What is Coding?

- ***Code***
  - *The instructions in a computer program.*
  - *Instructions written by a programmer in a programming language are often called source code.*

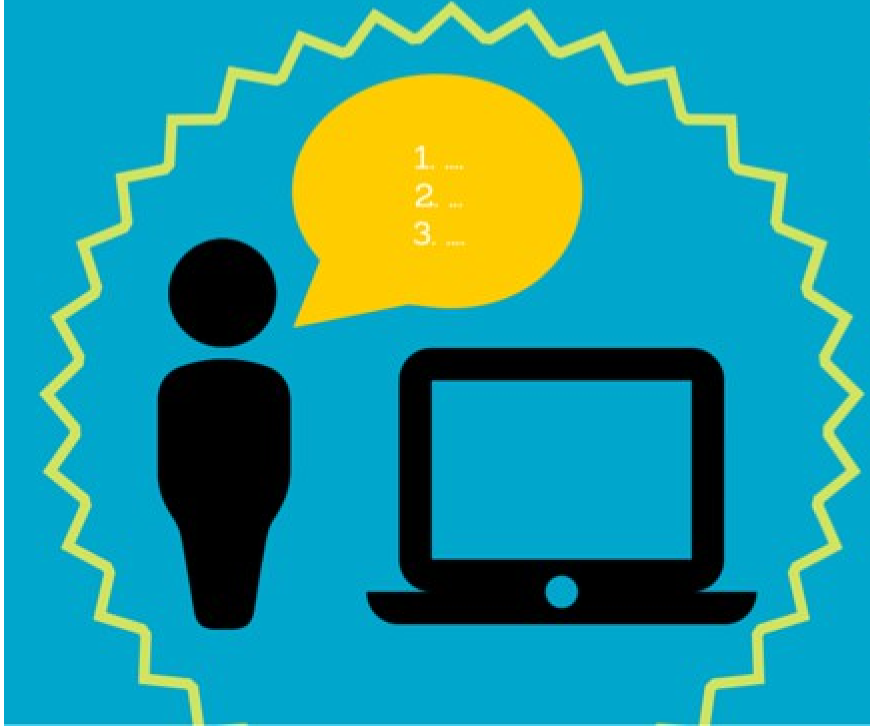
What is Coding?

- ***Program***
  - *The process of developing and implementing various sets of instructions to enable a computer to do a certain task.*
  - *These instructions are considered computer programs and help the computer to operate smoothly.*
  - *The language used to program computers is not understood by an untrained eye.*

What is Coding?

- ***Algorithm***
    - *a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.*

Coding is...



Telling the computer exactly what to do... by giving it step by step instructions to follow

WHAT IS CODING?

- Coding is about logical reasoning skills, creative problem solving and discovery of new solutions, as well as creating new solutions – innovations.
- It is about breaking bigger problems into smaller ones to be able to solve the bigger problems and create bigger solutions.
- Coding is commanding computer what to do; programming and instructing, so that it knows what, how and when to do the things needed.

Types of Coding

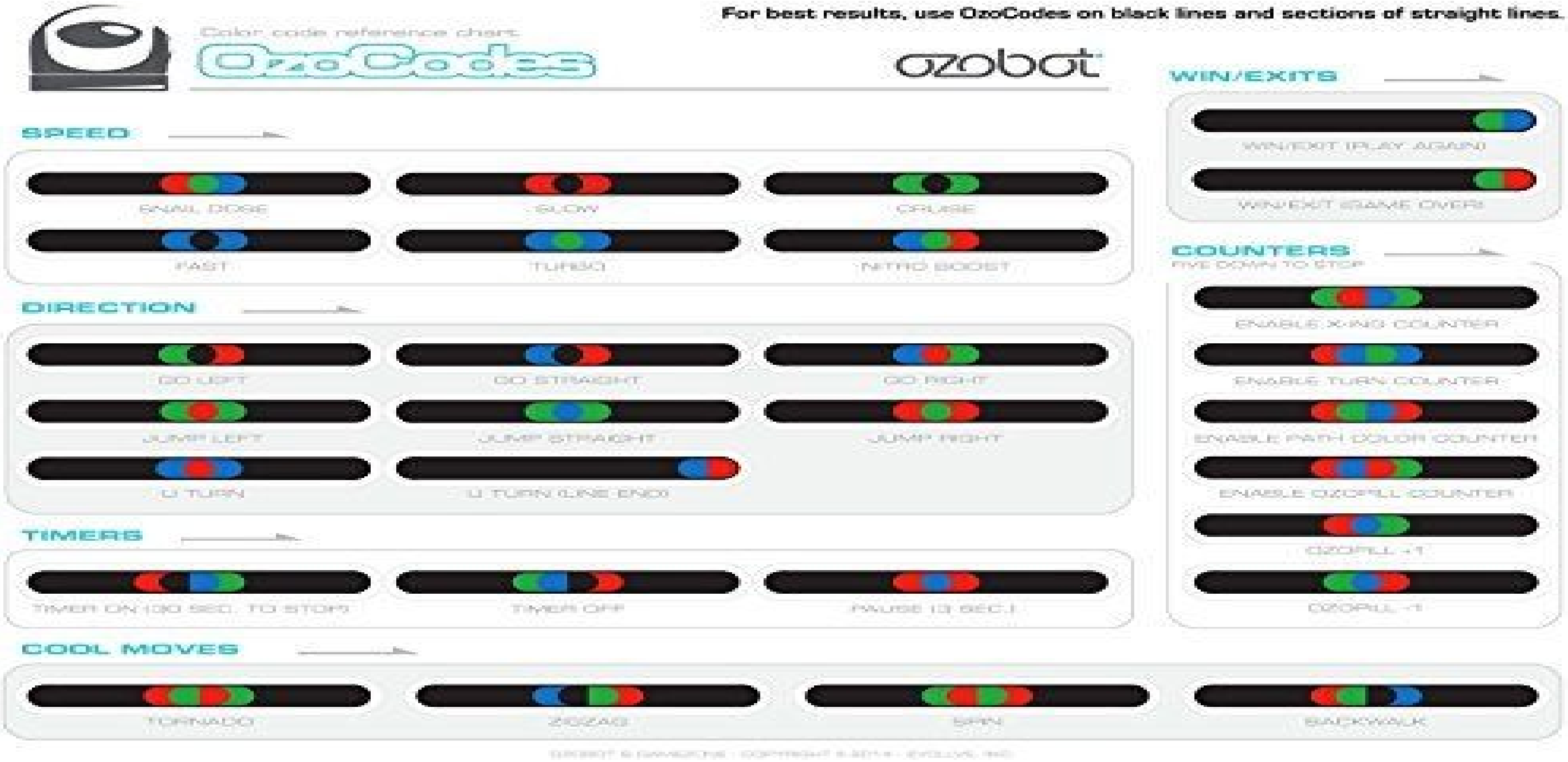
- *Draw Programming (beginner)*
- *Block Programming (intermediate)*
- *Text Based Coding (Advanced)*

Draw Programing (beginner)

- *The simpler method of programming.*
- *Users draw lines to program their robot and can modify speed and colour.*

Ozobot (Drawing based coding)

Ozobot (Drawing based coding)



For best results, use OzoCodes on black lines and sections of straight lines.

Color code reference chart

OzoCodes

ozobot

SPEED

SNAIL DOSE

SLOW

CRUISE

FAST

TURBO

NITRO BOOST

DIRECTION

GO LEFT

GO STRAIGHT

GO RIGHT

JUMP LEFT

JUMP STRAIGHT

JUMP RIGHT

U TURN

U TURN (LINE END)

TIMERS

TIMER ON (30 SEC. TO STOP)

TIMER OFF

PAUSE (3 SEC.)

COOL MOVES

TORNADO

ZIGZAG

SPIN

BACKWALK

WIN/EXITS

WIN/EXIT (PLAY AGAIN)

WIN/EXIT (GAME OVER)

COUNTERS

FIVE DOWN TO STOP

ENABLE X-ING COUNTER

ENABLE TURN COUNTER

ENABLE PATH COLOR COUNTER

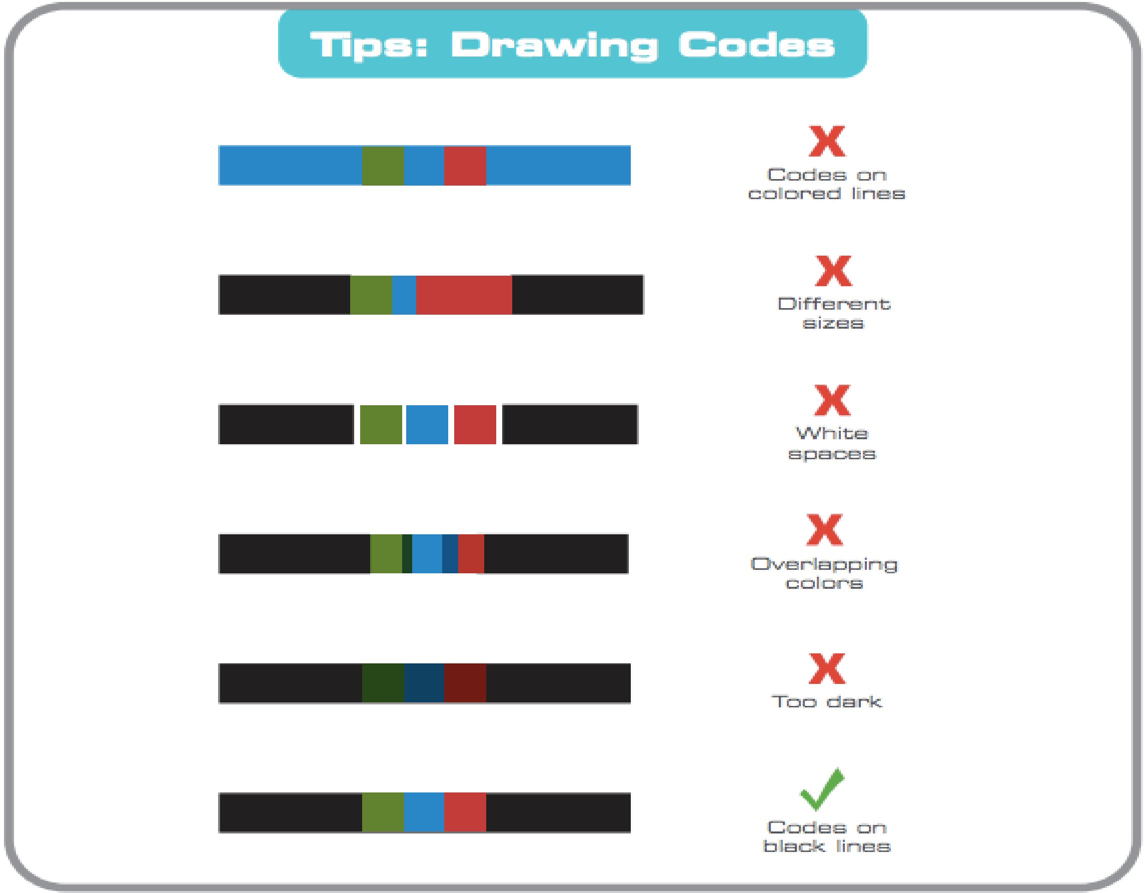
ENABLE OZOPILL COUNTER

OZOPILL +1

OZOPILL -1

OZOBOT & OZOCODES - COPYRIGHT © 2014 - EVOLLVE, INC.

Ozobot (Drawing based coding)



Tips: Drawing Codes

✗ Codes on colored lines

✗ Different sizes

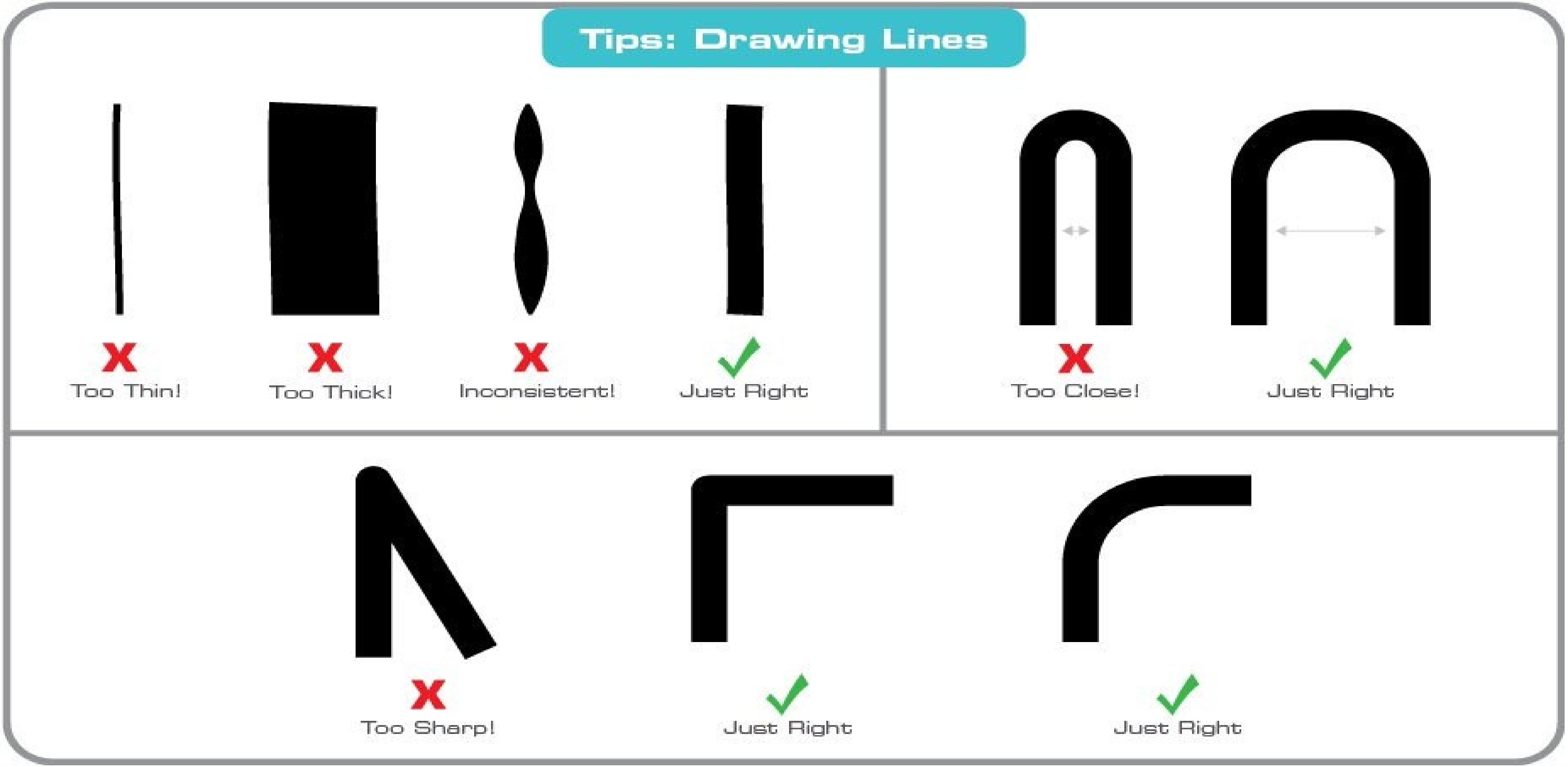
✗ White spaces

✗ Overlapping colors

✗ Too dark

✓ Codes on black lines

Ozobot (Drawing based coding)

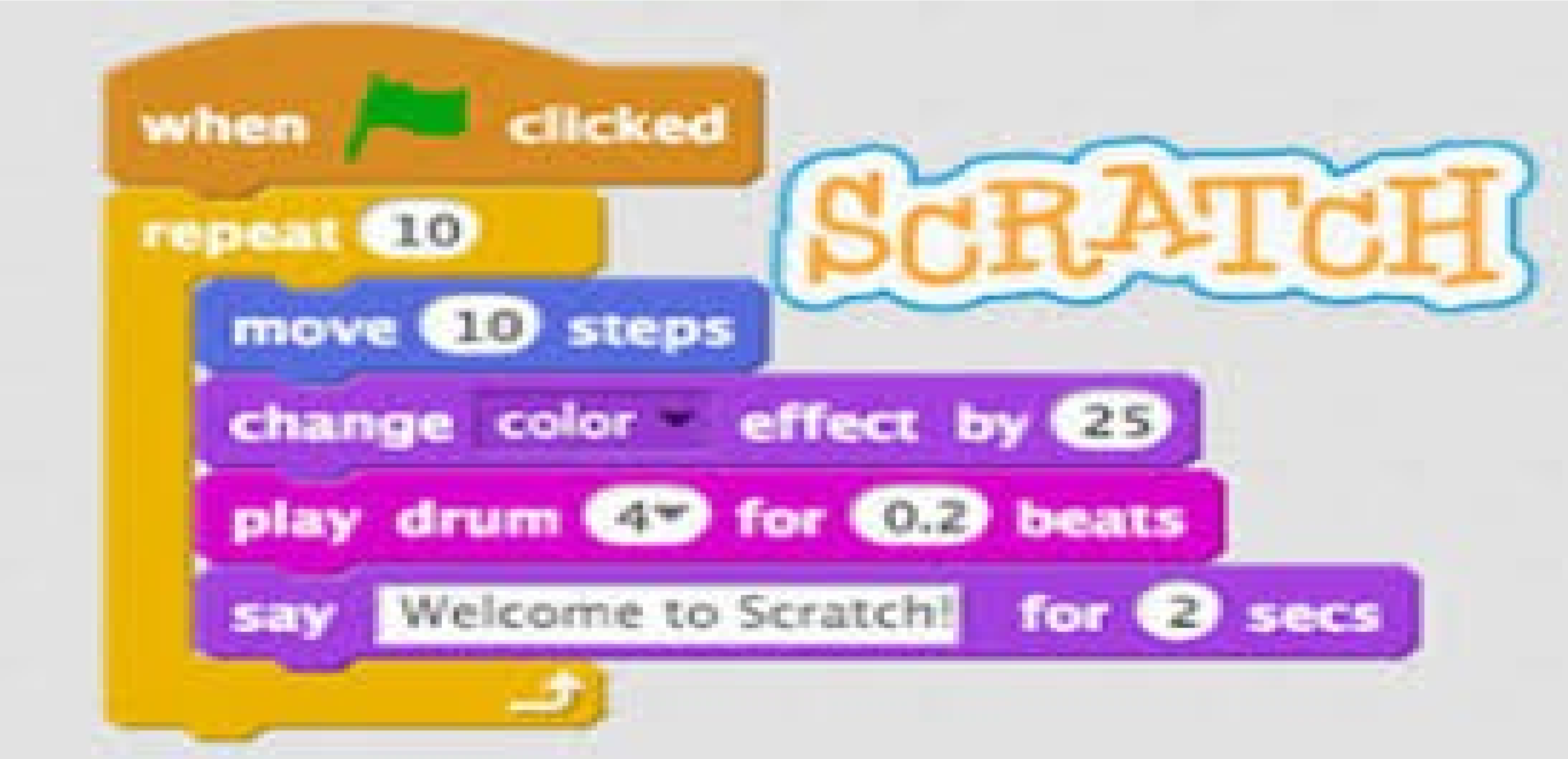


Block Programing (intermediate)

- *Coders can utilise the familiar block-based drag and drop interface to code their robot.*

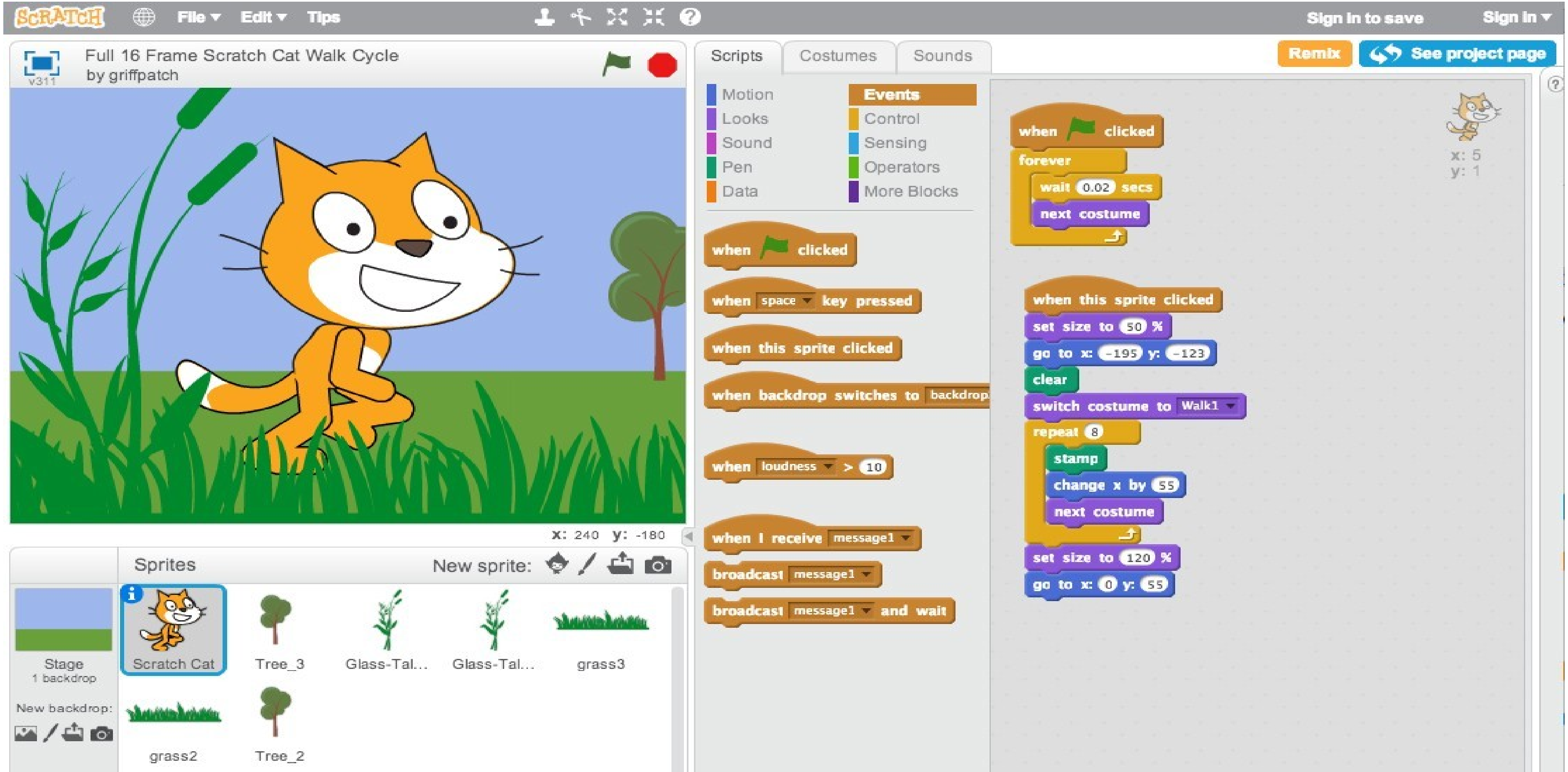
- *Pre-programmed blocks allow for a wide variety of actions and variables.*

Scratch (block programming/coding)



```
when 🏁 clicked
repeat 10
    move 10 steps
    change color ▾ effect by 25
    play drum 4▾ for 0.2 beats
    say Welcome to Scratch! for 2 secs
```

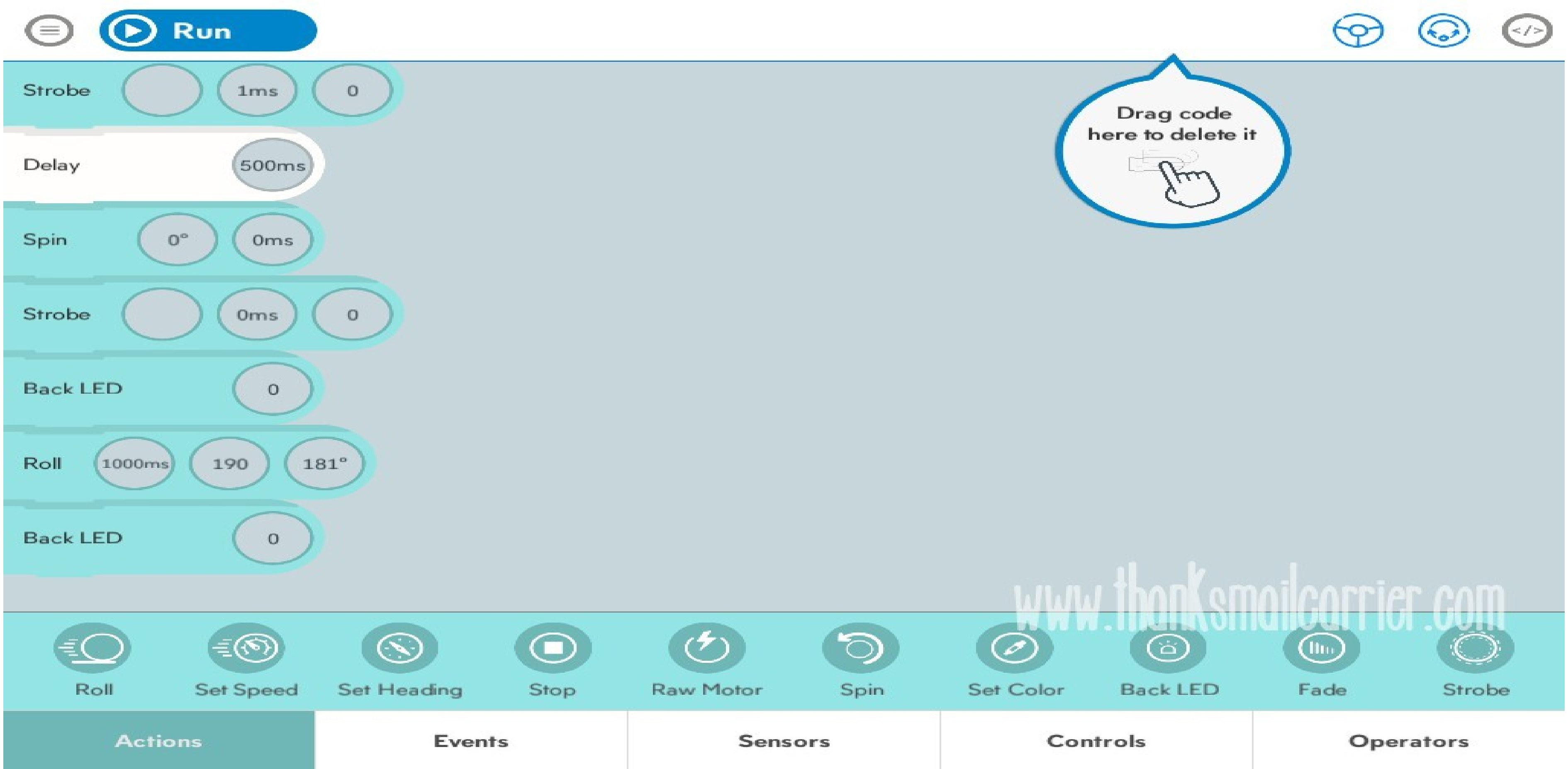
Scratch (block programming/coding)



```
when ⚑ clicked
forever
    wait 0.02 secs
    next costume

when this sprite clicked
set size to 50 %
go to x: -195 y: -123
clear
switch costume to Walk1 ▾
repeat 8
    stamp
    change x by 55
    next costume
set size to 120 %
go to x: 0 y: 55
```

Sphero EDU app (block programming/coding)



Strobe | 1ms | 0

Delay | 500ms

Spin | 0° | 0ms

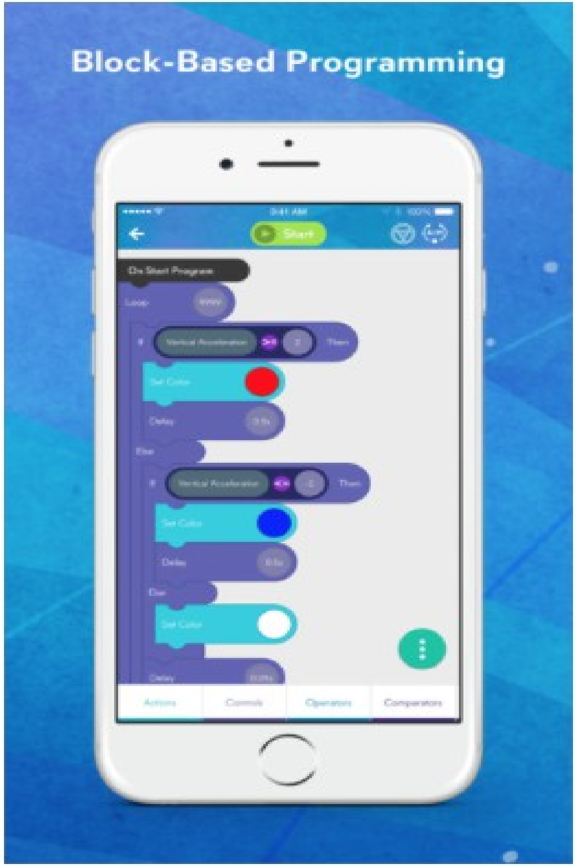
Strobe | 0ms | 0

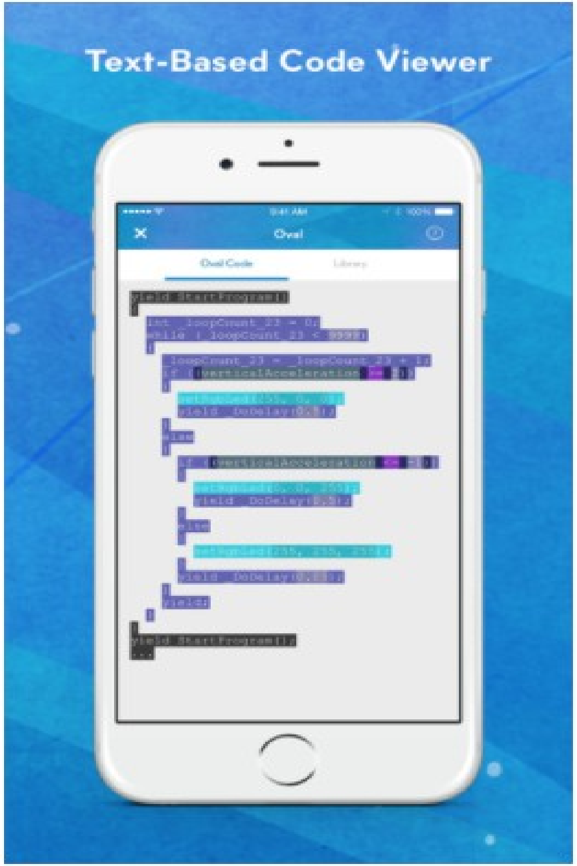
Back LED | 0

Roll | 1000ms | 190 | 181°

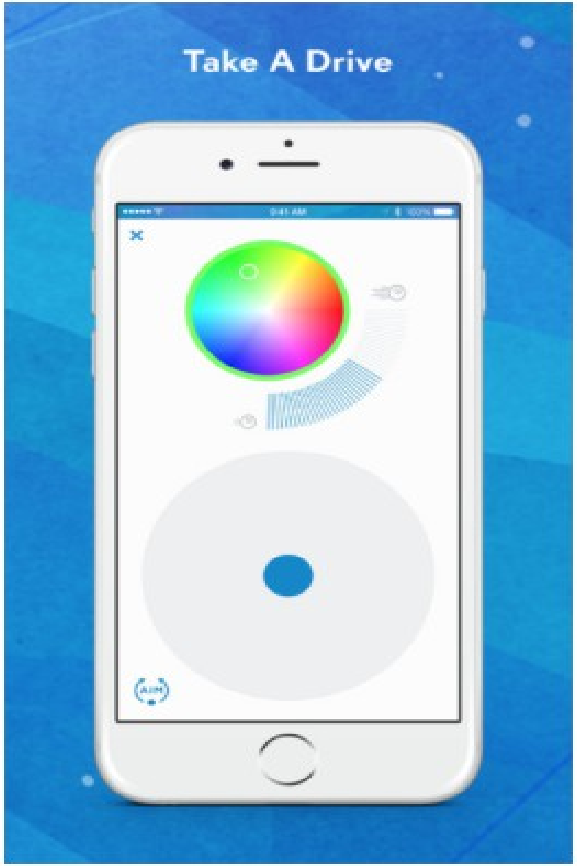
Back LED | 0

Sphero EDU app (block programming/coding)





```
yield StartProgram()
{
  int _loopCount_23 = 0;
  while (_loopCount_23 < 9999)
  {
    _loopCount_23 = _loopCount_23 + 1;
    if ((verticalAcceleration >= 2))
    {
      setRgbLed(255, 0, 0);
      yield _DoDelay(0.5);
    }
    else
    {
      if ((verticalAcceleration <= -2))
      {
        setRgbLed(0, 0, 255);
        yield _DoDelay(0.5);
      }
      else
      {
        setRgbLed(255, 255, 255);
      }
      yield _DoDelay(0.05);
    }
    yield;
  }
}
yield StartProgram();
...
```

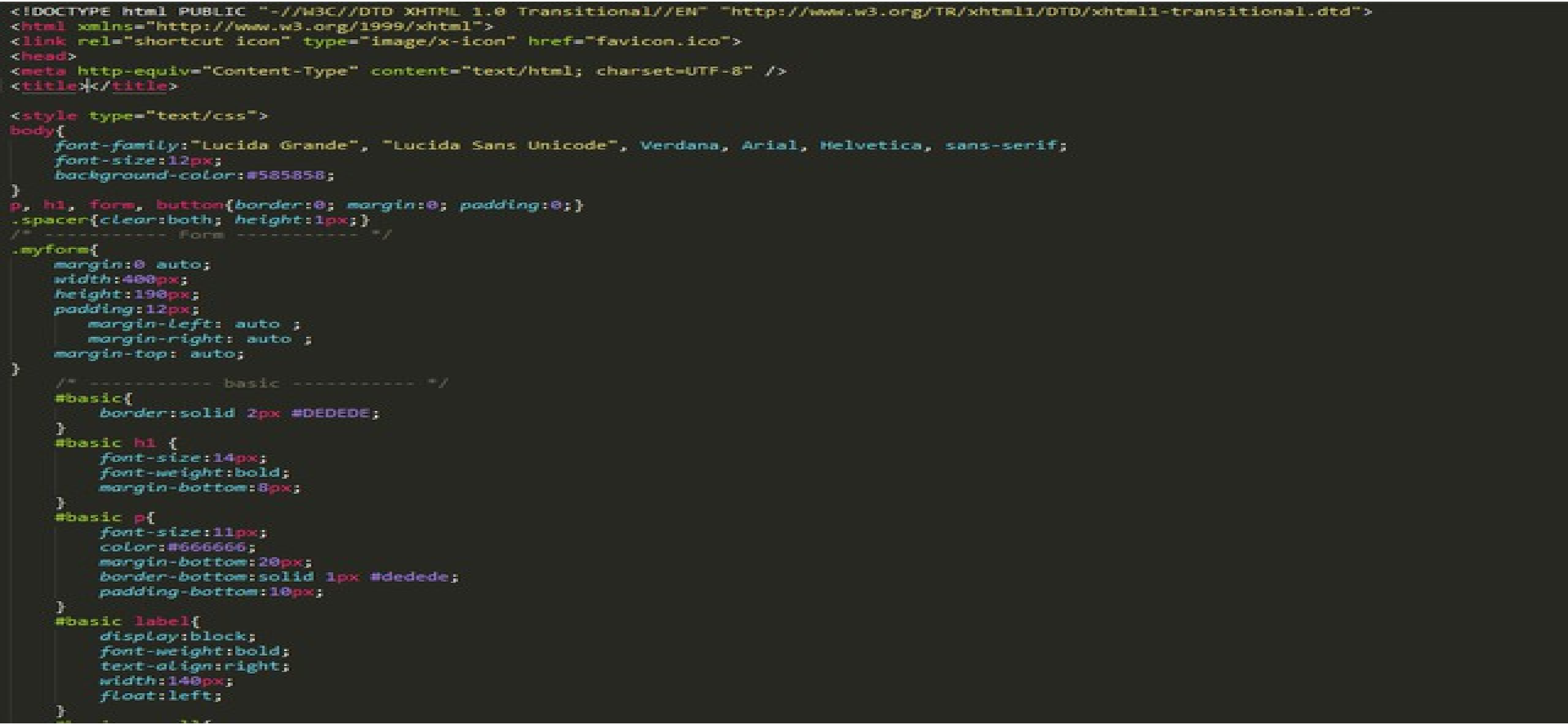


Text Based Coding (advanced)

- *Users can program with a text editor to write custom syntax.*

- *An integrated "wiki" will support users graduating from blocks to text; the same type of tool real developers use.*

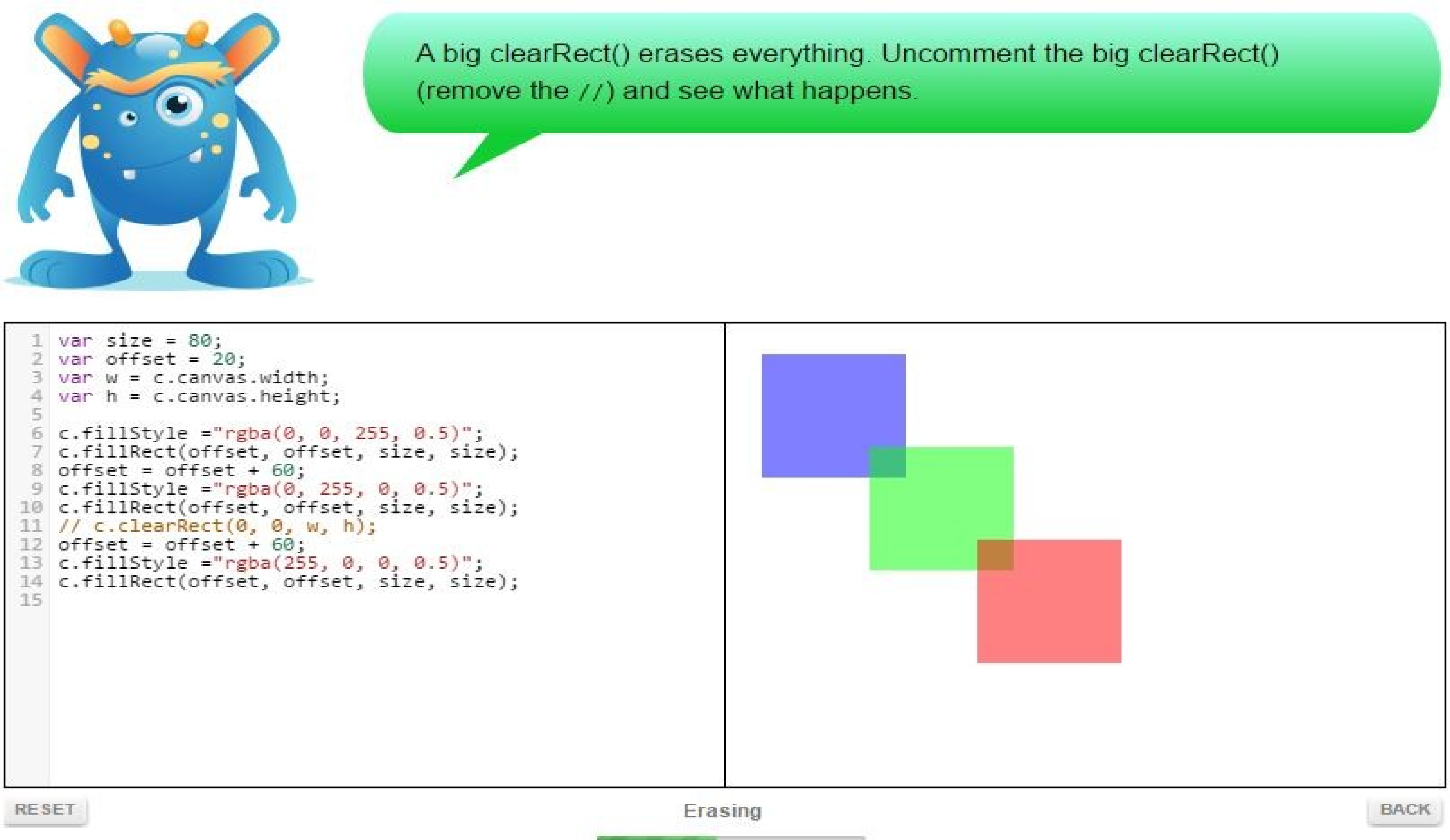
HTML (Text based code)



```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<link rel="shortcut icon" type="image/x-icon" href="favicon.ico">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
<title></title>

<style type="text/css">
body{
    font-family:"Lucida Grande", "Lucida Sans Unicode", Verdana, Arial, Helvetica, sans-serif;
    font-size:12px;
    background-color:#585858;
}
p, h1, form, button{border:0; margin:0; padding:0;}
.spacer{clear:both; height:1px;}
/* ----------- Form ----------- */
.myform{
    margin:0 auto;
    width:400px;
    height:190px;
    padding:12px;
        margin-left: auto ;
        margin-right: auto ;
    margin-top: auto;
}
    /* ----------- basic ----------- */
    #basic{
        border:solid 2px #DEDEDE;
    }
    #basic h1 {
        font-size:14px;
        font-weight:bold;
        margin-bottom:8px;
    }
    #basic p{
        font-size:11px;
        color:#666666;
        margin-bottom:20px;
        border-bottom:solid 1px #dedede;
        padding-bottom:10px;
    }
    #basic label{
        display:block;
        font-weight:bold;
        text-align:right;
        width:140px;
        float:left;
    }
```

Code Monster (Text based code)



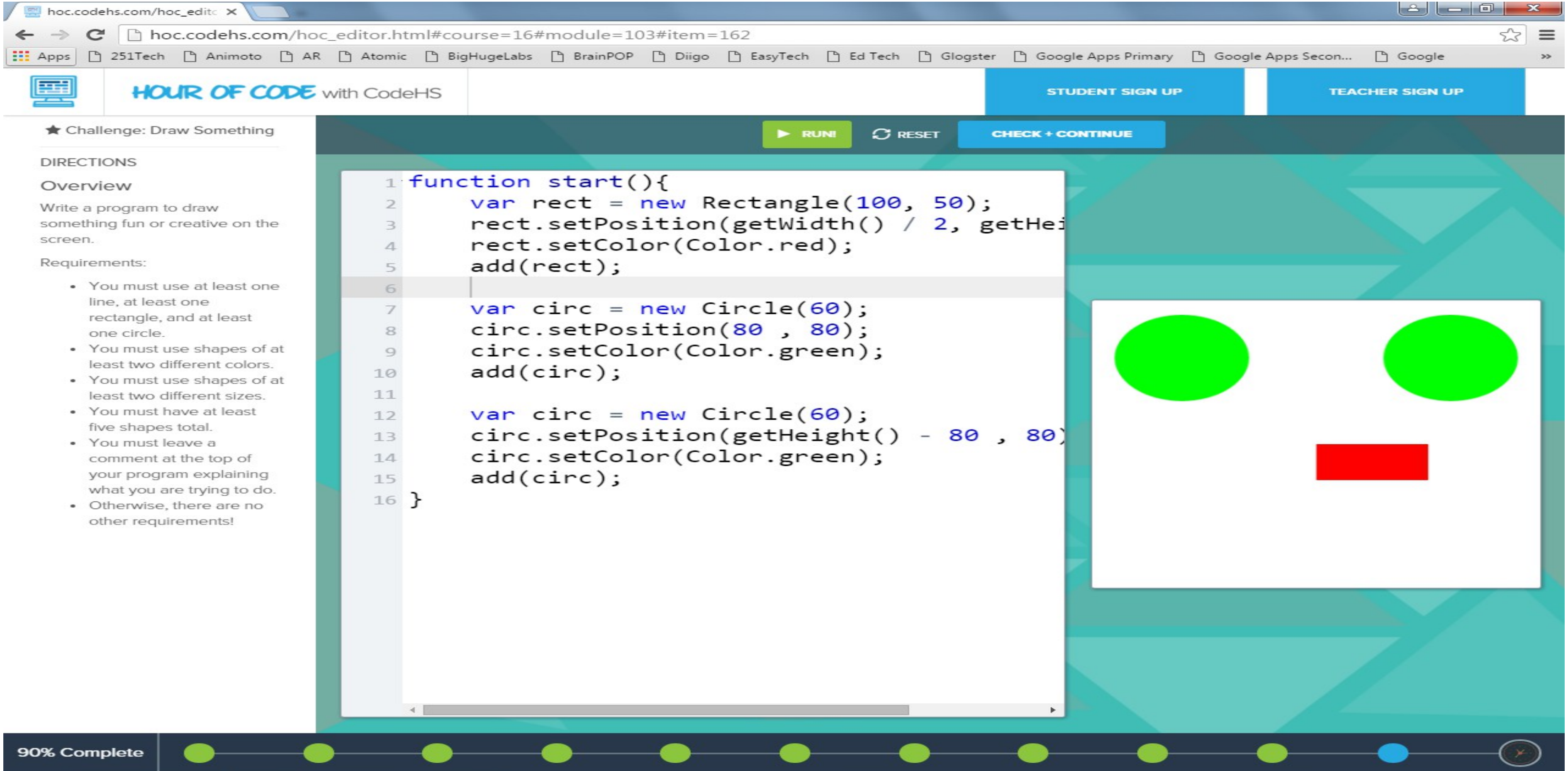
A big clearRect() erases everything. Uncomment the big clearRect() (remove the //) and see what happens.

```
var size = 80;
var offset = 20;
var w = c.canvas.width;
var h = c.canvas.height;

c.fillStyle ="rgba(0, 0, 255, 0.5)";
c.fillRect(offset, offset, size, size);
offset = offset + 60;
c.fillStyle ="rgba(0, 255, 0, 0.5)";
c.fillRect(offset, offset, size, size);
// c.clearRect(0, 0, w, h);
offset = offset + 60;
c.fillStyle ="rgba(255, 0, 0, 0.5)";
c.fillRect(offset, offset, size, size);

```

Python (Text based code)



★ Challenge: Draw Something

DIRECTIONS

Overview

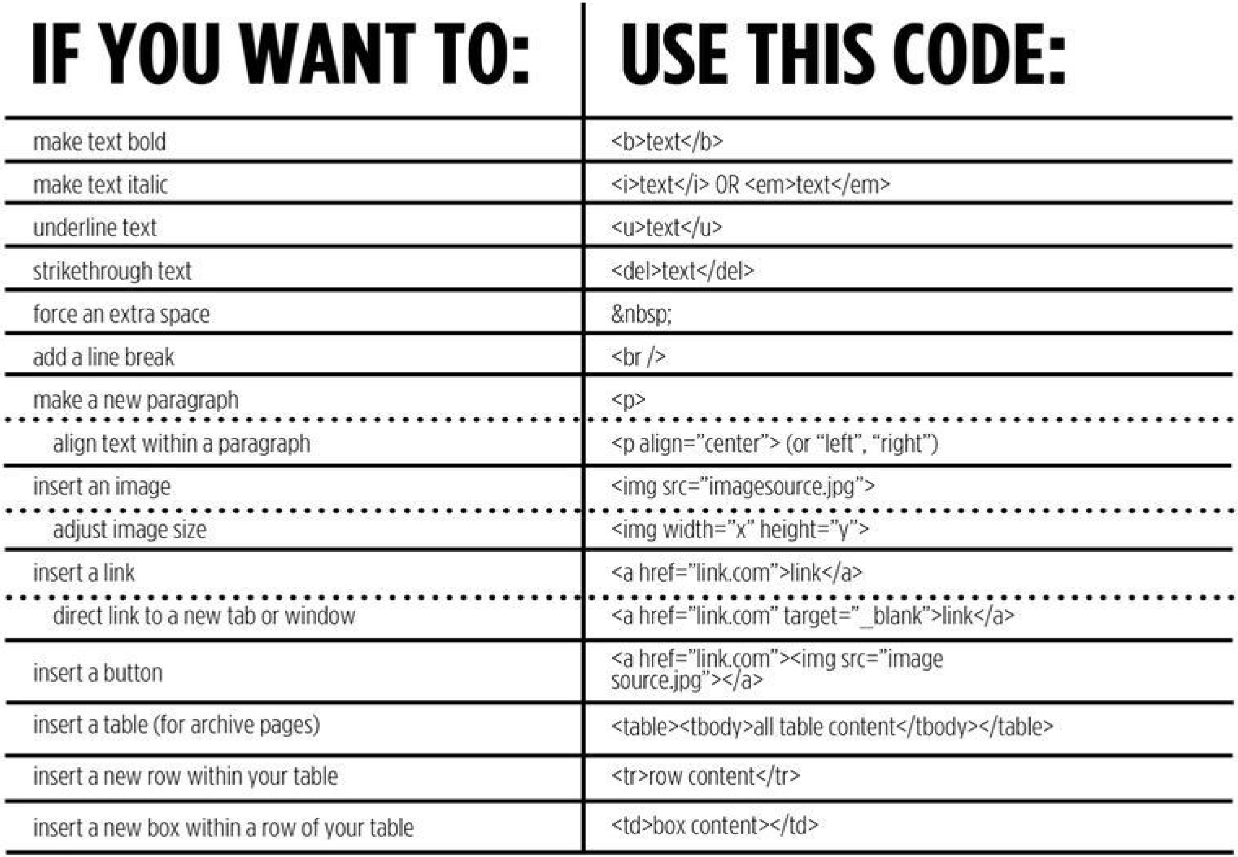
Write a program to draw something fun or creative on the screen.

Requirements:

- You must use at least one line, at least one rectangle, and at least one circle.
- You must use shapes of at least two different colors.
- You must use shapes of at least two different sizes.
- You must have at least five shapes total.
- You must leave a comment at the top of your program explaining what you are trying to do.
- Otherwise, there are no other requirements!

```
function start(){
    var rect = new Rectangle(100, 50);
    rect.setPosition(getWidth() / 2, getHei
    rect.setColor(Color.red);
    add(rect);
    
    var circ = new Circle(60);
    circ.setPosition(80 , 80);
    circ.setColor(Color.green);
    add(circ);
    
    var circ = new Circle(60);
    circ.setPosition(getHeight() - 80 , 80)
    circ.setColor(Color.green);
    add(circ);
}
```

Python (Text based code)



IF YOU WANT TO:	USE THIS CODE:
make text bold	<b>text</b>
make text italic	<i>text</i> OR <em>text</em>
underline text	<u>text</u>
strikethrough text	<del>text</del>
force an extra space	
add a line break	<br />
make a new paragraph	<p>
align text within a paragraph	<p align=”center”> (or “left”, “right”)
insert an image	<img src=”imagesource.jpg”>
adjust image size	<img width=”x” height=”y”>
insert a link	<a href=”link.com”>link</a>
direct link to a new tab or window	<a href=”link.com” target=”_blank”>link</a>
insert a button	<a href=”link.com”><img src=”image source.jpg”></a>
insert a table (for archive pages)	<table><tbody>all table content</tbody></table>
insert a new row within your table	<tr>row content</tr>
insert a new box within a row of your table	<td>box content></td>

Everybody in this country should learn how to program a computer…

…***because it teaches you how to think.***

Steve Jobs

It would be wonderful if every kid wrote computer programs and understood how computers work. It would certainly make you a better thinker.

Bill Gates

In fifteen years we’ll be teaching programming just like reading and writing. We’ll be looking back and wondering why we didn’t do it sooner.

Mark Zuckerberg