Welcome to MCC092 “Introduction to Integrated Circuit Design”

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Sept 4 2018

LP 20180904

Why?

- Understand digital **circuit-level design** and **optimisations**
  - **Tradeoffs** at circuit level that affect performance “higher up”
  - **Non-idealities** due to the physical implementation
  - **Speed, power** and sometimes **area**
  - Analysis and design
  - Complement to DAT093 “Introduction to electronic system design”
    - Bottom-up vs top-down
    - Within bottom-up there is still a bottom-up and top-down track

What?

- Lectures & exercises (& movies!)
- Labs and hand-in problems & quiz & computer exercises
- Assessment/examination:
    - 7 submissions (1 quiz + 2 home assignments, 4 pre-labs) (individual)
    - 4 Lab sessions (in pairs)
    - Written exam (individual) (Thursday Oct 29, 8.30-13.30)

Two tracks

- The bottom-up track
  - **MOS transistor**
  - **CMOS inverter**
  - **RC inverter delay model**
  - **Logical effort**
  - **CMOS layout**
  - **Wire delay**
  - **CMOS power and related techniques**
  - **Sequential ckts & metastability**
- The top-down track
  - **Iterative logic arrays**
  - **Ripple-carry adder**
  - **Carry-look ahead adders**
  - **Binary tree adders**
  - **Adders and datapaths in context**
  - **Adder design wrap-up**

When?

	Mo	Tue	Wed	Thu	Fri
8.00-11.45	Lab section 1 weeks 3-6				
13.15-17.00	Lab section 2 week 3-6	Lecture Postlab		Prelab Lecture POTW Exercise	

Some variations - check in PingPong

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New 2017: Week 6&7

	Mo	Tue	Wed	Thu	Fri
8.00-11.45					
13.15-17.00		Adder Exercise Lecture		Lap prep follow up etc POTW Exercise	

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Pedagogical thoughts (1)

- Engage and reflect to increase learning!
- Practice solving problems!
- Use labs several times (prelab, during lab, post lab reflection).
    - Advice: save some screen shots so you can you can go back and reflect later on what you did
- Goal: students should be able to apply knowledge to new problems!

Pedagogical thoughts (2)

- Prelabs and hand-in problems
  - Look at them early so you have an idea.
  - Prelabs you often need some info from Thursday, but you can start earlier (Wednesday).
  - Labs: read through - what do you expect?

When & where for submissions

- Quiz/Home-assignment problems sets **Mondays at 23.59** (weeks 2,7,8)
- Prelabs due on **Fridays at 13.00** (weeks 2,3,4,5)
- All submissions in Pingpong
  - Crucial because several teachers grade
- Feedback in Pingpong
- Any returns and resubmissions in Pingpong
  - Resubmit within one week
- Note: first deadline is already on Monday, Sept 10! Quiz!

Lab sessions

- Compulsory computer labs using Cadence
- **Complete** prelab submission **on time** required to do the lab!
  - Individual assignment!
  - Mondays weeks 3-6, morning and afternoon
    - Each student assigned to **one** of the sessions
  - Work in lab pairs (which we decide)
  - If you are ill let us know ASAP!

- Let Lena know by **Monday Sept 10, 8.00** if you have a conflict!

Individual?

- What does individual assignment mean here?
  - You can discuss the problem with the other students.
  - You can **work closely** with **one** other student.
  - You have solve the problem in your own. (You cannot copy your friends solution).
  - Identify the other student you worked with on your solution.

Examination

- **Final exam sets grade.** 60 points. 30 to pass (grade 3), 40+ for grade 4, 50+ for grade 5**.**

- Hand-in problems and prelab preparations can give bonus points: maximum 7 bonus points.

- Bonus points for higher grade (that is, not to pass).

- Bonus points valid 1 year (=three exams).

Sign-up for exams!

- It is **compulsory** to sign up for exams!
- Sign up period is now longer than before:
  - 2018-08-20 through 2018-10-11
- You get an **exam code** which you must bring to the exam.
- Read more here: https://student.portal.chalmers.se/en/chalmersstudies/Examinations/Pages/how-to-sign-up.aspx

News about calculators

- “Only Chalmers' own calculators may be used during examinations. These are provided and administrated by the examination administration.”

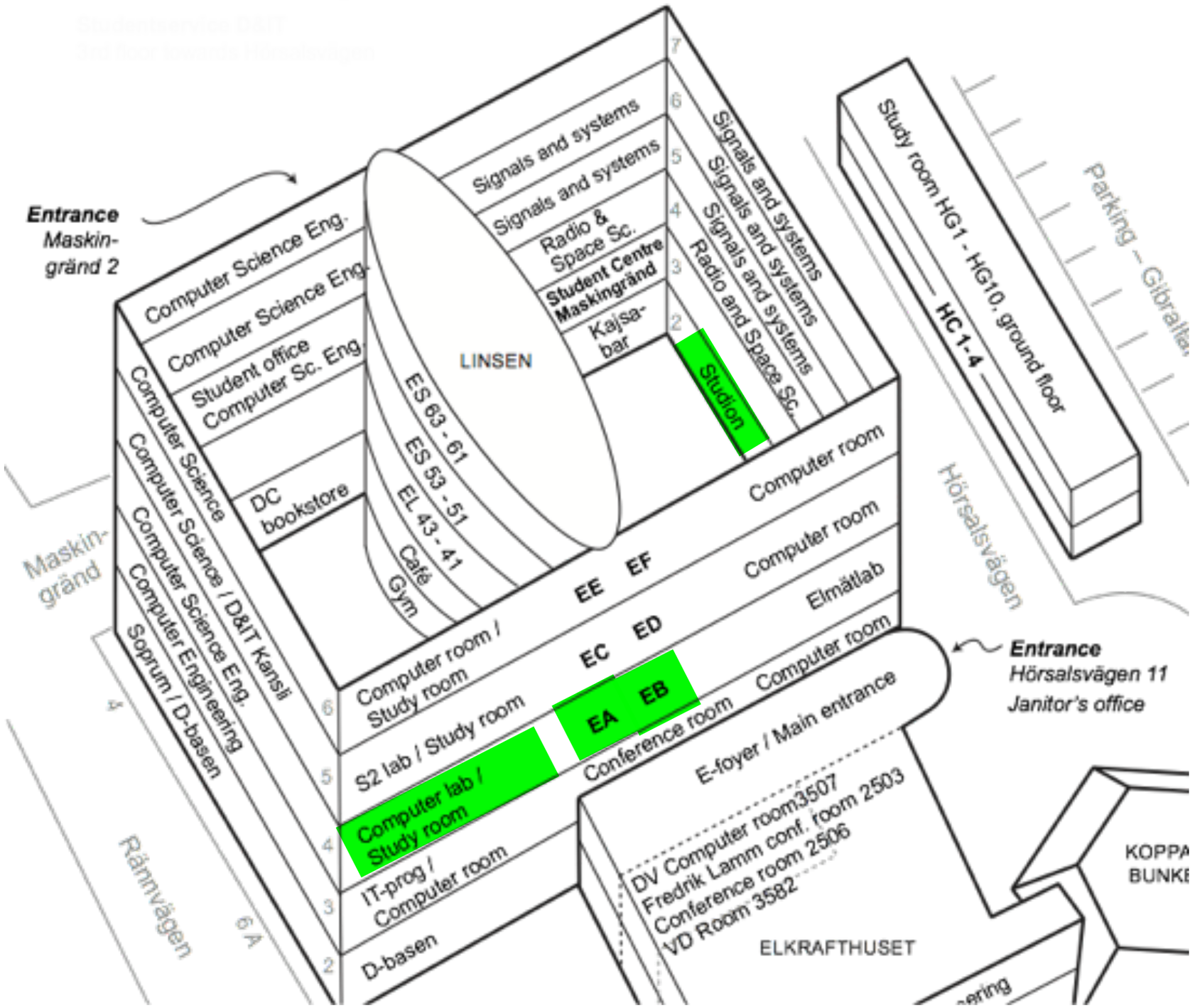
- Exact details not known yet.

Re-sit exams

- Thursday **January 9 2019** 8.30-13.30

- Monday **August 28 2019** 8.30-13.30

Where to meet?



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Who?

Lena Peterson

Kjell Jeppson

Victor Åberg

Stavros Giannakopoulos

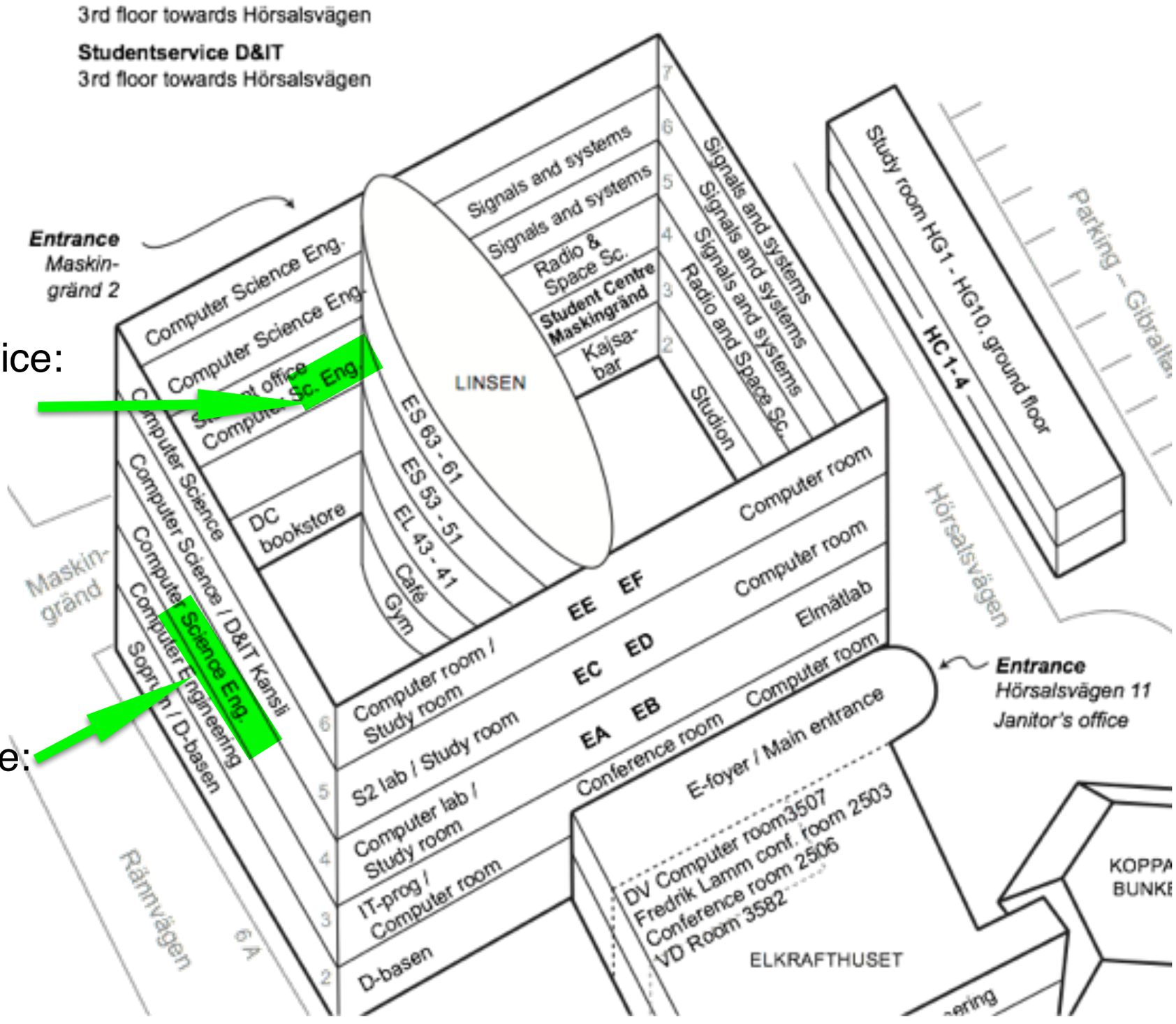
Additional lab TAs: Andreas Torstensson, Reema Sweeny Pinto
2nd year MPEES students

Stavros's office:

Offices

Victor's office:
4477

Lena's office:
4113



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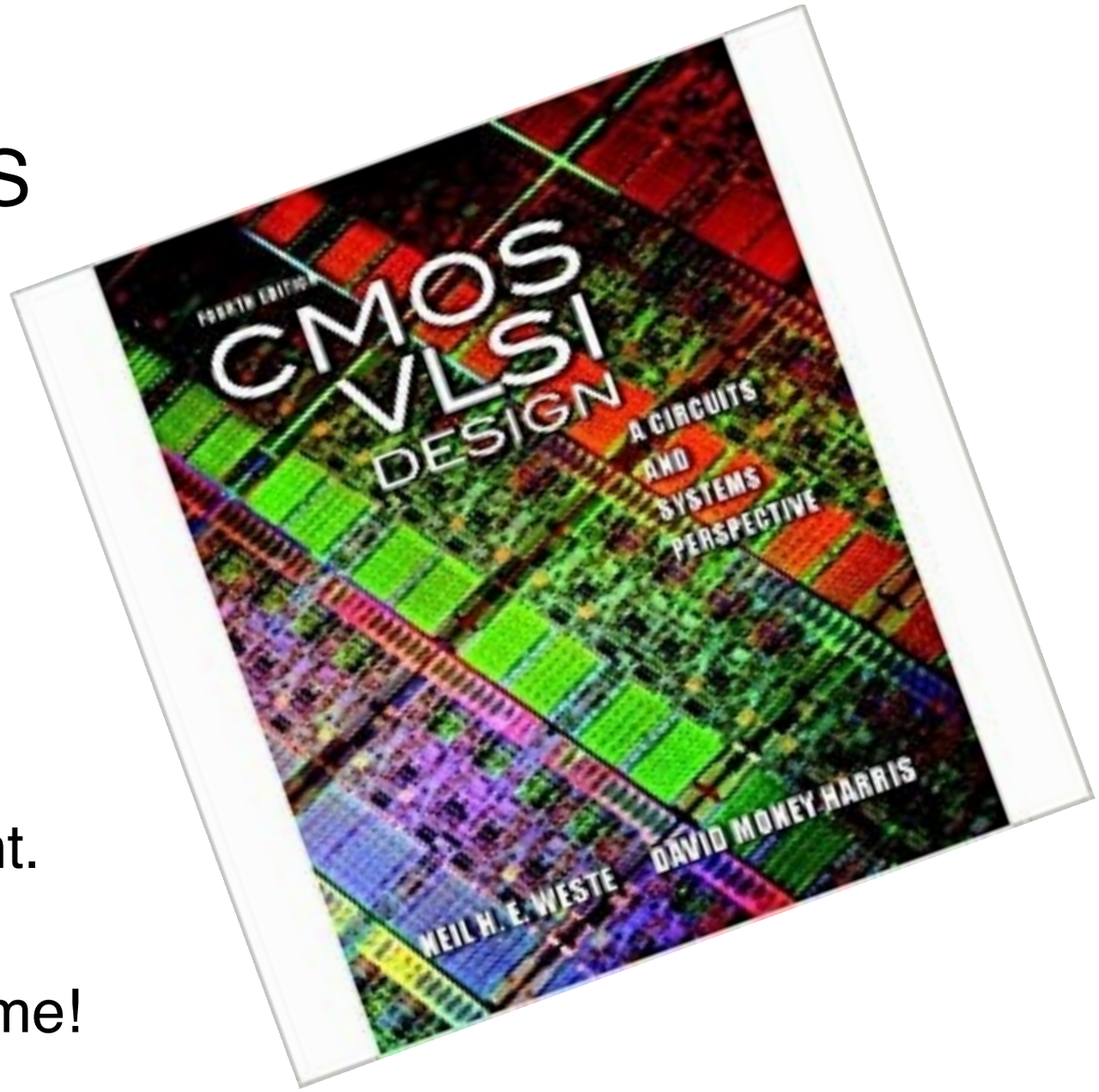
Literature

- Weste & Harris:
  Integrated Circuit Design
  - Reading instructions in PingPong
  - Hard to get this year.
- Other material posted in PingPong

Literature

- Weste & Harris: CMOS VLSI Design
  - Works equally well!
  - Chapters are numbered differently.
  - Exercises are a bit different.
  - Otherwise they are the same!



Web

- pingpong.chalmers.se
  - Login with your CID
  - You should all be registered and have access to the course page now
  - Let me know if there are any problems!

Communication

- To you all: **Message board in PingPong** - check it!
  - Recommended: App for PingPong - get notifications!
- PIM in PingPong (to specific person)
- Questions in PingPong (reach all teachers)
- E-mail: put MCC092 in the subject line
- FAQ & Discussion board in PingPong
- IRL: consultation times: Monday, Thursday, Friday.
  - Details in PingPong / course-PM

Course evaluation

- Student representatives collect feedback from fellow students and feed to teacher
  - Startup meeting with teachers
  - Meeting in week 4 with teachers for early feedback
  - Meeting after end of course for summarising the feedback
- Web-based questionnaire after the course to all students

Student representatives

- Student representatives (randomly picked):
  - Wenqian Han
  - Magnus Karlsson
  - Antonios Panagiotou
  - Lin Wang

- Student representatives make yourselves known to Lena in the break.

Changes 2017

- New adder computer exercise in E-studion instead of excel HW.
- New HW 3 and revamped HW 2.
- New exercise setup - Tuesday / Thursday with new problems of the week. So Thursdays always end at 4PM.
- New exercise document with extended and consolidated solutions. (Moved to LaTeX!)
- Added background material in PingPong.

Changes 2018

Your feedback matters!

- Increased tutorial time Thursdays: “Problems of the week”.
- Tutorials run by graduate students.
- Post-lab sessions moved to Tuesdays
- New server for running the EDA tools on.
- New wire section with updated movie, and movies for sequencing and meta stability.
- Consultation times earlier in the week.
- Updated material regarding the tools used in lab 3.
- Updated material related to the prefix adders, changed timing for this material and a POTW tutorial for adders.
- Inform students more about the different assignments beforehand.
- Updated HW 2 and 3.

Until next week

- Read course-PM closely.
- Explore the PingPong page.
- I will clarify anything that is unclear on Tuesday!
- Check your schedule if you have any conflicts on Mondays.