PhoneGap, Processing

Phonegap

4. Oct 2016

INF5261

Mobile app development

- Native code
- Android
  - Java
- iPhone
  - Objective-C
  - Swift

- Hybrid

  (HTML & JavaScript)

  +

  (Native code)
- Native code wrapped around a webview
- HTML & JavaScript for app logic and UI
- Can compile to app

- HTML & JavaScript
  - Browser based
    - Normal webpage

Hybrid, “webview” based app development

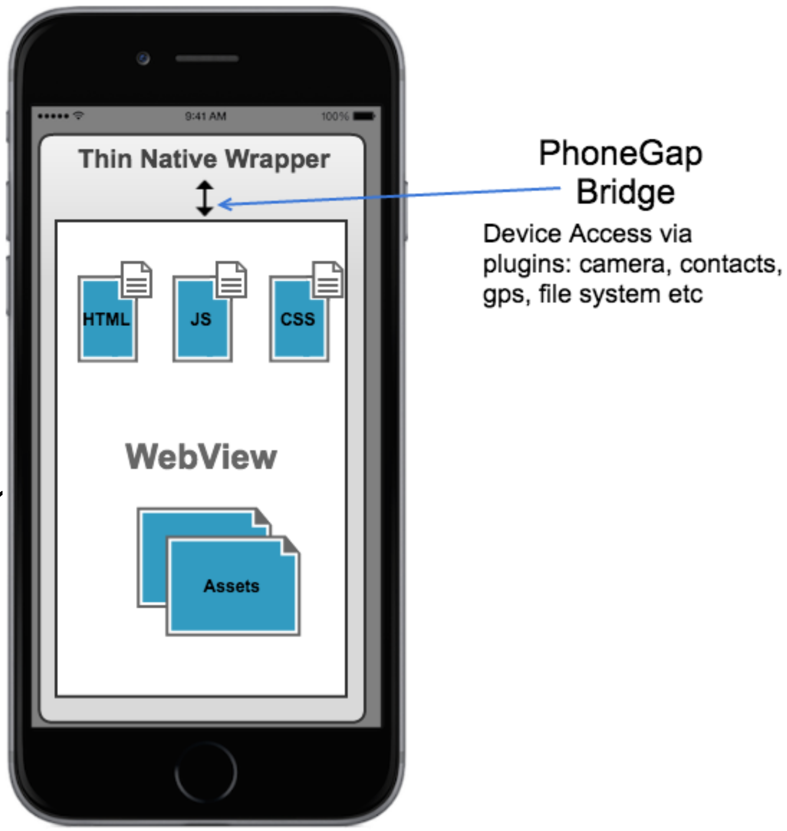
- Apps (can) use a lot of readymade code in the form of components:
  - Buttons, lists, media players, webview
- Webview is a browser that can be embedded inside an app to show web content.
  - Handles HTML and JavaScript, provides only a rendered view, no menus.
  - Can give JavaScript access to APIs that only native code normally can use, if you write your own JavaScript interface.
- But some native code must be written

Hybrid, the good news

- You don't have to do the native part

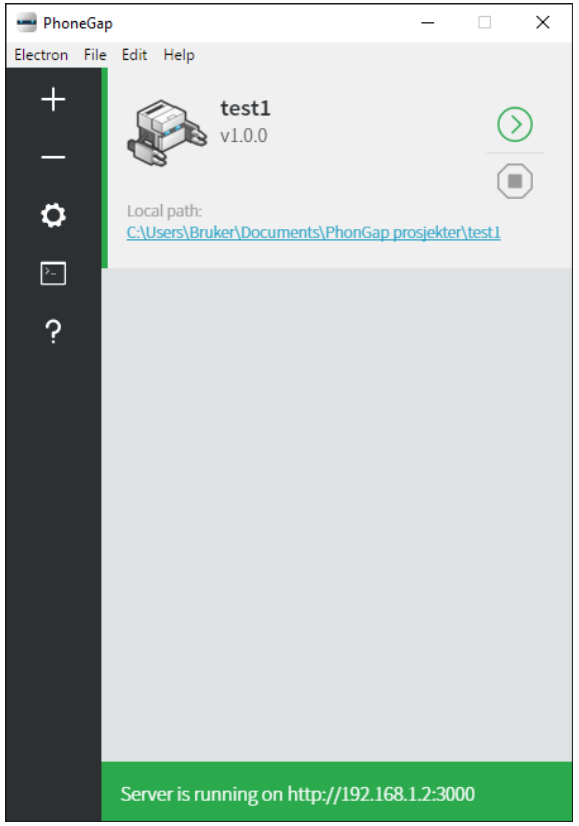
- Use PhoneGap/Cordova and concentrate on the web code
- Exposes a lot of native APIs to JavaScript
- 1500+ plugins to provide extra functionality
  - RFID/NFC, Barcode, Camera, Bluetooth, payment, maps

- http://phonegap.com/
- https://cordova.apache.org/
- Adobe owns PhoneGap.
- Cordova is the open source foundation for PhoneGap and other similar tools
- PhoneGap/Cordova is well established
  - PhoneGap gives approximately 8 120 000 hits on Google



PhoneGap

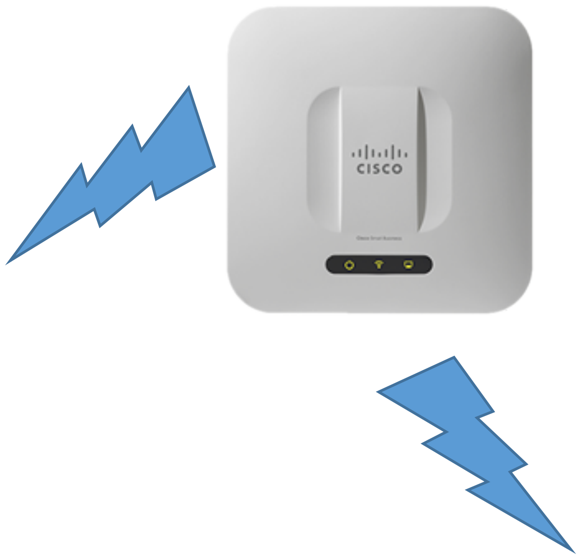
- Desktop app
  - Generate project
  - Server for mobile app



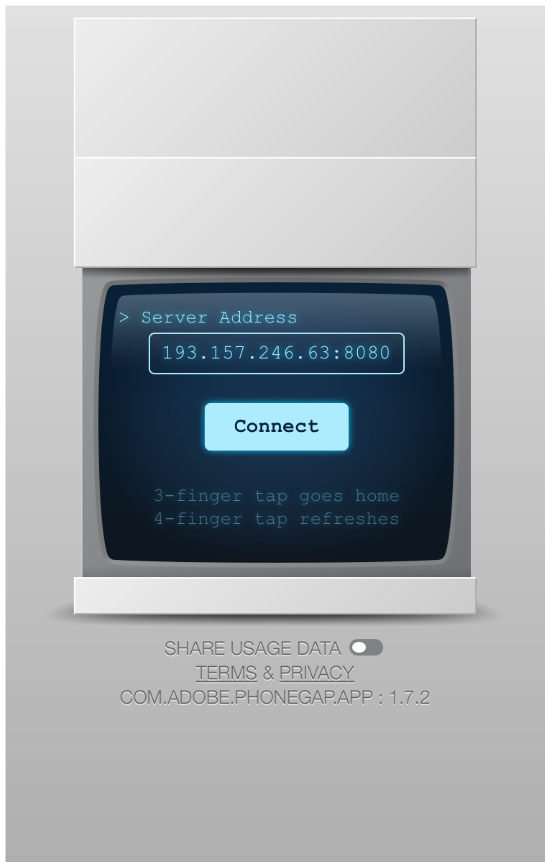
test1
v1.0.0

Local path:
C:\Users\Bruker\Documents\PhonGap prosjekter\test1

Server is running on http://192.168.1.2:3000



- Mobile app
  - Hosting mobile app for testing during development
  - Connecting to desktop server to download app



> Server Address
193.157.246.63:8080

3-finger tap goes home
4-finger tap refreshes

SHARE USAGE DATA
TERMS & PRIVACY
COM.ADOBE.PHONEGAP.APP : 1.7.2

- Desktop and mobile must be on same local network

Download & install

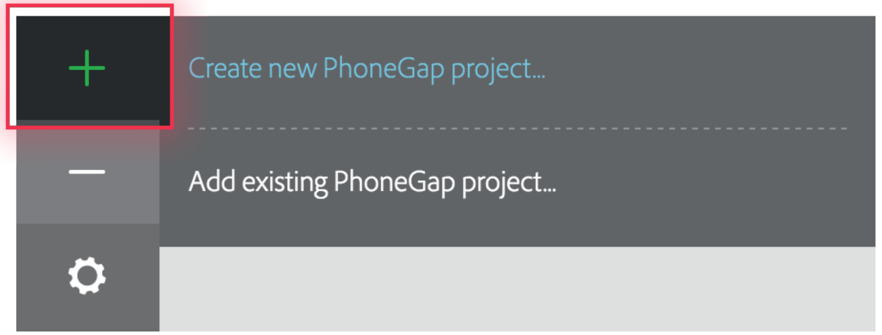
- Desktop
  - http://phonegap.com/products/
  - Scroll down and download desktop app for Mac og Windows
- Mobile
  - Go to App Store or Google Play
  - Install PhoneGap Developer by Adobe

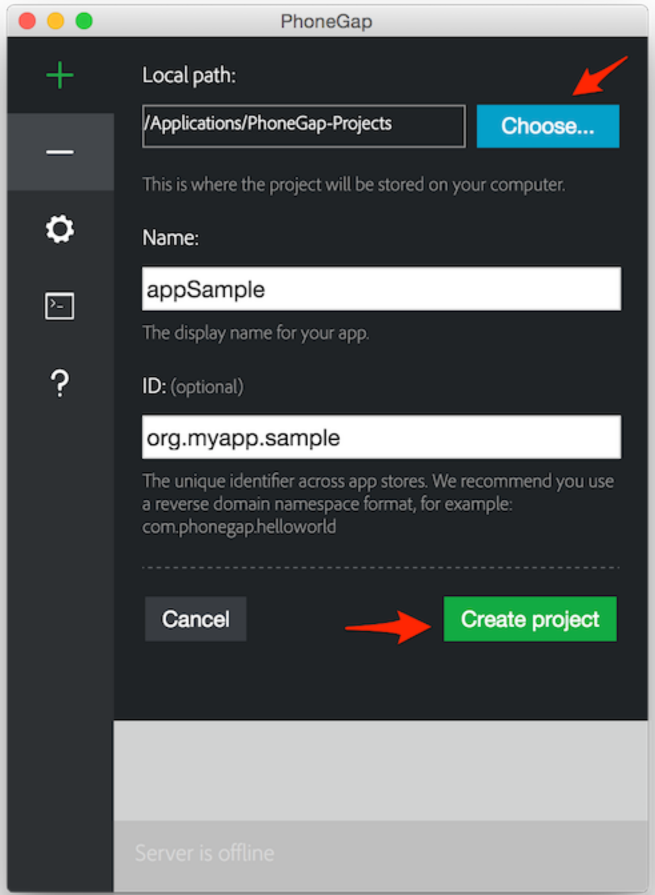
Create your new app

- Open the PhoneGap Desktop app
  - create a new project.

- Select a folder
- Write a project name
- Click green button

- http://phonegap.com/getstarted/


Create new PhoneGap project...
Add existing PhoneGap project...

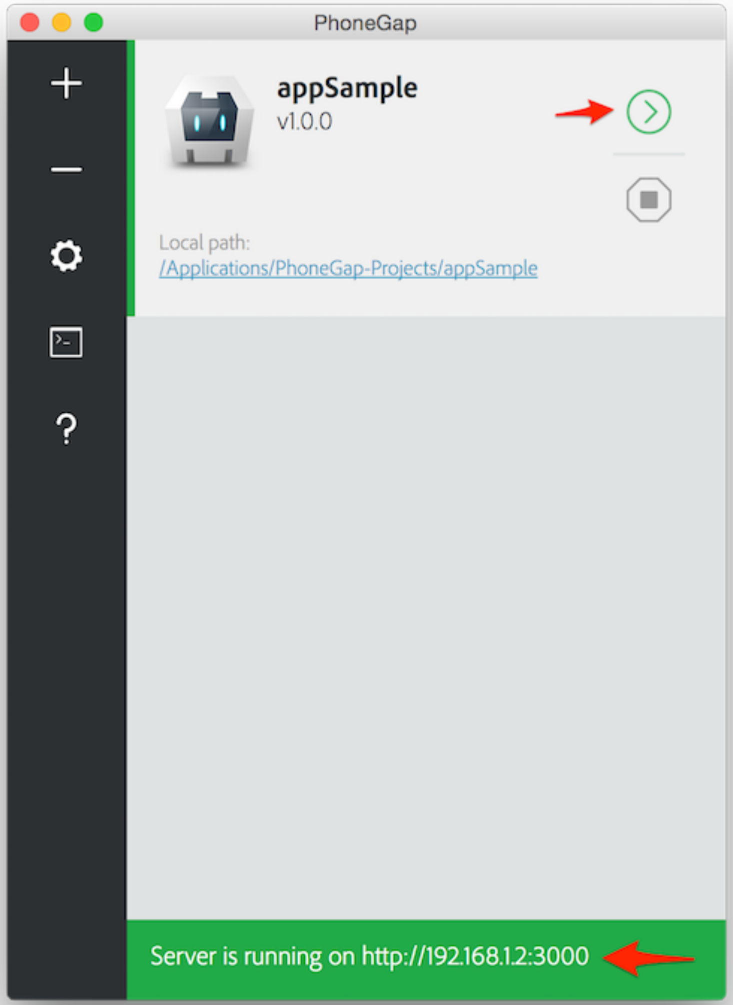


Local path:
/Applications/PhoneGap-Projects
This is where the project will be stored on your computer.
Name:
appSample
The display name for your app.
ID: (optional)
org.myapp.sample
The unique identifier across app stores. We recommend you use a reverse domain namespace format, for example: com.phonegap.helloworld

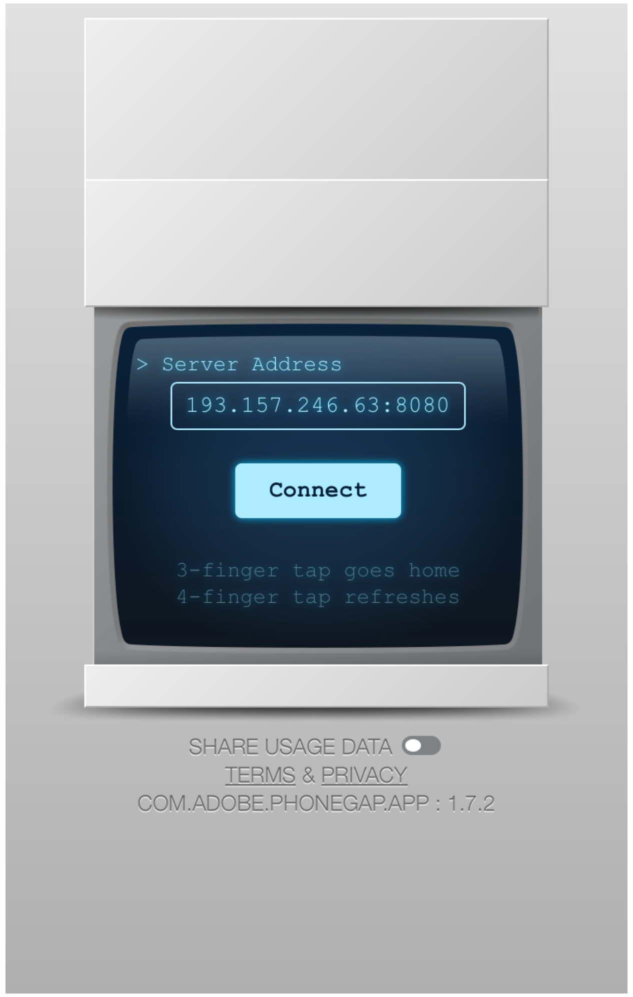
Server is offline

Preview your first app

- Start the server
- On the mobile:
  - Input the IP address and port number shown in the green field on the desktop server.

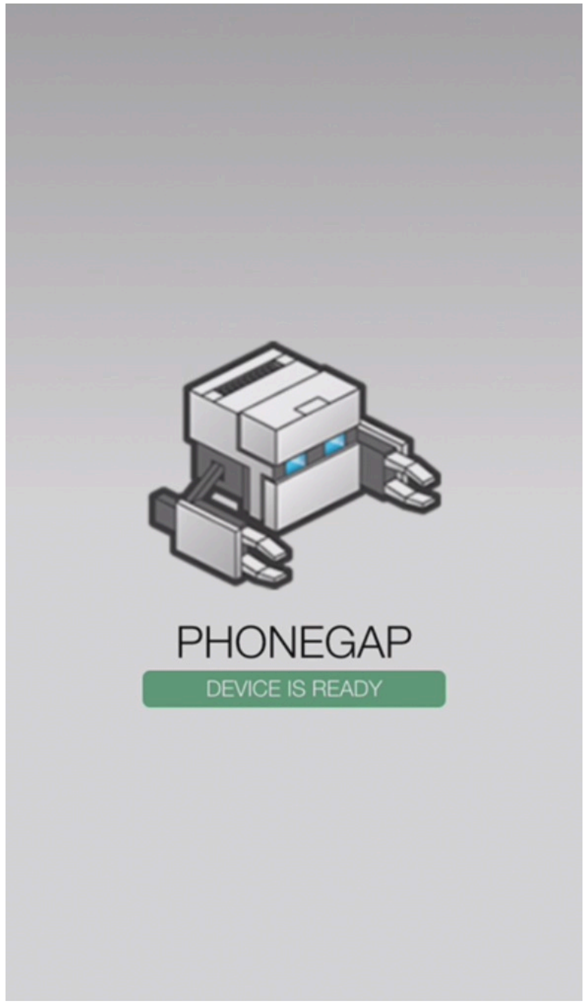


Server is running on http://192.168.1.2:3000



Preview your first app 2

- What it should look like



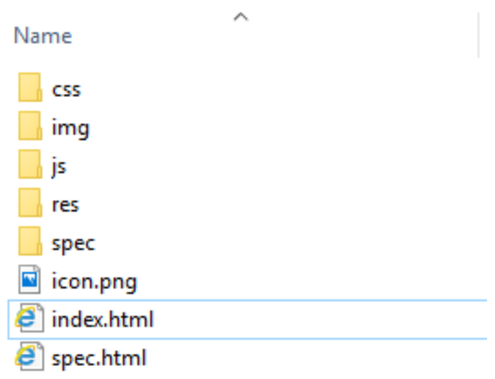
Use Chrome or Safari for preview

- Safari Responsive Design Mode
- Chrome DevTools' Device Mode

- They will not emulate all APIs
- But good for UI and logic

Where is the code?

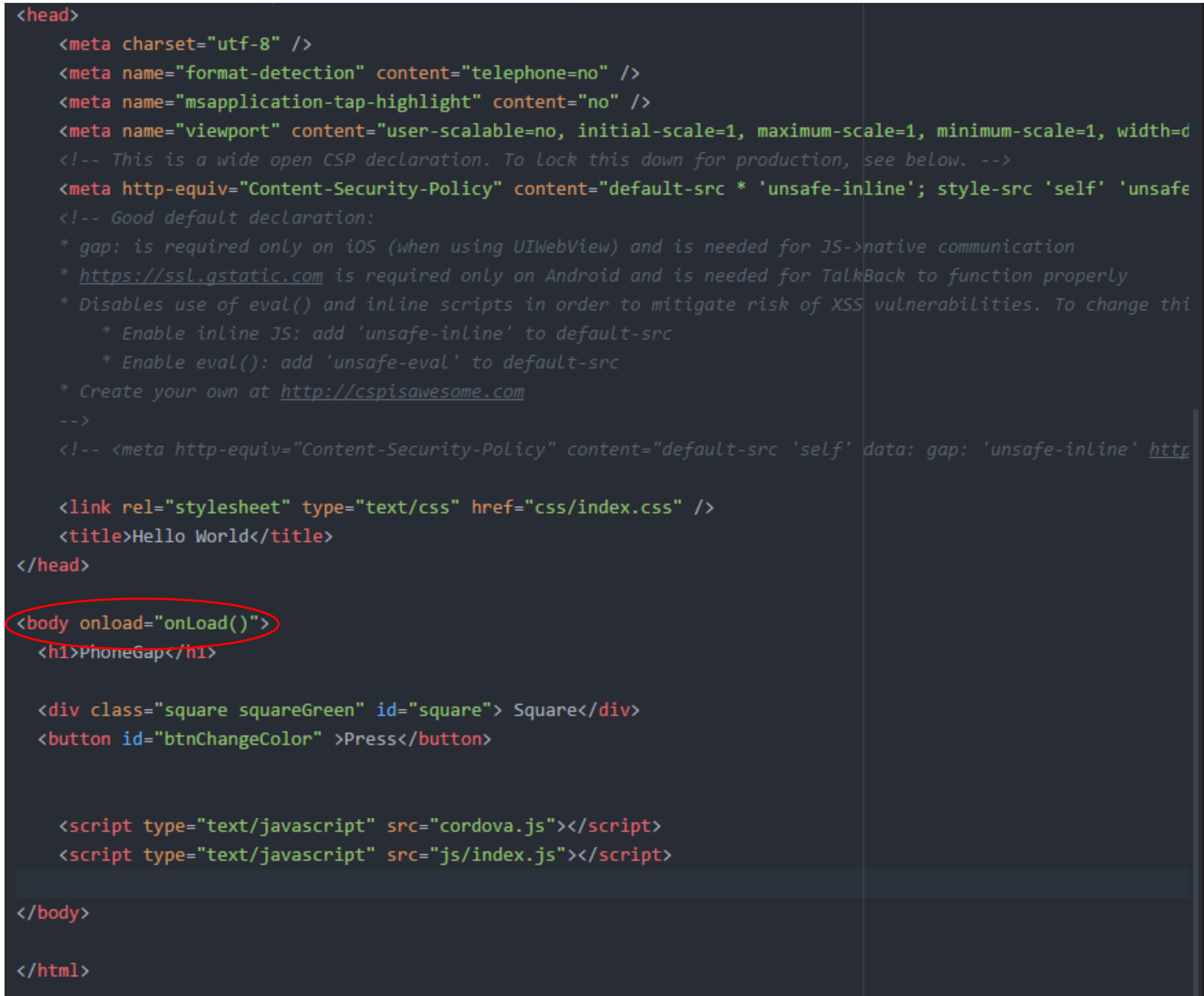
- In the project folder


Name
css
img
js
res
spec
icon.png
index.html
spec.html

Som code to start the app

```
function onLoad() {
   document.addEventListener("deviceready", onDeviceReady,
false);
}
function onDeviceReady() {
   // Now safe to use the Cordova API
}
```

- Deviceready event fires when cordova/phongap is loaded
  - Is “safe” to call cordova api from javascript



```
<head>
    <meta charset="utf-8" />
    <meta name="format-detection" content="telephone=no" />
    <meta name="msapplication-tap-highlight" content="no" />
    <meta name="viewport" content="user-scalable=no, initial-scale=1, maximum-scale=1, minimum-scale=1, width=d
    <!-- This is a wide open CSP declaration. To lock this down for production, see below. -->
    <meta http-equiv="Content-Security-Policy" content="default-src * 'unsafe-inline'; style-src 'self' 'unsafe
    <!-- Good default declaration:
    * gap: is required only on iOS (when using UIWebView) and is needed for JS->native communication
    * https://ssl.gstatic.com is required only on Android and is needed for TalkBack to function properly
    * Disables use of eval() and inline scripts in order to mitigate risk of XSS vulnerabilities. To change thi
        * Enable inline JS: add 'unsafe-inline' to default-src
        * Enable eval(): add 'unsafe-eval' to default-src
    * Create your own at http://cspisawesome.com
    -->
    <!-- <meta http-equiv="Content-Security-Policy" content="default-src 'self' data: gap: 'unsafe-inline' http

    <link rel="stylesheet" type="text/css" href="css/index.css" />
    <title>Hello World</title>
</head>

<body onload="onLoad()">
  <h1>PhoneGap</h1>

  <div class="square squareGreen" id="square"> Square</div>
  <button id="btnChangeColor" >Press</button>


    <script type="text/javascript" src="cordova.js"></script>
    <script type="text/javascript" src="js/index.js"></script>

</body>

</html>
```

Adding some tags and code

- Text
- Button
- CSS
- Javascript
  - jQuery
  - Angular
  - ….
- Plugin
  - Camera
  - Barcode??

Processing

- Developed for creative coding
- Lots of libraries
- Can compile to Android

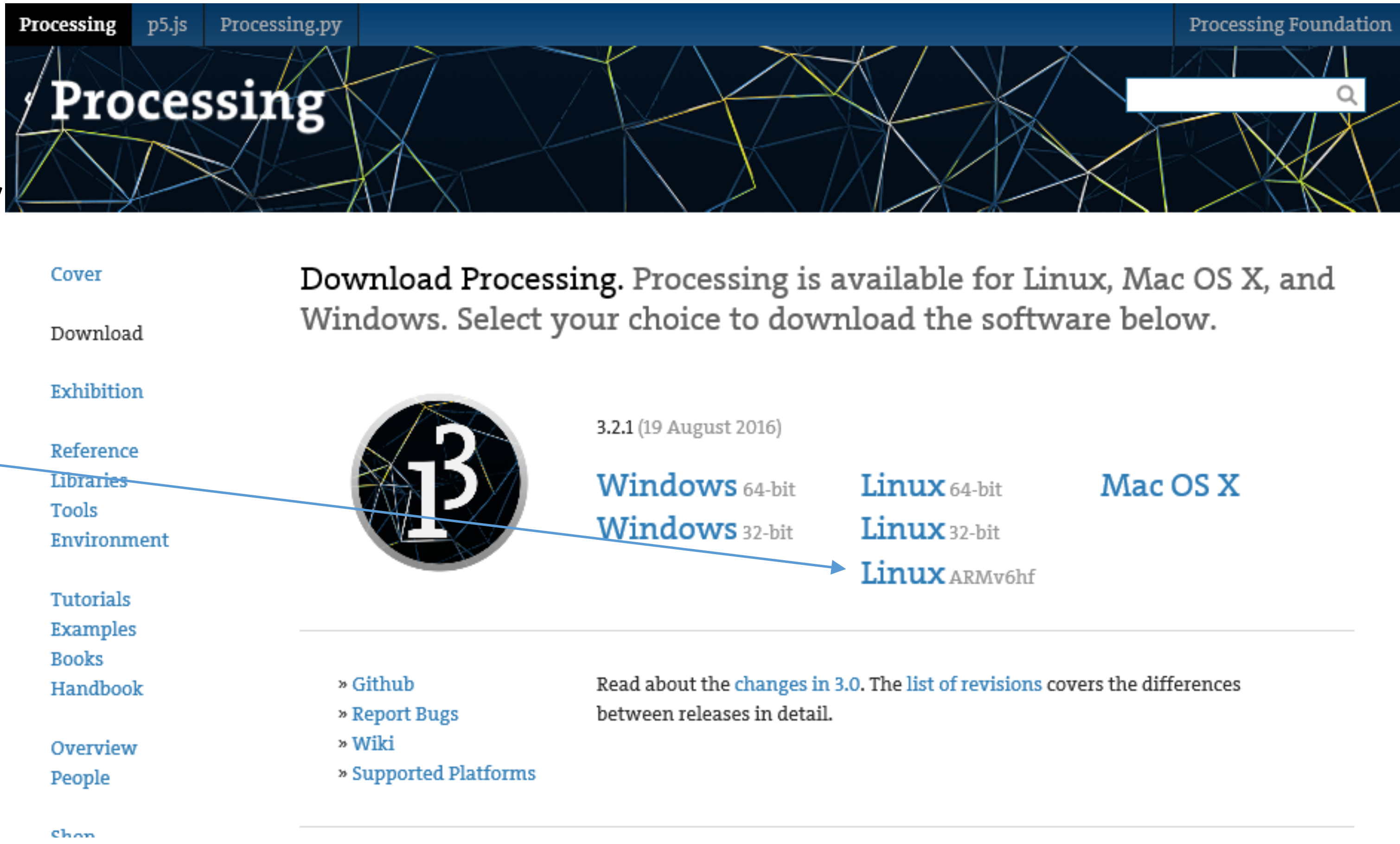
- Simple Java syntax
- Runs on:
  - Mac
  - Windows
  - Linux
  - ARM(RaspberryPi)
  - Android

Processing Visualization Design example:
https://vimeo.com/173760057

Processing

- Processing.org
- processing.org/download/

- Raspberry Pi



Processing | p5.js | Processing.py | Processing Foundation

Processing

Cover

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Exhibition

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Tools
Environment

Tutorials
Examples
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Handbook

Overview
People

Shop

Download Processing. Processing is available for Linux, Mac OS X, and Windows. Select your choice to download the software below.

3.2.1 (19 August 2016)

Windows 64-bit | Linux 64-bit | Mac OS X
Windows 32-bit | Linux 32-bit
Linux ARMv6hf

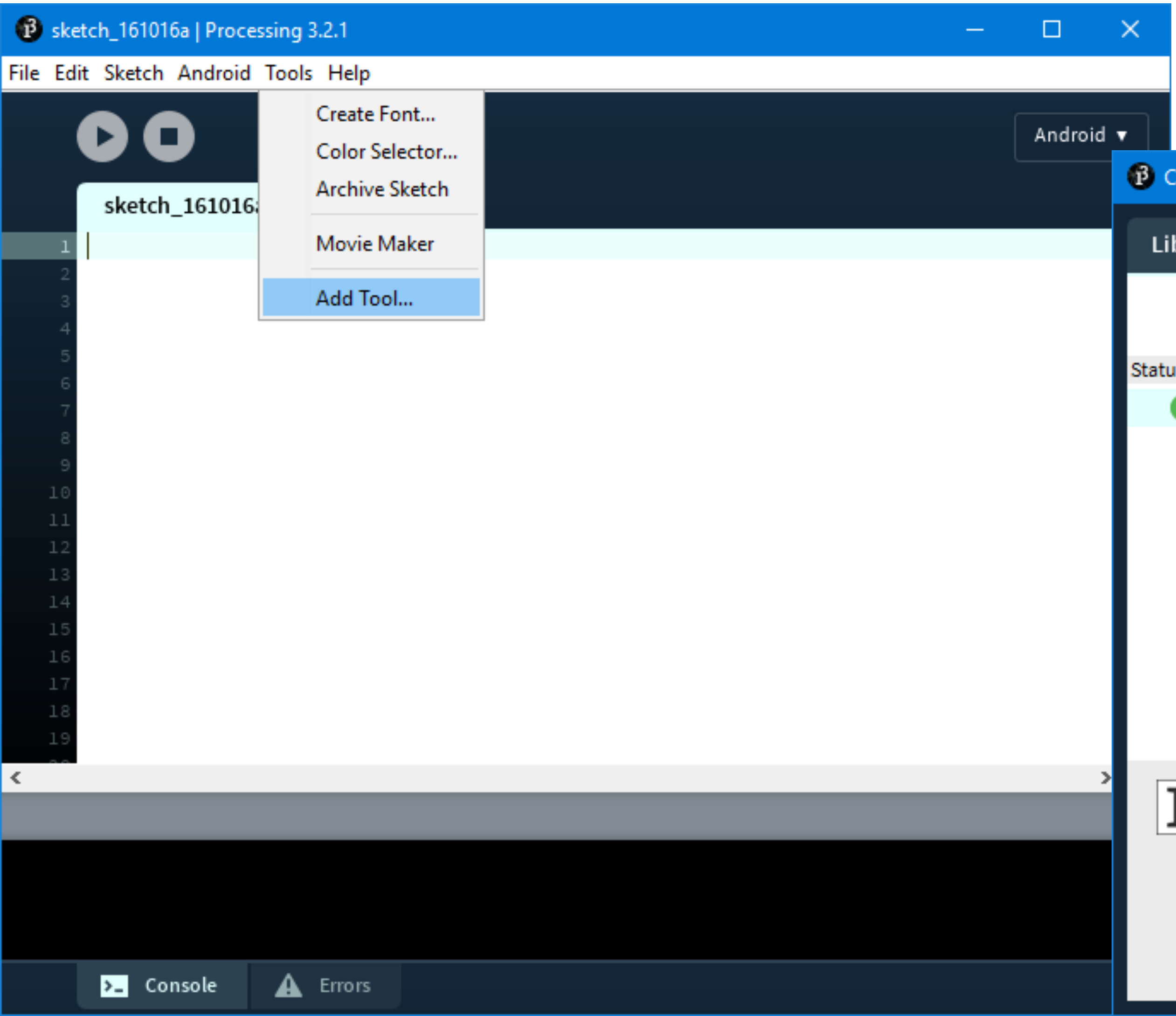
» Github
» Report Bugs
» Wiki
» Supported Platforms

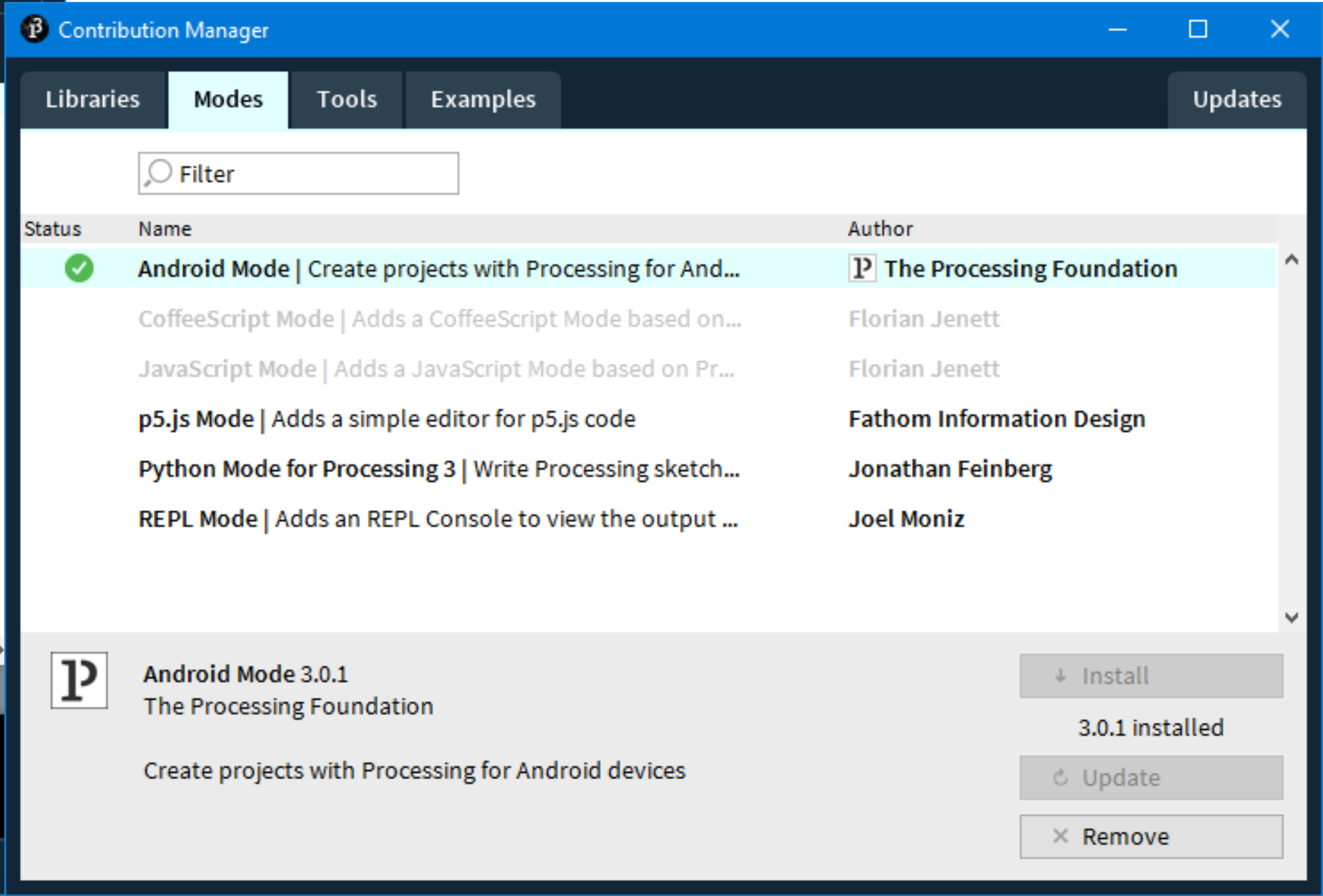
Read about the changes in 3.0. The list of revisions covers the differences between releases in detail.

Processing: installation

- Download
- Unzip
- Place folder where you like
- Make shortcut to desktop

Processing: editor and android mode





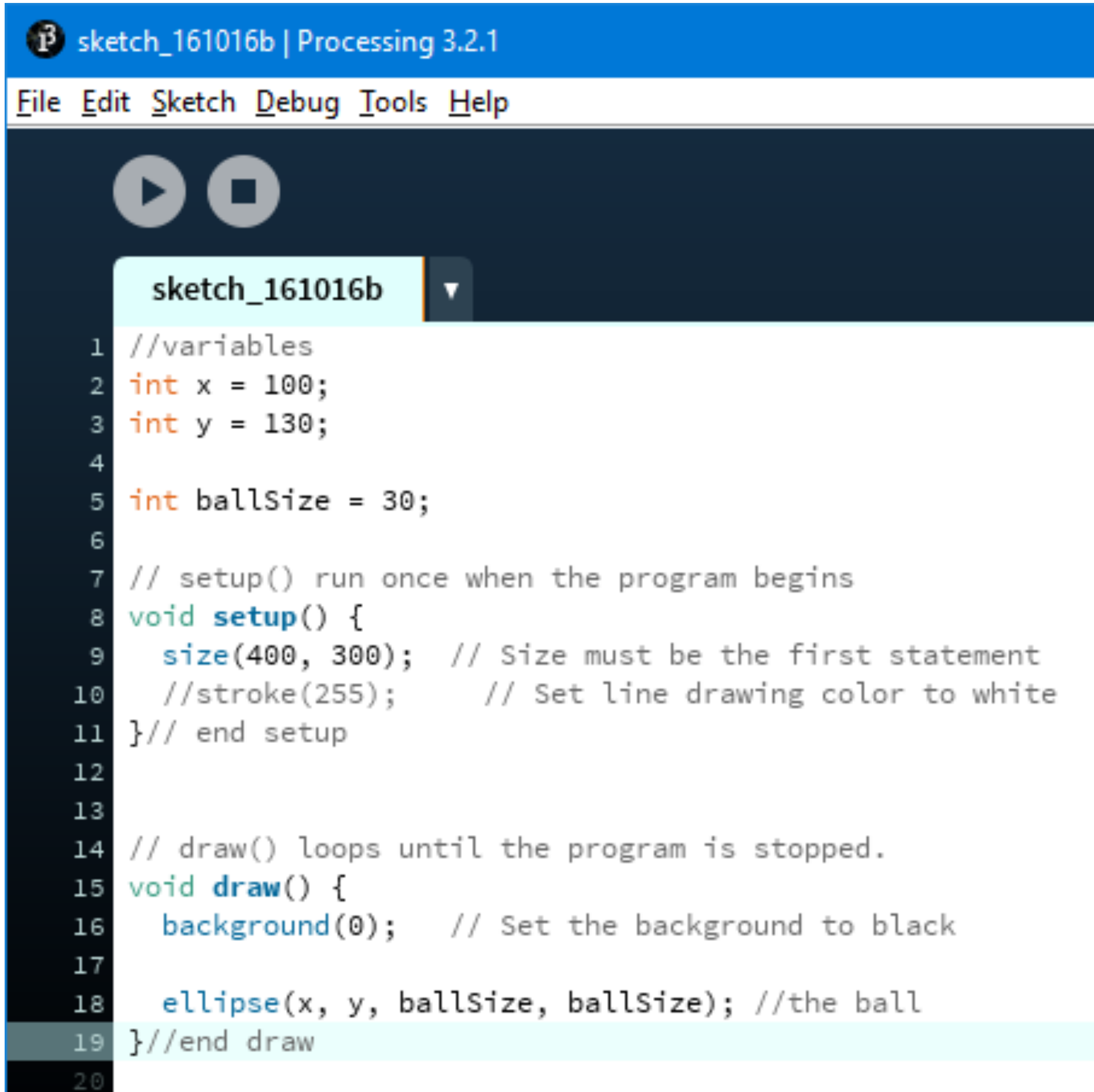
Status	Name	Author
✓	Android Mode | Create projects with Processing for And...	The Processing Foundation
	CoffeeScript Mode | Adds a CoffeeScript Mode based on...	Florian Jenett
	JavaScript Mode | Adds a JavaScript Mode based on Pr...	Florian Jenett
	p5.js Mode | Adds a simple editor for p5.js code	Fathom Information Design
	Python Mode for Processing 3 | Write Processing sketch...	Jonathan Feinberg
	REPL Mode | Adds an REPL Console to view the output ...	Joel Moniz

Android Mode 3.0.1
The Processing Foundation

Create projects with Processing for Android devices

Processing: first code

- Try this code
- Setup and draw

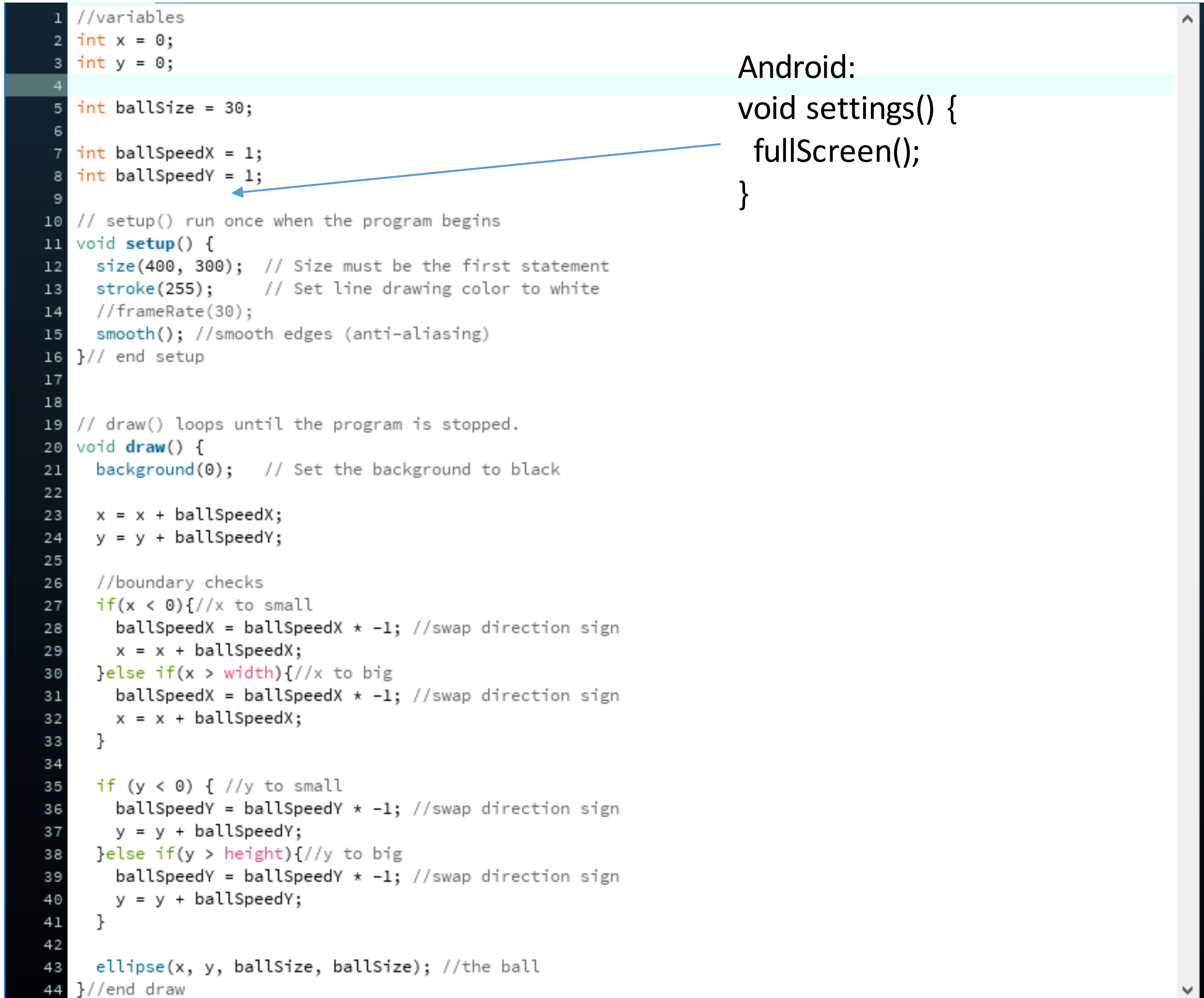

sketch_161016b | Processing 3.2.1
File Edit Sketch Debug Tools Help
sketch_161016b

```
//variables
int x = 100;
int y = 130;

int ballSize = 30;

// setup() run once when the program begins
void setup() {
  size(400, 300);  // Size must be the first statement
  //stroke(255);     // Set line drawing color to white
}// end setup


// draw() loops until the program is stopped.
void draw() {
  background(0);   // Set the background to black

  ellipse(x, y, ballSize, ballSize); //the ball
}//end draw
```

Processing:

- More code
- What is it?
- Bouncing ball

- Can you improve the code?
- Try it on your phone
  - fullScreen() insted of size() for Android

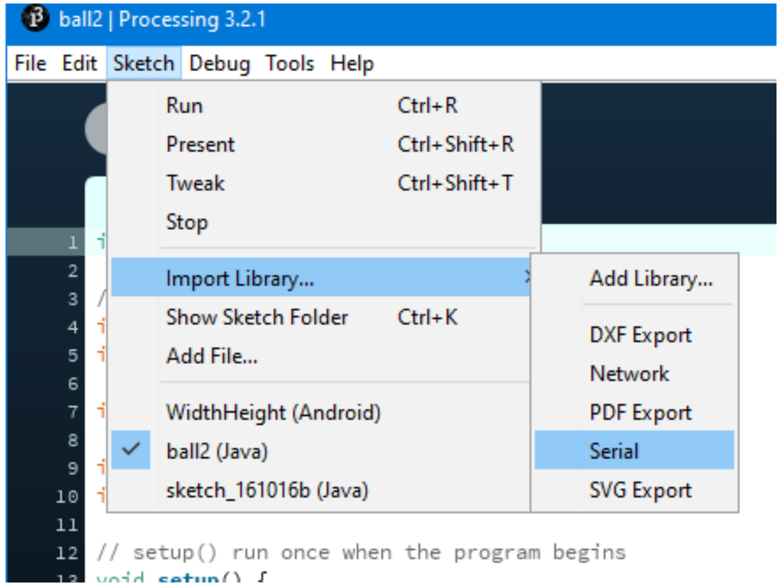


```
//variables
int x = 0;
int y = 0;

int ballSize = 30;

int ballSpeedX = 1;
int ballSpeedY = 1;

// setup() run once when the program begins
void setup() {
  size(400, 300);  // Size must be the first statement
  stroke(255);     // Set line drawing color to white
  //frameRate(30);
  smooth(); //smooth edges (anti-aliasing)
}// end setup


// draw() loops until the program is stopped.
void draw() {
  background(0);   // Set the background to black

  x = x + ballSpeedX;
  y = y + ballSpeedY;

  //boundary checks
  if(x < 0){//x to small
    ballSpeedX = ballSpeedX * -1; //swap direction sign
    x = x + ballSpeedX;
  }else if(x > width){//x to big
    ballSpeedX = ballSpeedX * -1; //swap direction sign
    x = x + ballSpeedX;
  }

  if (y < 0) { //y to small
    ballSpeedY = ballSpeedY * -1; //swap direction sign
    y = y + ballSpeedY;
  }else if(y > height){//y to big
    ballSpeedY = ballSpeedY * -1; //swap direction sign
    y = y + ballSpeedY;
  }

  ellipse(x, y, ballSize, ballSize); //the ball
}//end draw
```

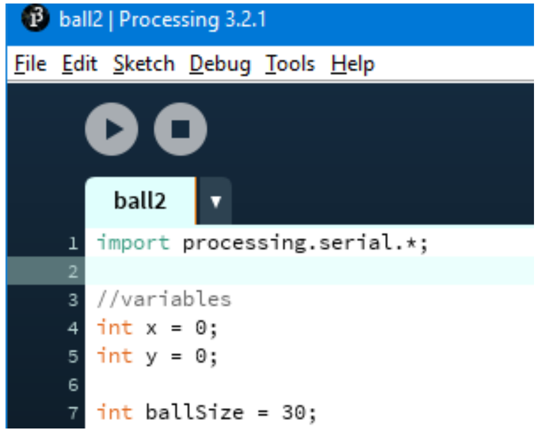
Android:
```
void settings() {
  fullScreen();
}
```

Processing: serial communication

- Can receive and handle data from Arduino
- Import serial library



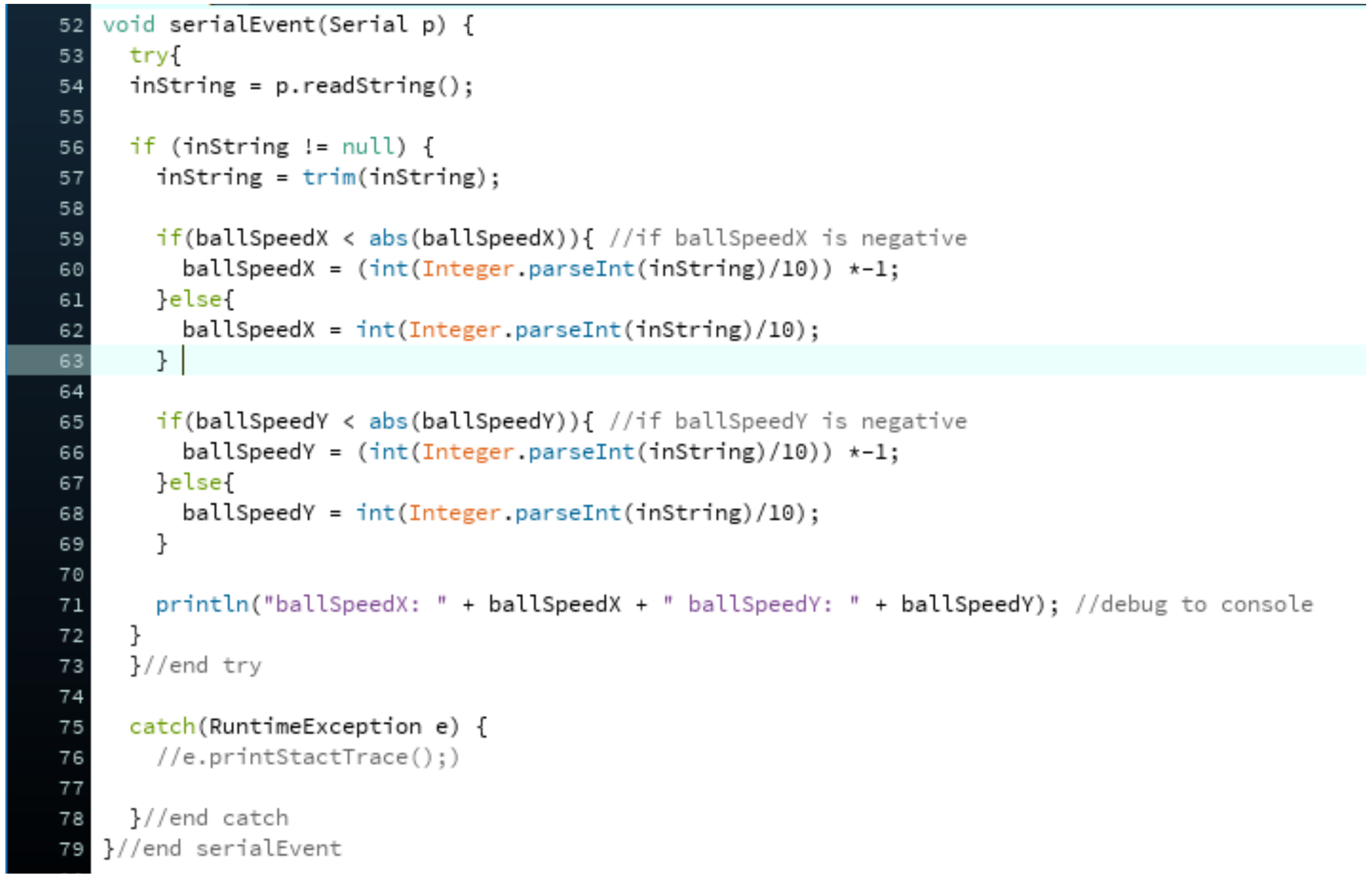
```
// setup() run once when the program begins
```



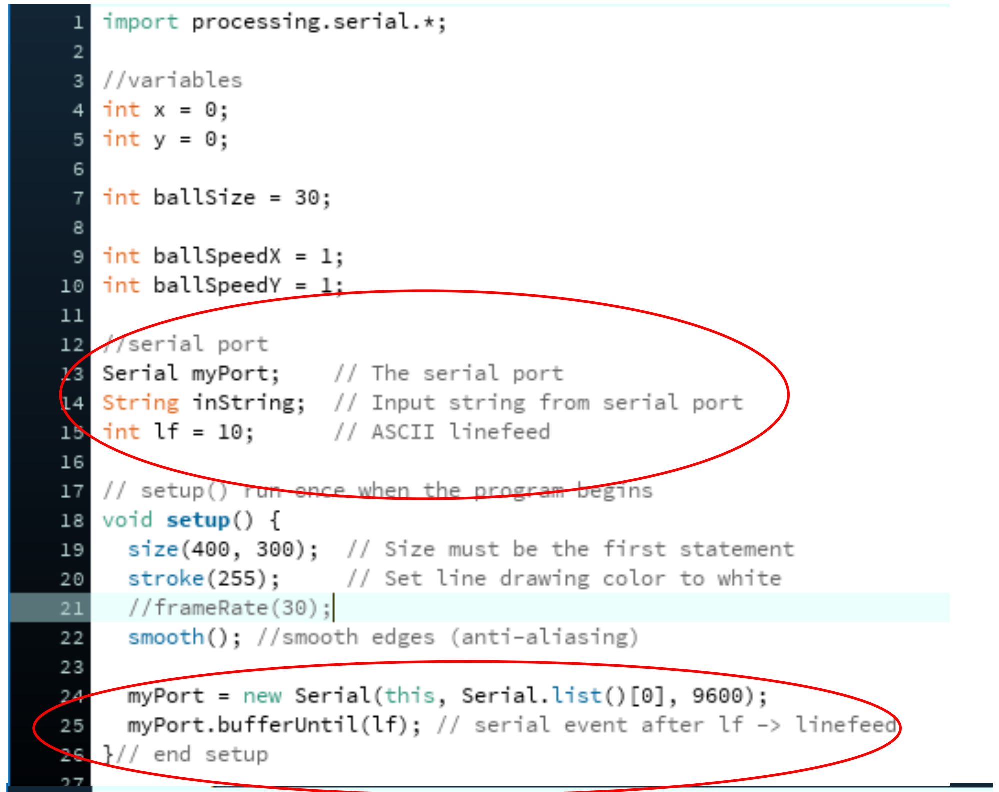
```
import processing.serial.*;

//variables
int x = 0;
int y = 0;

int ballSize = 30;
```

Processing: serial

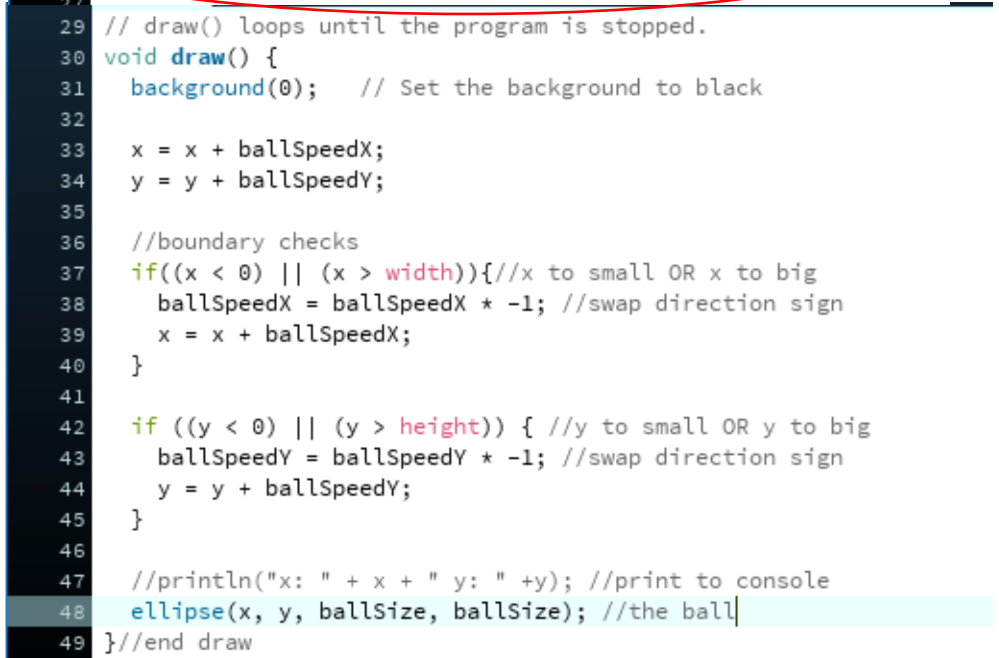
- Add code to receive and handle data



```
void serialEvent(Serial p) {
  try{
  inString = p.readString();

  if (inString != null) {
    inString = trim(inString);

    if(ballSpeedX < abs(ballSpeedX)){ //if ballSpeedX is negative
      ballSpeedX = (int(Integer.parseInt(inString)/10)) *-1;
    }else{
      ballSpeedX = int(Integer.parseInt(inString)/10);
    }

    if(ballSpeedY < abs(ballSpeedY)){ //if ballSpeedY is negative
      ballSpeedY = (int(Integer.parseInt(inString)/10)) *-1;
    }else{
      ballSpeedY = int(Integer.parseInt(inString)/10);
    }

    println("ballSpeedX: " + ballSpeedX + " ballSpeedY: " + ballSpeedY); //debug to console
  }
  }//end try

  catch(RuntimeException e) {
    //e.printStactTrace();)

  }//end catch
}//end serialEvent
```



```
import processing.serial.*;

//variables
int x = 0;
int y = 0;

int ballSize = 30;

int ballSpeedX = 1;
int ballSpeedY = 1;

//serial port
Serial myPort;    // The serial port
String inString;  // Input string from serial port
int lf = 10;      // ASCII linefeed

// setup() run once when the program begins
void setup() {
  size(400, 300);  // Size must be the first statement
  stroke(255);     // Set line drawing color to white
  //frameRate(30);
  smooth(); //smooth edges (anti-aliasing)

  myPort = new Serial(this, Serial.list()[0], 9600);
  myPort.bufferUntil(lf); // serial event after lf -> linefeed
}// end setup
```

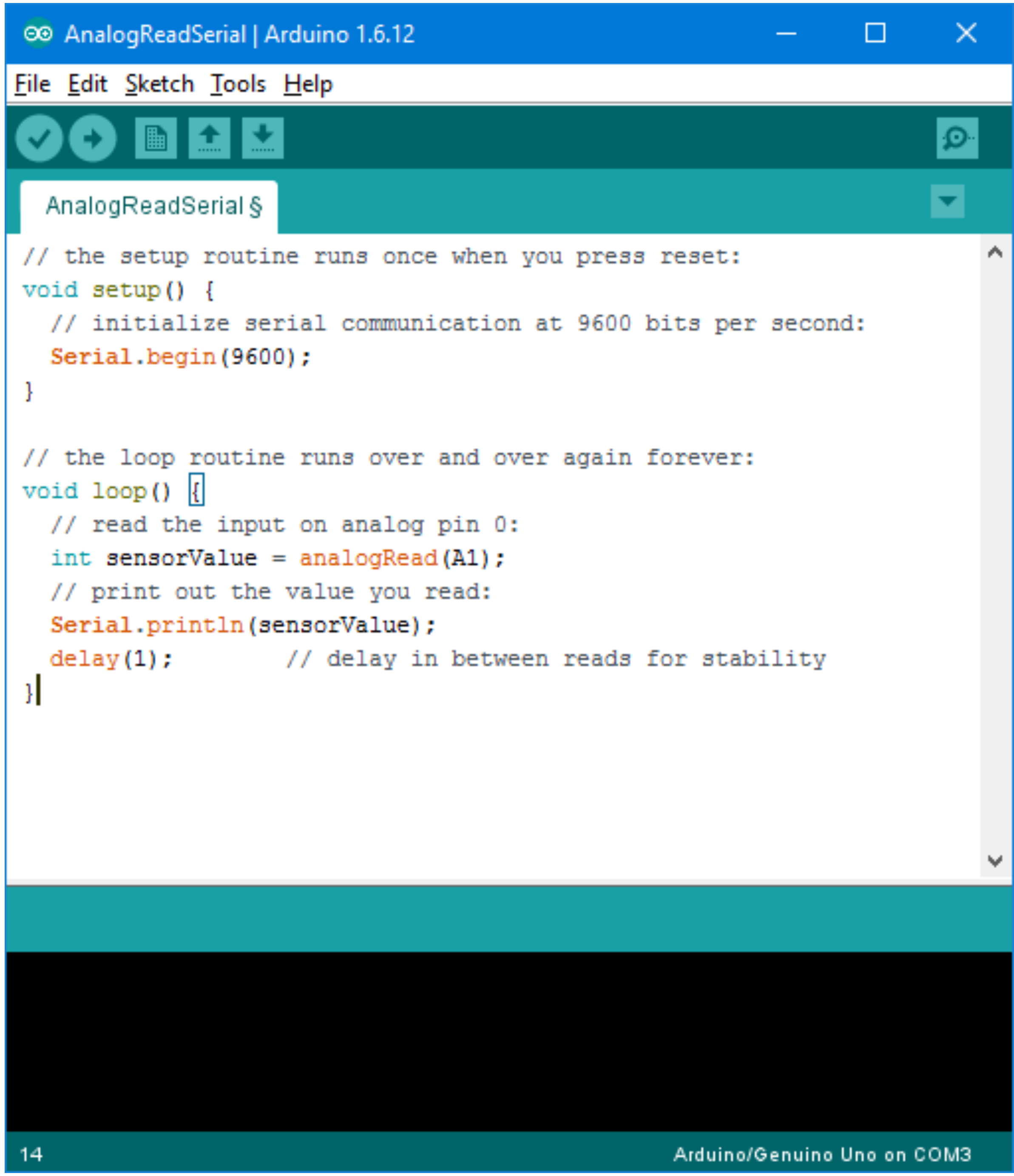


```
// draw() loops until the program is stopped.
void draw() {
  background(0);   // Set the background to black

  x = x + ballSpeedX;
  y = y + ballSpeedY;

  //boundary checks
  if((x < 0) || (x > width)){//x to small OR x to big
    ballSpeedX = ballSpeedX * -1; //swap direction sign
    x = x + ballSpeedX;
  }

  if ((y < 0) || (y > height)) { //y to small OR y to big
    ballSpeedY = ballSpeedY * -1; //swap direction sign
    y = y + ballSpeedY;
  }

  //println("x: " + x + " y: " +y); //print to console
  ellipse(x, y, ballSize, ballSize); //the ball
}//end draw
```

Processing: receive data from Arduino

Arduino: serial sensor

- Reading analog value from pin A1
- Sending on serial port
- Print out


AnalogReadSerial | Arduino 1.6.12
File Edit Sketch Tools Help
AnalogReadSerial §

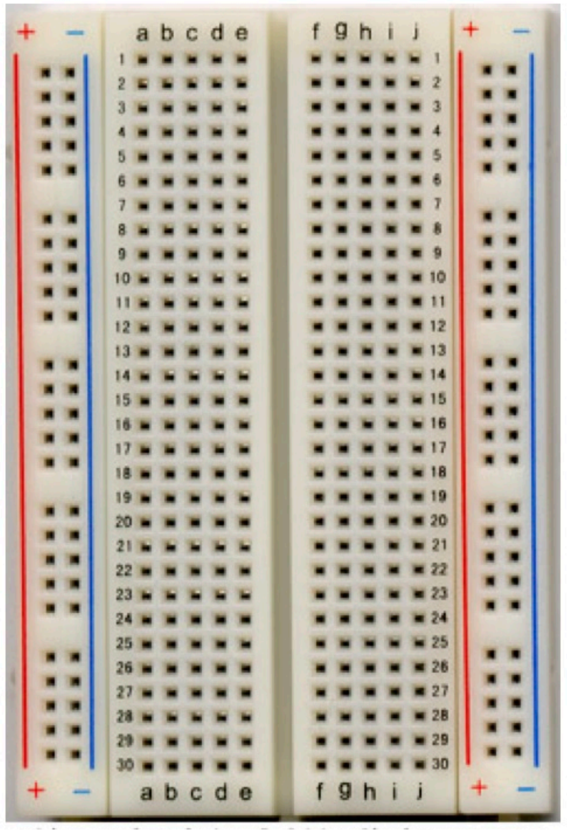
```
// the setup routine runs once when you press reset:
void setup() {
  // initialize serial communication at 9600 bits per second:
  Serial.begin(9600);
}

// the loop routine runs over and over again forever:
void loop() {
  // read the input on analog pin 0:
  int sensorValue = analogRead(A1);
  // print out the value you read:
  Serial.println(sensorValue);
  delay(1);        // delay in between reads for stability
}
```

14
Arduino/Genuino Uno on COM3

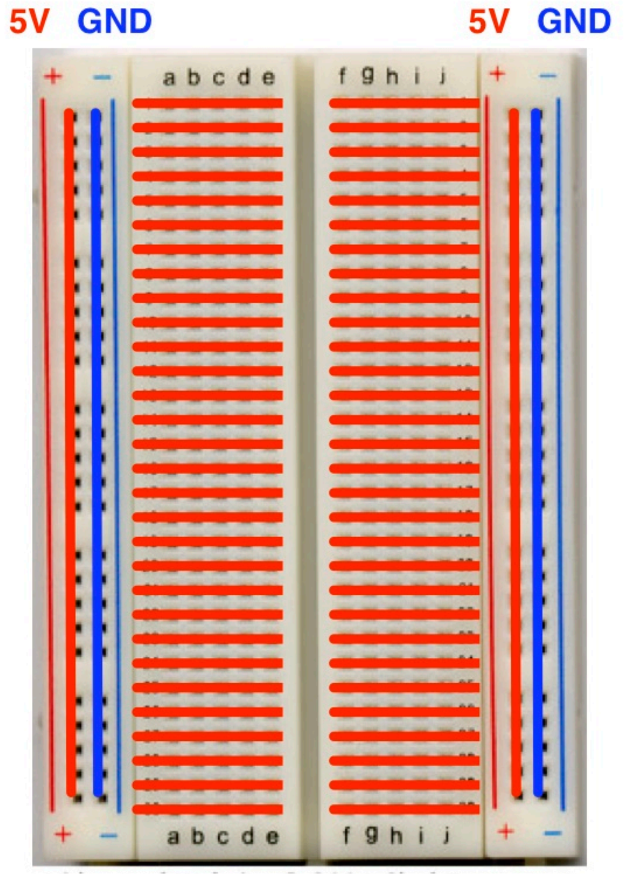
Arduino: breadboard

- Connections on the breadboard

Breadboard (photo)



Breadboard (schematic)


5V
GND
5V
GND
a b c d e
f g h i j