Assignment 01

Sentinel-2 is a constellation of two Earth observation satellites, developed under the direction of the European Space Agency, as part of the European Commission's ambitious Copernicus Earth observation program. The full Copernicus program, which consists of several different Sentinel missions, is the most comprehensive systematic Earth Observation program ever created, providing land, ocean, and atmosphere observations, with continuity out to 2030. The wide-swath, multi-spectral imaging capabilities of the Sentinel-2 satellites provide an unprecedented view of our Earth, covering all of the Earth's land masses, large islands, and waterways.

Sentinel-2 data is ideal for agriculture, forestry, and other land management applications. For example, it can be used to study leaf area as well as chlorophyll and water content; to map forest cover and soils; and to monitor inland waterways and coastal areas. Images of natural disasters such as floods and volcanic eruptions can be used for disaster mapping and humanitarian relief efforts.

The Sentinel-2 mission consists of two identical satellites: Sentinel-2A, launched on June 23, 2015, and Sentinel-2B, scheduled to launch in 2017. Once both satellites have launched, the constellation will be able to revisit each point on the Earth's surface every five days. Each satellite carries a Multi-Spectral Instrument (MSI) that produces images of the Earth with a resolution as fine as ten meters per pixel and spanning a 290 km field of view in thirteen bands across the visible and infrared.

You can find a description of the dataset here.
The dataset itself is hosted on Google Cloud: gs://gcp-public-data-sentinel-2

Using the raw dataset, it is hard to, for example, get satellite data for a specific location.
You are about to change this!

1. How is the image data stored? How is metadata of images stored?
2. Design and implement in Go on the Google Cloud Service a webservice that accepts GET requests that contain a location (latitude, longitude) as query parameters as follows: http://your.app.com/images?lat=37.4224764&lng=-122.0842499
   It should return a JSON array containing the links to all images for that location, e.g.:
   `["...2A_OPER_MSI_L1C_TL_EPA__20170529T193446_A002407_T33UUP_B01.jp2","...2A_OPER_MSI_L1C_TL_EPA__20170529T193446_A002407_T33UUP_B02.jp2"... ]`
3. How do Go language features support your server side programming?
4. Bonus exercise: Imagine that you are building the backend for a system that needs to deal with end users that just want to specify a human-like location, such as "Rued Langgaards Vej 7, 2300 København S"
   Implement that feature to your service by connecting to Google's Geocoding API.