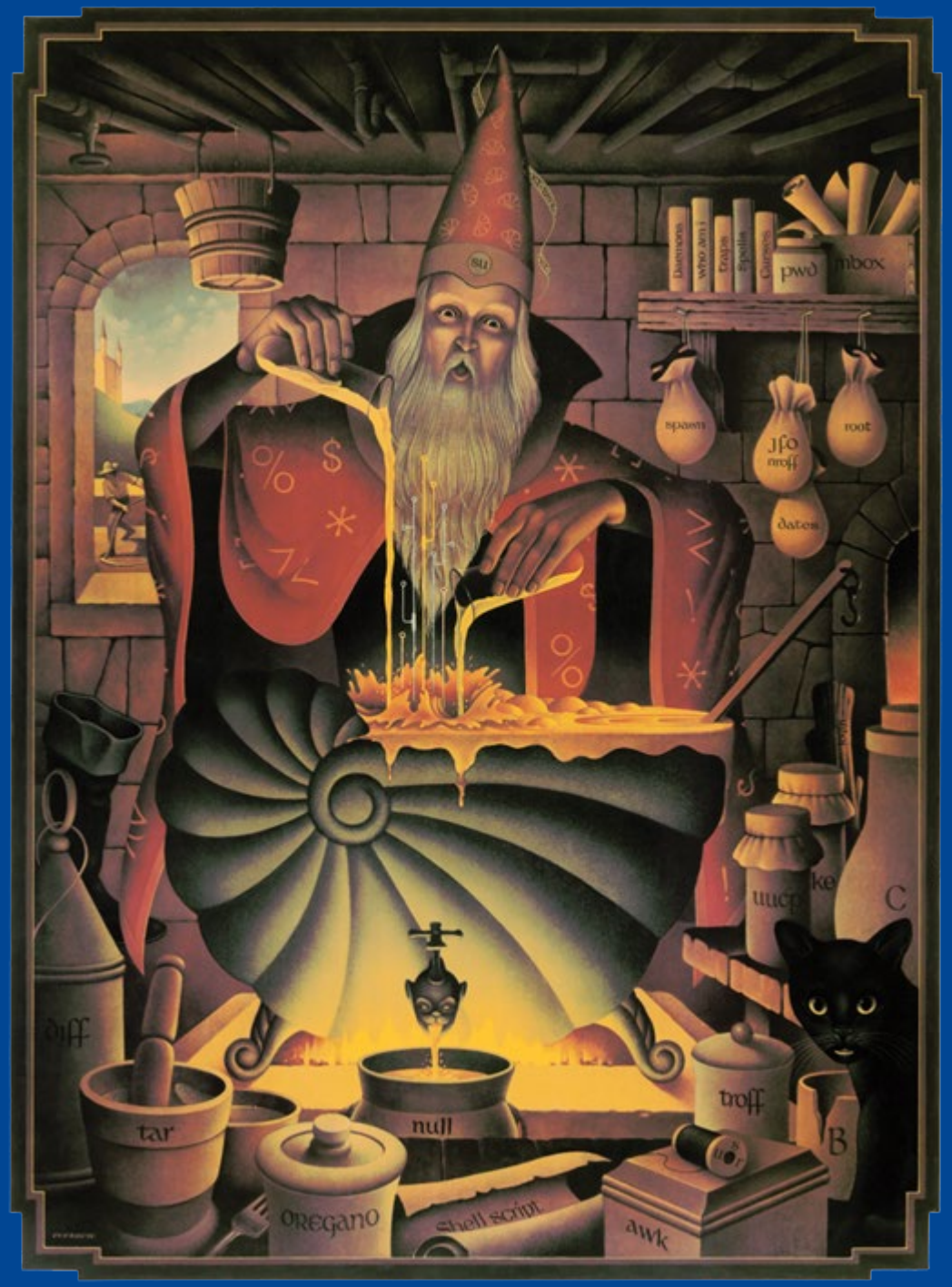
NTNU | Kunnskap for en bedre verden

TTM4175 – Week 34

Intro Linux Command Line Interface (CLI)



https://archive.org/details/unix-magic-poster-gary-overcare-1

Agenda

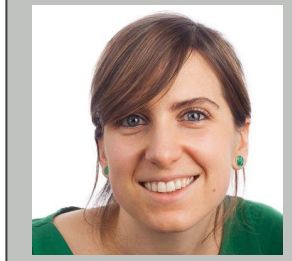
- General info [Katrien, Stas]
- Explainer about labs and reports [Stas]
- Explainer about RATs [Stas]
- RATs – individual & team-based
- Break
- Lecture until 12
- Labs in Sahara

Course Team: Lecturers

Stanislav Lange
Lecturer,
Course responsible
room: B231
stanislav.lange@ntnu.no
subject field [ttm4175]

Urooj Fatima
Lecturer
Room: B-215
Urooj@ntnu.no
subject field [ttm4175]

Danilo Gligoroski
Lecturer
Room: B-221
danilog@ntnu.no
subject field [ttm4175]



Katrien De Moor
Lecturer,
Course responsible
room: A-273
katrien.demoor@ntnu.no
subject field [ttm4175]

Tu Dac Ho
Lecturer
Tu.d.ho@ntnu.no
subject field [ttm4175]

Iwona Windekilde
Lecturer
iwona.windekilde@
ntnu.no
subject field [ttm4175]

Tjerand Silde
Lecturer
Tjerand.silde@ntnu.no
subject field [ttm4175]

Course Team: Student Assistants

Maria Olsen Melsnes
2. klasse CybDat
mariaome@stud.ntnu.no

August Skorgen Rakvaag,
3. klasse CybDat
augustsr@stud.ntnu.no

Attal Ahmadjan,
3. klasse CybDat
attala@stud.ntnu.no

Torjus Hegre
2. klasse Cybdat
torjusmh@stud.ntnu.no

Bendik Trosterud,
3. klasse CybDat
bendik.trosterud@ntnu.no

Course Schedule

Week	Date	Where	Theme	Teacher
33	12-15-Aug	EL6	Teknostart	
34	20-Aug	KJL4, Sahara	Lab 1: Linux CLI	Stas
35	27-Aug	KJL4, Sahara	Lab 2: Ips, LAN	Stas
36	03-Sep	KJL4, Sahara	Lab 3: Ports, Web Servers	Stas
37	10-Sep	KJL4, Sahara	Lab 4: Routing, DNS	Stas
38	17-Sep	KJL4, Sahara	Lab 5: Sustainability	Iwona
39	24-Sep	KJL4, Sahara	Lab 6: Menneskelige aspekter	Katrien
40	01-Oct	KJL4, Sahara	Lab 7: Introduction to IoT and the	Urooj
41	08-Oct	KJL4, Sahara	Lab 8 Tilstandsmaskiner	Urooj
42	15-Oct	KJL4, Sahara	Lab 9: HTTP and JSON	Tu
43	22-Oct	KJL4, Sahara	Lab 10: MQTT	Tu
44	29-Oct	KJL4, Sahara	Lab 11: Kryptografi	Tjerand
45	05-Nov	KJL4, Sahara	Only lab, no lecture	
46	12-Nov	KJL4, Sahara	Lab 12: Cybersikkerhet 1	Danilo
47	19-Nov	KJL4, Sahara	Lab 13: Cybersikkerhet 2	Danilo

Lectures: 10:15-12 (KJL4)
Lunch break: 12:00-13:00
Lab: 13:00-16:00 (Sahara)

TTM4175 Lab Reports

Lab Report Part 1 – Communication Networks

- Intermediate delivery: 27th of August
- Delivery Deadline: 17th of September

Lab Report Part 2 – IoT

- Delivery Deadline: 22nd of October

Lab Report Part 3 – Cryptography and Cybersecurity

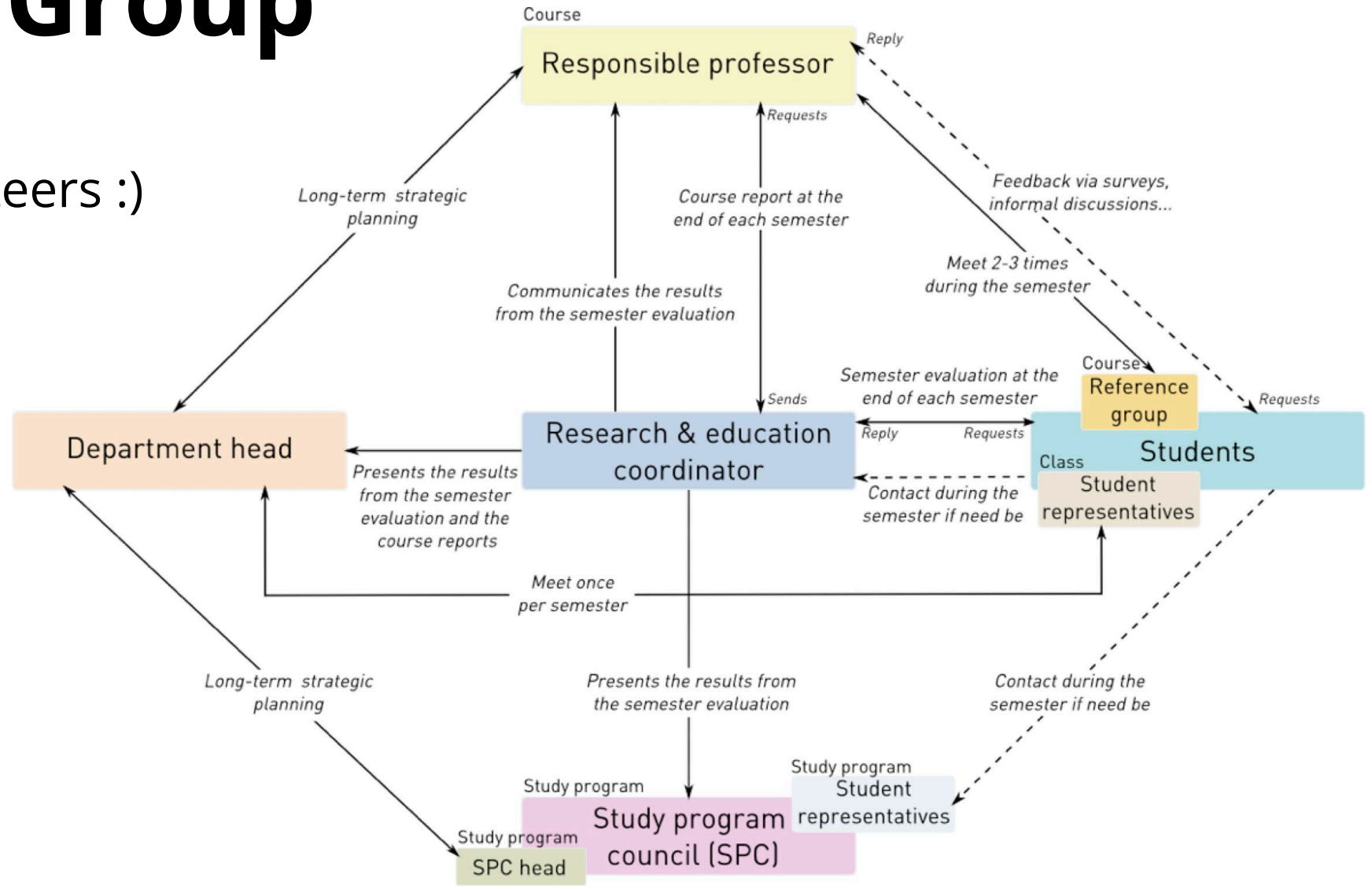
- Delivery Deadline: 26th of November

Weekly Reflections

- Short **individual** reflection about every lab (week)
- To be included in the reports

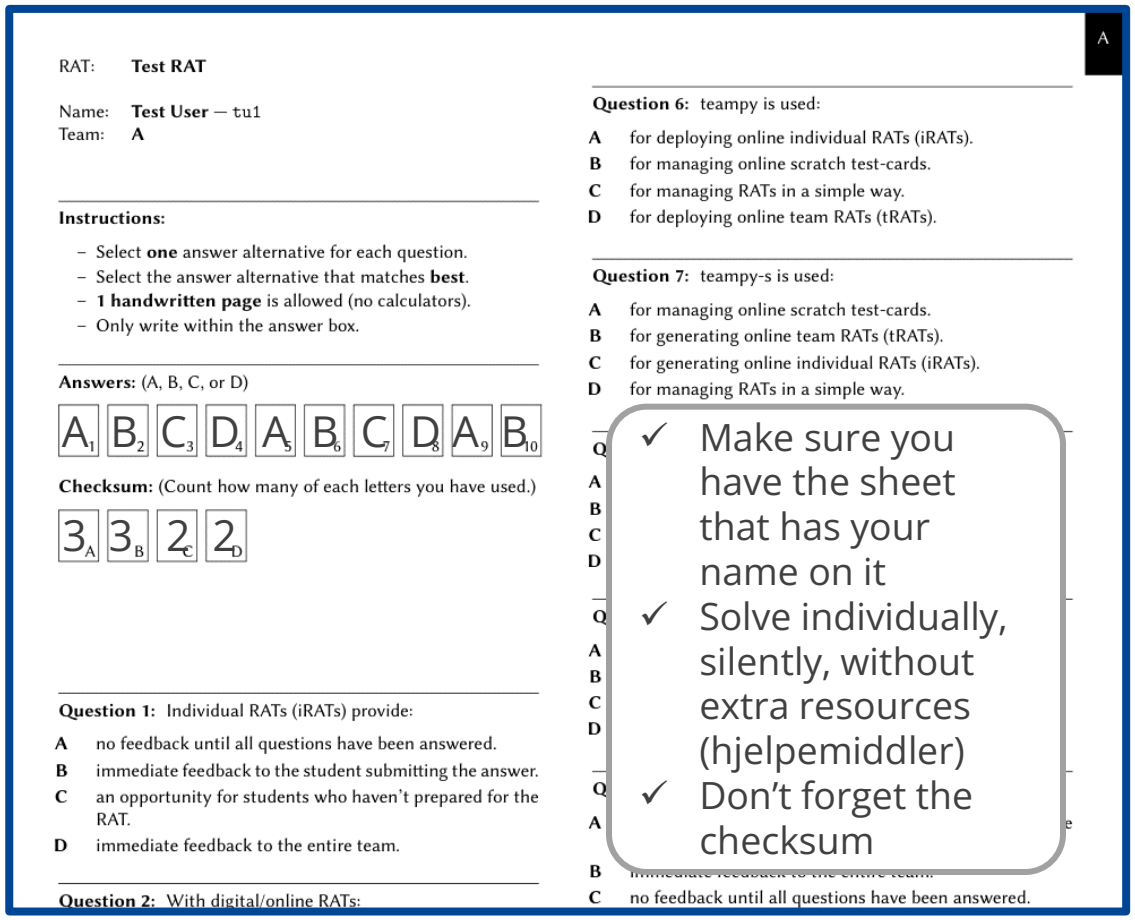
Reference Group

- We need 4-5 volunteers :)
- 3 short meetings



Readiness Assurance Tests (RATs)

- Two types: individual / team-based → iRAT / tRAT



A

RAT: **Test RAT**

Name: **Test User** — `tu1`
Team: **A**

Instructions:

- Select **one** answer alternative for each question.
- Select the answer alternative that matches **best**.
- **1 handwritten page** is allowed (no calculators).
- Only write within the answer box.

Answers: (A, B, C, or D)

A_1	B_2	C_3	D_4	A_5	B_6	C_7	D_8	A_9	B_{10}

Checksum: (Count how many of each letters you have used.)

3_A	3_B	2_C	2_D

Question 1: Individual RATs (iRATs) provide:

A no feedback until all questions have been answered.
B immediate feedback to the student submitting the answer.
C an opportunity for students who haven't prepared for the RAT.
D immediate feedback to the entire team.

Question 2: With digital/online RATs:

Question 6: teampy is used:

A for deploying online individual RATs (iRATs).
B for managing online scratch test-cards.
C for managing RATs in a simple way.
D for deploying online team RATs (tRATs).

Question 7: teampy-s is used:

A for managing online scratch test-cards.
B for generating online team RATs (tRATs).
C for generating online individual RATs (iRATs).
D for managing RATs in a simple way.

Q
A
B
C
D

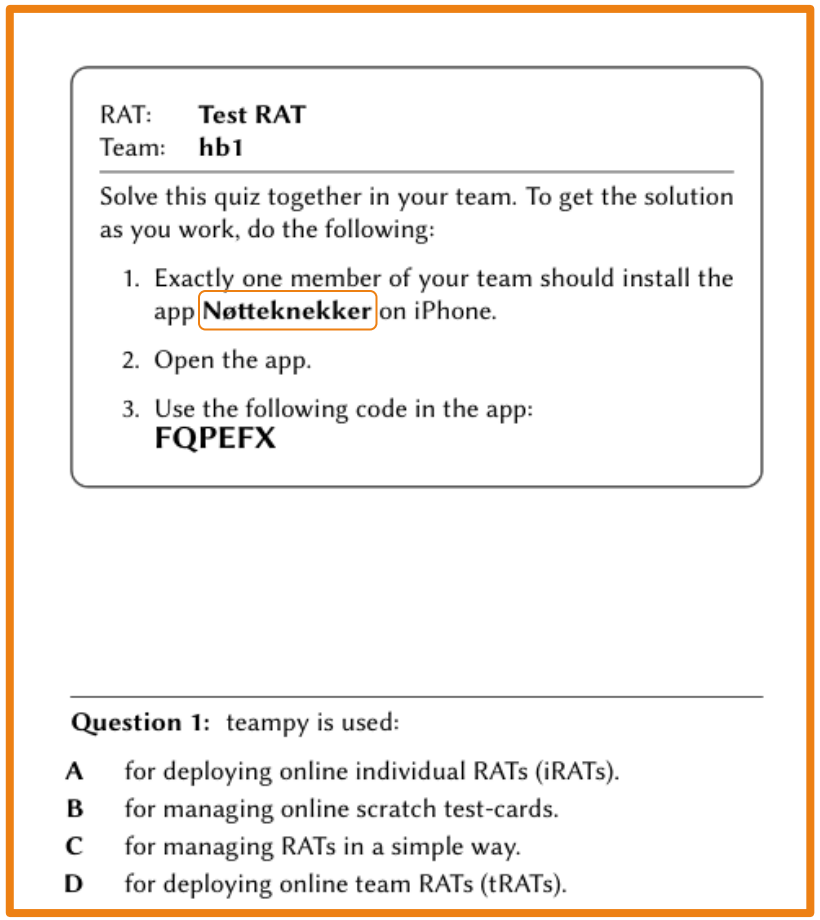
Q
A
B
C
D

Q
A

B

C no feedback until all questions have been answered.

- ✓ Make sure you have the sheet that has your name on it
- ✓ Solve individually, silently, without extra resources (hjelpemiddler)
- ✓ Don't forget the checksum



RAT: **Test RAT**
Team: **hb1**

Solve this quiz together in your team. To get the solution as you work, do the following:

1. Exactly one member of your team should install the app **Nøtteknekker** on iPhone.
2. Open the app.
3. Use the following code in the app: **FQPEFX**

Question 1: teampy is used:

A for deploying online individual RATs (iRATs).
B for managing online scratch test-cards.
C for managing RATs in a simple way.
D for deploying online team RATs (tRATs).

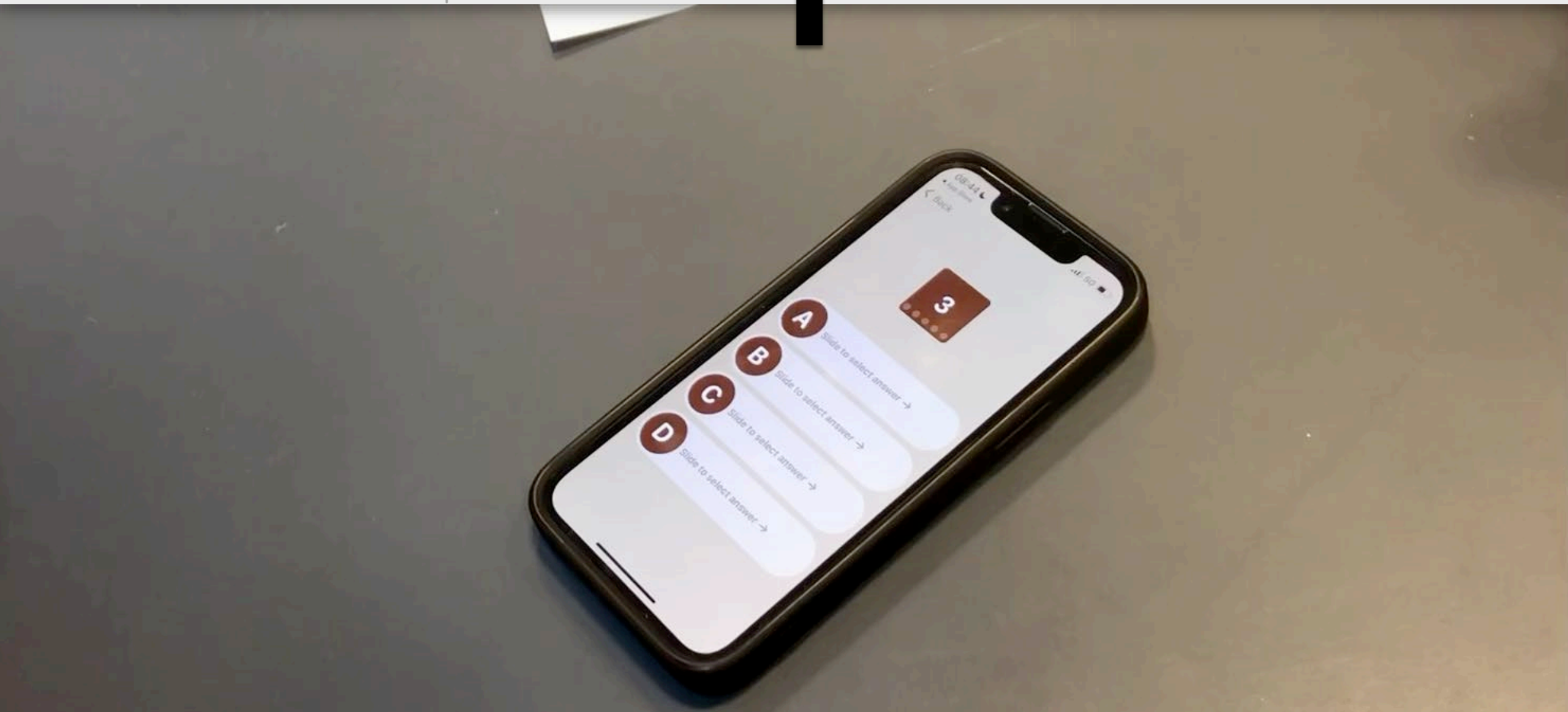
1: Forberedelse

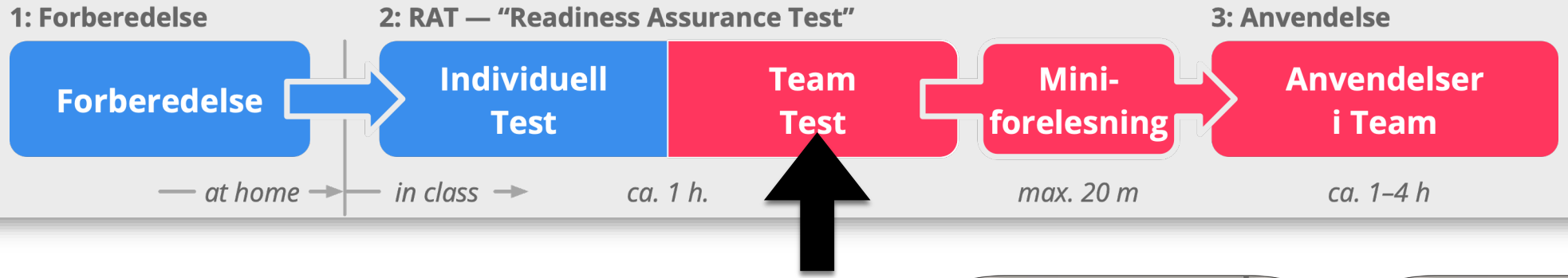
2: RAT — “Readiness Assurance Test”

3: Anvendelse

Forberedelse → Individuell Test → Team Test → Mini-forelesning → Anvendelser i Team

at home → in class → ca. 1 h. → max. 20 m → ca. 1–4 h





- **Nøtteknekker-App**
- Viser rett svaralternativ underveis
- Trenger kun én iPhone per team
- Enkelt å bruke og gratis
- Lagt med ♥ved NTNU

Download on the App Store

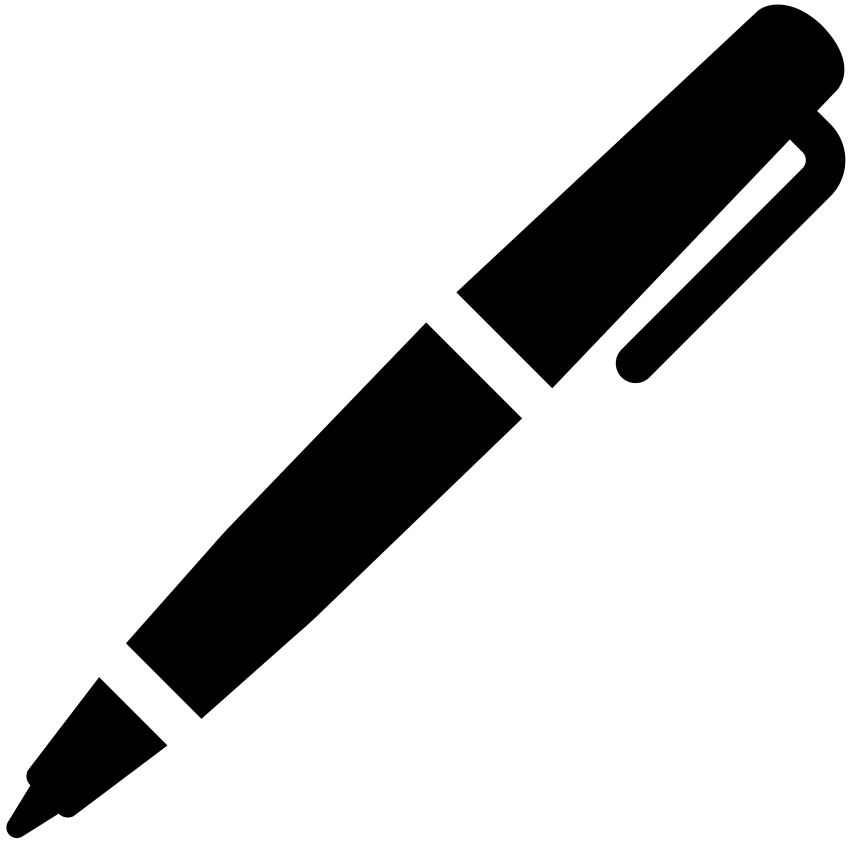
https://s.ntnu.no/nuts

RAT Evaluation

- Each individual RAT awards 0/1/2 points
  - 0 points: fewer than 3 correct answers
  - 1 point: fewer than 6 correct answers
  - 2 points: 6 or more correct answers
- 10 RATs in total
- RATs are “passed” with a total score of at least 15

iRATs

- ✓ Make sure you have the sheet that has your name on it
- ✓ Solve individually, silently, without extra resources (hjelpemidler)
- ✓ Don’t forget the checksum



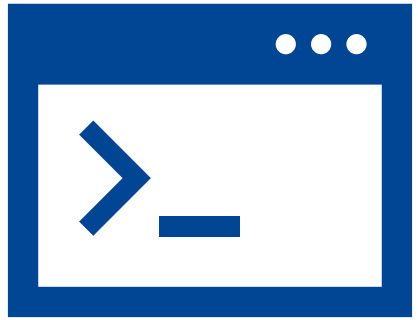
15:00

tRATs - Get the Nøtteknekker App

15:00

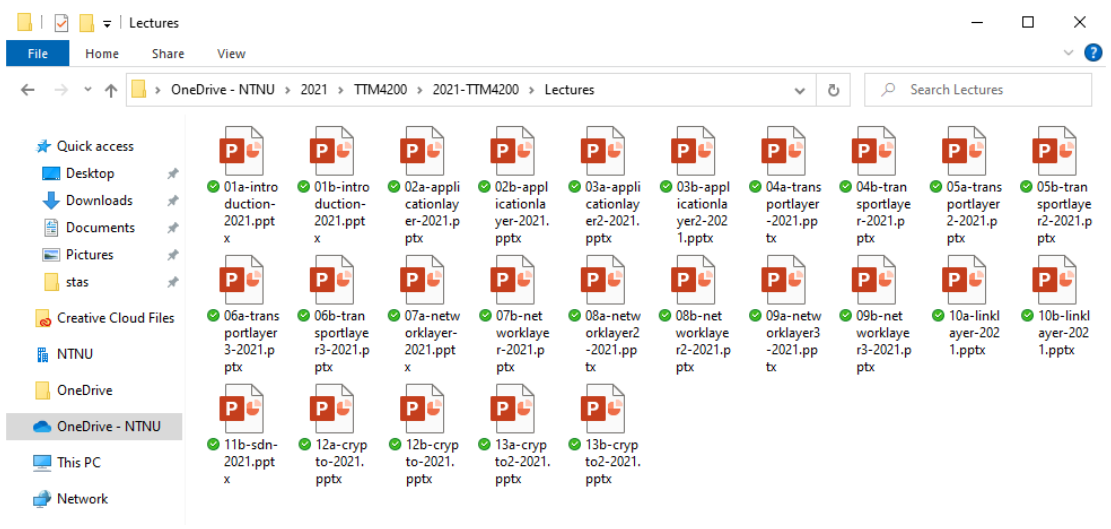
Goals

- Get to know the Linux Command Line Interface (CLI)
  - Understand its importance
  - Learn basic commands for
    - Navigation
    - Remote access
    - Networking-related tasks
  - Understand basic virtualization principles

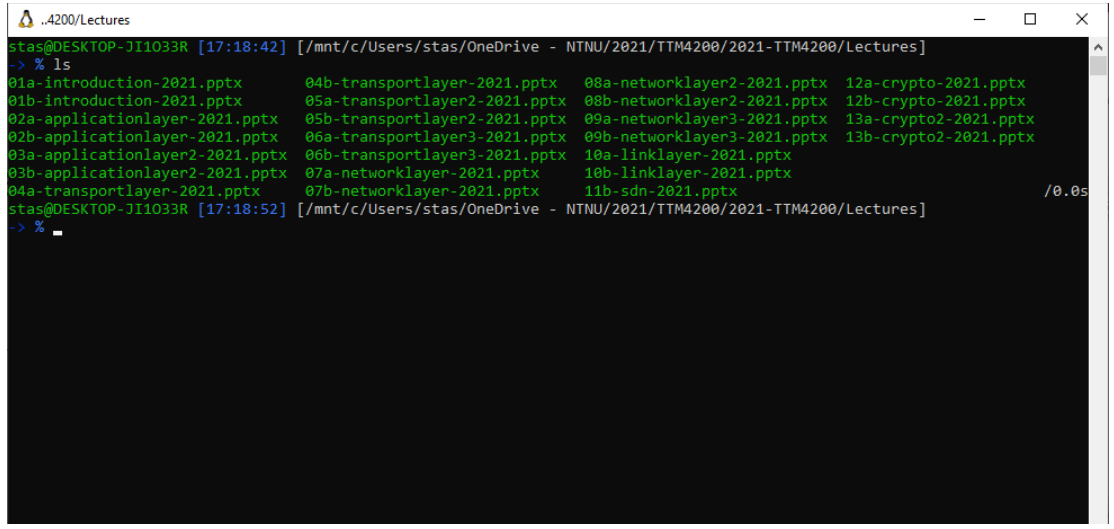


What is the Command Line?

- Text-based interface to navigate and control computers
  - Inspect, create, move, edit files
  - Execute programs



Graphical User Interface (GUI)



Command Line Interface

Why use the Command Line?

- Unified set of tools & commands to navigate
  - Servers
  - Personal computers
  - Mobile and embedded devices

- Interaction with devices that don’t have a GUI (servers)
- Easier to automate than GUI interactions

Recap of Preparation Material

Practical

Local environment

VMs, SSH, VNC

Readings

What is the CLI

Getting help

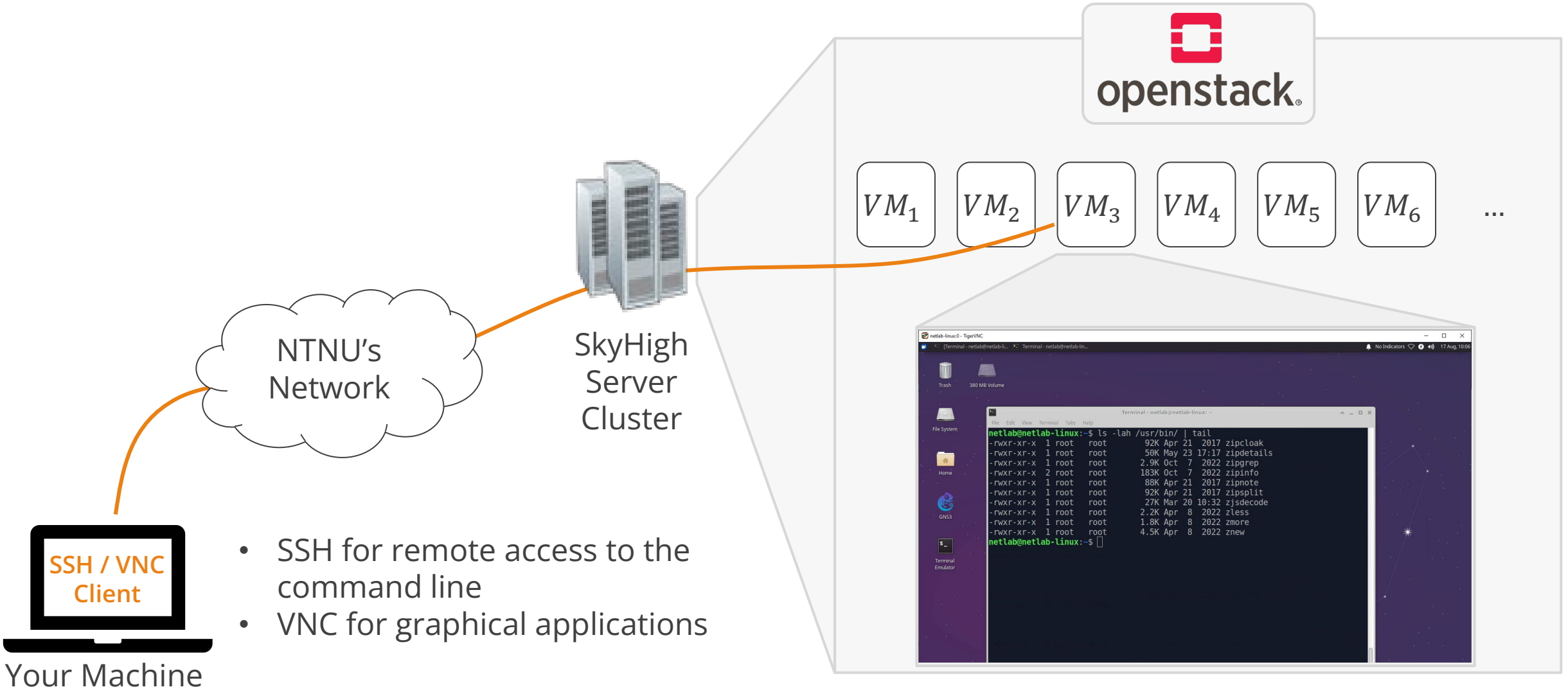
Videos

File system navigation

File system manipulation

grep, cat, man

Course Environment – OpenStack

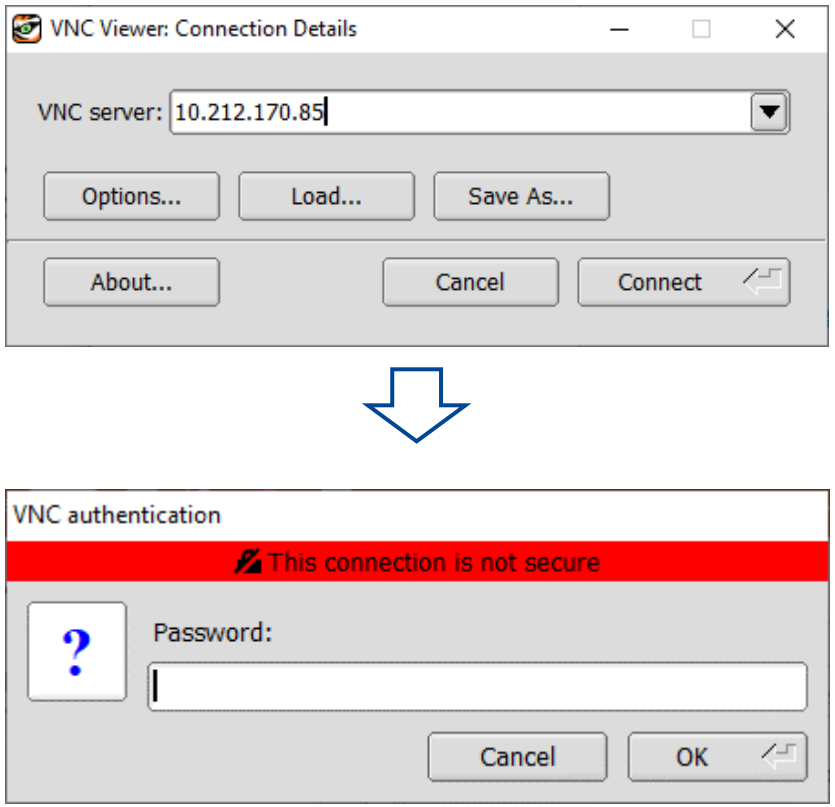


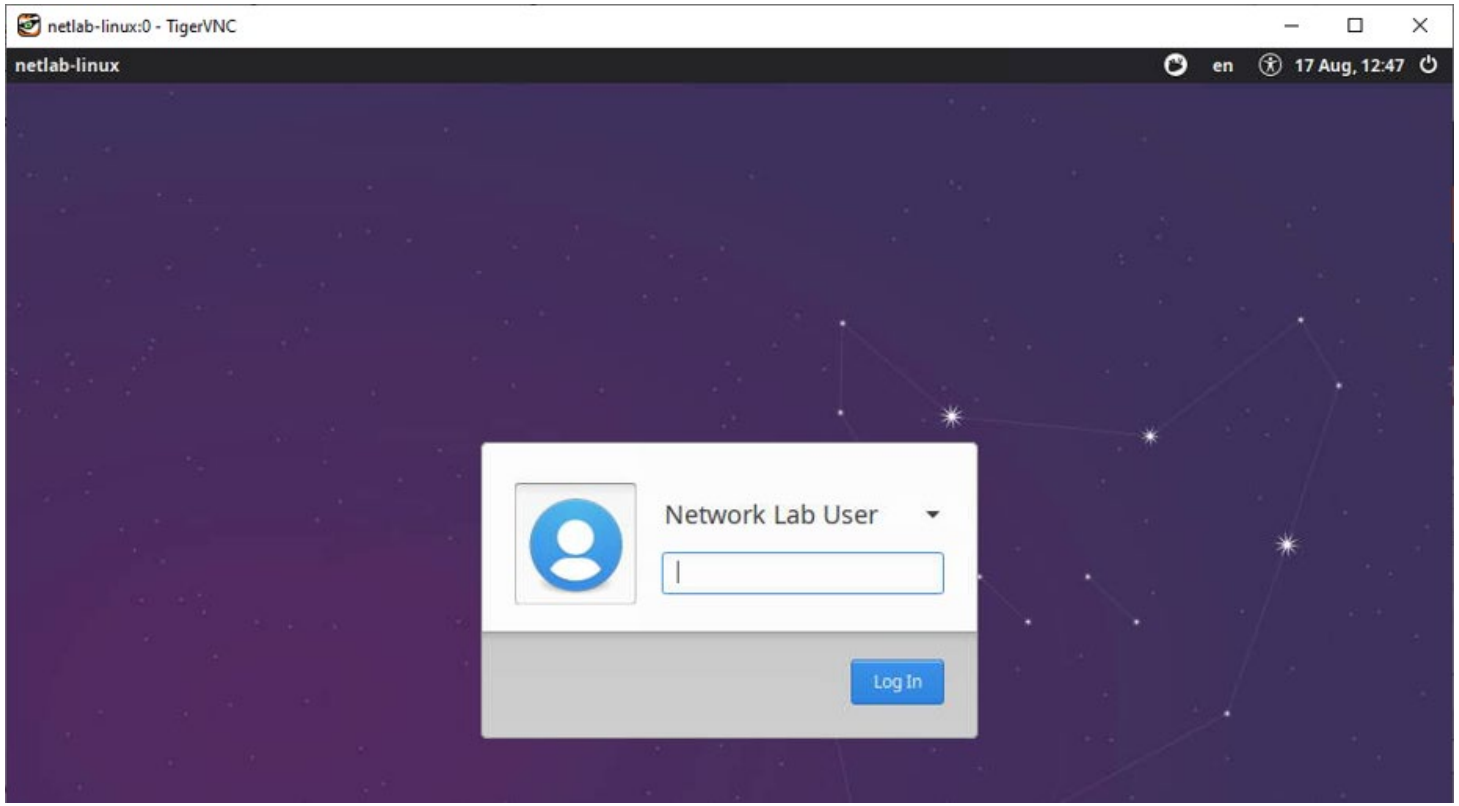
- SSH for remote access to the command line
- VNC for graphical applications

VM Credentials

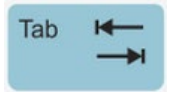
- Blackboard: TTM4175 > My Groups > $yourGroup > Group Homepage > Group Description

Demo: Using VNC to Connect to Your VM





Demo: Basics

- `pwd`, `ls`, `cd`, `cat`, `less`
- `mkdir`, `rm`, `rmdir`, `mv`, `cp`
- *Tab completion*: start typing a command and hit 

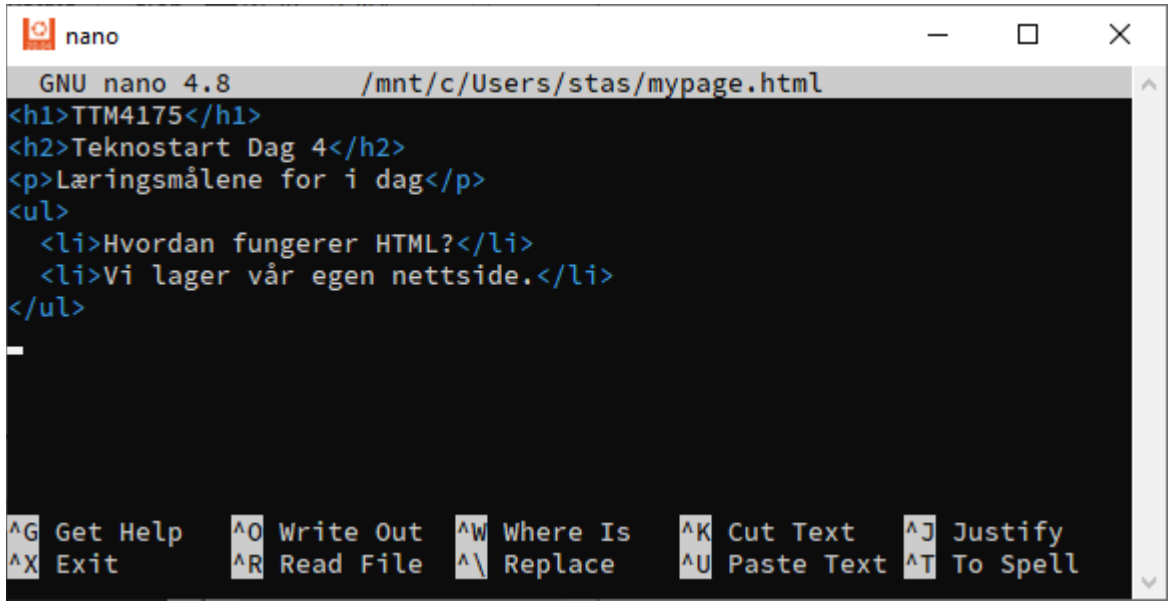
- Arrow keys up / down to browse command history
- Ctrl + ..
  - C: abort currently active program – handy if something hangs
  - R: search command history
  - L: `clear` terminal window
  - D: `exit` current session

Demo: Streams, Redirection, Pipes

- (Over-)Writing to a file with >
  - `echo "hello, world" > hello.txt`
- Appending to a file with >>
  - `echo "hei, world" >> hello2.txt`
- *Piping* output from one command to the next with |
  - `ls | head`
  - `cat *.txt | grep hei`

Demo: nano Editor

- Most basic CLI-based text editor
- Shipped with most Linux distributions
- Open a file for editing via `nano myfile.txt`
- Ctrl + ..
  - S: **s**ave
  - O: save as (**o**ffer to write)
  - X: e**x**it
  - W: search (**w**here is)
- Arrow keys to navigate



https://www.nano-editor.org/dist/latest/cheatsheet.html

Activities Today

Connect to Your VM

Suggested mode: one computer / connection per group

Solve the Tasks

Jeopardy-style Capture-the-Flag (CTF)

Command line crime mystery

Next Week: Networking Lab I

- Topics: binary, IP addresses, subnets, LAN configuration
- Goals
  - Understand and apply basic binary arithmetic
  - Understand IP addresses and their organization into subnets
  - Create and configure Local Area Networks (LANs)
  - Use basic Linux commands for managing
    - IP addresses (IPv4 and IPv6)
    - IP subnets and masks
- Preparation material & BB announcement on Friday