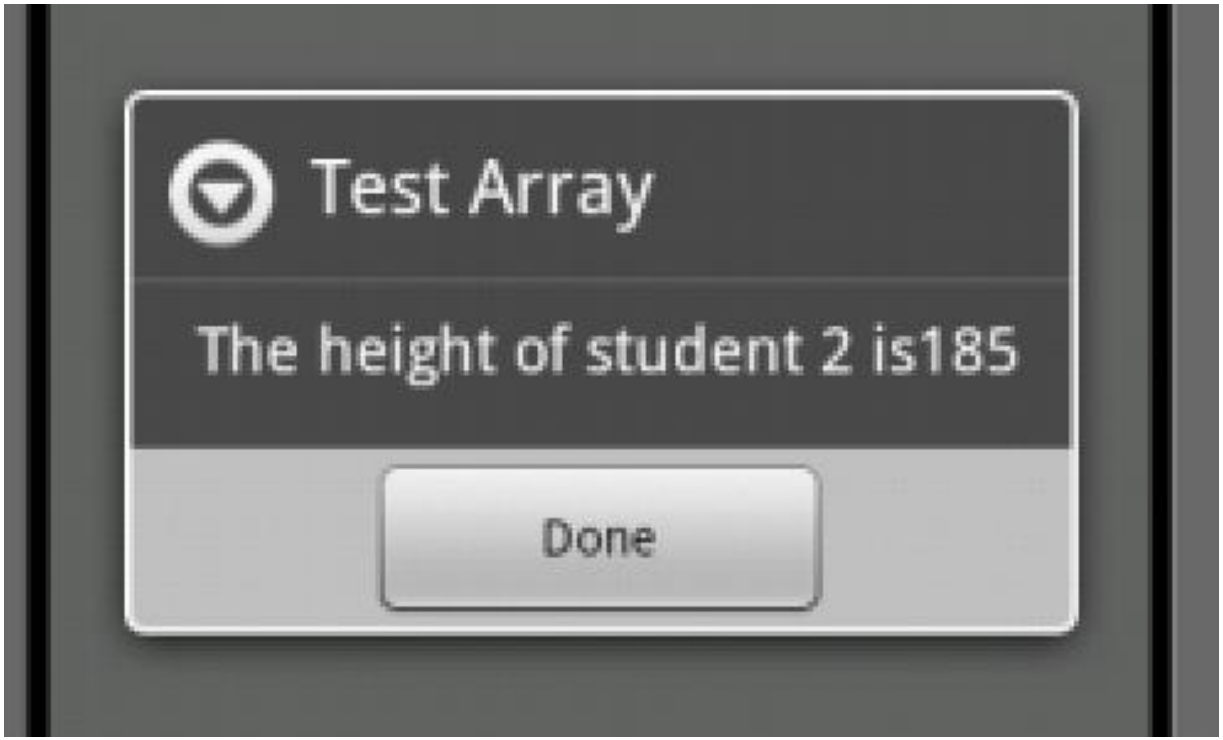


Example



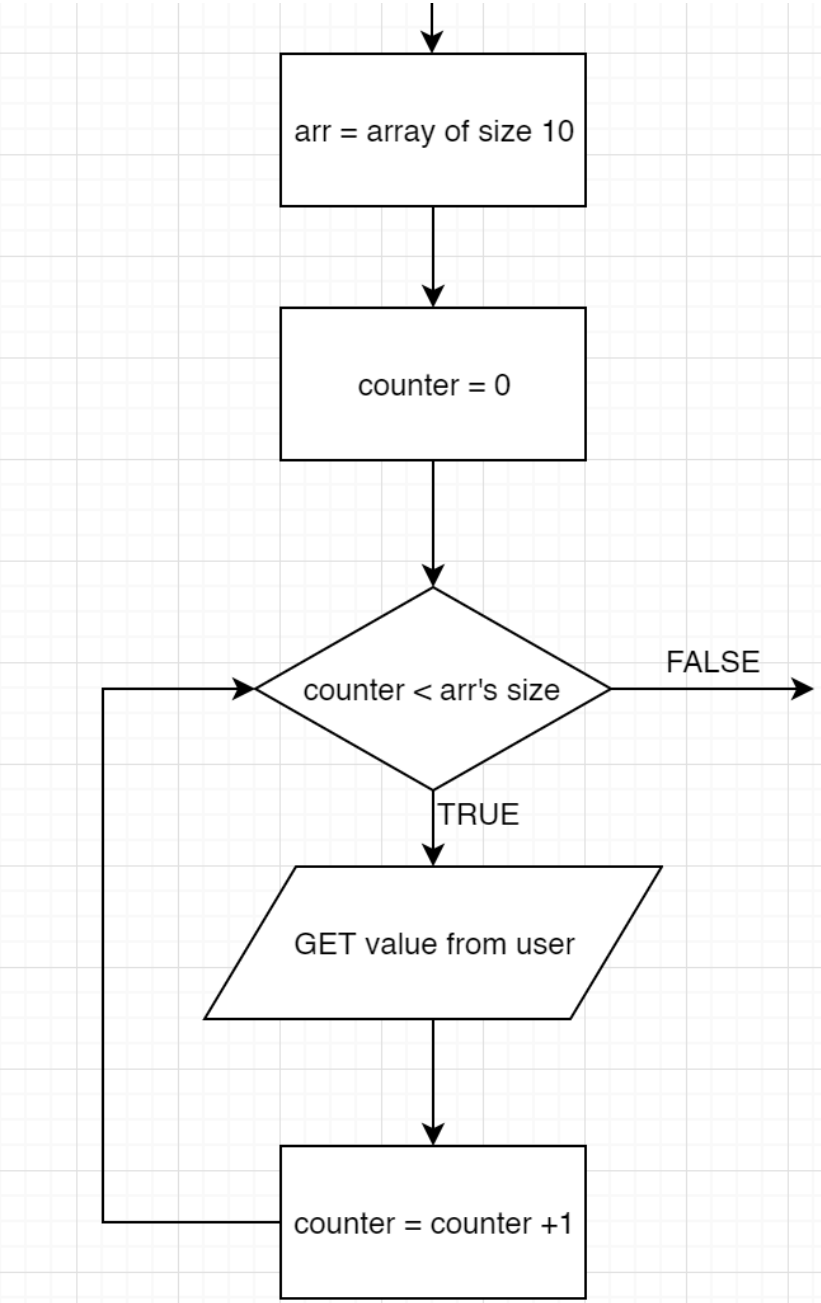
Change the element at position 2 to 185

- The result of the program is as follows.



Array Usage Technique

- Walk through the list of the array
  - Loop
- You can change the GET value to some other process
- Common structure when work with array



Q&A