Exercise: Batch system

For all scripts below, use `'/bin/sleep 60'` (or a longer period, like 100 or 120 seconds) as the command to run, and use 'hpcintro' as the queue name.

1. Write a simple job script, like the one shown in the lecture and submit it.
   (a) Check the status with qstat and/or showq. Use 'man qstat', 'man showq', to get information about the options.
   (b) add a walltime limit to the script. Can you see that limit in the qstat or showq output?
2. Write a job script that sends you notifications when the job starts and ends - see 'man qsub' for the details.
   (a) What is the option to get mails in the case of a job failure, only?
   (b) To test (a), increase the period in the sleep command to be longer than the walltime limit, and submit the job again. What happens?
3. The 'hpcintro' queue has nodes of different type, e.g. CPUs. The CPU type can be requested as a feature in a command script.
   (a) Use the 'nodestat' command to check which CPU types are available in the 'hpcintro' queue, and then submit a job script that requests one of the types.
   (b) Add the necessary commands to your job script, to print the CPU type - and check in the job output that your job did indeed run on a node with the requested feature.

   The next two steps are a preparation for week 2, where we want to submit multi-core jobs to the batch system:
4. Write a job script that requests 1 node and 4 cores.
   (a) How can you achieve that?
   (b) Check the PBS environment variables during the job, to see how your request is reflected in any variables. Add the following lines to your job script:

```
echo PBS_NP: $PBS_NP
echo PBS_NODENUM: $PBS_NODENUM
echo PBS_NUM_NODES: $PBS_NUM_NODES
echo PBS_NUM_PPN: $PBS_NUM_PPN
echo PBS_TASKNUM: $PBS_TASKNUM
```

   Which of the variables reflects the request (1 node, 4 cores)?
5. Write a job script, requesting one node and 16 cores. Does it run? If the job doesn't start, use checkjob to check for the reason. Can you tell from the checkjob output when the job will start and finish?
6. Write a job script, requesting one node and 32 cores. Does it run? If the job doesn't start, use the 'checkjob' command to check for the reason. Can you tell from the checkjob output when the job will start and finish?
7. Check all your submitted jobs with 'qstat' again. If there are any left, that still are in status 'Q' or 'H', please remove them with 'qdel JOBID' (the JOBID is the number in the first column of the 'qstat' output).

Hints: to get the informations needed, you should use the 'man' command and take a look at the DTU Computing Center webpages www.hpc.dtu.dk under HPC.