

# HPC CF

Christian Meesters (+ HPC Certification Forum)

## HPCCF Taking the Exam



2021-12-14

Certification for the German HPC Community

# Getting Started

**Timelimit (scenario):** 60 minutes

**Timelimit (multiple choice):** 50 minutes

**Score to pass:** 70%

Name

Will be on the certificate

E-mail

Will be used to send you the certificate/your result

Affiliation

Will be used for statistical purposes

☐ I agree to the privacy policy and terms of this service

Please check the correctness of the Name, Email address, and Affiliation.  
**Test submissions cannot be undone, the values above will be used to create your certificate**

Press **Register for this examination** to transfer your request for examination together with the provided **personal information** to the server.

■ navigate to the web page

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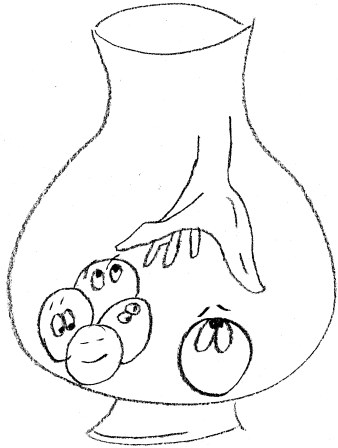
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**Register for this examination!**

- navigate to the web page
  - select the appropriate skill to be tested for
  - submit Name & Affiliation (which are needed for the certificate) & email
- ↪ a mail will be send containing links and keys for the actual exam (valid for 24 h)

# Background: Selecting the Questions



Questions are randomly chosen from a pool: the pool may itself be a bundle of

sub-branches of the skill tree



↪ All examinations will be based on different sets of questions.

# On Cheating

- 1 By confronting with random questions no perfect preperation can be accomplished.
- 2 There is a time-limit per question.
- 3 A registration prior to a test session is required.

No online system without ID checks and other measures is safe against cheating!  
Yet, our measures will raise awareness.

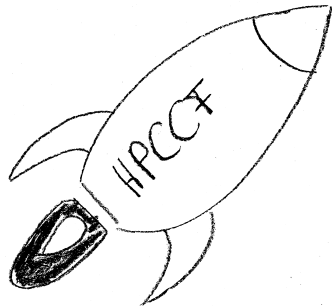




# Boosting Acceptance

Want to hire a scientist?

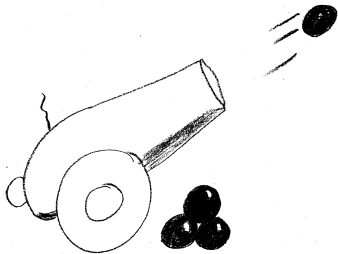
We intend to provide a (sub)set of question for prospective employers. This way they will have an idea of the background, if a solicitant waves a HPCCF-certificate.



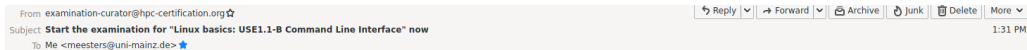
# What is in the Arsenal?

MCQs aren't everything:

- 1 Freecode (if short and explicit)
- 2 Parson Problem (can be done as MCQ)
- 3 Tracing (can be done as MCQ)



# Getting Access - Email



This email contains the information how to conduct the examination for the certificate "*Linux basics: USE1.1-B Command Line Interface*" from the HPC Certification Forum.

Make sure you are ready for the examination, because once the test is started you have a time limit to complete it. If you fail the test, you must wait for an embargo period to restart the examination.

Click on the link to start the [multiple choice examination](#).

Click on the link to start the [scenario examination](#).

# Multiple Choice Questions

time remaining: 20:00

## Question 1

Which command is used to close the vi editor?

Mark individual answers as correct or wrong.

correct ▾	q
wrong ▾	exit
wrong ▾	quit
wrong ▾	<esc>ZZ

## Question 2

Which command is used to close the vi editor without saving any changes?

Mark individual answers as correct or wrong.

correct ▾	:q!
wrong ▾	:q & wq
wrong ▾	q
wrong ▾	quit

## Question 3

Assume you try to run the program "ls" with the argument "dir" and if it executes successfully, you want to print a message. How can this be executed in one command line on the bash?

Mark individual answers as correct or wrong.

wrong ▾	echo "" && ls dir && echo "directory exists"
correct ▾	ls dir && echo "directory exists"
unknown ▾	ls dir    echo "directory exists"
unknown ▾	ls dir ; echo "directory exists"

# Scenerio Based Questions

Here:

In this task, you will need to run the program `terminator` and send a fixed sequence of signals to the program. Note that this program is very sensitive to signals, very bad things may happen on the cluster if it is used incorrect. **Therefore, it is mandatory that you send the correct sequence of signals to the program and no other sequence.**

We want to remind you that you can open multiple terminal sessions by opening the URL with the browser again.

Please send the following sequence of signals:

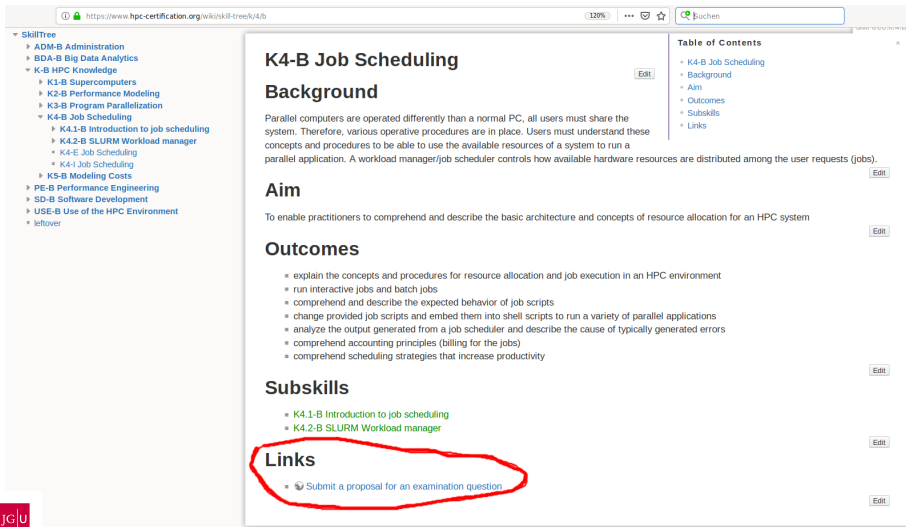
- 1 INT
- 2 USR1
- 3 2

# Scenerio Based Questions - Continued

```
user@login:~$ terminator &
[2] 88
user@login:~$ kill -s SIGINT 88
user@login:~$ kill -s SIGUSR1 88
user@login:~$ kill -s SIGUSR2 88
user@login:~$ kill -9 88
user@login:~$ ps
  PID TTY          TIME CMD
   42 pts/3        00:00:00 bash
   50 pts/3        00:00:00 bash
   51 pts/3        00:00:00 sleep
   89 pts/3        00:00:00 ps
[2]+  Killed                  terminator
user@login:~$
```

Note: SIGUSR2 != 2. Hence: Not full grade.

# Contributions via the HPCCF-Wiki



https://www.hpc-certification.org/wiki/skill-tree/k4/b

120%

Suchen

**SkillTree**

- ▶ ADM-B Administration
- ▶ BDA-B Big Data Analytics
- ▼ K-B HPC Knowledge
  - ▶ K1-B Supercomputers
  - ▶ K2-B Performance Modeling
  - ▶ K3-B Program Parallelization
  - ▼ K4-B Job Scheduling
    - ▶ K4.1-B Introduction to job scheduling
    - ▶ K4.2-B SLURM Workload manager
      - K4-E Job Scheduling
      - K4-I Job Scheduling
    - ▶ K5-B Modeling Costs
  - ▶ PE-B Performance Engineering
  - ▶ SD-B Software Development
  - ▶ USE-B Use of the HPC Environment
  - leftover

**K4-B Job Scheduling**

**Background**

Parallel computers are operated differently than a normal PC, all users must share the system. Therefore, various operative procedures are in place. Users must understand these concepts and procedures to be able to use the available resources of a system to run a parallel application. A workload manager/job scheduler controls how available hardware resources are distributed among the user requests (jobs).

**Aim**

To enable practitioners to comprehend and describe the basic architecture and concepts of resource allocation for an HPC system

**Outcomes**

- explain the concepts and procedures for resource allocation and job execution in an HPC environment
- run interactive jobs and batch jobs
- comprehend and describe the expected behavior of job scripts
- change provided job scripts and embed them into shell scripts to run a variety of parallel applications
- analyze the output generated from a job scheduler and describe the cause of typically generated errors
- comprehend accounting principles (billing for the jobs)
- comprehend scheduling strategies that increase productivity

**Subskills**

- K4.1-B Introduction to job scheduling
- K4.2-B SLURM Workload manager


**Links**

- [Submit a proposal for an examination question](#)

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- ▶ Subskills
- ▶ Links


## Contributions via the HPCCF-Wiki II

Each [HPCCF wiki](#)  page contains a link. It leads to a little form asking for:

- contact mail
- to select a learning objective from a pre-formatted list
- to supply the question you thought of
- and (in case of a multiple choice question) the possible answers.



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### Evaluation Process

Now, HPCCF-member evaluate the submitted question. If approved, it will be formatted and merged into the pool of questions for the chosen topic / skillset.

# Certification: Assessment Prototype

- 1 User takes multiple-choice test online (any time!)
    - ▶ A combination of JavaScript and a web service
    - ▶ System selects number of questions randomly from a pool
      - By submitting questions the related usage-allowance is granted to HPCCF
    - ▶ In case of sufficient numbers the system draws from a pool of different possible answers (MCQ-case).
  - 2 Choices are submitted to the web server
  - 3 *Manual approval* of the result
  - 4 Automatic creation of certificate and returned by email
    - ▶ Permanent computer-verifiable proof is created about certification of skills
      - Return a text version with GPG signature
      - Return a link that can be verified on [hpc-certification.org](http://hpc-certification.org)
  - 5 Privacy: minimize information stored on servers, keep some for statistics
- is some measure to prevent cheating and brute forcing (e.g., delay)

# Certification: Certificate

## Text representation

```
-----BEGIN PGP SIGNED MESSAGE-----  
Hash: SHA512  
HPC Certification Forum Certificate  
This text confirms that "Jane Doe" has  
successfully obtained the certificate  
"HPC driving license" (id: 1) at 02/2019.  
Verification URL: https://hpc-certification.org/[...]  
-----BEGIN PGP SIGNATURE-----  
[...]  
-----END PGP SIGNATURE-----
```

## Certificate



Thank You for Your Attention!

