Exercise 1: Working with Sentinel-2 data

Step 1: In this exercise, you will work with Sentinel-2 data. Before you start coding, you should check out the metadata/properties for Sentinel-2 data in the Earth Engine Data Catalogue. Before you start working with a new dataset, you should know the answer to the following questions:

1. What data products are available and what is their catalogue reference information? (i.e. how would I access this dataset in Earth Engine)
2. What products are available (e.g. Surface Reflectance, Top of Atmosphere) and which should I use for this project?
3. What are the *band* names that I might need to access? *E.g.* if I am planning to calculate NDVI, what are the names of the bands I would need to use for this sensor?

Check out the information about Sentinel-2 Surface Reflectance [here](https://developers.google.com/earth-engine/datasets/catalog/COPERNICUS_S2_SR#description).

Step 2: Open up a new CoLab notebook and set up your notebook (i.e. install and import packages, authenticate and initialize Earth Engine).

Step 3: Define a new AOI “point” (latitude and longitude coordinate) for an area of interest. Write the code to display that point on a map.

Step 4: Filter and visualize S2 data

1. Import the Sentinel-2 Surface Reflectance dataset as an image collection. Filter by your new AOI point, and by a date range of your choice.
2. Sort your filtered image collection by cloud cover and visualize the first image in true colour. *(hint: make sure you know what property to use to sort by cloud cover!).*

Step 5: Visualize NDWI

1. Calculate the Normalized Difference Water Index (NDWI) using one of the four methods covered in the demo.  *(hint: use any band combination for NDWI you want - there are a few published options)*
2. Display NDWI on the map using a palette.