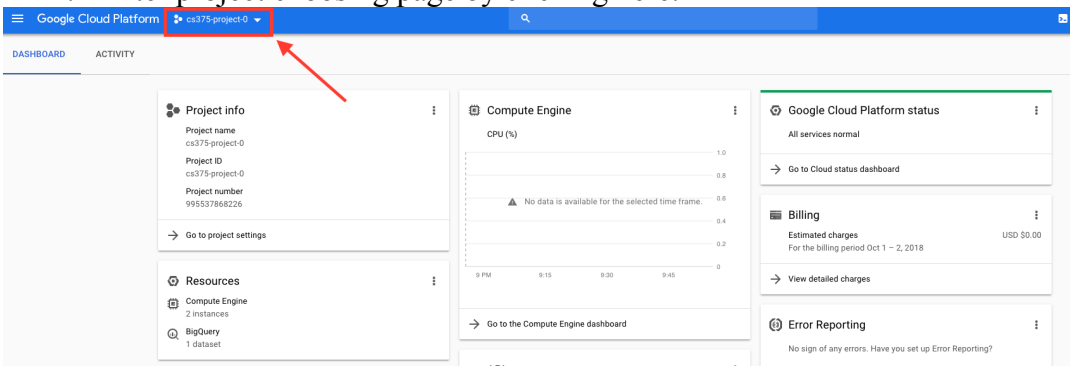
# Google cloud tutorial
PSYCH 249 / CS 375

1. Overview:
   After this tutorial, you will know how to use google cloud resources to train deep neural networks on ImageNet dataset. Going over the whole tutorial can take up to 1 hour, depending on how familiar you were about google cloud.

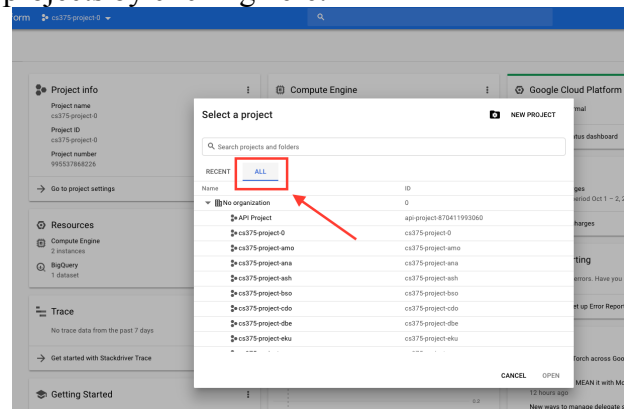
2. Step 1: Sign up a google cloud account using **your Standford email address**

3. Step 2: Install Google Cloud SDK
   Website: https://cloud.google.com/sdk/install

4. Step 3: Select your project:
   a. Go to https://console.cloud.google.com
   b. Make sure that you are signing in using your Stanford email address by checking the account information at the right top corner
   c. Choose the project already created for you:
      i. Enter project choosing page by clicking here:



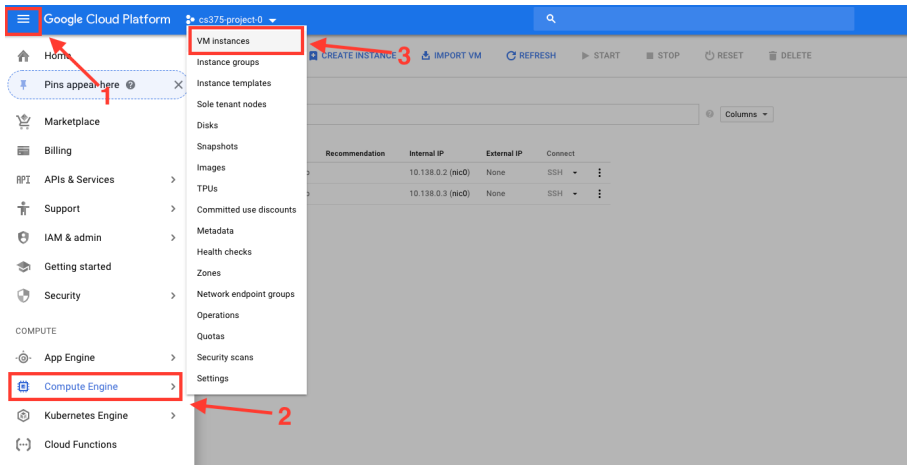

      ii. View all projects by clicking here:



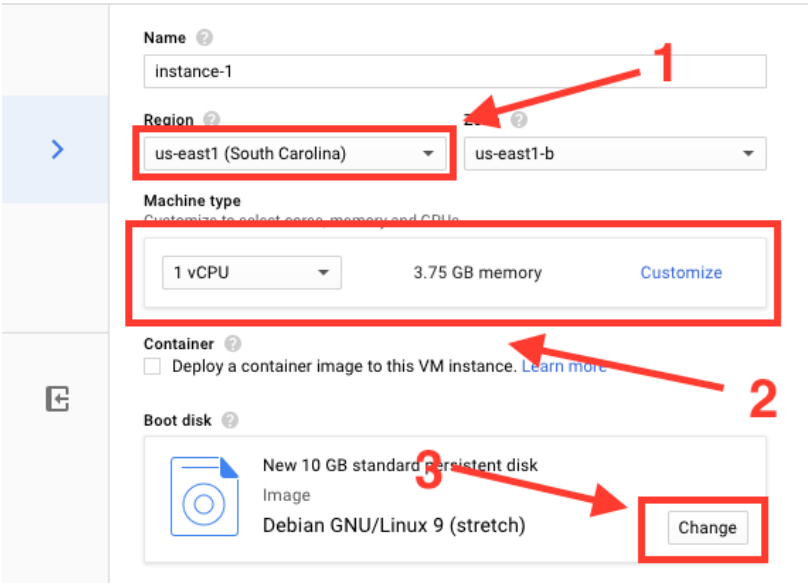

      iii. Choose the project named as "cs375-project-xxx", where xxx is the first three characters of your Stanford email address:
         1. If you have enrolled in the class but cannot find a project named in this way, please contact Chengxu (using either Slack or email is fine).
   d. Create a virtual machine instance in your project:

i. **THE MOST IMPORTANT THING TO KNOW BEFORE CREATING THE INSTANCE**:
    1. You will share the big credit pool with all other students in this class.
    2. Please avoid wasting credits.
    3. The best way to avoid wasting credits is to stop the instance when it's no longer needed!

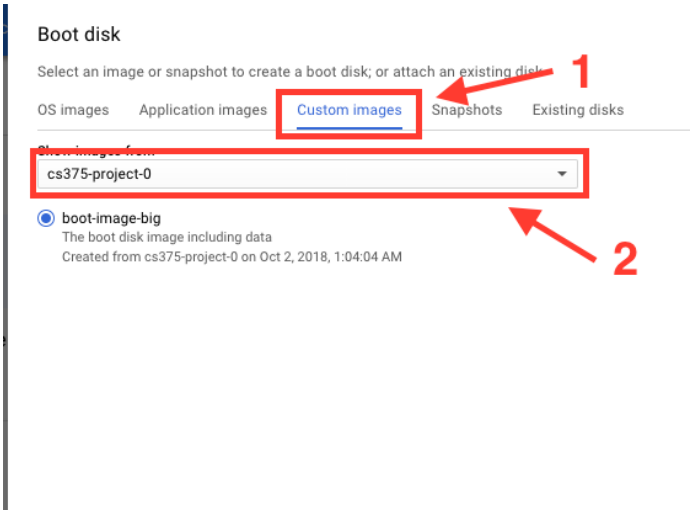
ii. Enter your virtual machine instance managing page by clicking in this order:




iii. Create an instance using prebuilt boot disk image:



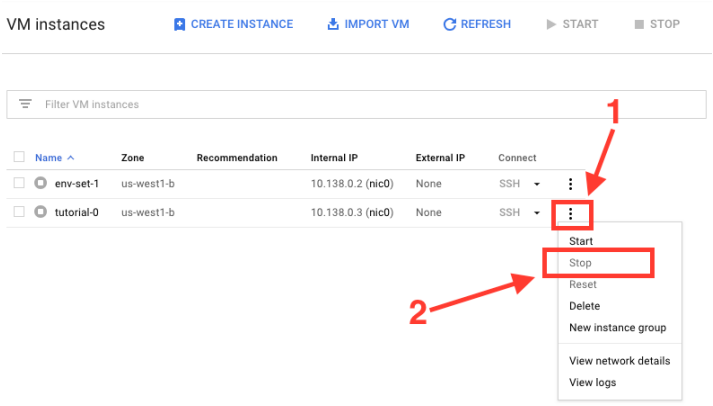

1. First edit the region to us-west1 by clicking position 1
2. Customize your instance by clicking position 2:
    a. Choose 1 gpu K80 to begin, you can edit your instance later
    b. Choose 8 cpus with 30 GB memory to begin.
3. Click position 3 to choose the boot disk image.
4. See image in next page:




5. Choose custom images through position 1
6. Choose project "cs375-project-0" (NOT your project!) through position 2
7. Choose "boot-image-big"

iv. Create the instance and wait for this to be done.

e. Some explanations about the instance you just created:
   i. This instance already has many software installed, such as cuda, nvidia drivers, tensorflow, and tfutils, which is a toolkit we will use in this class for training tensorflow models.
   ii. This instance has been configured so that there will be a mongodb running in the backend, as tfutils requires a mongodb database to train the network. The mongodb is running at port 29101.
   iii. The ImageNet data is hosted at "/mnt/data/ImageNet" and the neural responses data is hosted at "/mnt/data/neural_data".
f. Test a network training on the instance just created
   i. Ssh to that instance by running command like this: "gcloud compute ssh --project PROJECT --zone us-west1-b INSTANCE"
   ii. Clone tfutils repo through this command: "git clone https://github.com/neuroailab/tfutils.git"
   iii. Go into "~/tfutils/tutorials" folder and run following command: "python train_alexnet.py --image_dir /mnt/data/ImageNet/image_label_full/"
   iv. You should be able to see the training starts. There will be two validations first where you will see status bars reporting status. When the training actually starts, you will see outputs reporting step number, training time for this step, loss, learning rate, loss_pure. Wait for around 400 steps to see that loss_pure at around 6.8, which means that the network is starting to give non-trivial outputs.
   v. Stop the training by ctrl-c, log out the instance, and stop the instance (see image in next page):


VM instances
CREATE INSTANCE
IMPORT VM
REFRESH
START
STOP
Filter VM instances
Name
Zone
Recommendation
Internal IP
External IP
Connect
env-set-1
us-west1-b
10.138.0.2 (nic0)
None
SSH
tutorial-0
us-west1-b
10.138.0.3 (nic0)
None
SSH
1
2
Start
Stop
Reset
Delete
New instance group
View network details
View logs