

High Performance Parallel Machine Learning and AI

Prof Handan Liu



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**Assignment 02**

1. Show the node list, time limit, state, and CPU numbers of the “debug” partition.                      6 pts

**Solution**: $ sinfo -p debug --Format=nodelist,time,statecompact,cpus

2. Tell the TA the meaning of the following codes of the job state and what you should do if it happens: **PD, R, S, CG**8 pts

PD- pending Node is yet to be allocated for job to start

R – running. Job is still running

S – Suspended. To manually suspend : - scontrol suspend

CG – Completing The job is finishing but some processes are still active. it happens to a job that cannot be terminated, probably because of an I/O operation.

3. Show all pending jobs on the “debug” partition.                      4 pts

squeue -p debug -t PENDING

4. Show how to use **srun** to request one node and 4 tasks for 30 minutes with 16GB memory on the reservation “csye7105” partition.         5 pts

srun -p reservation --reservation=csye7105 -N 1 --ntasks 4 --mem=16GB --time=00:30:00 --pty /bin/bash

5. Use **squeue** to show the job information in the question 4, including the job\_id and the node name which the job is working, and the job state.           5pts

$ squeue -p reservation -u gaurihar.n

$ squeue -p reservation --user gaurihar.n

6. Show how to cancel the job in question 4.                        4 pts

Solution:

$ scancel 32397991

7. In your $HOME, create a new directory: *tmp7105*; then create a sub-directory: *homework1*               4 pts

$ mkdir -p $HOME/tmp7105/homework1

8. Show how to transfer (any) one file in your local machine to the cluster to your subdirectory you created in question 7.                                4 pts

New terminal-

Ls

Cd desktop

Ls

scp NUDeepawali.pdf [gaurihar.n@xfer.discovery.neu.edu:/home/gaurihar.n/](mailto:gaurihar.n@xfer.discovery.neu.edu:/home/gaurihar.n/)

---🡪> Previous Terminal : ls

Output : File will be visible.

9. Load modules of anaconda3/2022.01 and cuda/11.4         4 pts

module load anaconda3/2022.01 cuda/11.4

10. Check available modules and loaded modules.                       4 pts

module avail <search query - cuda>

module list

11. In HW1, the csye7105\_ex2.c has been parallelized according to the requirements. On this compute node, implement the following operations:            8 pts

* + Compile the parallelized C program with OpenMP flag.
  + OpenMP parallel run the compiled file on 2 threads.
  + Show TA the current number of threads by using echo environmental variable.
  + Change the number of threads to 4 and run the compiled file again.

module load gcc/11.1.0

gcc -fopenmp csye7105\_ex2.c -o output

export OMP\_NUM\_THREADS=2

echo $OMP\_NUM\_THREADS

./output

export OMP\_NUM\_THREADS=4

echo $OMP\_NUM\_THREADS

./output

12. Show TA the list of all your Python environments and activate your customized Python environment and deactivate it.               8 pts

conda info -e

source activate <envname – py2022>

To deactivate - $conda deactivate

13. Copy the tarball *hpl-2.3.tar.gz* from /scratch/flyingsky2007 to your home directory; then extract the tarball using the command tar and flags.          6 pts

cp /scratch/flyingsky2007/hpl-2.3.tar.gz ~

tar -xvf hpl-2.3.tar.gz

14. Write a sbatch script according to the following requirements:           30 pts

(1) define the names of the job, output file and error file as hw2, hw2.out and hw2.err.  
  
(2) request one compute node from the “csye7105” partition.  
  
(3) request 4 tasks per node.  
  
(4) request 4GB memory.  
  
(5) define your work directory, and go to this work directory.  
  
(6) set the number of threads to 4  
  
(7) command to run your OpenMP-compiled file **csye7105\_ex2**.  
  
(8) load anaconda3/2022.01 module.  
  
(9) command to run a python file (any).

#!/bin/bash

#SBATCH --job-name=hw2  
#SBATCH --output=hw2.out  
#SBATCH --error=hw2.err  
#SBATCH --partition reservation  
#SBATCH --reservation=csye7105  
#SBATCH -N 1  
#SBATCH -n 4  
#SBATCH --mem=4GB

mkdir ~/work  
cd ~/work  
cp ~/tmp7105/homework1/csye7105\_ex2.c ~/work  
module load gcc/11.1.0  
export OMP\_NUM\_THREADS=4  
gcc -o csye7105\_ex2.out -fopenmp csye7105\_ex2.c  
./csye7105\_ex2.out

module load anaconda3/2022.01  
echo 'print("hello this is Nikita")' > hw2\_test.py  
python hw2\_test.py