



A Brief History of Computing and an Introduction to Unix

 [Kjell Are Refsvik](#)

 August 31, 2011

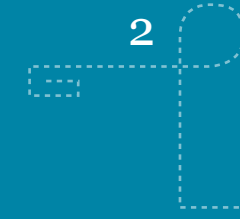
 [IMT4892 Digital Workflow](#)

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 <http://www.ansatt.hig.no/kjellr/imt4892>



WHERE WE ARE NOW



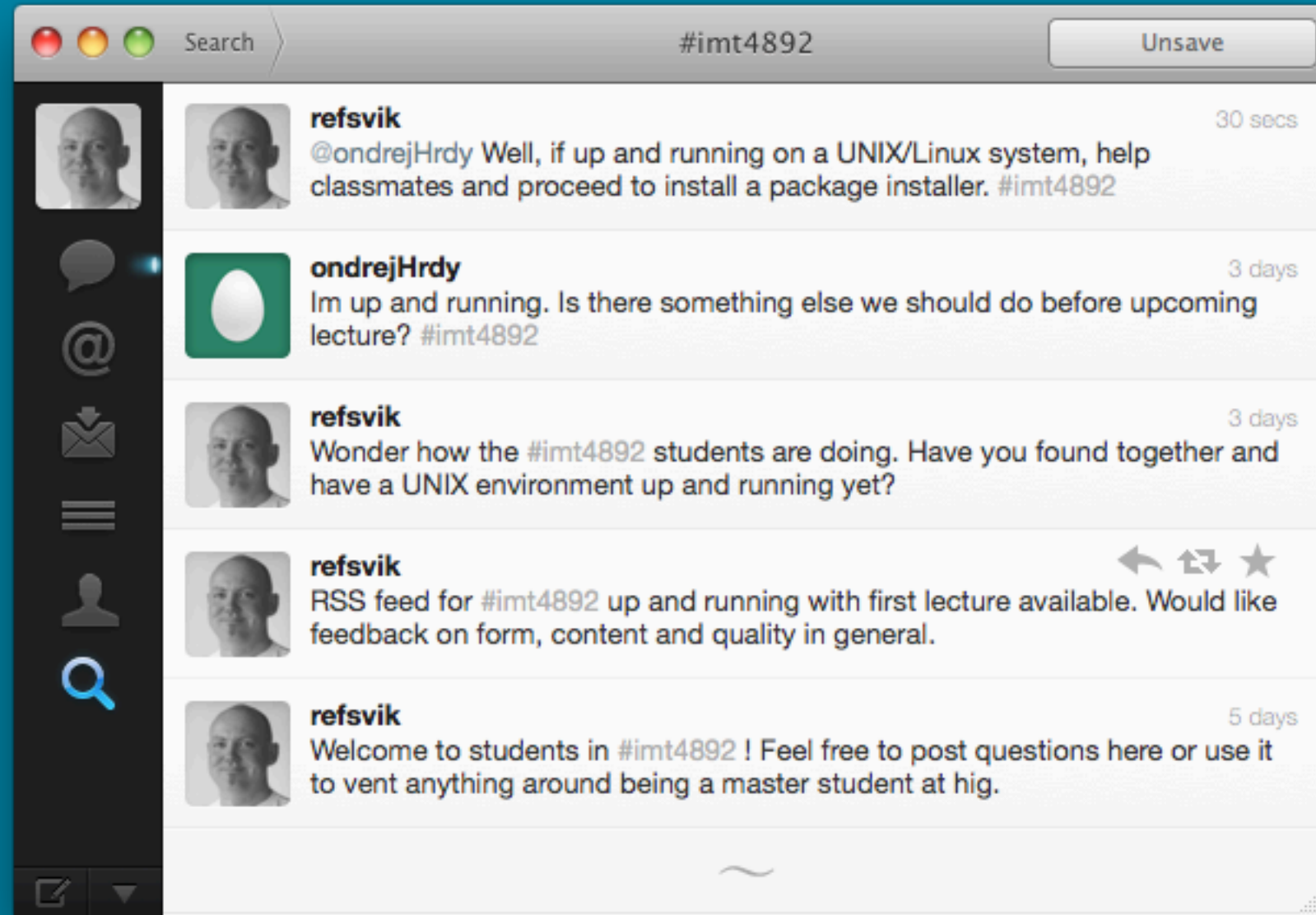
WEEK	TOPIC
33	-
34	Course Introduction
35	<u>A Brief History of Computing and an Introduction to Unix</u>
36	<u>Devices and data formats, wrappers and compressors</u>
37	<u>Tools for transforming common datatypes</u>
38	<u>Moving data, remote processing and workflow automation</u>
39	<u>Workflow automation</u>
40	<u>Intellectual property rights (IPR), including Creative Commons</u>
41	<u>Mashup fundamentals and applied mashup using KML and Google Maps</u>
42	<u>XML Fundamentals, part 1</u>
43	<u>XML Fundamentals, part 2</u>
44	<u>Academic planning and writing</u>
45	<u>Project, week 1 - project outline delivery</u>
46	<u>Project, week 2 - work</u>
47	<u>Project delivery/presentation</u>
48	<u>Reading week before the exam</u>
49	<u>Exam</u>

ASSIGNMENTS FROM LAST WEEK?

1. Buy the books
2. Start reading the first chapter in all of the books
3. Get access to a UNIX system
4. Start thinking about a project to do later in this course
5. Get hold of an RSS-reader and subscribe to the lecture feed:
(<feed://www.ansatt.hig.no/kjellr/imt4892/imt4892.rss>)
6. Form a social network around the course and help each other!



TWITTER, YESTERDAY AT LUNCH



STAN.HIG.NO

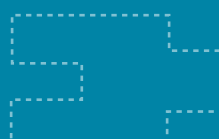
- you now all have accounts on stan.hig.no
- `ssh stan.hig.no` in a terminal window [ssh=secure shell]
- username: s...
- password: p...
- Change password at first login with `passwd`





TODAY'S GOAL

- Be able to identify the key milestones in the development and use of computers
- Know the two main user interface paradigms and their strengths and weaknesses
- Know the main attributes of a UNIX command-line system and its strength as an environment for digital workflows



TOOLS

- No content without form - no form/design without tools
- The tools we select influence how we work
- Ideally, we should have different tools and interface paradigms in our toolbox to handle different situation
- Approaches may range from having an artistic relationship with data, to having a more mechanical one

COMPUTER?

- Minimum: Input, processing, output
- Mechanical as well as electrical/electronic
- 300 BC - Mechanical devices for calculation (i.e. Abacus)
- 1801 - Mechanical calculation machines (i.e. Looms)
- 1884 - Electrical computing with vacuum tube
- 1925 - Transistor
- 1949 - Intergrated circuit
- 1971 - Microprosessor

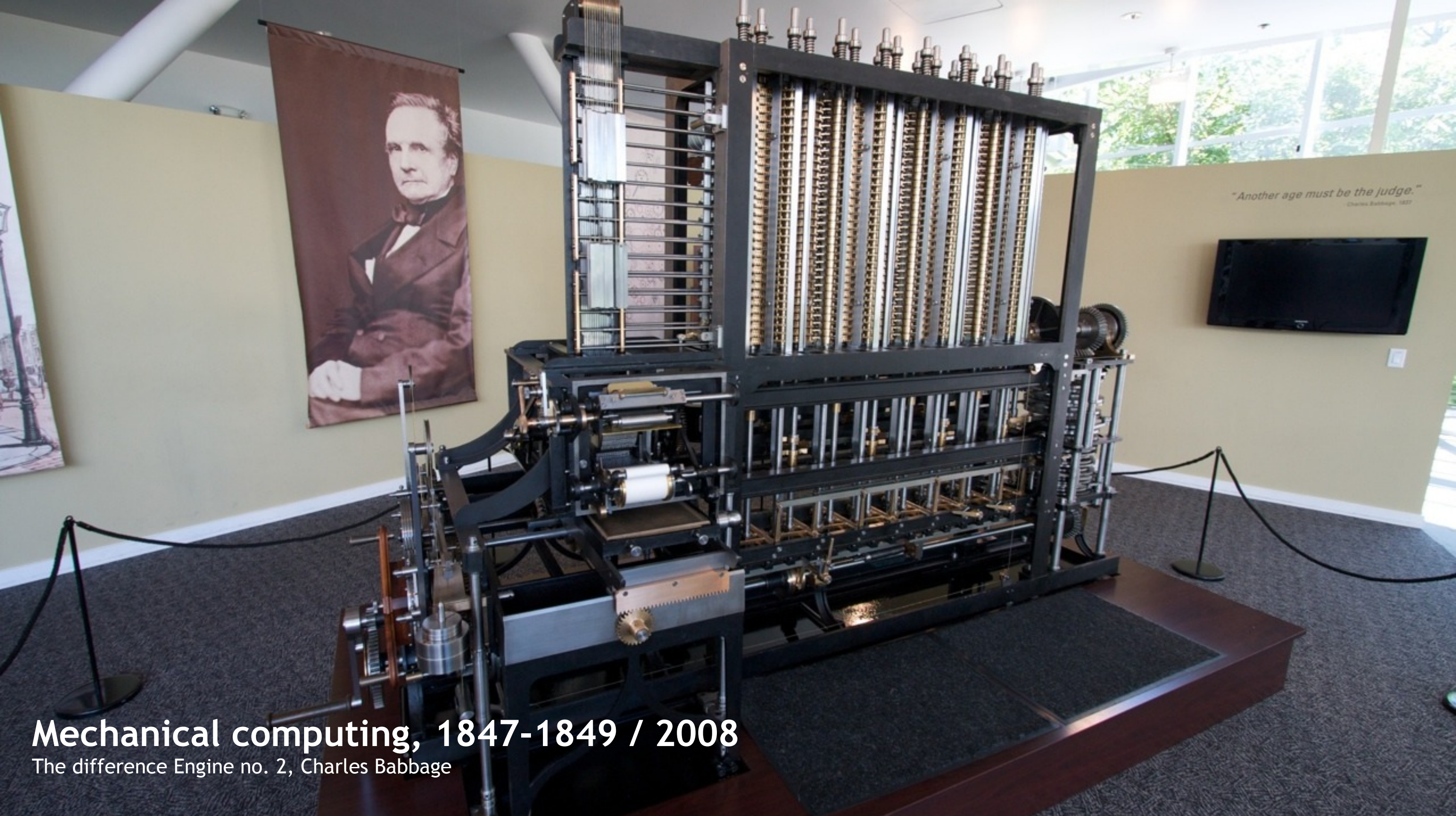
Sector, England, c. 1740
Loan of Gwen and Gordon Bell (B338.85)

Sector, France, c. 1680
Loan of Gwen and Gordon Bell

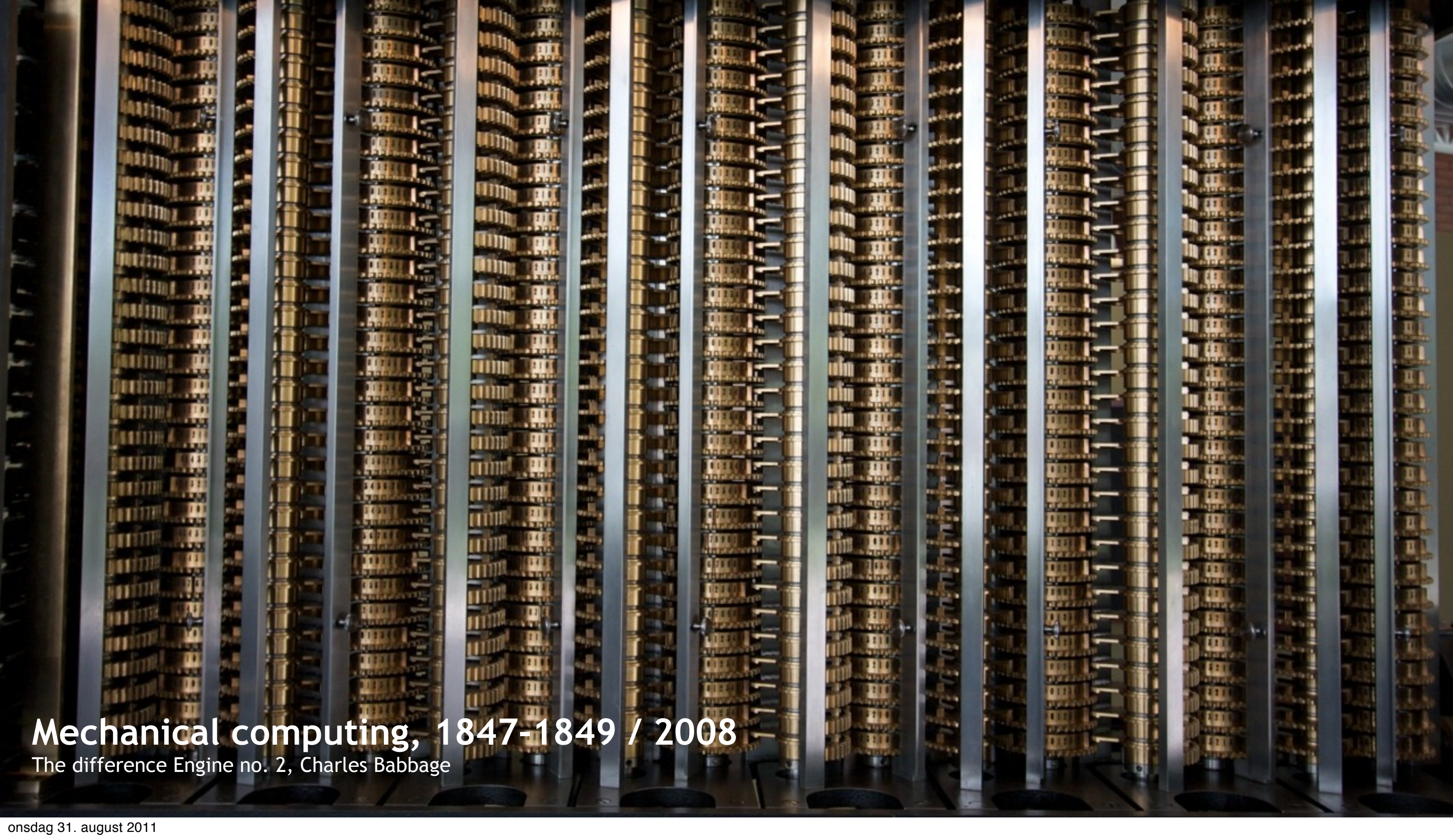
Sector, Italy, 1687
Loan of Gwen and Gordon Bell (B1507.01)



Mechanical calculation device,
1687



Mechanical computing, 1847-1849 / 2008
The difference Engine no. 2, Charles Babbage

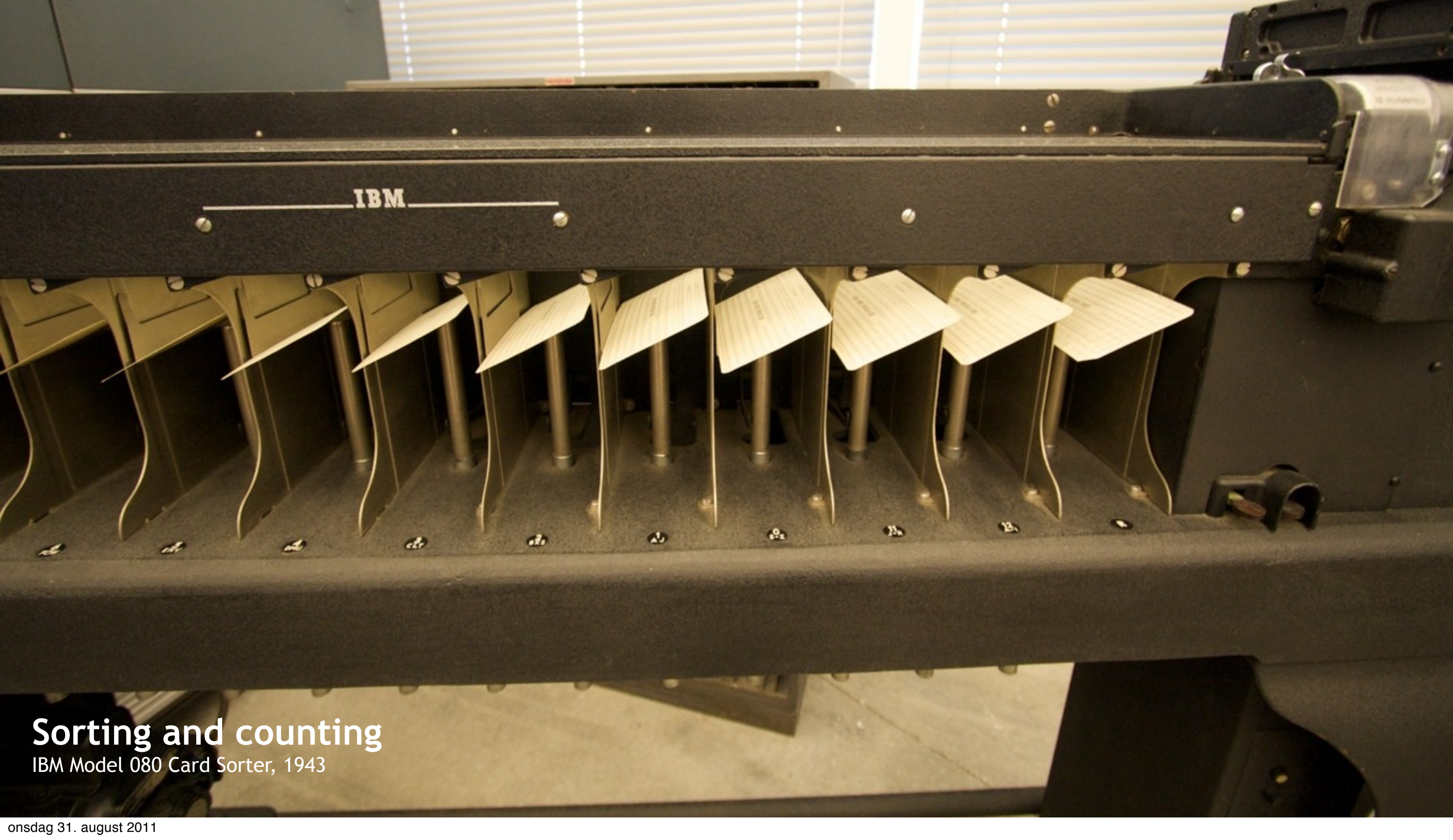


Mechanical computing, 1847-1849 / 2008

The difference Engine no. 2, Charles Babbage



Mechanical computing, 1847-1849 / 2008
The difference Engine no. 2, Charles Babbage



Sorting and counting

IBM Model 080 Card Sorter, 1943

1940s and -50s. Ballistics.

Analog Computing

General Precision Systems, ca. 1950



GPS Analog Computer
c. 1950
General Precision Systems, United States

1960s. The era of the Mainframes



Lawrence Livermore National Laboratory



First computer mouse, 1967
Douglas Engelbart, Stanford Research Institute

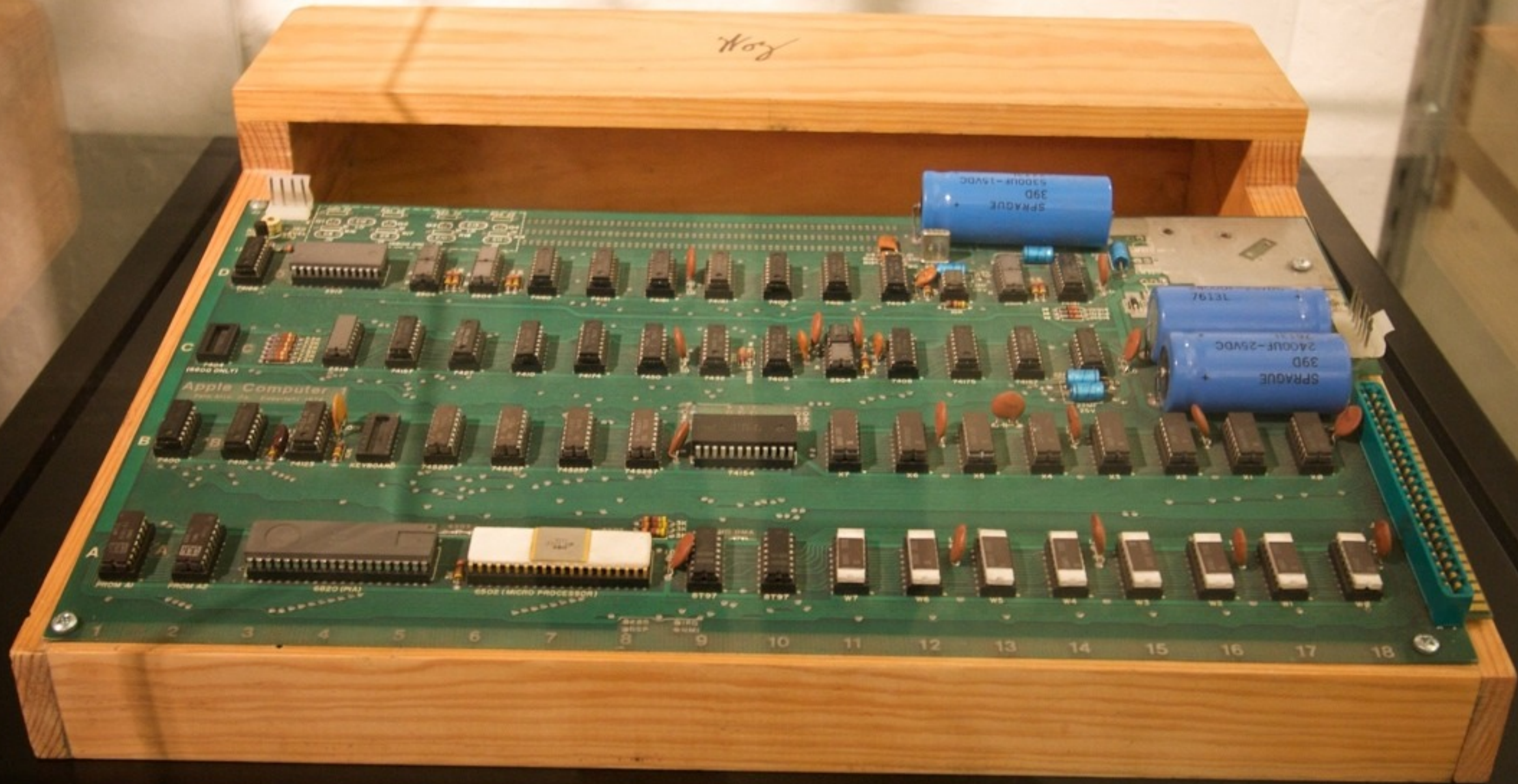


<http://www.youtube.com/watch?v=JflgzSoTMOs>

http://en.wikipedia.org/wiki/The_Mother_of_All_Demos



Hobby Computing, 1975
MITS



Personal computer (Apple-1), 1976
Apple Computer, Steve Wozniac and Steve Jobs



Personal Computer, 1981

IBM PC

Home computing, 1982-1994

Commodore 64, Commodore Inc.



Mobile computing, 1990s

Apple Newton Messagepad, 1993, Apple Computer

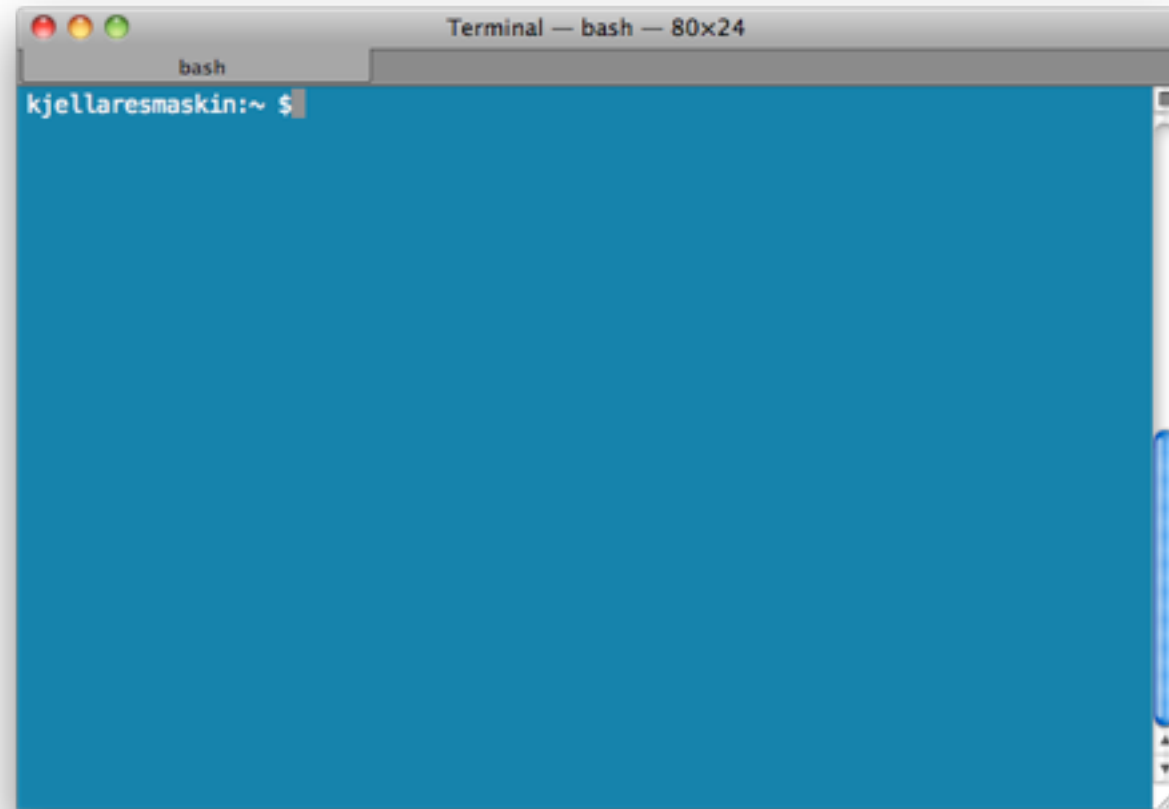


1991

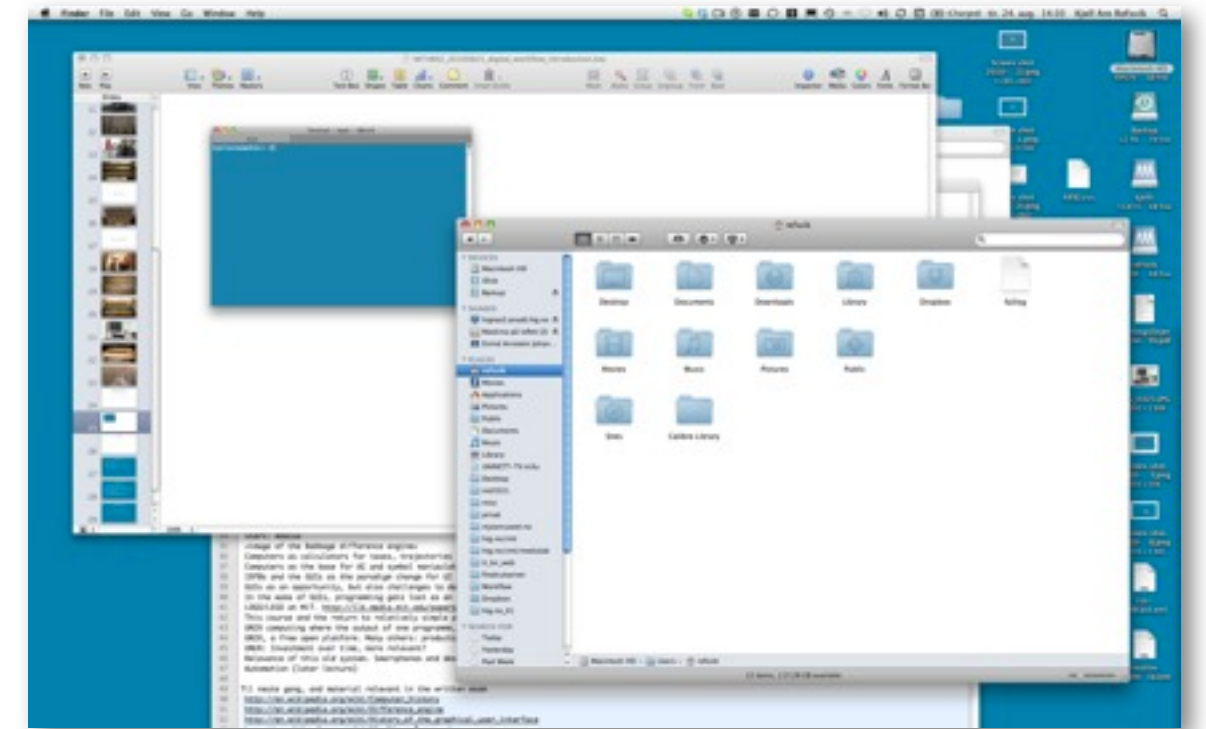


<http://en.wikipedia.org/wiki/Linux>

Switches, dials and levers
Paper/cardboard



TUI/CLI



GUI

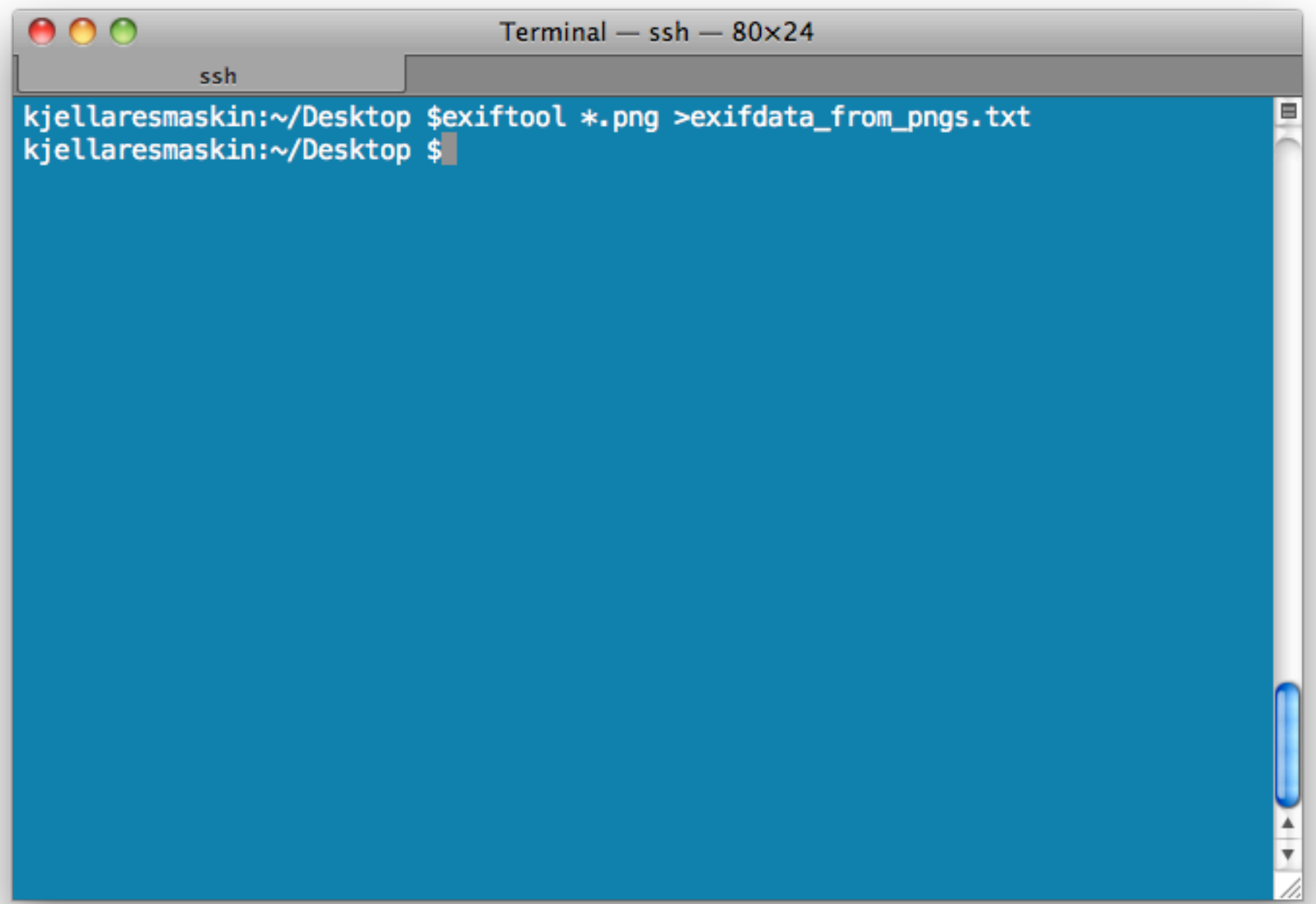
UNIX SYSTEMS, SHELLS AND COMMAND-LINE INTERFACES

- Open and free environment where you may formalise workflows
- Small simple programs that can communicate with each other
- Lends itself well to large and/or repetitive tasks
- Avoids lock-ins between tools and data
- As soon as the workflow had been defined, often more effective (cpu/power/time)
- Not intuitive
- Not artistic

COMMAND-LINE PROGRAMS

- `[doSomething] [how] [toFiles]`
- `[doSomething] [how] [sourceFile] [destinationFile]`
- `[doSomething] [how] < [inputFile] > [outputFile]`
- `[doSomething] [how] | [doSomething] [how] | [do Something] [how] > [outputFile]`

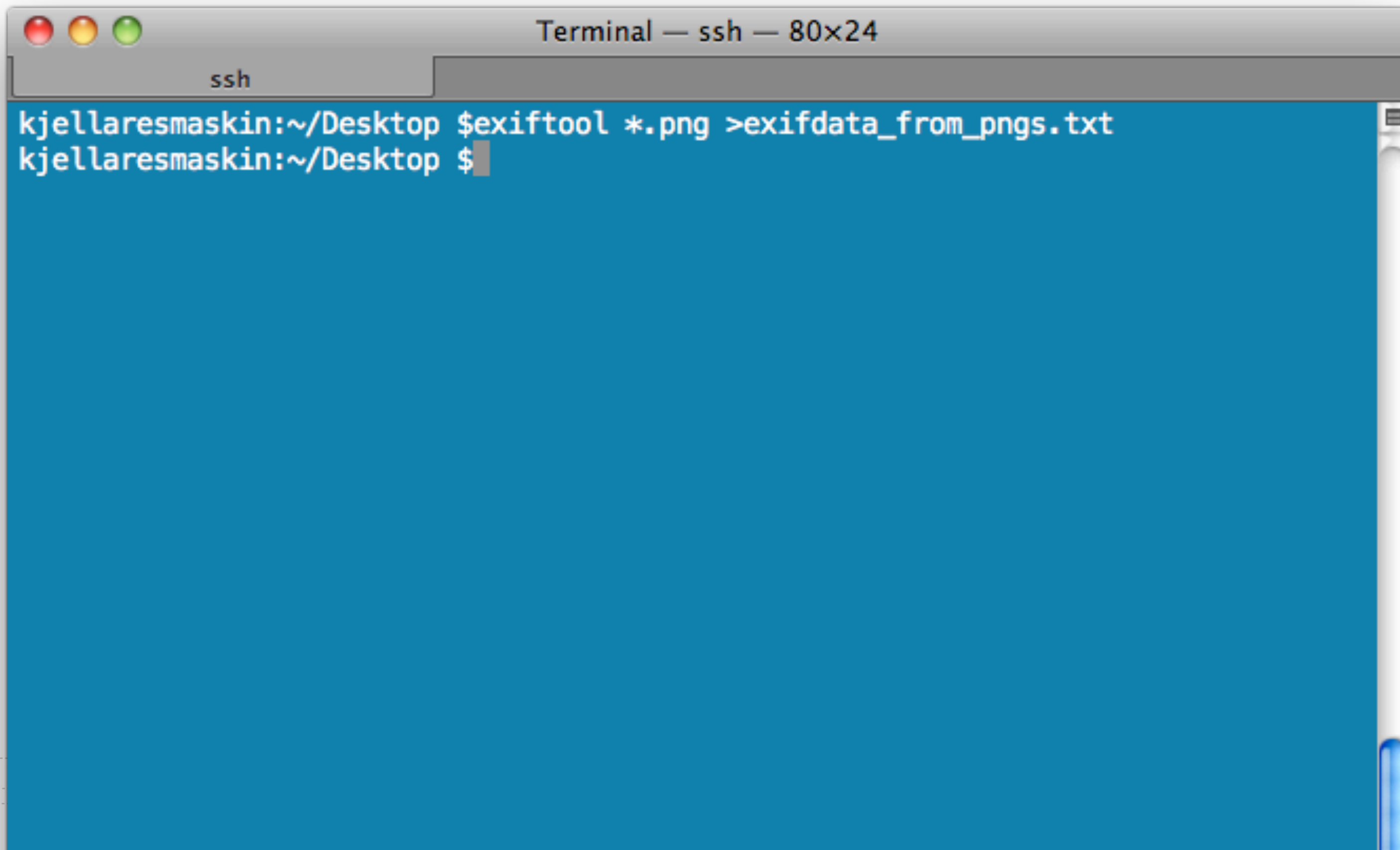
http://en.wikipedia.org/wiki/Command_line_argument#Anatomy_of_a_shell_CLI



A terminal window titled "Terminal — ssh — 80x24" with a tab labeled "ssh". The terminal background is blue. The prompt is "kjellaresmaskin:~/Desktop". The command entered is "exiftool *.png >exifdata_from_pngs.txt". The prompt returns to "kjellaresmaskin:~/Desktop \$".

```
kjellaresmaskin:~/Desktop $exiftool *.png >exifdata_from_pngs.txt  
kjellaresmaskin:~/Desktop $
```



A screenshot of a macOS Terminal window. The title bar reads "Terminal — ssh — 80x24". A single tab labeled "ssh" is open. The terminal text shows a user named "kjellaresmaskin" at the "~ / Desktop" directory. The user has executed the command "exiftool *.png >exifdata_from_pngs.txt". The prompt "\$" is visible on the next line, indicating the command has completed.

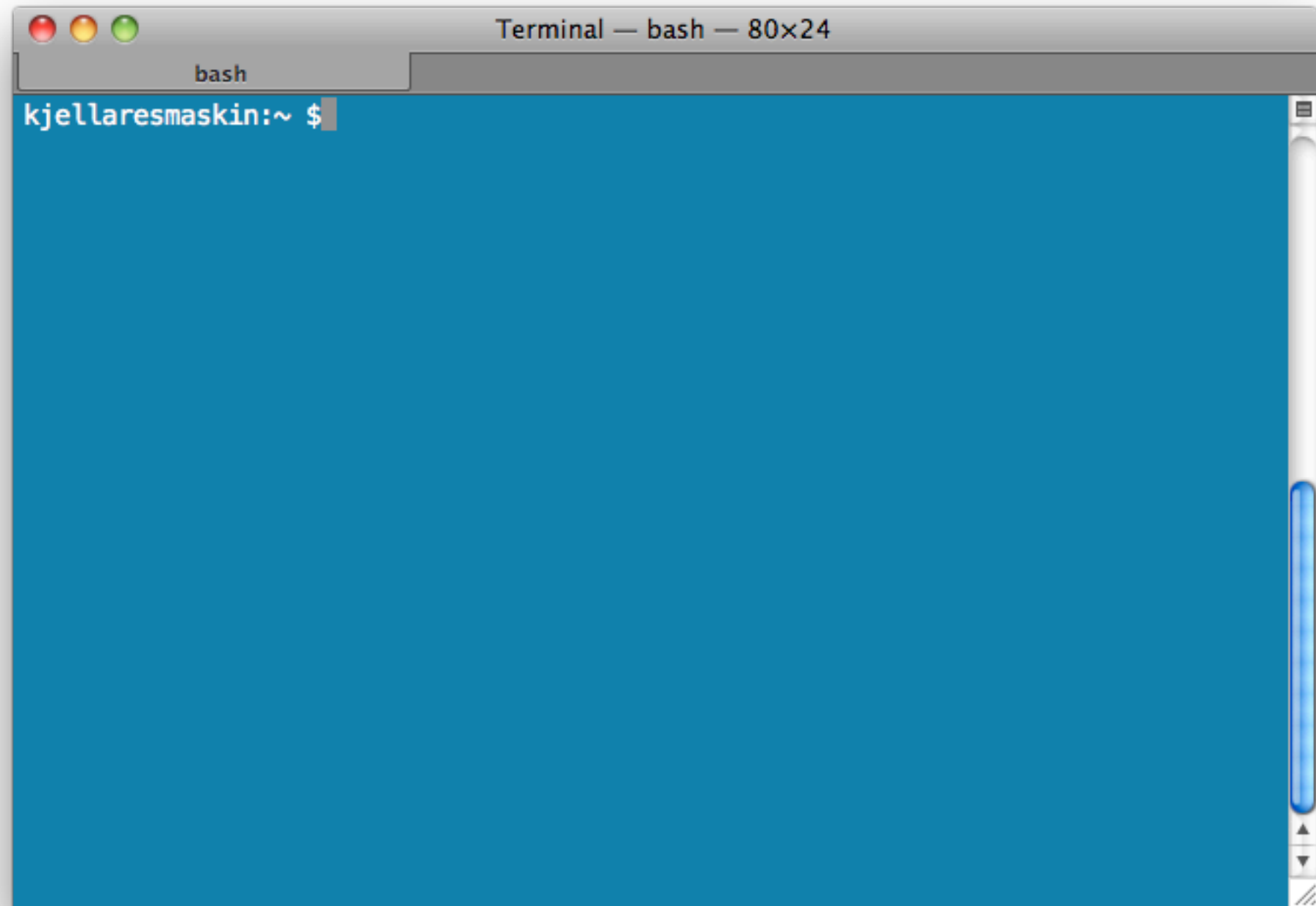
```
Terminal — ssh — 80x24
ssh
kjellaresmaskin:~/Desktop $exiftool *.png >exifdata_from_pngs.txt
kjellaresmaskin:~/Desktop $
```

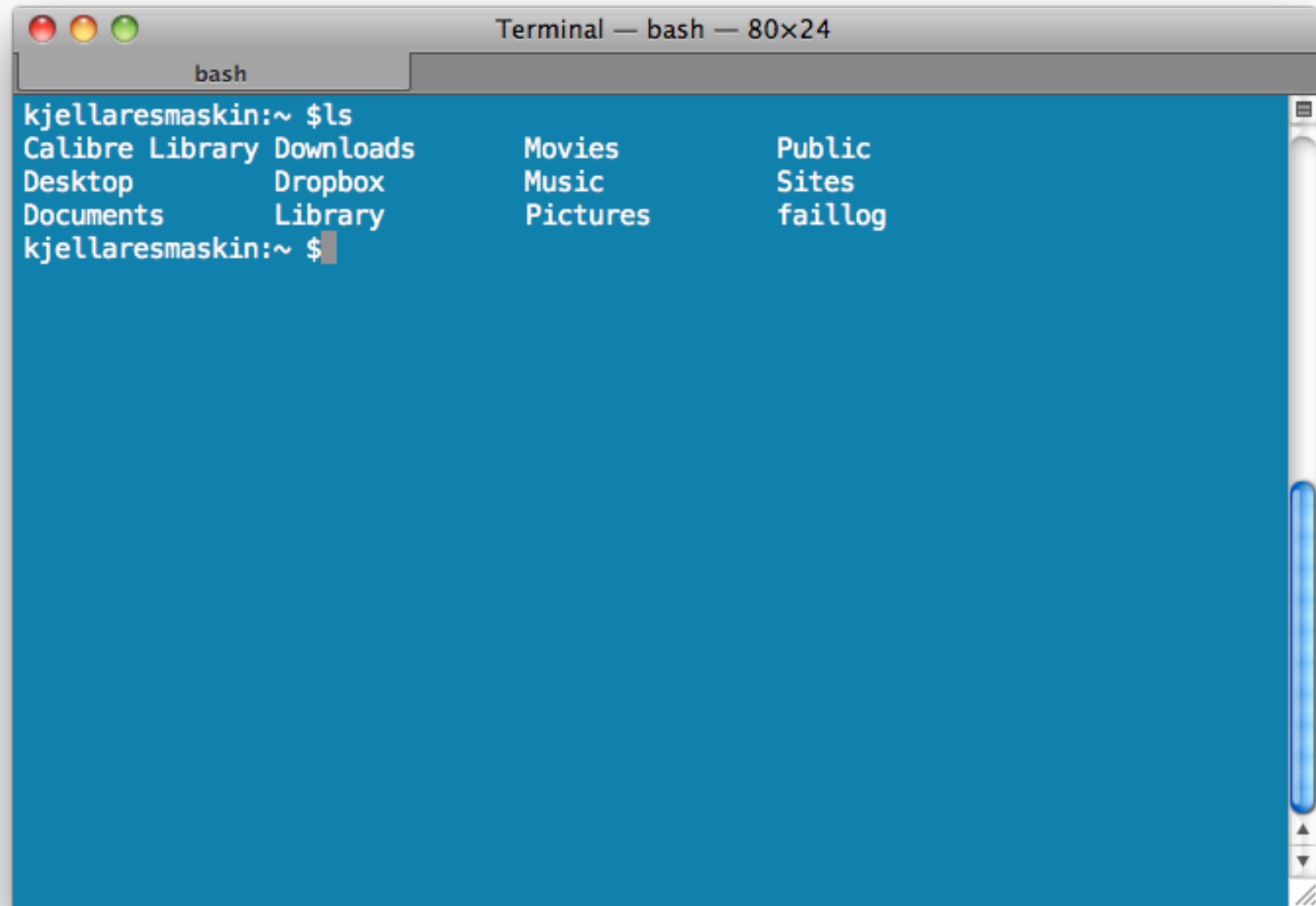
UNIX

- 1969, AT&T (USA/Bell Labs)
- Multitasking, multiuser, timesharing server/workstation operating system
- Popular in academic institutions (open, sharing) and later as a system that drove the machines on connected to the internet
- Unix philosophy: small simple programs that does one thing very well and can pipe the result to another program for further processing
- Still very popular and driving most new mobile devices
- UNIX have been re-created in the shape of GNU/Linux and there are a lot of versions/distributions built on the open/free Linux kernel today

UNIX

- UNIX™ owned by The Open Group (Technology Consortium)
- They certify systems to be branded as UNIX
- However, a lot of similar systems are branded “Unix-like” or “Un*x”
 - FreeBSD
 - Linux (Android)





A terminal window titled "Terminal — bash — 80x24" with a tab labeled "bash". The window has a blue background and a white border. The output of the 'ls' command is displayed in a columnar format. The prompt is "kjellaesmaskin:~ \$".

```
kjellaesmaskin:~ $ls
Calibre Library Downloads  Movies      Public
Desktop      Dropbox     Music       Sites
Documents    Library    Pictures    faillog
kjellaesmaskin:~ $
```



ASSIGNMENTS

- Install a package management system on your Unix system to prepare for installing software
 - http://en.wikipedia.org/wiki/Package_management_system
- Begin by installing imagemagick, ffmpeg, latex/bibtex, gnuplot, exiftool. Some of these tools may not be available through a package management system but will come with their individual installers.
- Help each other out using twitter (#imt4892) and meet up physically. Also - my office door is still open.



RESOURCES

Questions from these Wikipedia articles may end up in the final written exam.

- http://en.wikipedia.org/wiki/Computer_history
- http://en.wikipedia.org/wiki/History_of_computing_hardware
- http://en.wikipedia.org/wiki/Difference_engine
- http://en.wikipedia.org/wiki/History_of_the_graphical_user_interface
- http://en.wikipedia.org/wiki/Timeline_of_operating_systems
- <http://en.wikipedia.org/wiki/Unix>
- http://en.wikipedia.org/wiki/Graphical_user_interface
- http://en.wikipedia.org/wiki/Command_line_argument#Arguments
- http://en.wikipedia.org/wiki/Comparison_of_operating_systems
- http://en.wikipedia.org/wiki/Unix_philosophy
- http://en.wikipedia.org/wiki/List_of_Unix_utilities



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