Instructions:

- This is an open-book and open-Internet quiz
- You are free to look up any information from the lecture notes or labs, as well as the Internet
- Please have your NUS ID available for checking.
- When you are done, submit your report before 4 pm to the Canvas Quiz 2 folder.

1. Copy the following text to your report, and insert your name, signature, and the date:

**Academic Integrity Declaration**

a. **I am aware of, and will abide by the NUS Code of Student Conduct (in particular the part on Academic, Professional and Personal Integrity as shown below) when attempting this assessment.**

*Academic, Professional and Personal Integrity*

i. *The University is committed to nurturing an environment conducive for the exchange of ideas, advancement of knowledge and intellectual development. Academic honesty and integrity are essential conditions for the pursuit and acquisition of knowledge, and the University expects each student to maintain and uphold the highest standards of integrity and academic honesty at all times.*

ii. *The University takes a strict view of cheating in any form, deceptive fabrication, plagiarism and violation of intellectual property and copyright laws. Any student who is found to have engaged in such misconduct will be subject to disciplinary action by the University.*

iii. *It is important to note that all students share the responsibility of protecting the academic standards and reputation of the University. This responsibility can extend beyond each student's own conduct, and can include reporting incidents of suspected academic dishonesty through the appropriate channels. Students who have reasonable grounds to suspect academic dishonesty should raise their concerns directly to the relevant Head of Department, Dean of Faculty, Registrar, Vice Provost or Provost.*

b. **I have read and understood the rules of the assessments as stated below.**

i. *Students should attempt the assessments on their own. There should be no discussions or communications, via face to face or communication devices, with any other person during the assessment.*

ii. *Students should not reproduce any assessment materials, e.g. by photography, videography, screenshots, or copying down of questions, etc.*

c. **I understand that by breaching any of the rules above, I would have committed offences under clause 3(l) of the NUS Statute 6, Discipline with Respect to Students which is punishable with disciplinary action under clause 10 or clause 11 of the said statute.**

*i. Any student who is alleged to have committed or attempted to commit, or caused or attempted to cause any other person to commit any of the following offences, may be subject to disciplinary proceedings:*

*1. plagiarism, giving or receiving unauthorised assistance in academic work, or other forms of academic dishonesty.*

Name: _____ Signature: _____ Date: _____

2. Take a screenshot listing the information on your cluster from your EC2 instance:

   ```
   [ec2-user@ip-54.169.221.196 ~]$ pcluster describe-cluster-instances -n
   MyCluster01
   ```

   Include the screenshot in your report.

   Do the following from your cluster to show that your queue is empty:

   ```
   (env1) [ec2-user@ip-10-0-0-26 ~]$ date
   (env1) [ec2-user@ip-10-0-0-26 ~]$ squeue
   (env1) [ec2-user@ip-10-0-0-26 ~]$ date
   ```

   Take a screenshot showing the output of the commands above, and include it in your report.

3. Double check that your /data/picasso directory looks like this:

   ```
   (env1) [ec2-user@ip-10-0-0-26 ~]$ ls /data/picasso
   20181101    20181102    envlist.hkl  envlist.khl.lock  geom.csv
   sort.sh.txt
   ```

4. For the 20181101 directory, we want to create the Waveform object for all the channels. Before we do that, we have to make sure that the "firings.mda" file has been created for all the channels.

   a. Find the channels that are missing the "firings.mda" file. Include screenshots of the commands you used and the output in your report.

   b. Create a sort-waveform-slurm.sh file to run the spike sorting commands without the "RPLHighpass" command, and add in the command to create the Waveform object:

      ```
      python -u -c "import PyHipp as pyh; \
      from PyHipp import mountain_batch; \
      mountain_batch.mountain_batch(); \
      from PyHipp import export_mountain_cells; \
      export_mountain_cells.export_mountain_cells(); \
      pyh.Waveform(saveLevel=1);"
      ```

      Remember to make sure the jobs are run in separate conda environments. The conda environments have already been created in the snapshot you are using so you do not need to recreate them. Include a screenshot of this script in your report.

      Make sure that PyHipp/envlist.py is executable by doing:
      `chmod a+x envlist.py`

   c. Create slurm scripts based on fsall-slurm.sh and consol_fsjobs.sh that will use the following command to generate and save a cumulative Waveform object containing all the channels once all the previously submitted slurm jobs are completed:

```
python -u -c "import PyHipp as pyh; \
import DataProcessingTools as DPT; \
wfall = DPT.objects.processDirs(dirs=None, exclude=['*eye*',
'*mountains*'], objtype=pyh.Waveform); \
wfall.save(); "
```

Remember to include a AWS SNS notification so you know when the job has been completed. Include a screenshot of the script(s) in your report.

d. Submit the slurm jobs to generate the missing "firings.mda" files, as well as the Waveform objects for the channels that are missing them. After that, submit the slurm job that will generate the cumulative Waveform object. Include screenshots of the commands you used and the output in your report. In addition, include a screenshot of the email you received when the job completed.

5. For the 20181102 directory, all the Waveform objects have been generated, so generate a cumulative object in iPython from one of the **compute nodes** in order to avoid tying up the head node. Include screenshots of the commands you used and the last few lines of the output in your report.

6. Create interactive plots of the cumulative objects.

   a. After the two cumulative objects have been successfully generated, rename one of them so they do not overwrite each other, and then copy them to your computer. Include screenshots of the commands you used to copy the files, and to check the size of the files before and after the transfer.

   b. Use Spyder to plot the two cumulative objects, and include the eight array plots in your report. Include screenshots of the commands you used to generate the plots.

7. Submit your report to the Canvas Quiz 2 Assignment (in PDF format only, and name the file Quiz2_YourName.pdf):
   a) Screenshots from Step 2
   b) Screenshots from Step 4
   c) Screenshots from Step 5
   d) Screenshots from Step 6

8. Wrap Up
   a. Create a snapshot of the cluster used in the quiz
   b. Delete all other snapshots
   c. Delete all clusters (make sure "pcluster list-clusters …" returns empty list)
   d. Terminate all EC2 instances using AWS Dashboard
   e. Delete CloudWatch Rules
   f. Delete Lambda function