



TA Lecture Notes

September 2, 2015

Scratch is a computer programming language:

We give instructions to a computer. And then, computer is doing things based on blocks that you drag on the screen.

Scratch is a procedural programming language:

- (1) runs program top to bottom
- (2) contains loops and conditionals

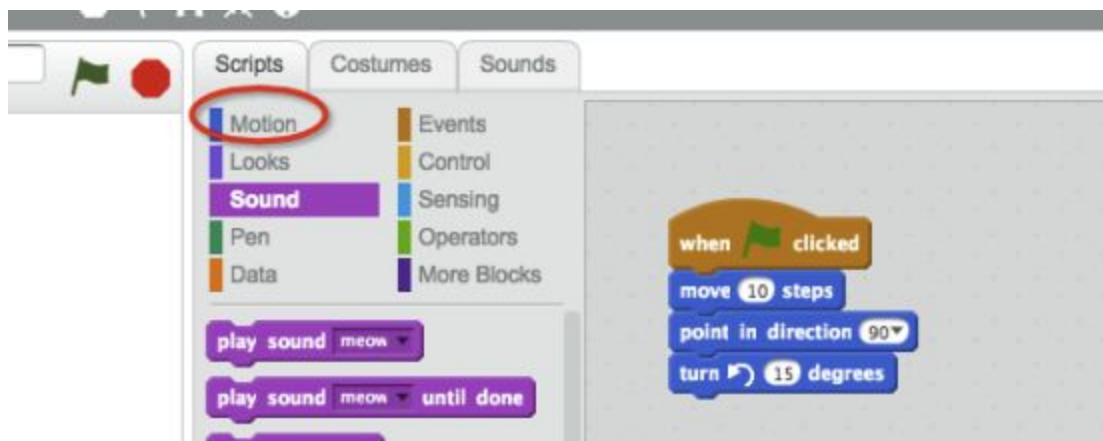
Javascript (world's most popular programming language) is exactly the same:

- (1) runs program top to bottom
- (2) contains loops and conditionals

CONVERTING SCRATCH TO JAVASCRIPT

Every scratch block is a JavaScript statement.

Statement: instruct computer to DO something (Click the "Motion" in SCRATCH, you will find several statements) e.g. move 10 steps, point in direction 90 degrees, etc.



FUNCTIONS

A very important thing in computer science which allows us to write bigger and bigger programs. Functions allow us to group code together for easy RE-USE.

A function call runs code somewhere else, that does something else.

In scratch, "say" function runs code on a sprite that has it speak.



In JavaScript, "alert" function runs code on a Web Browser that informs the user.

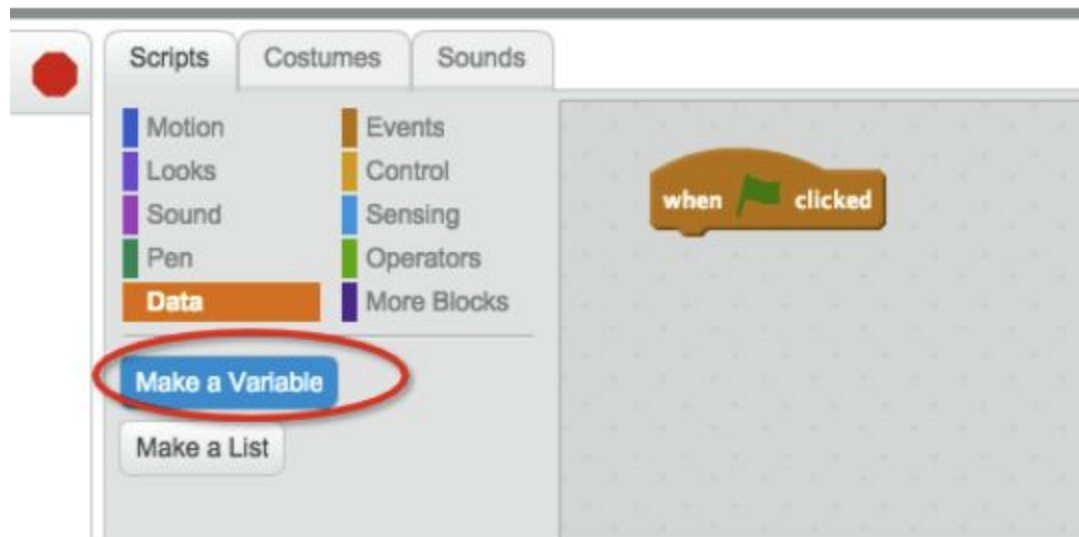
```
alert("Hello, world!");
```

Another example:

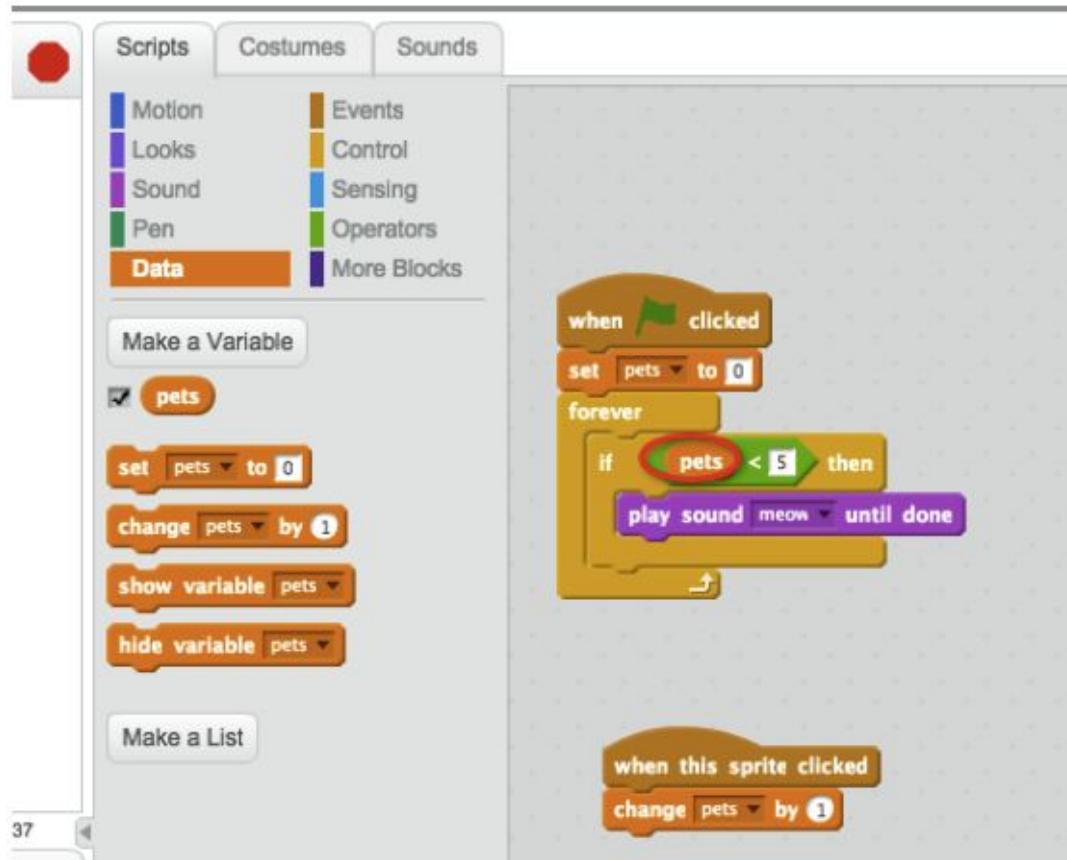


VARIABLES

Variables store data in a computer memory for later use.



Variables can be any name we give. For example, “pet” is a variable name.



Use var only the first time a variable is used. After that we can refer to the variable just by its name.

For e.g.

```
var a = 3;
```

```
var b = a * 3;
```

Here a can be used using just the variable name.

STRINGS VS NUMBERS

Strings are a sequence of characters that must be surrounded by quotes. For example: “hello”

Numbers do not have to enclosed by quotes. For example: 24.

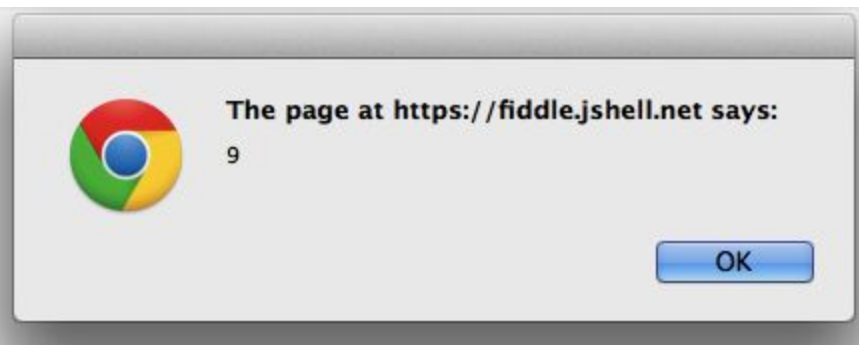
In the following code, **a** is enclosed within quotes, so it is treated as a string “a”. Thus, the alert says the string “a”.

```
1 var a = 3;  
2 a = a * 3;  
3 alert ("a");
```

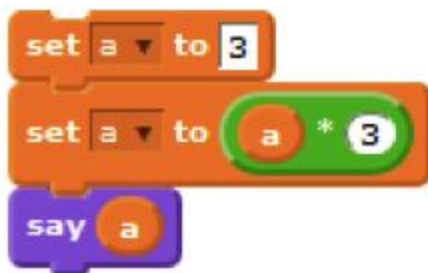


In the following code, **a** is not enclosed in quotes. So, it is treated as the variable **a** whose value is 9.

```
1 var a = 3;  
2 a = a * 3;  
3 alert (a);
```



The above code in Scratch:

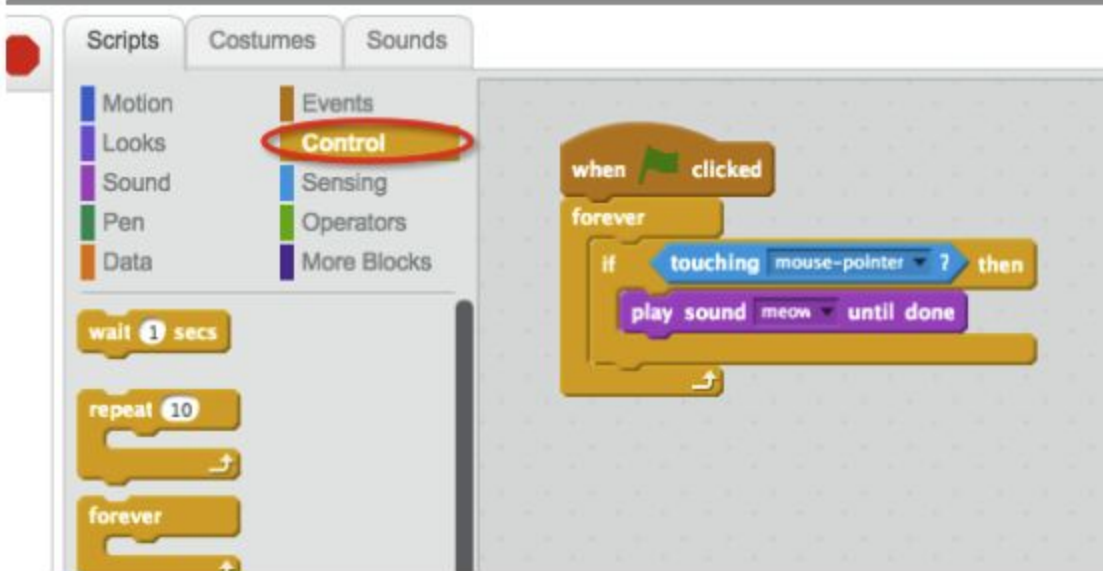


CONDITIONALS

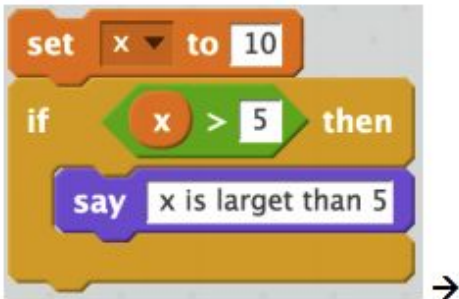
Conditionals allow the computer to make decisions based on values of variables. Conditional encapsulate other blocks, so they use curly braces and not Semicolon. For example:

```
var x = 10;
if (x > 5) {
  alert ("x is larger than 5");
}
```

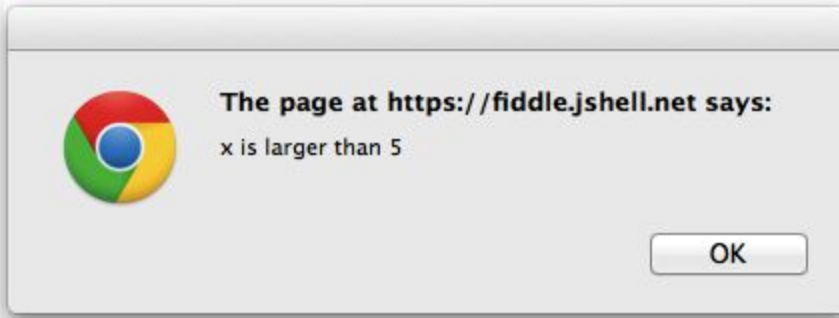
In the figure, you can find conditional in “control”.



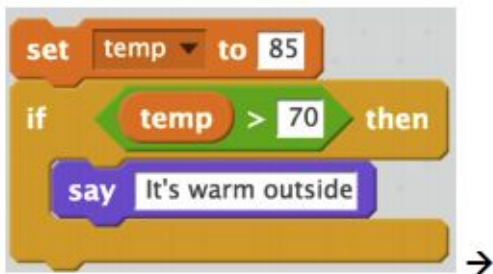
For example:



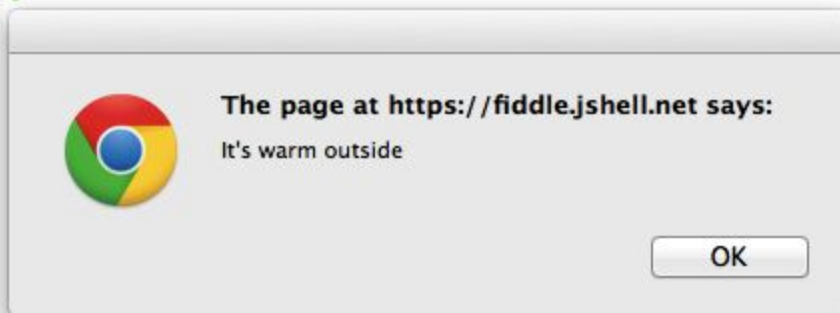
```
1 var x = 10;  
2 if (x > 5) {  
3   alert ("x is larger than 5");  
4 }
```



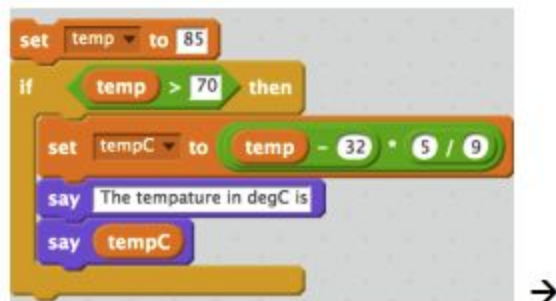
Example 2:



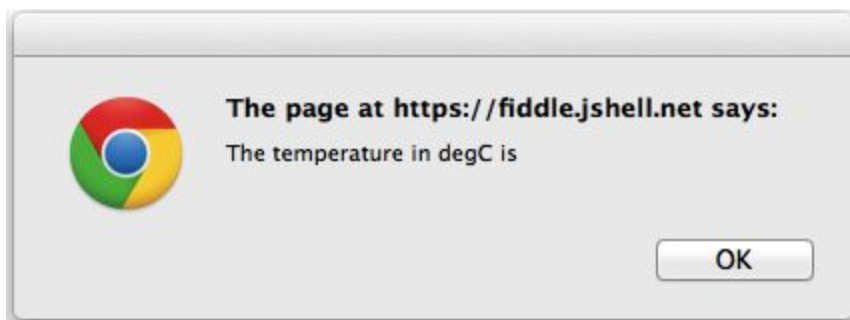
```
1 var temp = 85;  
2 if (temp > 70) {  
3   alert ("It's warm outside");  
4 }
```



Example 3:



```
1 var temp = 85;
2 if (temp > 70) {
3   var tempC = (temp-32) * (5/9);
4   alert ("The temperature in degC is");
5   alert (tempC);
6 }
```



After clicking on "OK", the following alert message comes:



The sheet which was given to you in the class has been attached here with the blanks filled. Please find it when you scroll below.

The “first rule” of converting Scratch to JavaScript:

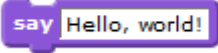
Statements: All statements tell the computer to _____ **do something** _____.

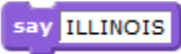

Function Calls

Definition:

A function call runs code	<u>somewhere else</u>	that	<u>does something</u>
In Scratch, the “say” function runs code	<u>on a sprite</u>	that	<u>has it speak</u>
In JavaScript, the “alert” function runs code	<u>in a web browser</u>	that	<u>informs the user</u>

Code Puzzles:

Scratch	JavaScript
	<pre style="color: red;">alert ("Hello, world!");</pre>
	<div style="display: flex; justify-content: space-around;"> [1] [2] [3] [4] </div>

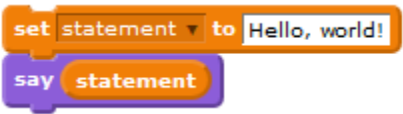
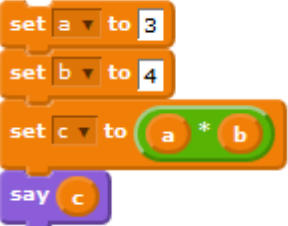
Scratch	JavaScript
	<pre style="color: red;">alert ("ILLINOIS");</pre>
	<pre style="color: red;">alert ("CS"); alert ("105");</pre>

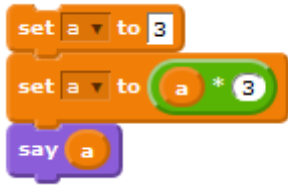
Variables

Definition:

- Variables store data in the computer’s memory for later use.

Code Puzzles:

Scratch	JavaScript
	<pre style="color: red;">var statement = "Hello, world!"; alert (statement);</pre>
	<pre style="color: red;">var a = 3; var b = 4; var c = a * b; alert (c);</pre>
Scratch	JavaScript



```
var a = 3;
var a = a * 3;
alert (a);
```

Definition:

- Strings are _____ **words** _____ and **must be** surrounded with _____ **quotes** _____
- Non-strings are _____ **variables** _____ and **are NOT** surrounded with _____ **quotes** _____
- Use of **var**: _____ **only the first time you refer to the variable** _____

Conditionals

Definition:

- **Conditionals** allow the computer to _____ **make decisions** _____ based on _____ **values of variables**.
- **Conditionals** encapsulate other blocks, so they use _____ **curly braces** _____, **NOT** _____ **Semicolons** _____.

Code Puzzles:

Scratch	JavaScript
	<pre>var x = 10; if (x > 5) { alert ("x is larger than 5"); }</pre>

Code Puzzles:

Scratch	JavaScript
	<pre>var temp = 85; if (temp > 70) { alert ("It's warm outside!"); }</pre>
	<pre>var temp = 85; if (temp > 70) { temp = (temp - 32) * (5/9); alert ("The temperature in degC is"); alert (temp); }</pre>