

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
- When you are done, submit your report before 4 pm to the appropriate LumiNUS folder:
Quiz 2 Group X

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

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: _____

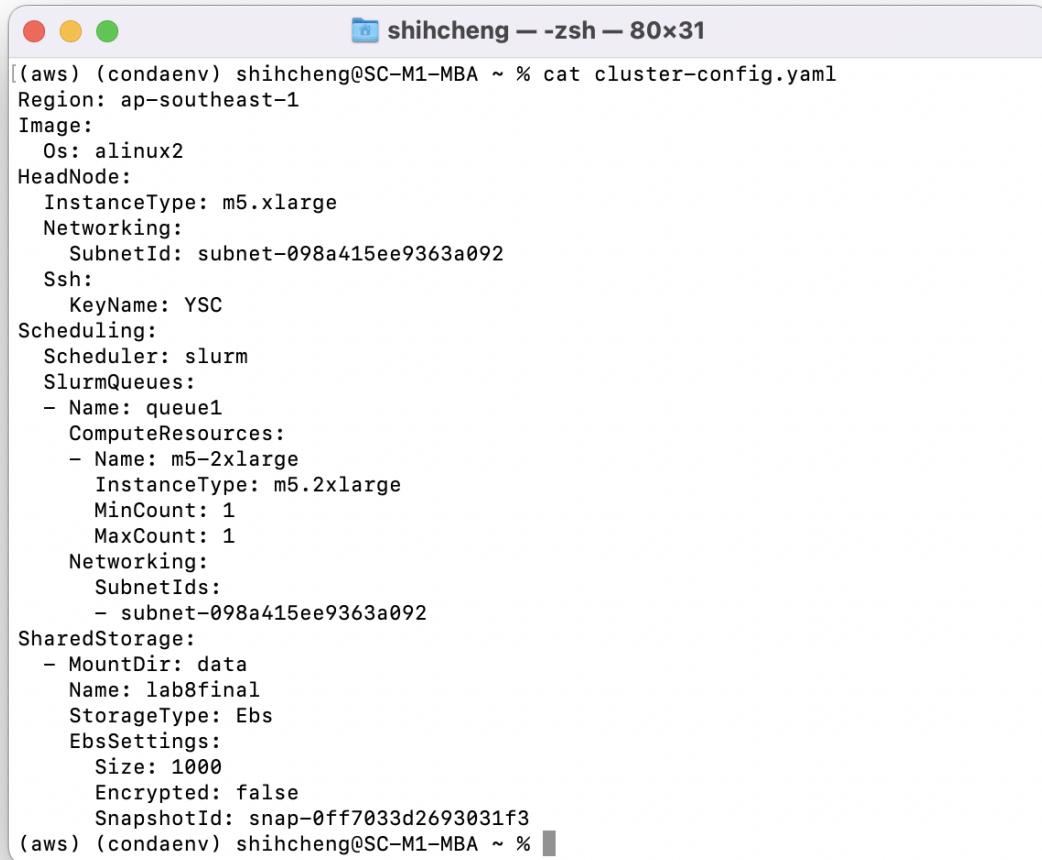
2. Take a screenshot listing the information on your cluster from your EC2 instance:

```
[ec2-user@ip-54.169.221.196 ~]$ pcluster describe-cluster-instances  
--region ap-southeast-1 --cluster-name MyCluster01
```

Include the screenshot in your report. Include also a screenshot of the cluster config file you used to create the cluster.



```
EG2310 — ec2-user@ip-10-0-3-227:/data/src/PyHipp — zsh — 80x43  
[(aws) (condaenv) shihcheng@SC-M1-MBA EG2310 % pcluster describe-cluster --region  
ap-southeast-1 --cluster-name MyCluster01  
{  
    "creationTime": "2022-11-10T02:11:04.356Z",  
    "headNode": {  
        "launchTime": "2022-11-10T02:14:33.000Z",  
        "instanceId": "i-007c4aa31ca9dbf4e",  
        "publicIpAddress": "13.215.176.189",  
        "instanceType": "m5.xlarge",  
        "state": "running",  
        "privateIpAddress": "10.0.4.167"  
    },  
    "version": "3.2.0",  
    "clusterConfiguration": {  
        "url": "https://parallelcluster-1524b7ec17c70fc0-v1-do-not-delete.s3.ap-sout  
heast-1.amazonaws.com/parallelcluster/3.2.0/clusters/mycluster01-eubemajlzijwfgj  
g/configs/cluster-config.yaml?versionId=IuOVtawwXQgHTIns.gIg7x6uhVYNtfGd&AWSAcce  
ssKeyId=AKIAQINPN3UAVMJDB4G5&Signature=pZXrBE44j4YMKoQ8d65LB2qoJ4g%3D&Expires=16  
68056702"  
    },  
    "tags": [  
        {  
            "value": "3.2.0",  
            "key": "parallelcluster:version"  
        },  
        {  
            "value": "MyCluster01",  
            "key": "parallelcluster:cluster-name"  
        }  
    ],  
    "cloudFormationStackStatus": "CREATE_COMPLETE",  
    "clusterName": "MyCluster01",  
    "computeFleetStatus": "RUNNING",  
    "cloudformationStackArn": "arn:aws:cloudformation:ap-southeast-1:018084650241:  
stack/MyCluster01/ede33ad0-609c-11ed-99cd-0629adf8e1d6",  
    "lastUpdatedTime": "2022-11-10T02:11:04.356Z",  
    "region": "ap-southeast-1",  
    "clusterStatus": "CREATE_COMPLETE",  
    "scheduler": {  
        "type": "slurm"  
    }  
}  
(aws) (condaenv) shihcheng@SC-M1-MBA EG2310 %
```



```
(aws) (condaenv) shihcheng@SC-M1-MBA ~ % cat cluster-config.yaml
Region: ap-southeast-1
Image:
  Os: alinux2
HeadNode:
  InstanceType: m5.xlarge
  Networking:
    SubnetId: subnet-098a415ee9363a092
  Ssh:
    KeyName: YSC
Scheduling:
  Scheduler: slurm
  SlurmQueues:
  - Name: queue1
    ComputeResources:
    - Name: m5-2xlarge
      InstanceType: m5.2xlarge
      MinCount: 1
      MaxCount: 1
    Networking:
      SubnetIds:
      - subnet-098a415ee9363a092
  SharedStorage:
  - MountDir: data
    Name: lab8final
    StorageType: Ebs
    EbsSettings:
      Size: 1000
      Encrypted: false
      SnapshotId: snap-0ff7033d2693031f3
(aws) (condaenv) shihcheng@SC-M1-MBA ~ %
```

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.

```
EG2310 — ec2-user@ip-10-0-4-167:/data/src/PyHipp — ssh -pcluster ss...
Running setup.py develop for PyHipp
Successfully installed PyHipp
[(env1) [ec2-user@ip-10-0-4-167 PyHipp]$ pip list | grep Data
DataProcessingTools          0.23.0           /data/src/DataProcessingTools
[(env1) [ec2-user@ip-10-0-4-167 PyHipp]$ ls
checkfiles2.sh    remote_setup.sh      rs3a-slurm.sh
checkfiles.sh     removefiles.sh      rs3-slurm.sh
consol_jobs.sh   requirements.txt    rs4a-slurm.sh
ec2snapshot.sh   rplhighpass-sort-slurm.sh  rs4-slurm.sh
envlist.py        rplifp-slurm.sh    rse-slurm.sh
geom.csv          rplparallel-slurm.sh  setup.py
pipe2a.sh         rplsplit-slurm.sh   slurm.sh
pipe2.sh          rs1a-slurm.sh     sort.sh.txt
PyHipp            rs1-slurm.sh      sort-slurm.sh
PyHipp.egg-info   rs2a-slurm.sh     update_snapshot.sh
README.md         rs2-slurm.sh
[(env1) [ec2-user@ip-10-0-4-167 PyHipp]$ date
Thu Nov 10 04:11:55 UTC 2022
[(env1) [ec2-user@ip-10-0-4-167 PyHipp]$ squeue
      JOBID PARTITION      NAME      USER ST      TIME  NODES NODELIST(REA
SON)
[(env1) [ec2-user@ip-10-0-4-167 PyHipp]$ date
Thu Nov 10 04:11:58 UTC 2022
(env1) [ec2-user@ip-10-0-4-167 PyHipp]$
```

Setup on cluster:

```
[ec2-user@ip-10-0-5-95 ~]$ /data/mimiconda3/bin/conda init
[ec2-user@ip-10-0-5-95 ~]$ source ~/.bashrc
(base) [ec2-user@ip-10-0-5-95 ~]$ conda activate env1
(env1) [ec2-user@ip-10-0-5-95 ~]$ cd /data/src
(env1) [ec2-user@ip-10-0-5-95 src]$ git clone https://github.com/shihchengyen/PyHipp
(env1) [ec2-user@ip-10-0-5-95 src]$ cd PyHipp
(env1) [ec2-user@ip-10-0-5-95 PyHipp]$ pip install -e .
```

Copy from laptop:

```
(aws) shihcheng@SC-M1-MBA EG2310 % scp -i YSC.pem -r ~/.aws
ec2-user@13.213.46.12:~/aws
```

Continue on cluster:

```
(env1) [ec2-user@ip-10-0-5-95 PyHipp]$ pip install -e .
```

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

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

The DataProcessingTools and pyedfread repositories have been installed in the env1 conda environment so you do not need to reinstall them.

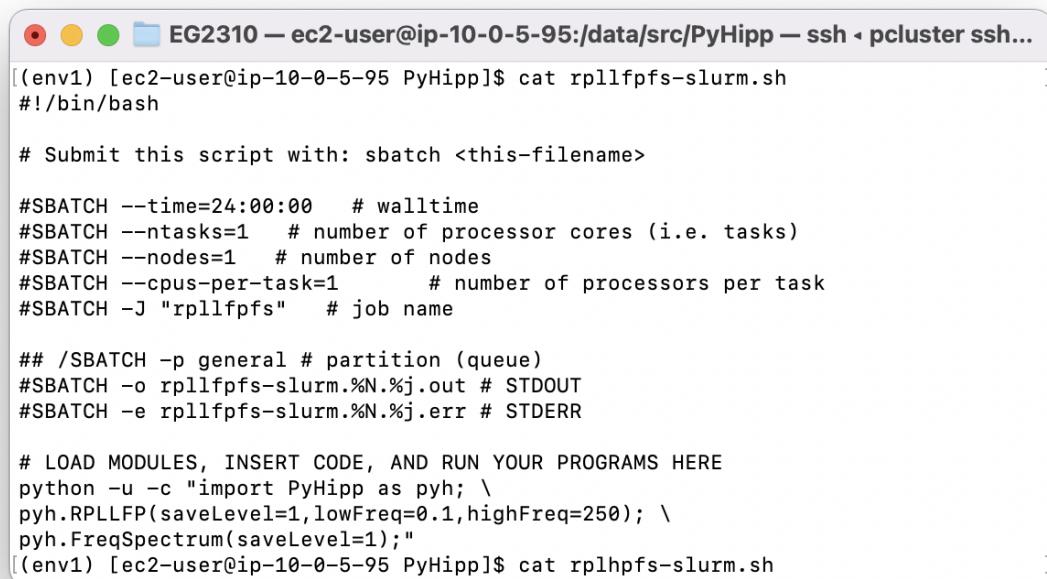
4. We would like to create low-frequency and high-frequency cumulative FreqSpectrum objects for **only** the channels in the **session01/array02** subdirectory.
5. Create a slurm script (**rpllpfs-slurm.sh**) that will create RPLLFP objects with the following arguments:

```
pyh.RPLLFP(saveLevel=1,lowFreq=0.1,highFreq=250);
```

as well as FreqSpectrum objects with the following arguments:

```
pyh.FreqSpectrum(saveLevel=1);
```

Include a screenshot of the rpllpfs-slurm.sh script in your report.



```
EG2310 — ec2-user@ip-10-0-5-95:/data/src/PyHipp — ssh - pcluster ssh...
[(env1) [ec2-user@ip-10-0-5-95 PyHipp]$ cat rpllpfs-slurm.sh
#!/bin/bash

# Submit this script with: sbatch <this-filename>

#SBATCH --time=24:00:00    # walltime
#SBATCH --ntasks=1      # number of processor cores (i.e. tasks)
#SBATCH --nodes=1       # number of nodes
#SBATCH --cpus-per-task=1        # number of processors per task
#SBATCH -J "rpllpfs"    # job name

## /SBATCH -p general # partition (queue)
#SBATCH -o rpllpfs-slurm.%N.%j.out # STDOUT
#SBATCH -e rpllpfs-slurm.%N.%j.err # STDERR

# LOAD MODULES, INSERT CODE, AND RUN YOUR PROGRAMS HERE
python -u -c "import PyHipp as pyh; \
pyh.RPLLFP(saveLevel=1,lowFreq=0.1,highFreq=250); \
pyh.FreqSpectrum(saveLevel=1);"
[(env1) [ec2-user@ip-10-0-5-95 PyHipp]$ cat rplhpfs-slurm.sh
```

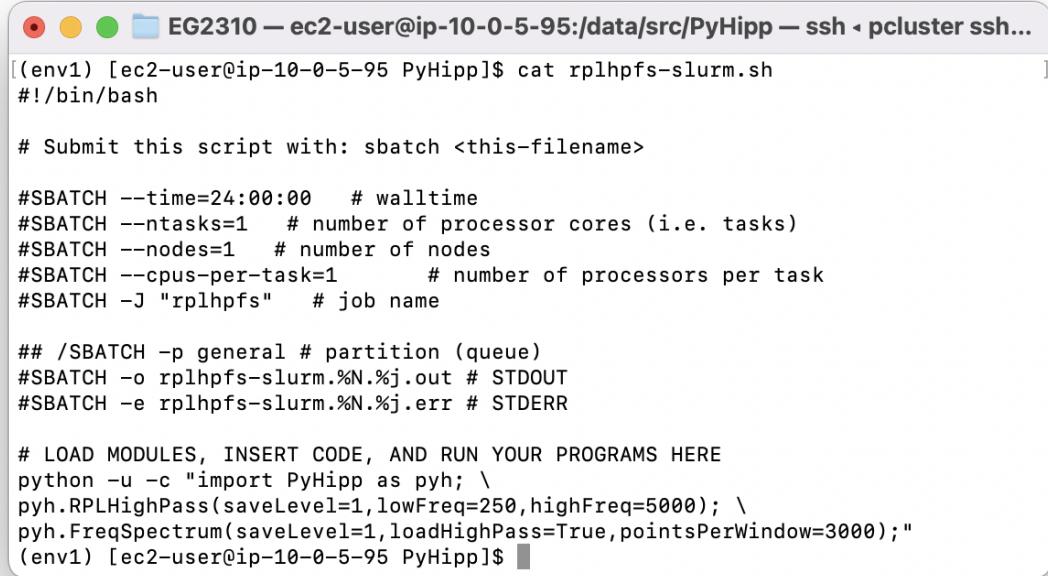
6. Create a second slurm script (**rplhpfs-slurm.sh**) that will create RPLHighPass objects with the following arguments:

```
pyh.RPLHighPass(saveLevel=1,lowFreq=250,highFreq=5000);
```

as well as FreqSpectrum objects with the following arguments:

```
pyh.FreqSpectrum(saveLevel=1,loadHighPass=True,pointsPerWindow=3000);
```

Include a screenshot of the rplhpfs-slurm.sh script in your report.



The screenshot shows a terminal window titled "EG2310 — ec2-user@ip-10-0-5-95:/data/src/PyHipp — ssh - pcluster ssh...". The window displays the contents of a file named "rplhpfs-slurm.sh". The script is a Slurm batch job submission script. It includes directives like "#SBATCH --time=24:00:00", "#SBATCH --ntasks=1", "#SBATCH --nodes=1", "#SBATCH --cpus-per-task=1", and "#SBATCH -J "rplhpfs"" for job name. It also specifies output and error files ("#SBATCH -o rplhpfs-slurm.%N.%j.out" and "#SBATCH -e rplhpfs-slurm.%N.%j.err"). The script concludes with a "# LOAD MODULES, INSERT CODE, AND RUN YOUR PROGRAMS HERE" section containing Python code to import PyHipp and run specific functions. The terminal prompt "(env1) [ec2-user@ip-10-0-5-95 PyHipp]\$" is visible at the bottom.

```
[(env1) [ec2-user@ip-10-0-5-95 PyHipp]$ cat rplhpfs-slurm.sh
#!/bin/bash

# Submit this script with: sbatch <this-filename>

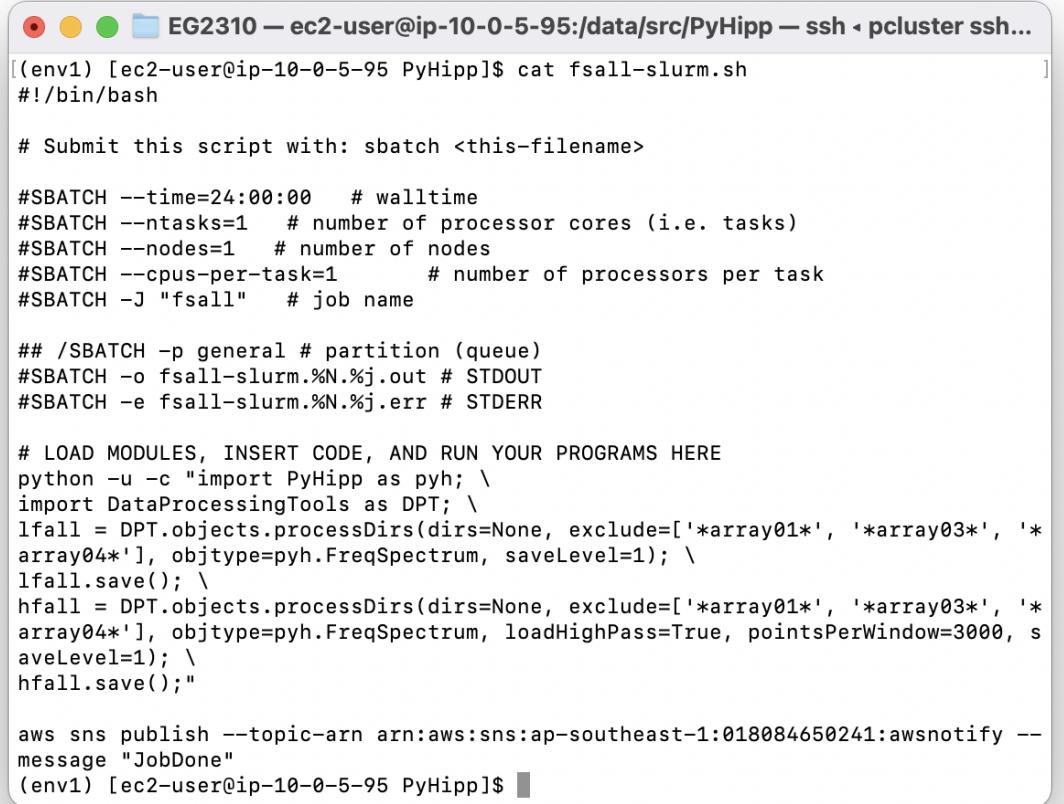
#SBATCH --time=24:00:00      # walltime
#SBATCH --ntasks=1           # number of processor cores (i.e. tasks)
#SBATCH --nodes=1            # number of nodes
#SBATCH --cpus-per-task=1    # number of processors per task
#SBATCH -J "rplhpfs"         # job name

## /SBATCH -p general # partition (queue)
#SBATCH -o rplhpfs-slurm.%N.%j.out # STDOUT
#SBATCH -e rplhpfs-slurm.%N.%j.err # STDERR

# LOAD MODULES, INSERT CODE, AND RUN YOUR PROGRAMS HERE
python -u -c "import PyHipp as pyh; \
pyh.RPLHighPass(saveLevel=1,lowFreq=250,highFreq=5000); \
pyh.FreqSpectrum(saveLevel=1,loadHighPass=True,pointsPerWindow=3000);"
(env1) [ec2-user@ip-10-0-5-95 PyHipp]$
```

7. Create a third slurm script (fsall-slurm.sh) that will create cumulative objects containing the low-frequency and high-frequency spectrum of only the channels in “session01/array02”. Include a SNS notification so you will receive an email notification when the job is completed.

Include a screenshot of the fsall-slurm.sh script in your report.



The screenshot shows a terminal window with the title "EG2310 — ec2-user@ip-10-0-5-95:/data/src/PyHipp — ssh - pcluster ssh...". The terminal displays the contents of a file named "fsall-slurm.sh". The script is a shell script that submits a Slurm job to run Python code. It includes comments explaining the submission command, job parameters like walltime and number of cores, and module loading. It also includes code to process directories and publish an AWS SNS message upon completion.

```
[(env1) [ec2-user@ip-10-0-5-95 PyHipp]$ cat fsall-slurm.sh
#!/bin/bash

# Submit this script with: sbatch <this-filename>

#SBATCH --time=24:00:00    # walltime
#SBATCH --ntasks=1      # number of processor cores (i.e. tasks)
#SBATCH --nodes=1       # number of nodes
#SBATCH --cpus-per-task=1        # number of processors per task
#SBATCH -J "fsall"     # job name

## /SBATCH -p general # partition (queue)
#SBATCH -o fsall-slurm.%N.%j.out # STDOUT
#SBATCH -e fsall-slurm.%N.%j.err # STDERR

# LOAD MODULES, INSERT CODE, AND RUN YOUR PROGRAMS HERE
python -u -c "import PyHipp as pyh; \
import DataProcessingTools as DPT; \
lfall = DPT.objects.processDirs(dirs=None, exclude=['*array01*', '*array03*', '*array04*'], objtype=pyh.FreqSpectrum, saveLevel=1); \
lfall.save(); \
hfall = DPT.objects.processDirs(dirs=None, exclude=['*array01*', '*array03*', '*array04*'], objtype=pyh.FreqSpectrum, loadHighPass=True, pointsPerWindow=3000, saveLevel=1); \
hfall.save();"

aws sns publish --topic-arn arn:aws:sns:ap-southeast-1:018084650241:awsnotify --message "JobDone"
(env1) [ec2-user@ip-10-0-5-95 PyHipp]$
```

This will depend on how you call this script, i.e. in which directory.

1. If you call from the /data/picasso/20181101/session01/array02 directory, you don't need the exclude argument in processDirs, but it is okay if you have included it.
 2. If you call from the /data/picasso/20181101/session01 directory, you will need to add exclude=['*array01*', '*array03*', '*array04*']
 3. If you call from the /data/picasso/20181101/ directory, you will need to add exclude=['*array01*', '*array03*', '*array04*', '*eye*', '*mountain*']
8. Create a shell script (consol_fsjobs.sh) that will run "fsall-slurm.sh" once all the FreqSpectrum jobs have been completed.

Include a screenshot of the consol_fsjobs.sh script in your report.

```
EG2310 — ec2-user@ip-10-0-5-95:/data/src/PyHipp — ssh - pcluster ssh...
[(env1) [ec2-user@ip-10-0-5-95 PyHipp]$ cat consol_fsjobs.sh
#!/bin/sh

temp1=($(squeue))

cmd1="sbatch --dependency=afterany:"

counter1=0
for i in "${temp1[@]}"; do
    if [[ "$i" == "queue1" ]]; then
        id1=${temp1[$counter1-1]}
        cmd1="${cmd1}${id1}:"
    fi
    counter1=$((counter1+1))
done

cmd1=${cmd1::-1}
cmd1="${cmd1} /data/src/PyHipp/fsall-slurm.sh"

echo $cmd1
eval $cmd1
(env1) [ec2-user@ip-10-0-5-95 PyHipp]$
```

9. Use the scripts created above to generate the FreqSpectrum objects for **only** the channel directories in the **session01/array02** subdirectory, as well as the two cumulative objects.

**Include a screenshot of the commands you used to create the objects in your report.
Include also the email notification that you received.**

```
SON)
[(base) [ec2-user@ip-10-0-5-95 ~]$ cd /data/picasso
[(base) [ec2-user@ip-10-0-5-95 picasso]$ conda activate env1
[(env1) [ec2-user@ip-10-0-5-95 picasso]$ cd 20181101/session01/array02
[(env1) [ec2-user@ip-10-0-5-95 array02]$ for i in `find . -name "channel*"; do ec]
```

```
EG2310 — ec2-user@ip-10-0-5-95:/data/picasso/20181101/session01/arr...
[(env1) [ec2-user@ip-10-0-5-95 array02]$ for i in `find . -name "channel*" | sort` ; do echo $i; cd $i; sbatch /data/src/PyHipp/rpllpfs-slurm.sh; sbatch /data/src/PyHipp/rplhpfs-slurm.sh; cd ..; done
./channel033
Submitted batch job 64
Submitted batch job 65
./channel034
Submitted batch job 66
Submitted batch job 67
./channel035
Submitted batch job 68
Submitted batch job 69
./channel036
Submitted batch job 70
Submitted batch job 71
./channel037
Submitted batch job 72
Submitted batch job 73
./channel038
Submitted batch job 74
Submitted batch job 75
./channel039
Submitted batch job 76
Submitted batch job 77
```

This will depend on how you call this script, i.e. in which directory.

1. If you call from the /data/picasso/20181101/session01/array02 directory (as shown above), you don't need to do anything to the output of the find command aside sort
2. If you call from the /data/picasso/20181101/session01 directory, you will need to add a grep command to filter out channels in array01, array03, and array04
3. If you call from the /data/picasso/20181101/ directory, you will need to add a grep command to filter out array01, array03, array04, eye, mountain like in Lab 7 Step 12

```
EG2310 — ec2-user@ip-10-0-5-95:/data/picasso/20181101/session01/arr...
[(env1) [ec2-user@ip-10-0-5-95 array02]$ bash /data/src/PyHipp/consol_fsjobs.sh ] sbatch --dependency=afterany:82:83:84:85:86:87:88:89:90:91:92:93:94:95:96:97:98:99:100:101:102:103:104:105:106:107:108:109:110:111:112:113:114:115:116:117:118:119:120:121:122:123:75:76:77:78:79:80:81 /data/src/PyHipp/fsall-slurm.sh
Submitted batch job 124
[(env1) [ec2-user@ip-10-0-5-95 array02]$ ls ]
```

This will depend on what you included in your script.

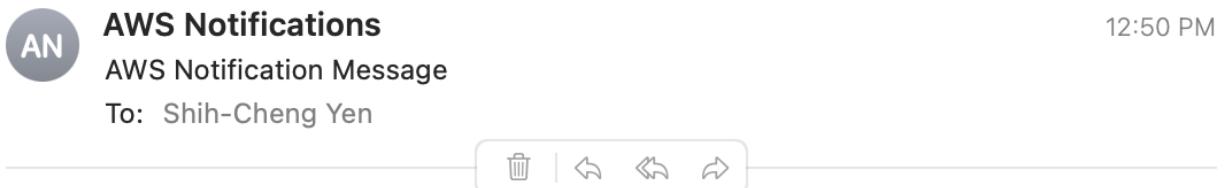
1. If you call from the /data/picasso/20181101/session01/array02 directory, you don't need the exclude argument in processDirs, but it is okay if you have included it.
2. If you call from the /data/picasso/20181101/session01 directory, you will need to add exclude=['*array01*', '*array03*', '*array04*']
3. If you call from the /data/picasso/20181101/ directory, you will need to add exclude=['*array01*', '*array03*', '*array04*', '*eye*', '*mountain*']

AN AWS Notifications

AWS Notification Message

To: Shih-Cheng Yen

- External Email -



JobDone

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If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:

<https://sns.ap-southeast-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:ap-southeast-1:018084650241:awsnotify:15cf62bb-b4ec-4a83-9834-d6aa3a470548&Endpoint=shihcheng@nus.edu.sg>

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at <https://ddec1-0-en-ctp.trendmicro.com:443/wis/clicktime/v1/query?url=https%3a%2f%2faws.amazon.com%2fsupport&umid=137cb4f5-118e-4c8d-b6b9-91c6d5e172fc&auth=8d3ccd473d52f326e51c0f75cb32c9541898e5d5-a38fbf2a006e1edac1eaca5b934bc1d67fe30e38>

10. Copy the saved objects to your computer.

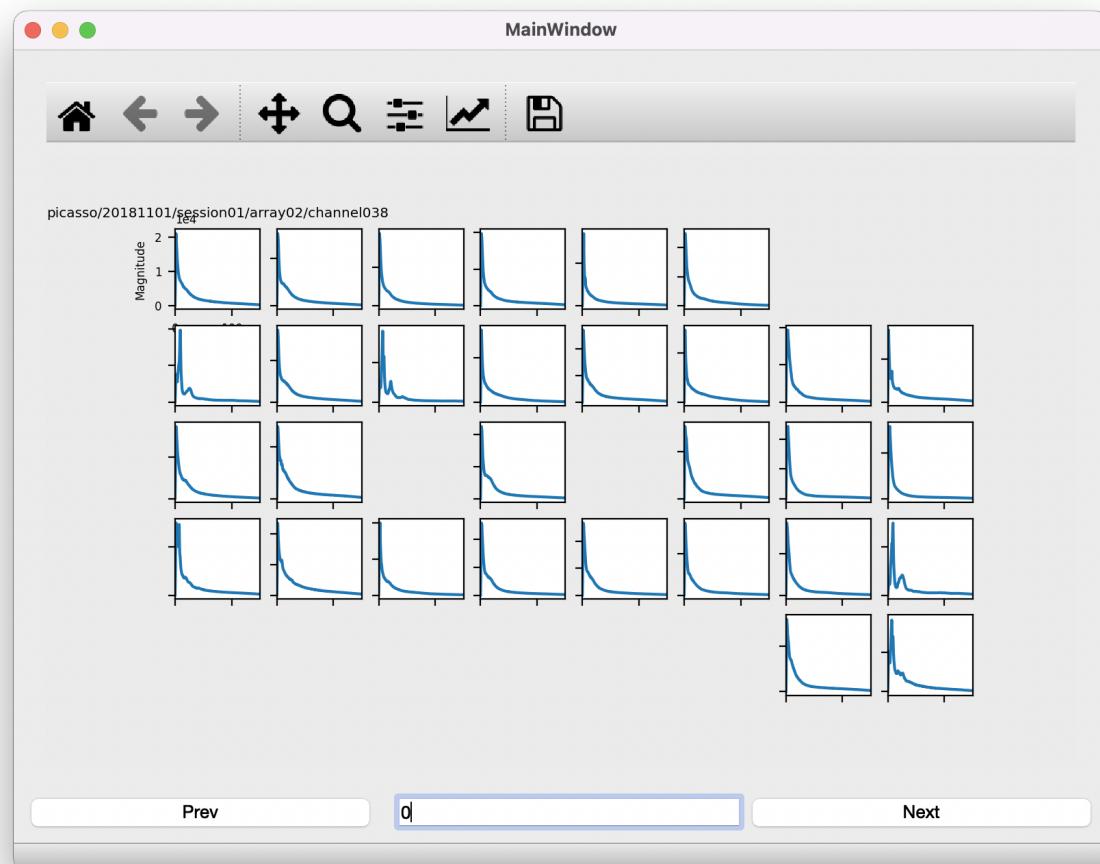
Include a screenshot of the commands you used in your report.

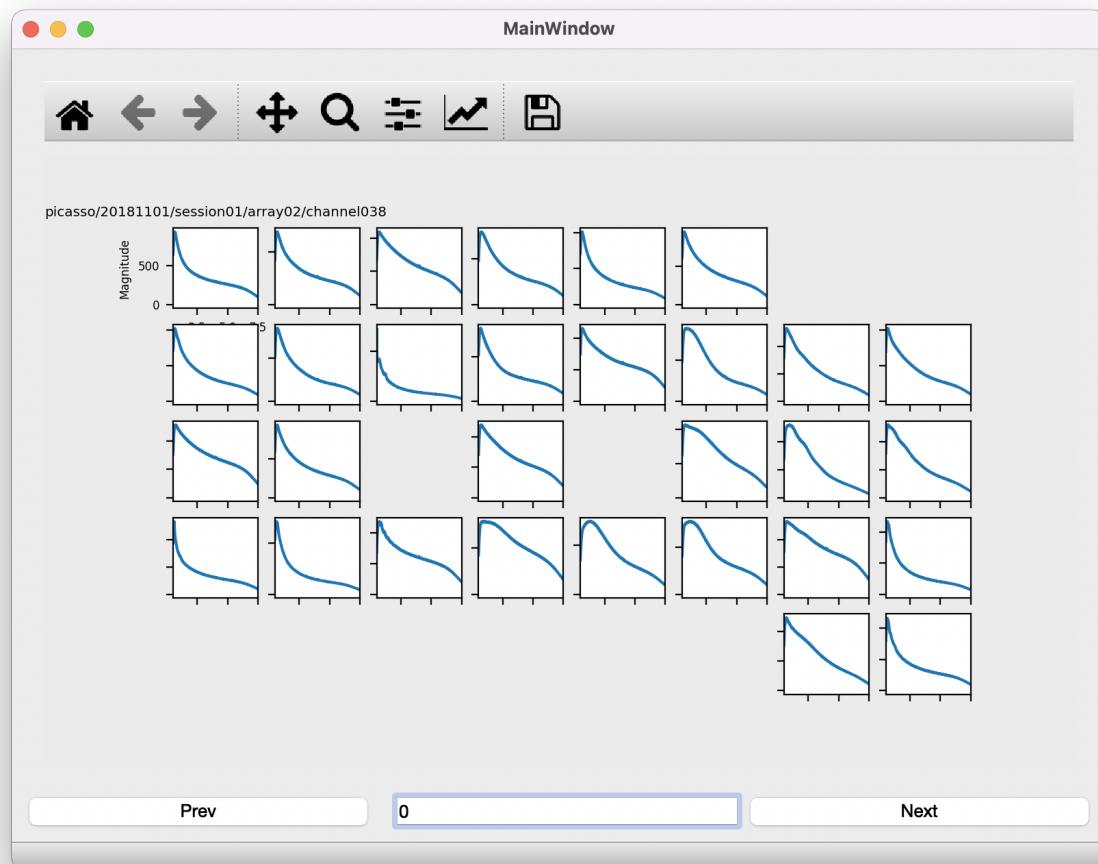
```
[(aws) (condaenv) shihcheng@SC-M1-MBA Downloads % scp -i ~/Documents/Work/Teachin] g/EG2310/YSC.pem "ec2-user@13.215.176.189:/data/picasso/20181101/freqspectrum*"
.
freqspectrum_660e.hkl                                100% 3024KB  28.0MB/s  00:00
freqspectrum_9c80.hkl                                100% 1584KB  36.7MB/s  00:00
(aws) (condaenv) shihcheng@SC-M1-MBA Downloads %
```

11. Use Spyder to load and plot the objects by array.

Include a screenshot of the array plot for the low-frequency and high-frequency spectrum objects in your lab report.

```
In Spyder  
In[ ]: cd ~/Downloads  
In[ ]: import PyHipp as pyh  
In[ ]: import PanGUI  
In[ ]: lf = pyh.FreqSpectrum(loadFrom='freqspectrum_9c80.hkl')  
In[ ]: plf = PanGUI.create_window(lf)  
In[ ]: hf = pyh.FreqSpectrum(loadFrom='freqspectrum_660e.hkl')  
In[ ]: plf = PanGUI.create_window(hf)
```





12. Submit your report to LumiNUS Quiz 2 Group X (in PDF format only, and name the file **Quiz2_YourName.pdf**):
- a) Screenshots from Step 2
 - b) Screenshot from Step 5
 - c) Screenshot from Step 6
 - d) Screenshot from Step 7
 - e) Screenshot from Step 8
 - f) Screenshots from Step 9
 - g) Screenshot from Step 10
 - h) Screenshots from Step 11