CSCI-GA.2250-001

Operating Systems

Class Overview

Hubertus Franke
frankeh@cims.nyu.edu

Formal Goals of This Course

- What exactly is an operating systems (OS)?
- Main concepts of an OS
- How does the OS interact with the hardware and other software applications?
- OS knowledge useful in many contexts
- Designated *C/C++* programming class
  - Please learn *C/C++* on your own, but I will answer any questions you have
  - There are free classes online on NYU as well as on the web (see NYU Brightspace syllabus)

Informal Goals of This Course

- To learn the basics of OS and enjoy it
- To use what you have learned in *MANY* different contexts
- To be able to develop your own OS if you want to or need to
- To start your research project in OS
- To get more than an *A*

Instructor

Who	Where
Hubertus Franke • Distinguished Research Scientist @ IBM T.J. Watson Research Center in Yorktown Heights, NY (since 1993) • Ph.D. EE Vanderbilt University 1992 • Diplom/Master CS Karlsruhe Institute of Technology, Germany, 1987 • Manager and Senior Manager of OS and Cloud 2001-2015 • IBM Master Inventor • IBM Academy of Technology • ACM Fellow	Office hours: Mon 6:10pm – 7:00pm WWH 320 OR after class "till no further student in line" OR On request via Zoom (see syllabus) OR Over discord ← **your quickest response**

General Interests

Cloud Infrastructures
- Containers, Cloud, Security

Operating Systems:
- Linux, AIX, object oriented OS (K42)
- Scheduling, memory management, ..

Computer Architecture:
- Multicore processors and Systems on a Chip

High Performance Computing:
- MPI (Message Passing Interfaces)
- Gang Scheduling

Software Engineering, Compilers and Robotics.

~139 publications in these areas

~177 patents

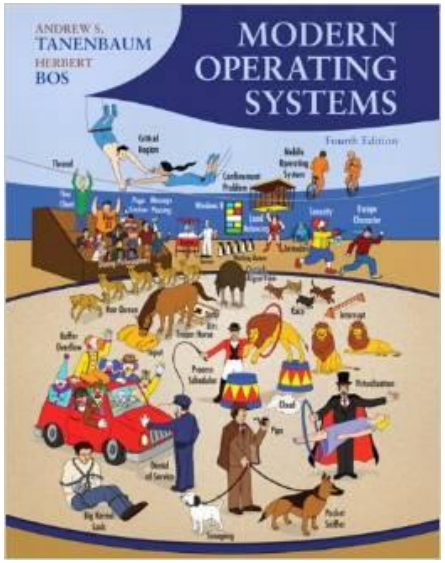
The Textbook

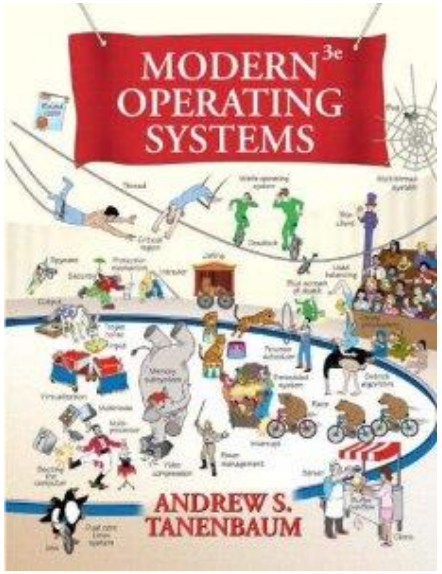
Author: Andrew Tannenbaum
Title: Modern Operating Systems 4e or 3e

Publisher: Prentice Hall

ISBN-13: 978-0133591620
ISBN-10: 013359162X

978-0-13-6006663-2
0-13-600663-9
(a bit outdated but OK)





Graders, office hours, etc

Lecture:	Mon 7:10pm - 9:00pm (WWH 109)
Instructor:	Hubertus Franke, frankeh@cs.nyu.edu, HubertusFranke@Linkedin Office Hour: Mon 6:10-7:00pm CIWW 320 or after class or on request per zoom

Graders / Grader Assignment

Last Name Range	Grader Name	Email @ nyu.edu
TBD	Kevin Tong	kt2653
TBD	Yiwen Wang	yw4930
TBD	Nishant Sanjeev	ns5287

Please, do **not** use hf44@nyu.edu

Student to Grader assignment will be updated when stable

Grader designation might re-adjust after the first lab assignment at which point the student population should have stabilized. The official current assignment will be on Discord (course-info) and on Brightspace.

All initial disputes about points should be first directed at your assigned grader.

The Course Web Page(s)

NYU Brightspace (where we keep all resources):

- Materials (syllabus, slides and labs)
- Grades/points (including exams)
- Discussion Forum moved to Discord (see below)

http://cs.nyu.edu/courses/spring23/CSCI-GA.2250-001/index.html

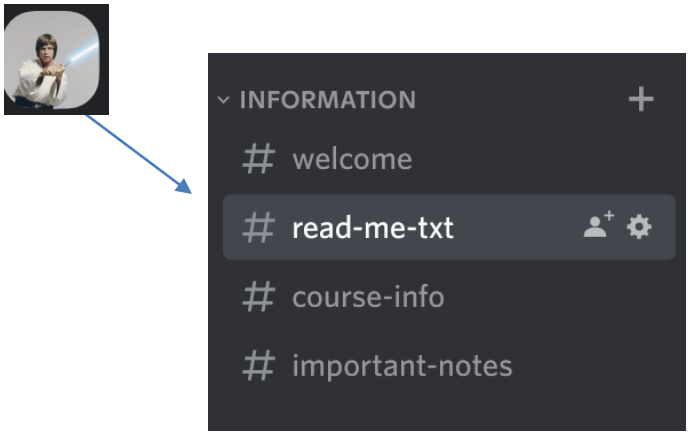
- Not really used for material exchange, but please read

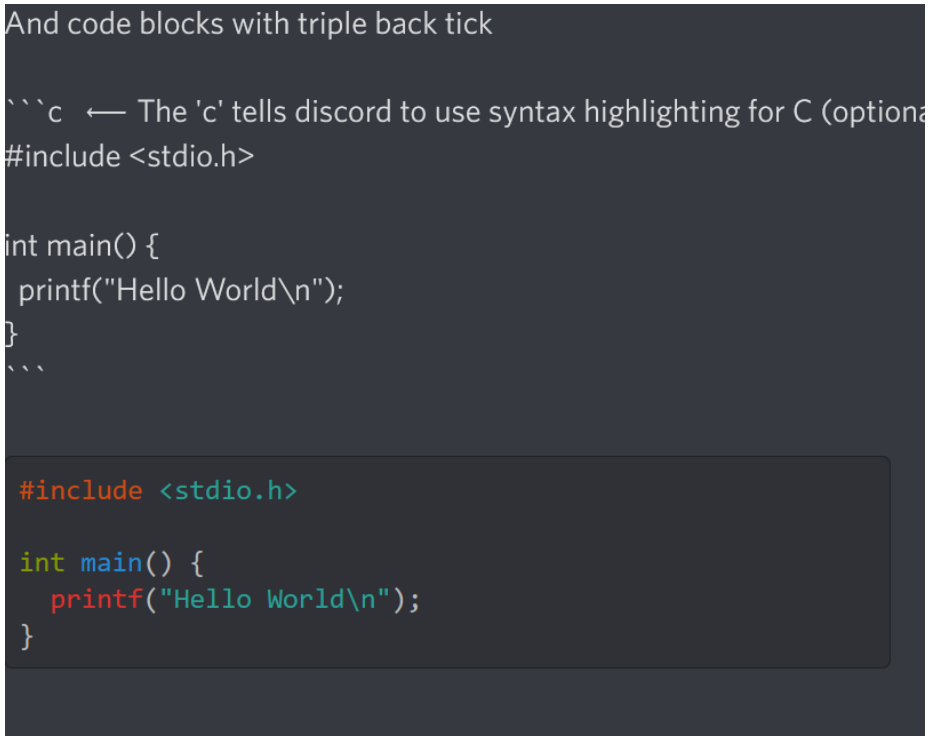
https://discord.gg/Es5s5zcNnG (discussion group invite)

Communications:

- Please use discord as fastest way to get in touch with me ..
  - Designated channels for lab and general info
  - Private chat for personal stuff.
- Please use direct email (frankeh@cims.nyu.edu) for questions on your grades (after you have sync'd with your grader) or for personal matters

Interactions on Discord





Please use proper quoting.
Taking a screenshot of code is really inefficient for me if it requires cut/paste.

Spring23 Dates / Issues

- Exams are in person and they will take between 1:00 and 1:40hr.
  Midterm: Mon 3/20/2023 (half of lecture session)
  Final: Mon 5/15/2023 (somewhere around this …)

- I am available week-round on email (frankeh@cs.nyu.edu)
  or Discord (@Prof) [preferred].

- I check Discord and frankeh@cs.nyu.edu daily several times.

- I do **not** check hf44@nyu.edu frequently
  (so please don't send email there)

- I (can be | am) available for zoom calls if necessary 7 days a week (give and take).

Anticipated Dates (these might change)

2023 JANUARY

SUN	MON	TUE	WED	THU	FRI	SAT
22	23 L1	24	25	26	27	28
29	30	31				

2023 FEBRUARY

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13 L2	14 L1	15	16	17	18
19	20 NC	21	22	23	24	25
26	27	28				

2023 MARCH

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
	6	7	8	9	10	11
2	13 NC	14	15	16	17	18
9	20 M	21	22 L2	23	24	25
6	27 L3	28	29	30	31	

2023 APRIL

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17 L4	18	19	20	21	22
23	24	25 L3	26	27	28	29

2023 MAY

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9 L4	10 |--	11 --	12 --	13 --
14 --	15 F(?)	16 --|	17	18	19	20

Exams:

M 7:15 pm

F 7:15 pm (zoom)

4 Labs

L* release

L* due

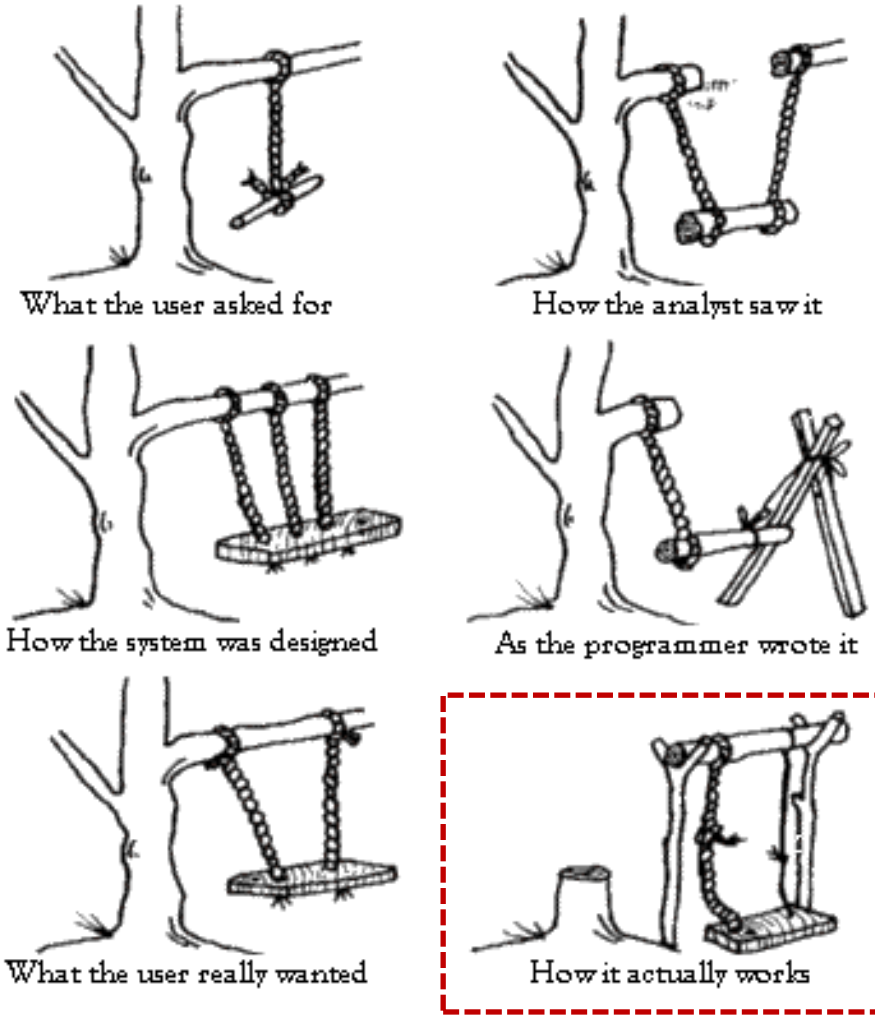
11:59pm ESDT

L1-L3 each lab have 7 days grace period with 2pts/day deduction

L4 has 3 days grace period

NC: no class

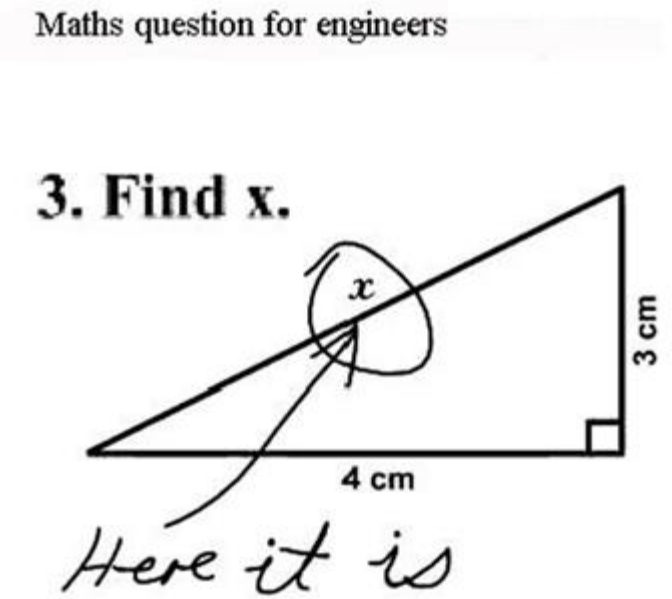
Lab instructions



What we grade

Read and Understand the instructions (early !!! Ask questions)

Possible solutions



Solution

Grading

- Labs : 60%
- Midterm : 15%
- Final : 25%

- Typically due a few weeks after assignment
- Submitted as softcopy of code
- Will be graded by 'scripts' against many test cases
- 2 points penalty per day late (7days max) (no more grace period beyond that)

Labs are <u>typically</u> due on a Tue night at 11:59pm EST when no further (re)submissions will be allowed.
We will only start grading after the due date.

If you have no submission by the due date, we accept one late (first) submissions up to 7 days late. Once a submission is entered it will be graded and further submissions are not allowed. There is a penalty of 2 points per day upto 7 days with a max of 14 pts. Not handing in a lab has significant impact on your grade as it counts 0 and that is 15% which takes you down to a B. So don't consider that an option. No further accommodations will be given.

Labs are roughly 500-700 lines of code each (some will repeat), so don't start the night before. Expect each lab to take 30+ hours straight work minimum. Start early, finish early and you will be fine. Start late and in many cases that's the beginning of the end.

Grading Table		
0.00	0.70	F
0.70	0.73	C-
0.73	0.77	C
0.77	0.80	C+
0.80	0.83	B-
0.83	0.87	B
0.87	0.90	B+
0.90	0.93	A-
0.93	1.00	A

Labs will be graded as follows:
- all based on 100 pts
- 40 pts for turning something in that attempts to solve the problem:

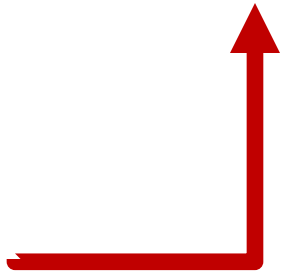
```
main () { printf("The Prof is totally nuts!"); }
```

only identifies the problem but doesn't attempt solve it.
- rest for getting various inputs right, so you need to get ~50% right to get C or 75% to get a B, preferred is getting 100% right to get an A

Exam:
- you need to get ~50% right to achieve a 70/100 for passing exam (C-)

Integrity

- Academic integrity
- http://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/academic-integrity-for-students-at-nyu.html
- Your labs, and exams must be your own - we have a zero tolerance policy towards cheating of any kind and any student who cheats will get a substantial deductions in the course.
- Both the cheater and the student who aided the cheater will be held responsible for the infraction.
- Examples:
  - Github: please make it private !!!
    If somebody copies your code …



Integrity

- **It is OK to discuss:**
  - "I just implemented the queue using C++ LinkedList, they have prio insert" → then go off and read about "C++ LinkedList " and use them to implement in the context of the lab.
  - Read about general approaches on internet, e.g. how to correctly parse command line arguments
- **It's NOT OK:**
  - Look at other solutions to the given problem from this or past semesters.
  - Search for solutions (I am keenly aware they are available on github and we have them).
  - Utilize other people solutions (we have them too).
  - Commonly develop a very similar solution
- We use multiple code similarity checkers with several years of references and submissions primed. They are amazing at spotting: code restructuring, variable renaming, code obscuring, ..
- I check throughout the semester even after points have been given. Graders not involved.
- Impact:
  - 1 lab identified -> 0 points -> $\frac{1}{4}$ * 60% = 15 / 100
    -> 1+ grade reduction + Department Notification -> mark on your academic record
  - 2 or more labs -> another Department Notification -> **"?"** typically not pleasant
    -> Class failed for sure
    and you are not eligible for grader jobs from that point off.

- **If in doubt:**
  you are responsible for your action

- **If you get stuck ask questions on the assigned discord forum or tutor or setup an office hour with me.**

The call is free, the advice might be priceless

And now to the

Fun Stuff