Assignment #4

just group it!

seeing cgroups

visual #1

For this visual to be understood, follow the following steps …

(i) Create a new CPU cgroup
(ii) Add a ***CPU intensive*** process to the new group
(iii) Change its period, shares and quota
(iv) Measure the process behavior (cgroups stats and execution time)
You can also get some metrics from the cpu.stat cgroups file
(v) Repeat these steps from step (ii) with different settings.
(vi) Report findings via a table or graphs as an experiment — question, hypothesis, data representation, observations.

visual #2

(i) Repeat 1a with two CPU cgroups with at least one process each.
(ii) Configure each cgroup to use differentiated CPU resources (via one or more of share,
quota, period etc.)
(iii) Measure the behavior of each process
(iv) Repeat these steps from step (ii) with different settings.
(v) Report findings via a table or graphs as an experiment — question, hypothesis, data
representation, observations.

namespaces or spaces with names?

Recreate and understand the two examples described here.
The link describes two programs/techniques to use the system call interface to work with interfaces — one is to create a new process in a new namespace and the other is to add a process to an existing namespace.
Repeat the above process using the command line tools unshare and nsenter to produce the same effect.
Demonstrate the correctness via shell tools (ps, ls etc.)
Modify the program in part (a) to accept as argument the PID of a process whose namespace a new process will join via setns.
Hint: The first parameter of setns can be a pidfd or fd of a namespace.

1+2 = 3

(i) Create a PID namespace and add 5 tasks to it, with its own root directory.
Will need to write a program that creates 5 child processes — the corresponding programs of these process are stored in a directory relative to its root directory.
You can use the same program and its variations from part 1.
Execute the main program with chroot to enable the correct execution.
Add the main program to a separate PID namespace (via clone or setns)
(ii) Add the processes of the new namespace to a new/separate cgroup.

Change cgroup configuration parameters to observe changes in behavior of the processes.
Report findings of change in resource settings.

Submission

Submit code files, data and outputs for each part.

Create a folder <your-roll-no>-CS695-a4 and add the above in three directories one for each part.
Create a .tar.gz of the folder and submit a single <your-roll-no>-CS695-a4.tar.gz file in Moodle. You may use the following command to create the tarball.

```
tar -czvf <your-roll-no>-CS695-a4.tar.gz <your-roll-no>-CS695-a4/
```

Due date: 7th Apr. 5pm