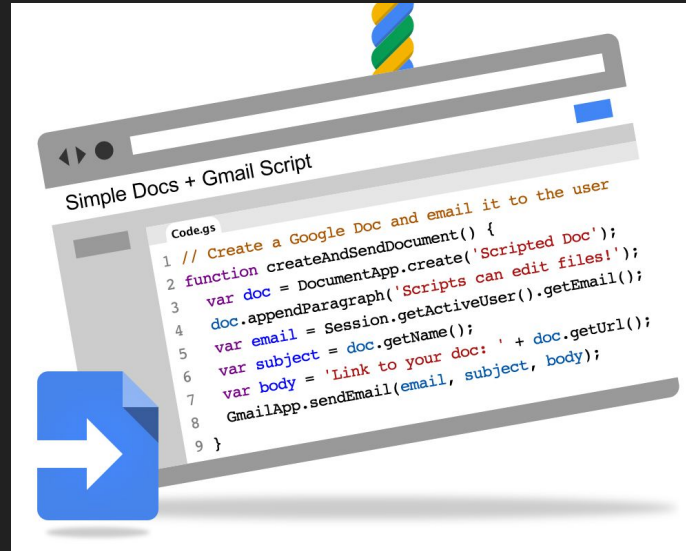


# Doing More with G Suite: Google Apps Script



Google Developers

CS50

Sundar Solai  
With guidance from Wesley Chun,  
Developer Advocate at Google

# G Suite

## Communicate



Gmail



Hangouts



Calendar



Google+

## Store



Drive

## Collaborate



Docs



Sheets



Forms



Slides



Sites

## Manage



Admin

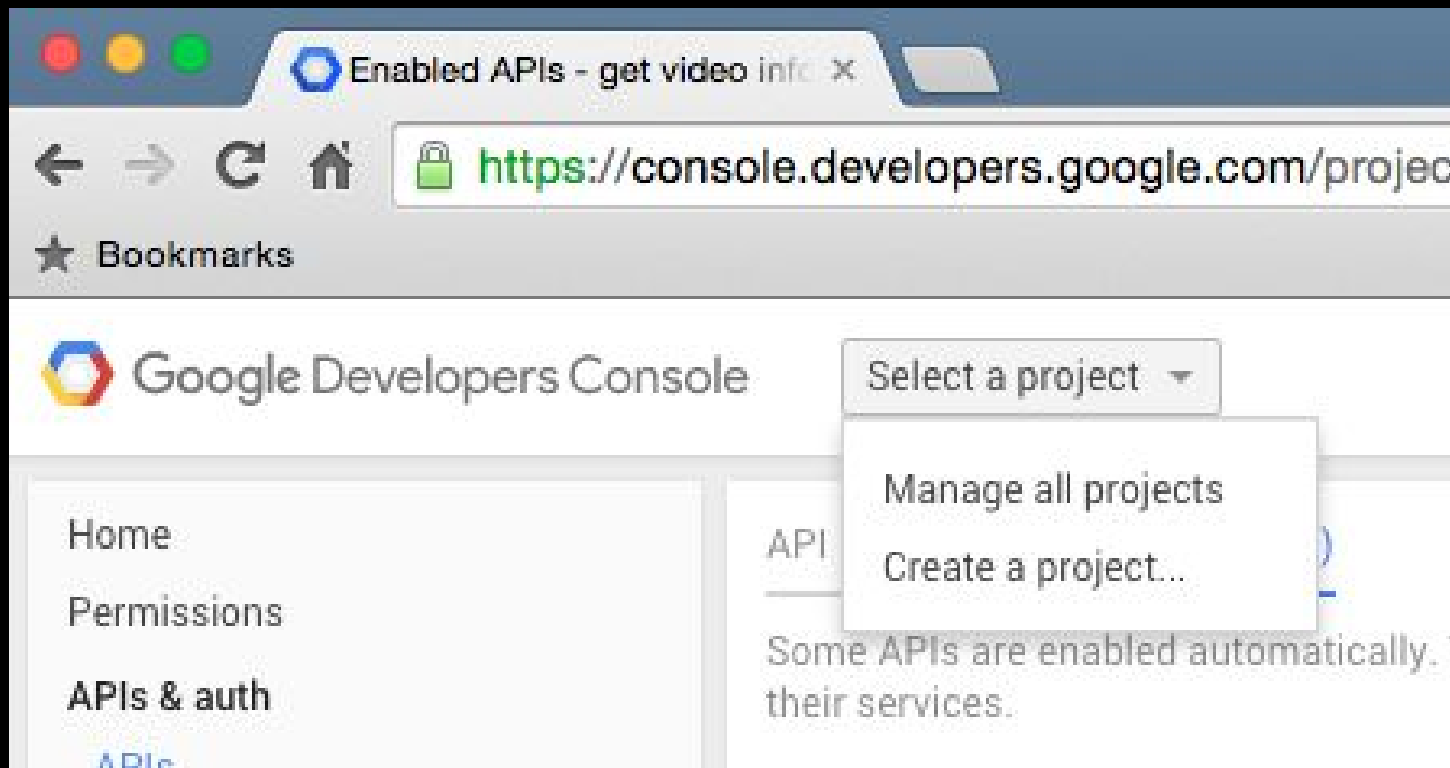


Vault



# Getting Started with Google APIs

# Developers Console (devconsole)



API Library - Google APIs x

https://console.developers.google.com/apis/library

Like our APIs? Check out our infrastructure. Sign up to get \$300 in credit and 60 days to explore Google Cloud Platform. [Learn more](#) **DISMISS** **SIGN UP FOR FREE TRIAL**

Google APIs Google APIs

API Manager

Dashboard

Library


Credentials

### Library


Google APIs

Search all 100+ APIs


#### Popular APIs

**Google Cloud APIs**


- [Compute Engine API](#)
- [BigQuery API](#)
- [Cloud Storage Service](#)
- [Cloud Datastore API](#)
- [Cloud Deployment Manager API](#)
- [Cloud DNS API](#)
- [More](#)

**Google Maps APIs**


- [Google Maps Android API](#)
- [Google Maps SDK for iOS](#)
- [Google Maps JavaScript API](#)
- [Google Places API for Android](#)
- [Google Places API for iOS](#)
- [Google Maps Roads API](#)
- [More](#)

**Google Apps APIs**


- [Drive API](#)
- [Calendar API](#)
- [Gmail API](#)
- [Sheets API](#)
- [Google Apps Marketplace SDK](#)
- [Admin SDK](#)
- [More](#)

**Mobile APIs**


- [Google Cloud Messaging](#)
- [Google Play Game Services](#)
- [Google Play Developer API](#)
- [Google Places API for Android](#)

**Social APIs**


- [Google+ API](#)
- [Blogger API](#)
- [Google+ Pages API](#)
- [Google+ Domains API](#)

**YouTube APIs**

- [YouTube Data API](#)
- [YouTube Analytics API](#)
- [YouTube Reporting API](#)

**Advertising APIs**

- [AdSense Management API](#)
- [DCM/DFA Reporting And Trafficking API](#)
- [Ad Exchange Seller API](#)
- [Ad Exchange Buyer API](#)
- [DoubleClick Search API](#)

**Other popular APIs**

- [Analytics API](#)
- [Translate API](#)
- [Custom Search API](#)
- [URL Shortener API](#)
- [PageSpeed Insights API](#)

# Which do you choose?

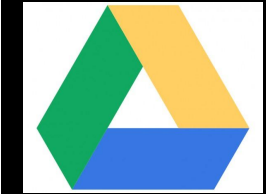
```
1 from apiclient import discovery
2
3 # Copy from project in DevConsole, or better yet, put into
4 # secure DB, or typed into a central server/proxy, etc.
5 API_KEY = '...'
6
7 # API information, i.e., (API='youtube', VERSION='v3')
8 SERVICE = discovery.build(API, VERSION, developerKey=API_KEY)
```

**SIMPLE**



```
1 from apiclient import discovery
2 from httplib2 import Http
3 from oauth2client import file, client, tools
4
5 SCOPES = # one or more scopes (strings)
6
7 # 'storage.json' - file to store access and refresh tokens
8 # 'client_secret.json' - download from project in Dev Console
9 store = file.Storage('storage.json')
10 creds = store.get()
11 if not creds or creds.invalid:
12     flow = client.flow_from_clientsecrets('client_secret.json', SCOPES)
13     creds = tools.run_flow(flow, store, flags)
14
15 # API information, i.e., (API='youtube', VERSION='v3')
16 SERVICE = discovery.build(API, VERSION, http=creds.authorize(Http()))
```

**AUTHORIZED**



# Simple API access

```
1 from apiclient import discovery
2
3 # Copy from project in DevConsole, or better yet, put into
4 # secure DB, encrypted store, credential server/proxy, etc.
5 API_KEY = ' ... '
6
7 # API information, i.e., (API='youtube', VERSION='v3')
8 SERVICE = discovery.build(API, VERSION, developerKey=API_KEY)
```

# Authorized API access

```
1 from apiclient import discovery
2 from httplib2 import Http
3 from oauth2client import file, client, tools
4
5 SCOPES = # one or more scopes (strings)
6
7 # 'storage.json' - file to store access and refresh tokens
8 # 'client_secret.json' - download JSON file from project in DevConsole
9 store = file.Storage('storage.json')
10 creds = store.get()
11 if not creds or creds.invalid:
12     flow = client.flow_from_clientsecrets('client_secret.json', SCOPES)
13     creds = tools.run_flow(flow, store)
14
15 # API information, i.e., (API='youtube', VERSION='v3')
16 SERVICE = discovery.build(API, VERSION, http=creds.authorize(Http()))
```



# Use of multiple APIs supported

Simple, authorized, or a mix of both types of APIs; re-uses HTTP client; also see [goo.gl/cdm3kZ](http://goo.gl/cdm3kZ)

```
1 from apiclient import discovery
2 from httplib2 import Http
3 from oauth2client import file, client, tools
4
5 SCOPES = (SCOPE_1,... SCOPE_M) # ' '- delimited string or multi-str iterable
6 store = file.Storage('storage.json')
7 creds = store.get()
8 if not creds or creds.invalid:
9     flow = client.flow_from_clientsecrets('client_secret.json', SCOPES)
10    creds = tools.run_flow(flow, store)
11
12 HTTP = creds.authorize(Http())
13 SERVICE_1 = discovery.build(API_1, VERSION_1, http=HTTP)
14     :
15 SERVICE_N = discovery.build(API_N, VERSION_N, http=HTTP)
16     :
```



# Example Projects with APIs

# Searching YouTube for videos

```
1 from __future__ import print_function
2 from apiclient import discovery
3 from settings import API_KEY
4
5 QUERY = 'python'
6 trim = lambda x, ct: ('%s%s' % (x[:ct],
7     '...' if len(x)>ct else '')).ljust(ct+3)
8 print('\n** Searching for %r videos...' % QUERY)
9
10 YOUTUBE = discovery.build('youtube', 'v3', developerKey=API_KEY)
11 res = YOUTUBE.search().list(q=QUERY, type='video',
12     part='id,snippet').execute().get('items', [])
13
14 for item in res:
15     print('http://youtu.be/%s\t%s' % (
16         trim(item['id']['videoId'], 24),
17         trim(item['snippet']['title'], 48)))
```

# Listing your files in Google Drive

```
1 from __future__ import print_function
2
3 from apiclient import discovery
4 from httplib2 import Http
5 from oauth2client import file, client, tools
6
7 SCOPES = 'https://www.googleapis.com/auth/drive.readonly.metadata'
8 store = file.Storage('storage.json')
9 creds = store.get()
10 if not creds or creds.invalid:
11     flow = client.flow_from_clientsecrets('client_secret.json', SCOPES)
12     creds = tools.run_flow(flow, store, flags)
13
14 DRIVE = discovery.build('drive', 'v3', http=creds.authorize(Http()))
15 files = DRIVE.files().list().execute().get('files', [])
16 for f in files:
17     print(f['name'], f['mimeType'])
```

# Tailored Presentations



Try our Node.js Markdown-to-Google-Slides generator:  
[github.com/googlesamples/md2googleslides](https://github.com/googlesamples/md2googleslides)

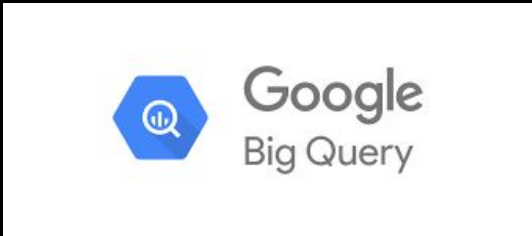
# Replace text & images from template deck

```
requests = [  
  # (global) search-and-replace text  
  {'replaceAllText': {  
    'findText':    '{{TITLE}}',  
    'replaceText': 'Hello World!',  
  }},  
  # replace text-based image placeholders (global)  
  {'replaceAllShapesWithImage': {  
    'imageUrl':    IMG_URL, # link to product logo  
    'replaceMethod': 'CENTER_INSIDE',  
    'containsText': {'text': '{{LOGO}}'},  
  }},  
]  
SLIDES.presentations().batchUpdate(body={'requests': requests},  
  presentationId=DECK_ID, fields='').execute()
```





# Sports Analytics Spreadsheets for *Every* MLB Team



Name: Batters Faced      Range: A1:U27

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	First Name	Last Name	Games Play	Pitch Hand	Batters Face	Innings Pttl	Walks	Hits Allowed	Strikeouts	Fastball Spe	Fastballs	Sliders	Cutters	Curveballs	Changeups	Knuckleballs	Splitters	Intentional B	Sinkers	Pitchouts	Other
2	Jonathan	Lester	27	L	671	168.3333333	45	130	160	92.08660759	1422	1	445	337	134	0	0	0	324	1	0
3	Jacob	Arrieta	26	R	668	161.3333333	67	121	153	93.50408163	490	446	0	334	135	0	0	4	1218	0	0
4	Kyle	Hendricks	27	R	655	167	41	122	149	89.65625	96	0	419	216	717	0	0	8	1097	0	1
5	John	Lackey	24	R	621	155	45	118	150	91.15212689	1387	24	546	320	119	0	0	0	0	1	0
6	Jason	Hammel	26	R	602	142.6666667	44	133	118	92.11567983	1165	822	0	224	58	0	0	0	0	0	0
7	Trevor	Cahill	41	R	249	58.33333333	30	40	58	92.50746269	67	34	0	197	238	0	0	6	464	0	0
8	Travis	Wood	66	L	228	54.66666667	22	41	40	90.34775641	624	64	176	29	16	0	0	8	0	0	0
9	Justin	Grimm	60	R	200	45.33333333	23	42	51	94.02849741	386	35	0	375	0	0	0	4	1	0	0
10	Hector	Rondon	46	R	172	43	8	38	43	96.00456621	438	235	0	0	19	0	0	0	0	0	0
11	Michael	Montgomery	17	L	164	38.33333333	20	30	38	92.65517241	319	0	61	184	59	0	0	0	1	0	0
12	Pedro	Strop	43	R	155	38	13	24	46	94.8976378	254	295	0	1	43	0	0	0	0	0	0
13	Carl	Edwards	36	R	139	36	14	15	49	95.12826087	460	2	0	159	2	0	0	1	0	0	0
14	Adam	Warren	22	R	123	27	16	29	18	92.77253219	233	117	6	46	121	0	0	13	0	0	1
15	Albertin	Chapman	28	L	102	26.66666667	10	12	46	100.6793478	368	67	0	0	12	0	0	0	0	0	1
16	Spencer	Patton	16	R	101	21.33333333	14	20	22	92.11857708	253	112	0	1	25	0	0	0	0	0	1
17	Robert	Zastny	8	L	66	16	5	12	16	89.71111111	135	33	22	54	9	0	0	0	0	0	0
18	Clayton	Richard	21	L	58	11.33333333	5	18	5	91.95683453	139	11	0	9	13	0	0	8	0	0	0
19	Joseph	Smith	16	R	58	14.33333333	5	11	15	89.0625	16	85	0	1	3	0	0	0	108	0	0
20	Felix	Pena	11	R	35	9	3	5	13	93.32	75	38	4	12	2	0	0	4	0	0	0
21	Jake	Buchanan	2	R	21	6	1	3	4	88	1	13	0	10	12	0	0	0	46	0	0
22	Joel	Peralta	5	R	19	4	1	6	5	89.76086957	46	0	0	13	0	0	30	0	0	0	0
23	Brian	Matusz	1	L	16	3	2	6	2	89.88235294	34	6	0	15	2	0	0	0	0	0	0
24	Gerardo	Concepcion	3	L	10	2.333333333	1	2	2	91.45454545	33	1	0	10	1	0	0	0	0	0	0
25	Joseph	Nathan	3	R	10	2	2	2	4	91.33333333	30	23	0	2	0	0	0	0	0	0	0
26	Neil	Ramirez	2	R	10	1.666666667	4	1	3	91.64285714	14	23	0	5	0	0	0	4	0	0	0
27	Miguel	Montero	1	R	9	1.333333333	0	4	0	0	0	0	0	1	30	0	0	0	0	0	0





# Introducing Google Apps Script



+JavaScript  
-API “flavor”  
+built-in “flavor”  
-OAuth2 (you)

**Nothing to see here**



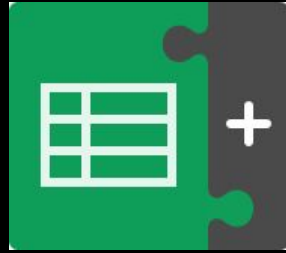
**It's just Javascript**

**JS**

# G Suite is just the beginning



# Apps Script powers add-ons



# Other Google services



# But wait, there's more...

## **G Suite/Apps services**

Admin SDK

Calendar

Classroom

Contacts

Docs

Drive

Forms

Gmail

Google+ Domains

Groups

Sites

Sheets

Tasks

## **Other Google services**

AdSense

Analytics

BigQuery

Fusion Tables

goo.gl

Maps

Mirror (Glass)

Prediction

Translate

YouTube

## **Other services**

URL Fetch

JDBC

... and more...



**Let's see it!**

Hello World! and more...



# Types of Apps Scripts

- Standalone scripts
  - [Script.google.com](https://script.google.com)
  - Google Drive > Create > Script
- Add-ons (Docs, Sheets, Slides, Forms) & document-bound scripts
  - Tools > Script editor
  - Add-ons > Get/Manage add-ons
- Simple web apps & Sites-bound gadgets
  - More > Manage Site > Apps Scripts > Add new script

# Your first Apps Script project

The image shows a Google Docs interface with the 'Tools' menu open. The 'Script editor...' option is circled in red. The Google Apps Script dialog box is also open, showing options to create a script for various Google services.

**Tools Menu:**

- Spelling...
- Explore ⌘+Option+Shift+I
- Define ⌘+Shift+Y
- Document outline Ctrl+⌘A Ctrl+⌘H
- Word count ⌘+Shift+C
- Voice typing... ⌘+Shift+S
- Translate document...
- Script editor...**
- Preferences

**Google Apps Script Dialog:**

**Create script for**

- Blank Project
- Google Sheets Add-on
- Google Docs Add-on
- Google Forms Add-on
- Custom Functions in Sheets
- Web App

**Tutorials**

- Overview of Google Apps Script
- Custom Functions in Google Sheets
- Quickstart: Macros, Menus, and Custom Functions
- Quickstart: Managing Responses for Google Forms
- Quickstart: Add-on for Google Docs
- Quickstart: Add-on for Google Forms

**Open a recent project**

No projects found

Don't show again **Close**

# Hello World!

```
function myFunction() {  
  SpreadsheetApp.getActiveSheet().getRange("A1").setValue("Hello World!");  
}
```

JS

```
function myFunction() {  
  SpreadsheetApp  
    .getActiveSheet()  
    .getRange("A1")  
    .setValue("Hello World!");  
}
```

JS

# Hello World

File Edit View Run Publish Resources Help

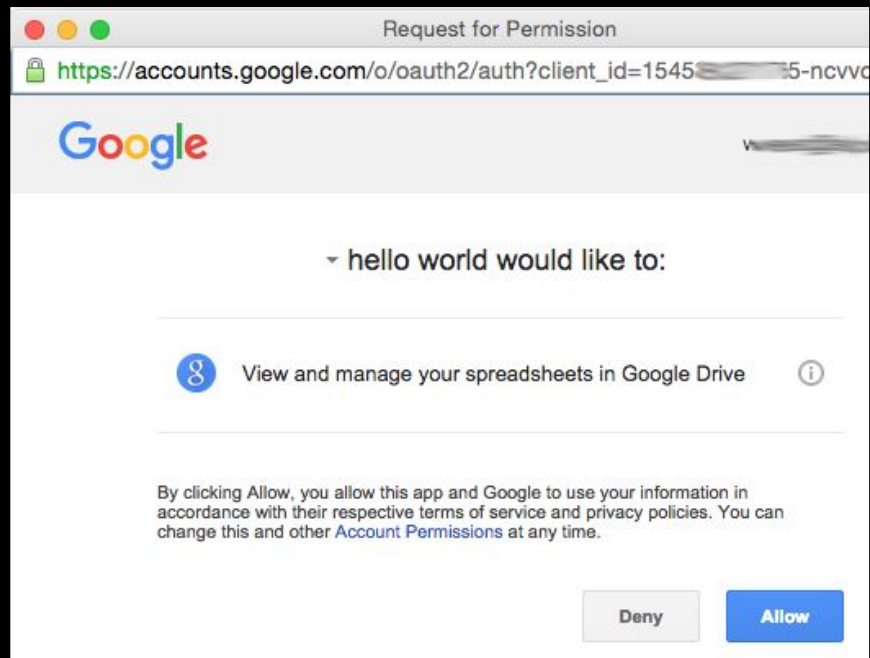
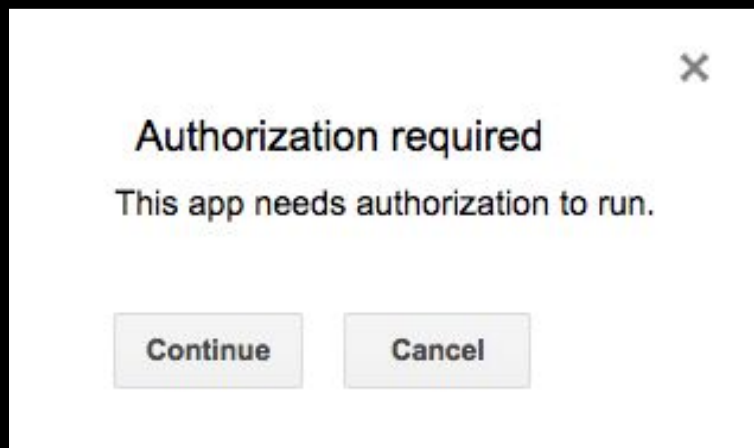


Code.gs

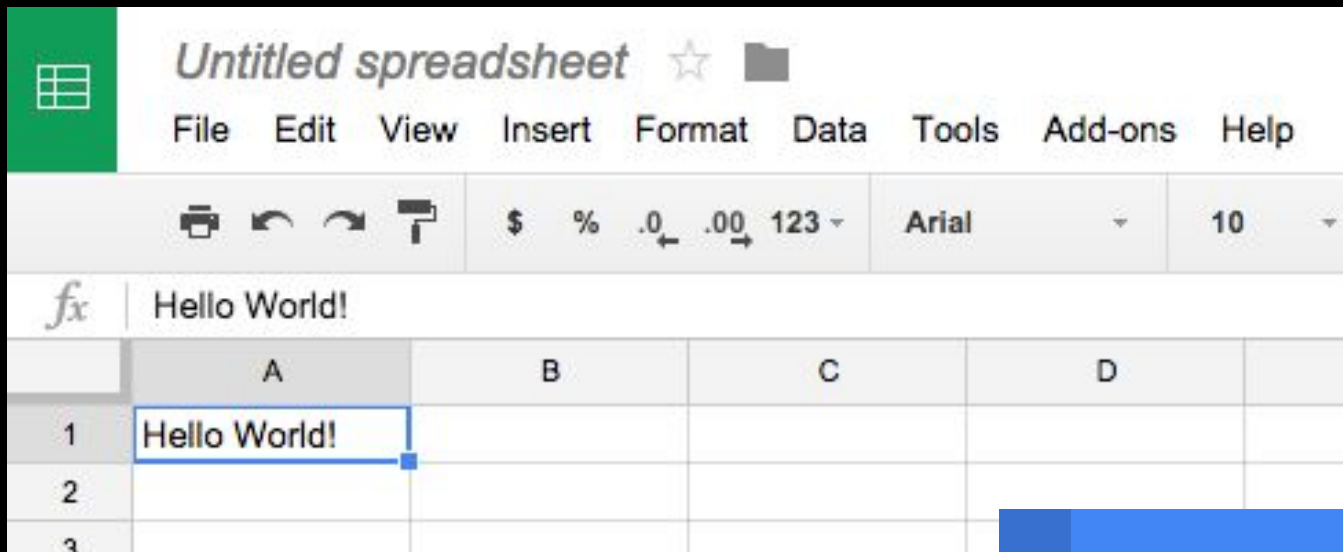
\* Code.gs x

```
1 function myFunction() {  
2   SpreadsheetApp  
3     .getActiveSheet()  
4     .getRange("A1")  
5     .setValue("Hello World!");  
6 }
```

# OAuth2 flow



# “Hello World”



**Apps Script intro video**

[goo.gl/1sXeuD](https://goo.gl/1sXeuD)

# More Google

```
function justSayingHello() {  
  var docs = .getFilesByType();  
  var friends = .getContacts();  
  for (var i = 0; i < docs.length; i++) {  
    var text = docs[i].getContentAsString();  
    text = .translate(text, 'en', 'cy');  
    for (var j = 0; j < friends.length; j++) {  
      var email = friends[j].getPrimaryEmail();  
      .sendEmail(email, 'Hello from !', text);  
    }  
  }  
}  
}
```

JS



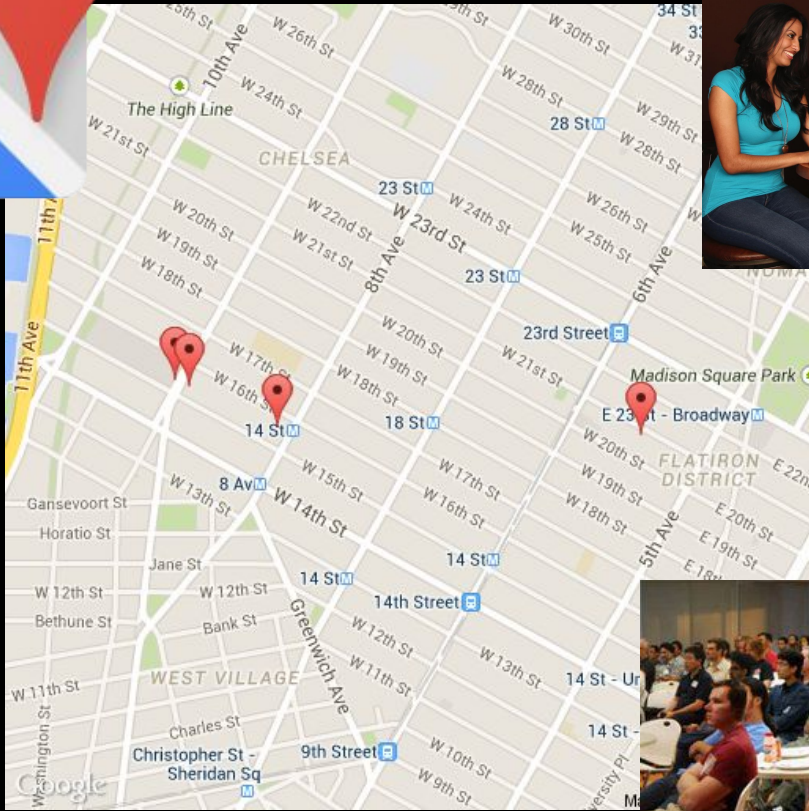
<i>f<sub>x</sub></i>	
	A
1	<b>Address</b>
2	76 9th Ave, New York, NY
3	
4	





```
function getMap() {  
  var sheet = SpreadsheetApp.getActiveSheet();  
  var address = sheet.getRange("A2").getValue();  
  var map = Maps.newStaticMap().addMarker(address);  
  sheet.getRange("B2").setValue(map.getMapUrl());  
}
```

JS





```
function sendMap() {  
  var sheet = SpreadsheetApp.getActiveSheet();  
  var address = sheet.getRange("A2").getValue();  
  var map = Maps.newStaticMap().addMarker(address);  
  MailApp.sendEmail(EMAIL, "Map", map.getMapUrl());  
}
```

JS

Map



Inbox x



~~XXXXXXXXXX~~@gmail.com

8:55 PM (0 minutes ago) ☆

to me ▾

<http://maps.google.com/maps/api/staticmap?sensor=false&size=512x512&markers=76+9th+ave,+New+York,+NY>



video statistics FINAL ☆ 📁

File Edit View Insert Format Data Tools Add-ons Help

🖨️ ↶ ↷ 📄 \$ % .0 ↵ .00 ↷ 123 ▾ Arial ▾ 10 ▾

*fx* |

	A	B	C
1	<b>Video ID</b>	<b>Title</b>	<b>Views</b>
2	CbgyI3ueznU		
3			



```
1 function getVideoInfo() {
2     var sheet = SpreadsheetApp.getActiveSheet();
3     var vid   = sheet.getRange("A2").getValue();
4     var data  = YouTube.Videos.list('snippet, statistics', {id: vid});
5     var item  = data.items[0];
6     var info  = [item.snippet.title, item.statistics.viewCount];
7     sheet.getRange("B2:C2").setValues([info]);
8 }
```

JS

▶ Blog post + video  
[goo.gl/nKfBQi](http://goo.gl/nKfBQi)

▶ Spreadsheet with code  
[goo.gl/SVxoCt](http://goo.gl/SVxoCt)



# Use cases

# Apps Script use cases

- **Enterprise Workflows**
  - Document Approval, Purchase Orders
- **Resource Management**
  - Time Booking, Helpdesk, Project Tracking, Mail Room Management, Billing
- **Automation**
  - Auto-create calendar events, mail merge, move cells in spreadsheet
- **Reporting**
  - Dashboards, Nightly reports
- **Integration Glue**
  - Salesforce.com, Twitter
- **Domain Administration**
  - Add users, reset user accounts, auto create sites/folders for users

# Teachers' tools (i.e., GFormIt, Flubaroo, Doctopus)

The image shows two overlapping Google Docs windows. The left window is titled "Google Quiz" and contains a form with the following questions:

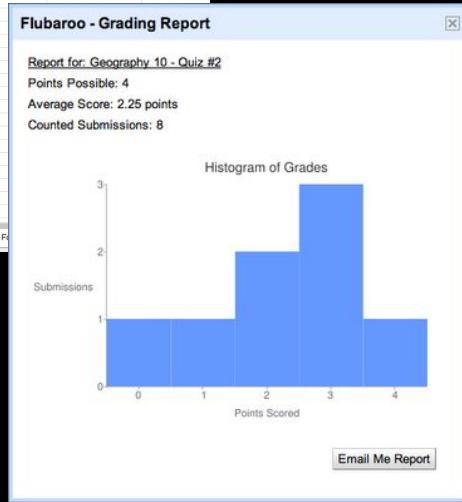
- How many colors are in Google's logo (number please)
- What is the word the company is playfully named as
- If Google has only one thing they're known for, what is it

The right window is titled "Google Quiz RESPONSES" and shows a spreadsheet with the following data:

Timestamp	How many colors are in C	What is the word
9/29/2014 18:12:21	4	googol

Below the spreadsheets is a screenshot of a "Geography 10 - Quiz #2" form. The form includes fields for "First Name", "Last Name", and "Your Email Address". It contains the following questions:

- Sacramento, the capital of California, was founded in what year?  
 1839  
 1849  
 1850  
 1851
- What is the capital of Louisiana?  
Correct spelling counts!
- Nashville is the capital of what state?  
 Tennessee  
 Boston  
 South Dakota  
 North Dakota
- Most of America's salmon, crab, halibut, and herring come from this state.





# Automation (i.e., mail merge)

The screenshot shows a spreadsheet application with a menu bar (File, Edit, View, Insert, Format, Data, Tools, Form (1), Help) and a toolbar. The active cell contains the formula `Hi {"First Name"}`. Below the formula bar, a text box contains the following content:

Hi {"First Name"}  
Thanks you for signing up. You submitted the following data:  
First Name: {"First Name"}  
Last Name: {"Last Name"}  
Email Address: {"Email Address"}  
  
Please verify the information and contact us if there's any mistake.  
  
Thank you!

The screenshot shows an email client interface. The main window displays an email with the following details:

- From: `hello@domain.com`
- To: `hello@domain.com`
- Subject: `Hi Another Mail Merge`
- Body: 

Hi {"First Name"}!  
Just a little email to let you know that the **Mail Merge** is working!

**Send** (Status: Large - Original Size - Below)

The interface also shows a sidebar with a folder list and a search bar.

# Enterprise workflow (i.e., team OoO calendars)

Today May 23 – 27, 2011

Print Refresh Day Week Month 3 Days Agenda

Mon 5/23 Tue 5/24 Wed 5/25 Thu 5/26 Fri 5/27

Who is Out Who is Out Who is Out Who is Out Who is Out

GMT-05

8am

9am 9 – 10 Meeting

10am 10 – 11 Time Tracking

11am

12pm 12:30p – travel & get laptop fr meeting - Google G

1pm 1p – 2p Google Apps Domain

8:30 – 9:30 Project Co

9:30 – travel (No title)

11:30 – fra

12p – 1p meeting - Google G

1:30p – trav

**Who is Out**  
Tue, May 24, 12am – Wed, May 25, 12am

**Calendar** Staff Sick/Vacation

**Created by** i-am-out@myschool.edu

**Description**  
[clarence-kates@myschool.edu](mailto:clarence-kates@myschool.edu) vacation 5/22 - 6/6  
[darlene-branton@myschool.edu](mailto:darlene-branton@myschool.edu) vacation full day  
[debbie-thai@myschool.edu](mailto:debbie-thai@myschool.edu) sick/doctor 8:00 AM - 10:00 AM  
[denise-pettigrew@myschool.edu](mailto:denise-pettigrew@myschool.edu) conference/training 5/2  
[florence-hirsch@myschool.edu](mailto:florence-hirsch@myschool.edu) sick/doctor full day  
[marcia-wilkey@myschool.edu](mailto:marcia-wilkey@myschool.edu) vacation full day  
Last updated: Tuesday 5/24 11:21 AM

Add: **Guests** | [Rooms, etc.](#)

i-am-out@mydomain.com

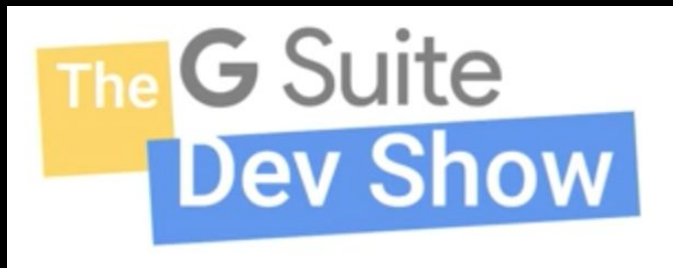
Add

# Summary

- It's just JavaScript
  - (Mostly) In Google's cloud, server-side
  - Not in browser but not Node.js either
  - No need to "learn a new programming language"
- Access to Google & external ecosystems
  - Programmatically access G Suite data & services
  - Access to other Google plus external resources
- Not like using APIs... more like built-in services
  - Runs in authenticated environment... no OAuth code!
  - No setup or deployment needed
- Wide variety of use cases
  - Standalone or application-bound scripts
  - Add-ons for Docs, Sheets, Forms
  - Powers Google App Maker — see [blog.google/products/g-suite/customize-your-g-suite-experience-app-maker-and-recommended-apps](https://blog.google/products/g-suite/customize-your-g-suite-experience-app-maker-and-recommended-apps)
- No longer Google's best kept secret?!?

# Reference + next steps

- Developer videos and/or blogposts
  - [developers.google.com/apps-script/guides/videos](https://developers.google.com/apps-script/guides/videos)
    - [goo.gl/1sXeuD](https://goo.gl/1sXeuD) (Apps Script intro)
    - [goo.gl/oAzBN9](https://goo.gl/oAzBN9) (Google Maps & Gmail APIs)
    - [goo.gl/nKfBQi](https://goo.gl/nKfBQi) (YouTube [Data] API)
    - [goo.gl/EK5edG](https://goo.gl/EK5edG) (Google Forms)
- Codelabs! ([g.co/codelabs/gmail-add-ons](https://g.co/codelabs/gmail-add-ons))
- Documentation
  - [developers.google.com/apps-script](https://developers.google.com/apps-script)
- Need help?
  - [stackoverflow.com/questions/tagged/google-apps-script](https://stackoverflow.com/questions/tagged/google-apps-script)
- Community
  - [plus.google.com/communities/102471985047225101769](https://plus.google.com/communities/102471985047225101769)



# Thank you! Q&A

Sundar Solai



# Google Developers

**Slides:**  
[goo.gl/83qvcz](https://goo.gl/83qvcz)

