Social Media Apps Programming

Google App Engine and Google Maps API

Min-Yuh Day, Ph.D.
Assistant Professor

Department of Information Management
Tamkang University

http://mail.tku.edu.tw/myday

2013-12-19
## Course Schedule (1/3)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject/Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2013/09/19</td>
<td>Mid-Autumn Festival (Day off)</td>
</tr>
<tr>
<td>2</td>
<td>2013/09/26</td>
<td>Course Orientation and Introduction to Social Media and Mobile Apps Programming</td>
</tr>
<tr>
<td>3</td>
<td>2013/10/03</td>
<td>Introduction to Android / iOS Apps Programming</td>
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<td>Double Tenth Day (Day off)</td>
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<td>Developing Android Native Apps with Java (Eclipse) (MIT App Inventor)</td>
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<td>Developing iPhone / iPad Native Apps with Objective-C (Xcode)</td>
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<td>7</td>
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<td>Mobile Apps using HTML5/CSS3/JavaScript</td>
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<tr>
<td>8</td>
<td>2013/11/07</td>
<td>jQuery Mobile</td>
</tr>
<tr>
<td>9</td>
<td>2013/11/14</td>
<td>Create Hybrid Apps with PhoneGap</td>
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<tr>
<td>10</td>
<td>2013/11/21</td>
<td>Midterm Exam Week (Midterm Project Report)</td>
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<tr>
<td>11</td>
<td>2013/11/28</td>
<td>jQuery Mobile/Phonegap</td>
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<tr>
<td>12</td>
<td>2013/12/05</td>
<td>Invited Talk: Social, Mobile and Business Model in PIXNET</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Invited Speaker: Dr. Rick Cheng-Yu Lu]</td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
<td>Subject/Topics</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>13</td>
<td>2013/12/12</td>
<td>Case Study on Social Media Apps Programming and Marketing in Google Play and App Store</td>
</tr>
<tr>
<td>14</td>
<td>2013/12/19</td>
<td>Google App Engine and Google Map API</td>
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<tr>
<td>15</td>
<td>2013/12/26</td>
<td>Facebook API (Facebook JavaScript SDK) (Integrate Facebook with iOS/Android Apps)</td>
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<tr>
<td>16</td>
<td>2014/01/02</td>
<td>Twitter API</td>
</tr>
<tr>
<td>17</td>
<td>2014/01/09</td>
<td>Final Project Presentation</td>
</tr>
<tr>
<td>18</td>
<td>2014/01/16</td>
<td>Final Exam Week (Final Project Report)</td>
</tr>
</tbody>
</table>
Outline

• Google App Engine
  – Google Cloud Platform
  – Google Cloud Datastore

• Google Maps API
Google Cloud Platform

Tools for modern applications
Google Cloud Platform enables developers to build, test and deploy applications on Google’s highly-scalable and reliable infrastructure. Choose from computing, storage and application services for your web, mobile and backend solutions.

Get Started

Google Compute Engine now generally available
Google Compute Engine is now generally available with a 99.95% monthly SLA and 24x7 support. We've eliminated maintenance windows with live migration, cut prices by 10%, added support for Red Hat, SUSE, FreeBSD, or any Linux variant you want, and introduced new 16-core instances.

Learn More

https://cloud.google.com/
Google Cloud Platform

• App Engine
• Compute Engine
• Cloud Storage
• Cloud SQL
• Cloud Datastore
• BigQuery
• Prediction API
• Translate API
• Cloud Endpoints

https://cloud.google.com/products/
Google Cloud Platform

Some of our customers

Google cloud platform is set of modular cloud-based services that allow you to create anything from simple websites to complex applications.

Snapchat

“App Engine enabled us to focus on developing the application. We wouldn’t have gotten here without the ease of development that App Engine gave us.”

- Bobby Murphy, CTO and co-Founder

Read Snapchat’s story

Webfilings

“Google App Engine has the breadth and the depth to grow with you. Every 6 months, it gets better. The Google App Engine team knows what you need to make a competitive application.”

- Brott Harper, Director of Product Development

Read Webfilings’ story

Khan Academy

“If we didn’t have Google App Engine, we’d be spending a lot more time figuring out server setup and working on routers. Our ability to focus on the actual product is the benefit of Google App Engine.”

- Ben Kamens, Lead Developer

Read Khan Academy’s story

Rovio

“Google App Engine allows us to launch games very quickly with teams of one or two developers per game. Because Google manages all the servers, there is little required of us in terms of maintenance.”

- Stefan Hauk, lead server developer for web games

Read Rovio’s story

MAG Interactive

“Our rapid growth to 5M Puzzle players in less than six months required a highly scalable server solution.

Interactions Marketing

“We are always looking for ways to maximize return and minimize investment. BigQuery is the perfect

https://cloud.google.com/
Google Cloud Platform

special offers and event information. You never know when it will come up at a
dinner party. You can thank us later.

joe@gmail.com
Submit

App Engine  Compute Engine  Cloud SQL
Cloud Storage  Cloud Datastore  Prediction API
Translate API  Cloud Endpoints

https://cloud.google.com/
Google Cloud Products

Run your application using the same technology and tools used at Google. Cloud Platform provides the building blocks so you can develop quickly, using the services that you need.

Compute

Compute Engine

Compute Engine is Google’s Infrastructure-as-a-Service (IaaS). Run large-scale workloads on virtual machines hosted on Google’s infrastructure. Choose a VM that fits your needs and gain the performance and consistency of Google’s worldwide fiber network. With per-minute billing, you pay only for what you use.

Features  Case Studies  Pricing

App Engine

App Engine is Google’s Platform-as-a-Service (PaaS). Develop your application easily using built-in services that make you more productive. Deploy to a fully-managed platform and let Google carry the pager. Just download the SDK and start building immediately for free with no credit card required.

Features  Case Studies  Pricing

https://cloud.google.com/products/
Google Cloud Products

Compute

Compute Engine

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Features  Case Studies
Pricing  Documentation

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Features  Case Studies
Pricing  Documentation

Storage

Cloud SQL

Store and manage data using a fully-managed, relational MySQL database. Google handles replication, patch management and database management to ensure availability and performance.

Features  Case Studies
Pricing  Documentation

Cloud Storage

Use a durable and highly available object storage service. With global edge-caching, your users have fast access to your app’s data from any location. Google manages versioning, guarantees a strong SLA and provides a simple API that allows you to manage your data programmatically.

Features  Case Studies
Pricing  Documentation

Cloud Datastore

Cloud Datastore provides a managed, NoSQL, schemaless database for storing non-relational data. Cloud Datastore automatically scales as you need it and supports transactions as well as robust, SQL-like queries.

Features  Case Studies
Pricing  Documentation

https://cloud.google.com/products/
Google Cloud Products

Big Data

BigQuery

Analyze Big Data in the cloud with BigQuery. Run fast, SQL-like queries against multi-terabyte datasets in seconds. Scalable and easy to use. BigQuery gives you real-time insights about your data.

Features  Case Studies  Pricing  Documentation

Services

Cloud Endpoints

Create RESTful services from your code and make them accessible to iOS, Android and Javascript clients. Automatically generate client libraries to make wiring up the frontend easy. Built-in critical infrastructure includes denial-of-service protection, OAuth 2.0 support and client key management.

Features  Case Studies  Pricing  Documentation

Translate API

Create multilingual apps and translate text into other languages programmatically. Thousands of language pairs are available.

Features  Case Studies  Pricing  Documentation

Prediction API

Use Google’s machine learning algorithms to analyze data and predict future outcomes using a familiar RESTful interface.

Features  Case Studies  Pricing  Documentation

https://cloud.google.com/products/
Google Cloud Products

Cloud Endpoints
Create RESTful services from your code and make them accessible to iOS, Android and Javascript clients. Automatically generate client libraries to make wiring up the frontend easy. Built-in critical infrastructure includes denial-of-service protection, OAuth 2.0 support and client key management.

Translate API
Create multilingual apps and translate text into other languages programmatically. Thousands of language pairs are available.

Prediction API
Use Google’s machine learning algorithms to analyze data and predict future outcomes using a familiar RESTful interface.

Developer Tools

Google Plugin for Eclipse
Provides tooling, API support and easy deployment for App Engine Java developers.

Cloud Playground
Run Cloud Platform services like App Engine, Cloud Storage and Cloud SQL right from your browser so you can quickly try them out.

Push-to-Deploy
Use Git to automatically deploy your application to App Engine. You can launch a new version with a repository push and get access to all of Git’s features, including a history of commits.

Android Studio
Add Cloud Platform as a backend to your application right from the Android Studio IDE. Google Cloud Endpoints provides an API to your web backend and updates it automatically across all of your frontend platforms.

Learn More
Visit the Cloud Playground
Read about Push to deploy
Download Android Studio

https://cloud.google.com/products/
Google App Engine

App Engine
Run your applications on a fully-managed platform with built-in services that make you more productive. Just download the SDK and start building immediately.

Try it now

Features

Popular languages and frameworks
Write applications in some of the most popular programming languages: Python, Java, PHP and Go. Use existing frameworks such as Django, Flask, Spring and webapp2. Develop locally with language-specific SDKs. Pair your applications with Compute Engine to integrate other familiar technologies such as Node.js, C++, Scala, Hadoop, MongoDB, Redis

Focus on your code
Let Google worry about database administration, server configuration, sharding and load balancing. With Traffic Splitting, you can A/B test different live versions of your app. Multitenancy support lets you compartmentalize your application data.

Multiple storage options
Choose the storage option you need: a traditional MySQL database using Cloud SQL, a schemaless NoSQL datastore, or object storage using Cloud Storage.

https://cloud.google.com/products/app-engine/
Google Cloud Datastore

Use a managed, NoSQL, schemaless database for storing non-relational data. Cloud Datastore automatically scales as you need it and supports transactions as well as robust, SQL-like queries.

Features

- **Schemaless access, with SQL-like querying**
  No need to worry about data models and migration. Cloud Datastore is a schemaless storage service that allows you to be agile by removing the need to think about the underlying structure of the data. Cloud Datastore provides a robust query engine that allows you to search for data across multiple properties and sort as needed.

- **Managed database**
  Cloud Datastore is fully managed. Google automatically handles sharding and replication in order to provide you with a highly available and consistent database.

- **Autoscale with your users**
  Cloud Datastore automatically scales depending on your needs. This allows you to focus on building your application and not on worrying about provisioning and load anticipation.

https://cloud.google.com/products/cloud-datastore/
Mobile App, Goolge App Engine, Cloud Datasotre

http://www.youtube.com/watch?v=v5u_Owtbfew
Google Cloud Endpoints

https://developers.google.com/appengine/docs/java/endpoints/
Build your mobile app with Google Cloud Platform

http://www.youtube.com/watch?v=ZZNb1NOPTp8
App Engine Architecture and Services

http://www.youtube.com/watch?v=QJp6hmASstQ
Datastore Introduction

Source: Datastore Introduction, http://www.youtube.com/watch?v=fQazhzcC-rg
**Datasotre** is a database (persistent storage) for **App Engine**

Web application framework (AP)

Google App Engine (Java, Python, Go)

Persistent storage (Database)

Google App Engine

Traditional Web applications

Perl/CGI

PHP

Ruby on Rails

ASP/JSP

RDBMS

- MySQL
- PostgreSQL
- SQL Server
- Oracle

Source: Datasotre Introduction, [http://www.youtube.com/watch?v=fQazhzC-rg](http://www.youtube.com/watch?v=fQazhzC-rg)
Datastore Internals

• Based on Bigtable
  – high scalability
  – High availability
  • synchronous writes on multiple datacenters

Source: Datastore Introduction, http://www.youtube.com/watch?v=fQazhzcC-rg
What is Bigtable?

• Scalable, distributed, highly-available and structured storage
  – Bigtable is not database by itself (it doesn’t support query)

• Google usage
  – In production since April 2005
  – Web Search, YouTube, Earth, Analytics

Source: Datastore Introduction, http://www.youtube.com/watch?v=fQazhzC-rg
Bigtable Data Model

• A row has a Key and Columns
  – Sorted by Key
    – In lexical order
    – Enables range query by application

Source: Datastore Introduction, [http://www.youtube.com/watch?v=fQazhzcC-rg](http://www.youtube.com/watch?v=fQazhzcC-rg)
Google Datastore Basic Operation

Different terms for corresponding concepts

<table>
<thead>
<tr>
<th>Category of object</th>
<th>Google Datastore</th>
<th>Relational Database Management System (RDBMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kind</td>
<td>Entity</td>
<td>Table</td>
</tr>
<tr>
<td>One entry/object</td>
<td>Entity</td>
<td>Row</td>
</tr>
<tr>
<td>Unique identifier of data entry</td>
<td>Key</td>
<td>Primary Key (PK)</td>
</tr>
<tr>
<td>Individual data</td>
<td>Property</td>
<td>Field</td>
</tr>
</tbody>
</table>

Source: Datastore Introduction, http://www.youtube.com/watch?v=fQazhzC-rg
Kind, Entity and Key

**Entities**

- **BlogEntry**
  - Key: 1234
  - name: joe@ex.com
  - message: xxxxx
  - data: 1/1/2012 12:32

- **User**
  - Key: joe@ex.com
  - email: joe@ex.com
  - followees:
    - [usr2@ex.com, usr3@ex.com]
  - followers:
    - []

  - Key: usr2@ex.com
  - email: usr2@ex.com
  - followees:
    - []
  - followers:
    - [joe@ex.com]

**Kinds**

**Key**

Source: Datastore Introduction, [http://www.youtube.com/watch?v=fQazhzC-rg](http://www.youtube.com/watch?v=fQazhzC-rg)
Properties and Data Types

Each entity has one or more **named properties**

- **Variety of datatypes** (int, float, boolean, String, Date,...)
- Can be multi-valued

---

**BlogEntry**

Key: 1234  
name: joe@ex.com  
message: xxxxx  
data: 1/1/2012 12:32

**User**

Key: joe@ex.com  
email: joe@ex.com  
followees:  
  [usr2@ex.com, usr3@ex.com]  
followers:  
  []

Key: usr2@ex.com  
email: usr2@ex.com  
followees:  
  []  
followers:  
  [joe@ex.com]

---

Source: Datastore Introduction, [http://www.youtube.com/watch?v=fQazhzC-rg](http://www.youtube.com/watch?v=fQazhzC-rg)
Creating an Entity with Java Low-level API

```java
DatastoreService datastore = DatastoreServiceFactory.getDatastoreService();

Entity employee = new Entity("Employee");
employee.setProperty("name", "Antonio Saliery");
employee.setProperty("hireDate", new Date());
employee.setProperty("attendedHrTraining", true);
datastore.put(employee);
```

Source: Datastore Introduction, http://www.youtube.com/watch?v=fQazhzC-rg
Google Maps API

https://developers.google.com/maps/
Google Maps API

Google Maps, available on every screen

55 million downloads can’t be wrong. Bring the popularity of Google Maps to your app with the Google Maps SDK for iOS.

https://developers.google.com/maps/
Google Maps JavaScript API

Getting Started

Audience

This documentation is designed for people familiar with JavaScript programming and object-oriented programming concepts. You should also be familiar with Google Maps from a user's point of view. There are many JavaScript tutorials available on the Web.

This conceptual documentation is designed to let you quickly start exploring and developing applications with the Google Maps API. We also publish the Google Maps API Reference.

Obtaining an API Key

All Maps API applications should load the Maps API using an API key. Using an API key enables you to monitor your application's Maps API usage, and ensures that Google can contact you about your application if necessary. If your application's Maps API usage exceeds the Usage Limits, you must load the Maps API using an API key.

https://developers.google.com/maps/documentation/javascript/tutorial
Obtaining an Google Maps API Key

All Maps API applications* should load the Maps API using an API key. Using an API key enables you to monitor your application's Maps API usage, and ensures that Google can contact you about your application if necessary. If your application's Maps API usage exceeds the Usage Limits, you must load the Maps API using an API key in order to purchase additional quota.

* Google Maps API for Business developers must not include a key in their requests. Please refer to Loading the Google Maps JavaScript API for Business-specific instructions.

To create your API key:

1. Visit the APIs Console at https://code.google.com/apis/console and log in with your Google Account.
2. Click the Services link from the left-hand menu.
3. Activate the Google Maps API v3 service.
4. Click the API Access link from the left-hand menu. Your API key is available from the API Access page, in the Simple API Access section. Maps API applications use the Key for browser apps.

https://developers.google.com/maps/documentation/javascript/tutorial
Demo:
Integrate
Google Maps JavaScript API
with
jQuery Mobile
Start using the Google APIs console

https://code.google.com/apis/console

https://code.google.com/apis/console/?noredirect&pli=1
## Google APIs Console

### All services

Select services for the project.

<table>
<thead>
<tr>
<th>Service</th>
<th>Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad Exchange Buyer API</td>
<td>OFF</td>
<td>Courtesy limit: 1,000 requests/day</td>
</tr>
<tr>
<td>Ad Exchange Seller API</td>
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<td>Courtesy limit: 10,000 requests/day</td>
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<td>Admin SDK</td>
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<tr>
<td>AdSense Host API</td>
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<td>Courtesy limit: 100,000 requests/day</td>
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<tr>
<td>AdSense Management API</td>
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<td>Courtesy limit: 10,000 requests/day</td>
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<tr>
<td>Analytics API</td>
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<td>Audit API</td>
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<td>BigQuery API</td>
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<td>Blogger API v3</td>
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</tr>
<tr>
<td>Calendar API</td>
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<td>Courtesy limit: 100,000 requests/day</td>
</tr>
<tr>
<td>Chrome Web Store API</td>
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We are improving the experience. Try the new [Cloud Console](https://console.cloud.google.com).
<table>
<thead>
<tr>
<th>API Name</th>
<th>Status</th>
<th>Daily Limit</th>
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<tbody>
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</tr>
<tr>
<td>Google Civic Information API</td>
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<td>None</td>
</tr>
<tr>
<td>Google Cloud Datastore API</td>
<td>OFF</td>
<td>None</td>
</tr>
<tr>
<td>Google Cloud Messaging for Android</td>
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<td>None</td>
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<tr>
<td>Google Cloud Messaging for Chrome</td>
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<td>Google Cloud Storage</td>
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<td>Google Cloud Storage JSON API</td>
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<td>Google Contacts CardDAV API</td>
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<td>Google Maps Coordinate API</td>
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<td>Google Maps Engine API</td>
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</tr>
<tr>
<td>Google Maps Geolocation API</td>
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<td>0 requests/day</td>
</tr>
<tr>
<td>Google Maps SDK for iOS</td>
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<td>None</td>
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<tr>
<td>Google Maps Tracks API</td>
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</tr>
</tbody>
</table>
Google Maps/Google Earth APIs Terms of Service

Last Updated: May 10, 2013

1. Your relationship with Google.

1.1 Use of the Service is Subject to these Terms. Your use of any of the Google Maps/Google Earth APIs (referred to in this document as the "Maps API(s)" or the "Service") is subject to the terms of a legal agreement between you and Google (the "Terms"). "Google" means either (a) Google Ireland Limited, with offices at Gordon House, Barrow Street, Dublin 4, Ireland, if Customer's billing address is in any country within Europe, the Middle East, or Africa ("EMEA"); (b) Google Asia Pacific Pte. Ltd., with offices at 8 Marina View Asia Square 1 #30-01 Singapore 018960, if Customer's billing address is in any country within the Asia Pacific region ("APAC"); or (c) Google Inc., with offices at 1600 Amphitheatre Parkway, Mountain View, California 94043, USA, if Customer's billing address is in any country in the world other than those in EMEA and APAC.

1.2 The Terms include Google's Legal Notices and Privacy Policy.

(a) Unless otherwise agreed in writing with Google, the Terms will include the following:
(i) the terms and conditions set forth in this document (the "Maps APIs Terms");
(ii) the Legal Notices; and
(iii) the Privacy Policy.

I agree to these terms.

Accept | Decline

Google Home - Privacy Policy

Send Feedback
Welcome to Google Cloud Platform

Use the same infrastructure that powers Google's own applications.

- [ ] I have read and agree to all Terms of Service for the Google Cloud Platform products.
- [ ] I'd like to receive email about Google Cloud Platform updates, special offers, and events.

Continue
Learn more
Google Maps API v3

The Google Maps API lets you embed Google Maps in your own web pages with JavaScript. Learn more
Credentials: Public API access
Get Google Maps API Key

API key: AizaEyBk9zQmesP[redacted]
Hello, World

The easiest way to start learning about the Google Maps API is to see a simple example. The following web page displays a map centered on Sydney, New South Wales, Australia:

```html
<!DOCTYPE html>
<html>
  <head>
    <meta name="viewport" content="initial-scale=1.0, user-scalable=no" />
    <style type="text/css">
      html { height: 100% }
      body { height: 100%; margin: 0; padding: 0 }
      #map-canvas { height: 100% }
    </style>
    <script type="text/javascript">
      function initialize()
      {
        var mapOptions = {
          center: new google.maps.LatLng(-34.397, 150.644),
          zoom: 8
        };
        var map = new google.maps.Map(document.getElementById("map-canvas"),
                                       mapOptions);
        google.maps.event.addDomListener(window, 'load', initialize);
      }
    </script>
  </head>
  <body>
    <div id="map-canvas"/>
  </body>
</html>
```

View example (map-simple.html)

Some of the simple examples have a few things to note:

https://developers.google.com/maps/documentation/javascript/tutorial
Google Map JavaScript API
Hello, World

<!DOCTYPE html>
<html>
<head>
<meta name="viewport" content="initial-scale=1.0, user-scalable=no" />
<style type="text/css">
html {
  height: 100%
}
body {
  height: 100%; margin: 0; padding: 0
}
#map-canvas { height: 100% }
</style>
<script type="text/javascript">
function initialize() {
    var mapOptions = {
        center: new google.maps.LatLng(-34.397, 150.644),
        zoom: 8
    };
    var map = new google.maps.Map(document.getElementById("map-canvas"),
        mapOptions);
    google.maps.event.addDomListener(window, 'load', initialize);
}</script>
</head>
<body>
<div id="map-canvas"/>
</body>
</html>

https://developers.google.com/maps/documentation/javascript/tutorial
<DOCTYPE html>
<html>
<head>
  <title>Simple Map</title>
  <meta name="viewport" content="initial-scale=1.0, user-scalable=no">
  <meta charset="utf-8">
  <style>
    html, body, #map-canvas {
      height: 100%;
      margin: 0px;
      padding: 0px;
    }
  </style>
  var map;
  function initialize() {
    var mapOptions = {
      zoom: 8,
      center: new google.maps.LatLng(-34.397, 150.644)
    };
    map = new google.maps.Map(document.getElementById('map-canvas'),
      mapOptions);
  }
  google.maps.event.addDomListener(window, 'load', initialize);
</script>
</head>
<body>
  <div id="map-canvas"></div>
</body>
</html>

https://developers.google.com/maps/documentation/javascript/examples/map-simple
<div style="position:absolute; height:100%; width:100%;">
  <div id="map-canvas"></div>
</div>

http://mail.tku.edu.tw/myday/app/map.html
Google Maps JavaScript API

```html
<style>
  #map-canvas {
    height: 100%;
    margin: 0px;
    padding: 0px
  }
</style>

<script>
  function initialize() {
    var mapOptions = {
      zoom: 15,
      center: new google.maps.LatLng(25.174738, 121.450381)
    };

    var map = new google.maps.Map(document.getElementById('map-canvas'),
                                 mapOptions);
  }

  function loadScript() {
    var script = document.createElement('script');
    script.type = 'text/javascript';
    document.body.appendChild(script);
  }

  window.onload = loadScript;
</script>

http://mail.tku.edu.tw/myday/app/map.html
Google Maps JavaScript API + jQuery Mobile

http://mail.tku.edu.tw/myday/app/map.html
Summary

• Google App Engine
  – Google Cloud Platform
  – Google Cloud Datastore

• Google Maps API
References


• Learn HTML5 and JavaScript for iOS: Web Standards-based Apps for iPhone, iPad, and iPod touch, Scott Preston, Apress, 2012


• Google Map API, https://developers.google.com/maps/