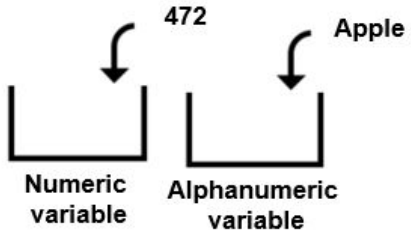
Lesson 17 – Variables



What we will Learn?

In the last lesson we learnt about operator blocks that can handle numeric & alphabetic data.

To be of any use this needs to be first entered, then stored & finally retrieved as & when required.

This is done using variables & lists.

Variable (var) & Terms Associated with them

In programming, think of var as an **Empty box**.

For identification, this box must **have a Name**.
This has to be assigned by us.

Process of giving a name is called
Declaring a variable.

Vars store a Value.
This value is also given by us.

Giving a value to a var is called Assigning a var.

Process of giving value for first time is called Initialising a Var.

The box can contain only one value.

A box with no value is called an Empty Var. It is very useful in coding.

Types of Variables

We have three basic types of var:

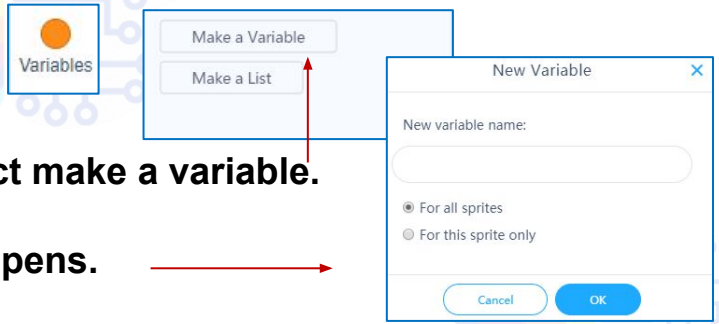
- Numeric var, loosely called Variables.
- Alphanumeric var, more commonly called Strings or a sequence of alphabets.
- List var.

Numeric var will be studied in level 1, & Strings in level 2.

Making a Variable

Scratch provides no block statements for variables. They have to be made. To do so:

- **Select sprites in SIA.**
- **Select var block in block area.**
- **In the window that opens, select make a variable.**
- **New Variable making window opens.**

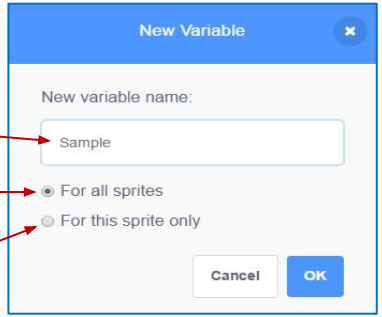


Give the var a name (say Sample).

Select For all sprites (default) for making a Global Var.

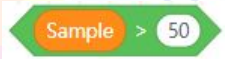
Select For this sprite only for making a Local Var.

Click OK.



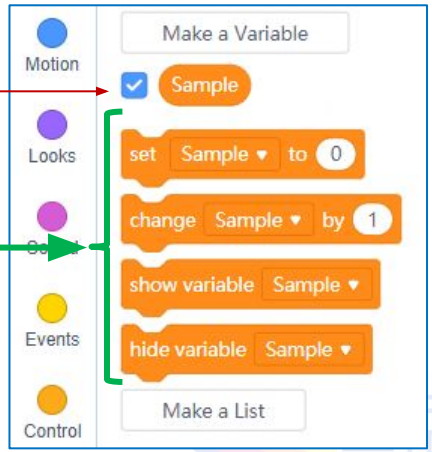
Var Named Sample has been made.
Its block statements appear in the block area.

The first is a boolean block
It will be used accordingly.



Next four are stack blocks.

They have a dropdown.
Since at present we have made only one var
only one appears in the dropdown of all four.



Saving the Variable

In programming, once made, vars are kept at a Specified Location allocated to it in a computers memory.

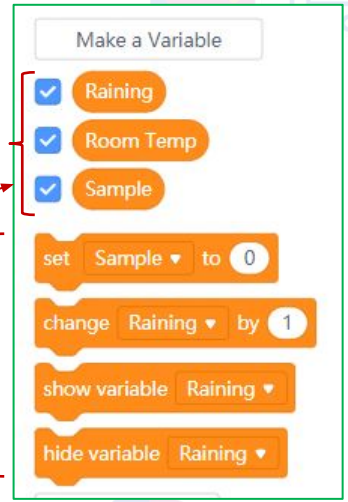
The computer remembers its name & location. This happens automatically without you having to bother.

In Scratch, details of saved var appears on the left hand side of the stage.

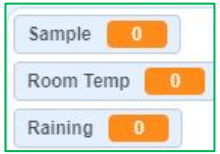
In projects, we may require to make more than one var.

In such cases
Names of all var will appear on the top.

Stack statements come below them.



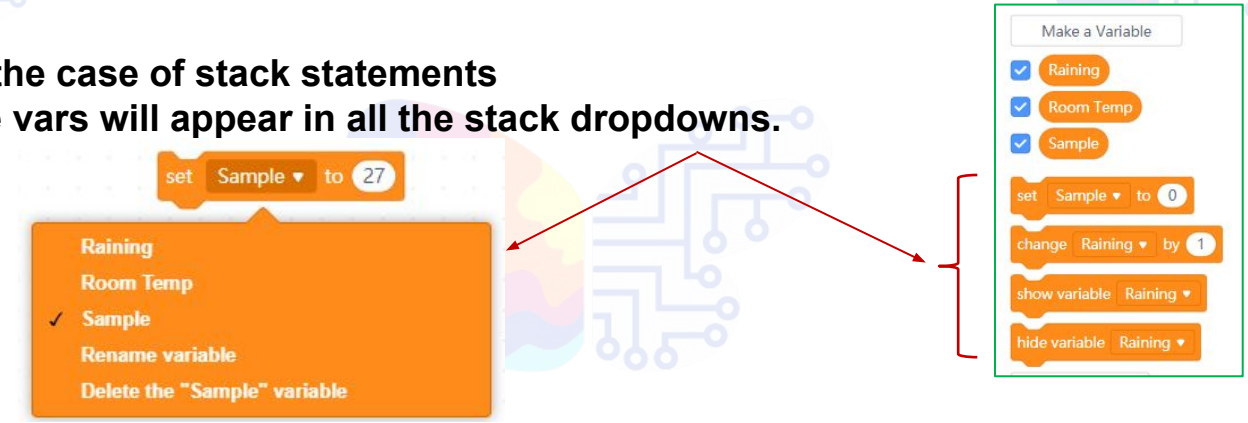
In multi var projects name will appear
in the left of the stage area, one below the other.



At this stage, value of all is set at zero (default).

These will get changed later as per the codes need.

In the case of stack statements
the vars will appear in all the stack dropdowns.

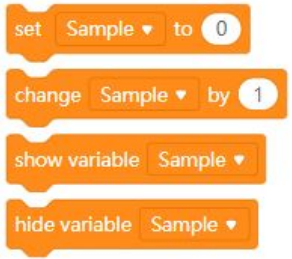


The default value 0 can now be changed & set as per need. set Room Temp to 27

In interactive projects, this value comes later when the code is run.

Assigning a Value

To work for us, var named Sample needs to be assigned a value.
This is done using the white roundel of first block statement.



Second changes value by specified amount.
Its dropdown also enables us to:

- Rename the var.
- Delete the var.

Statements 3 & 4 are used to control the appearance & hiding of the var as per its use in the code.

To consolidate this part, make one numeric vars named - **Runs.**

See how it appear on the stage.

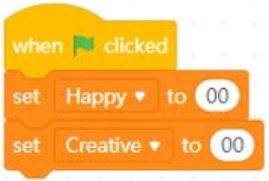
Next play around with its name, value, hide & show.

Project 43. Making a Simple Football Scoreboard

In this project we create two team var named Happy & Creative.

Next we need to make a backdrop.

Now when the game starts the scoreboard must be at 0, 0.



This is done by this code.

Now when Happy team scores:

We advances the score by 1.
This is done by this code using the right arrow as trigger.

When Creative team scores, the same is done using left arrow.

Project 44. Making a Count Controlled Loop

This ex is to make a table of 5 (increment specified in line 4).
The table should go to count up to 12 (line 2).

To make table of any other num, change value of change (line 4) by that num.
Num could be an integer or decimal.

When the loop is completed, the code exits & sets the number to its new value.

This method of making a table is better than the earlier one.

Think of the uses of this loop

Project 45. Making an OTP Generator

This makes use of 

To make an OTP generator create a var OTP.

This 

appears on the left top of stage.

Make block statement defining the OTP range.

Add a trigger. 

This will generate a four digit OTP in defined range. 

In professional coding, this would be called the **OTP Module**
it would be a part of a bigger module
or a bigger coding project

Take Aways…

In this lesson we have learnt about:

- **Types of variables.**
- **Local & global variables.**
- **Declaring, assigning & storing of variables.**
- **Renaming & deleting**
- **Adding a counter to loops.**
- **Making an OTP generator.**

Time to Do.

Go over all the projects till you can do them all yourself.

End of Lesson 17

Code Karega India Badhega