

Architecting and Engineering Main Memory Database Systems in Modern C



*Chapter 0
Organization & Introduction*

Marcus Pinnecke, M.Sc.

Research associate / Working Group Database & Software Engineering
Institute of Technical and Business Information Systems (ITI)



Lecturers

Marcus Pinnecke, M.Sc.

Room G29 125

Website: <http://www.dbse.ovgu.de/Mitarbeiter/Marcus+Pinnecke.html>

E-Mail: pinnecke{at}ovgu.de

The course is
held in english!

Tutors

Gabriel Campero Durand, M.Sc.

Room G29 125

Website: <http://www.dbse.ovgu.de/Mitarbeiter/Gabriel+Campero+Durand.html>

E-Mail: campero{at}ovgu.de

Mahmoud Mohsen, B.Sc.

E-Mail: mahmoud.mohsen{at}st.ovgu.de

PREFACE

Face it: you learn
basics in your
studies!

basics
stuff

you are here

most industry is here

cutting-edge research
happens here

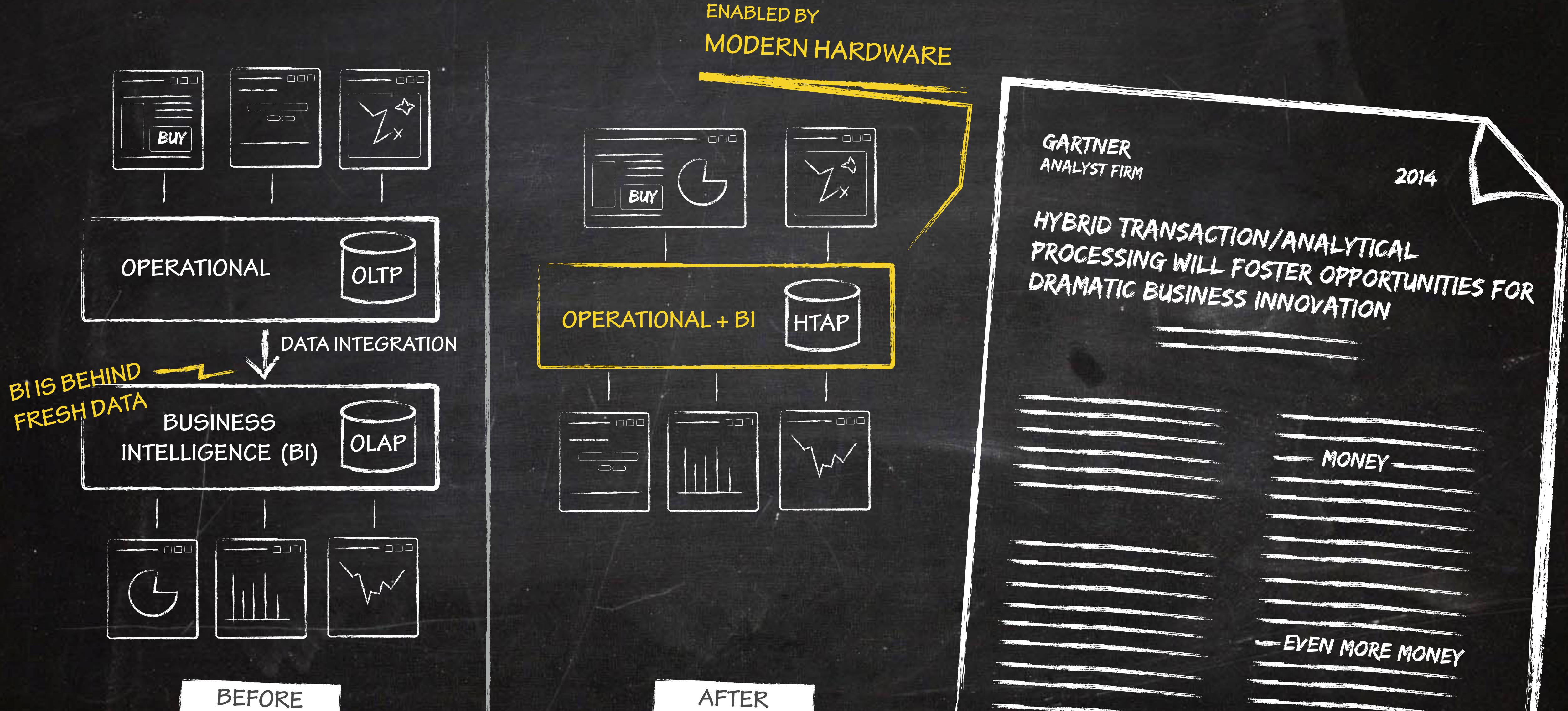
ridculously
advanced
stuff that almost
no one understands

you want to be here

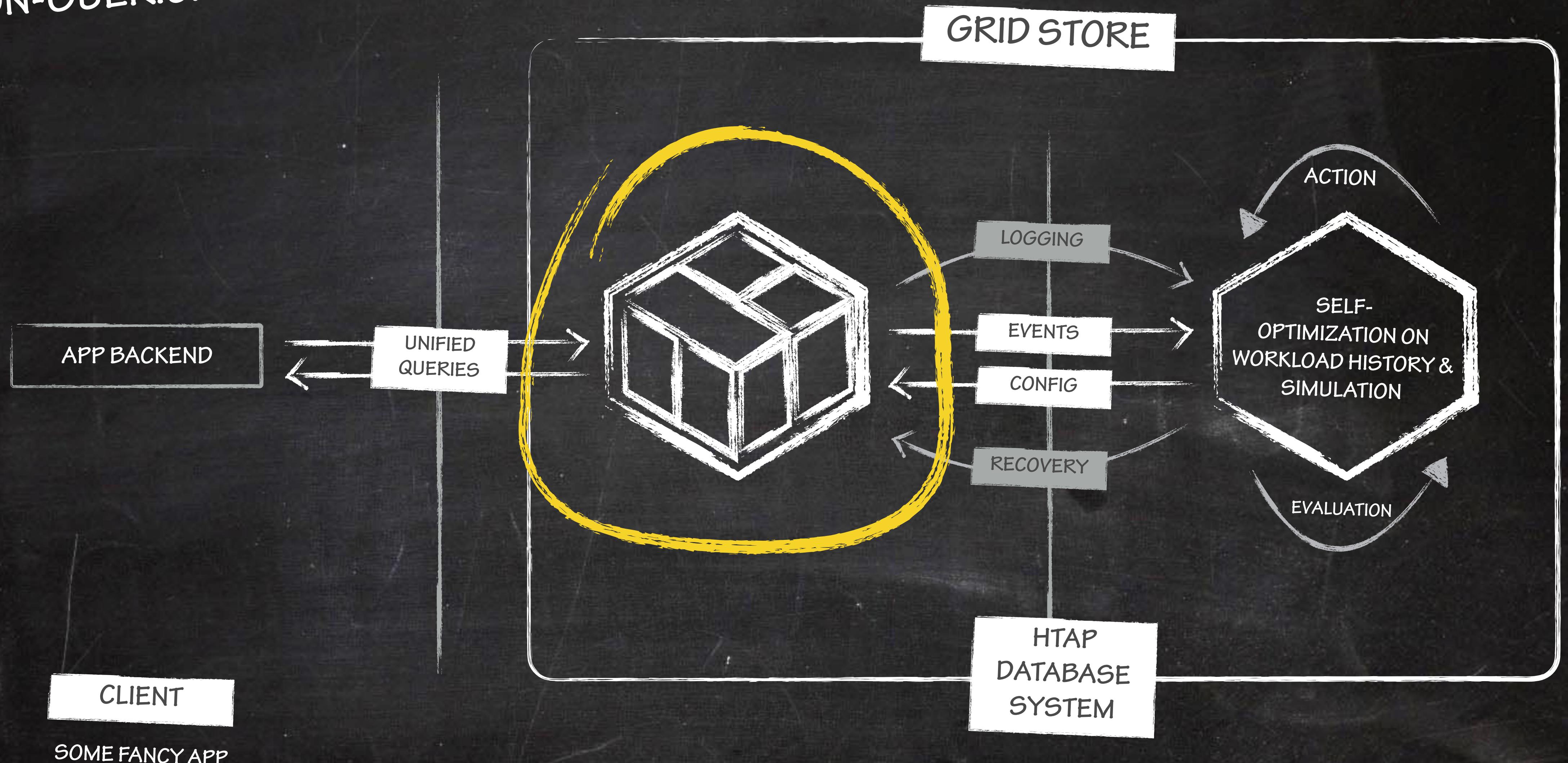
NOVEL KIND OF IN-MEMORY PLATFORM OUTPERFORMING

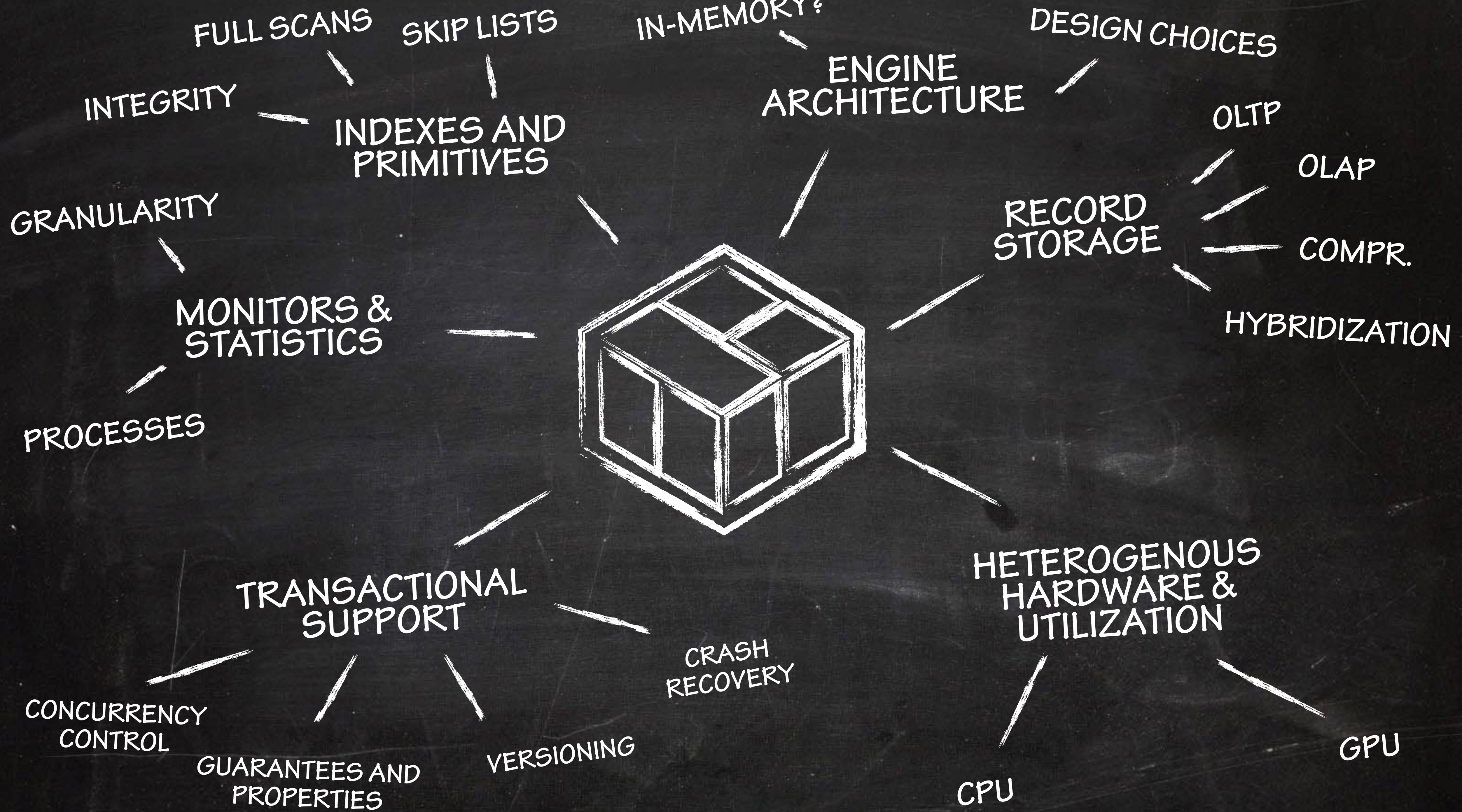
- ONLINE TRANSACTION PROCESSING (OLTP), AND
- ONLINE ANALYTICAL PROCESSING (OLAP)

Let's begin with a question
What's HTAP?

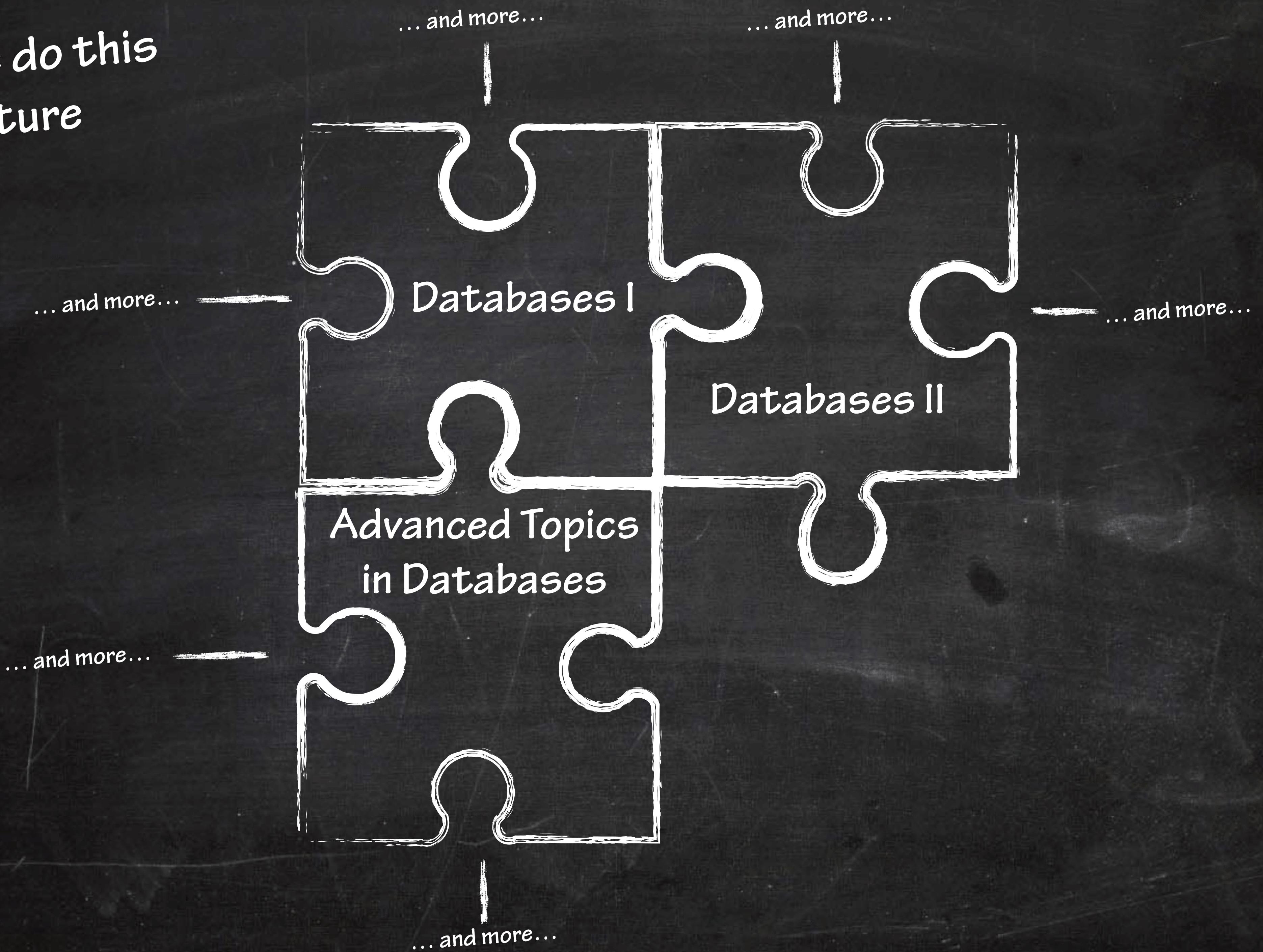


OUR RESEARCH AT OTTO-VON-GUERICKE UNIVERSITY

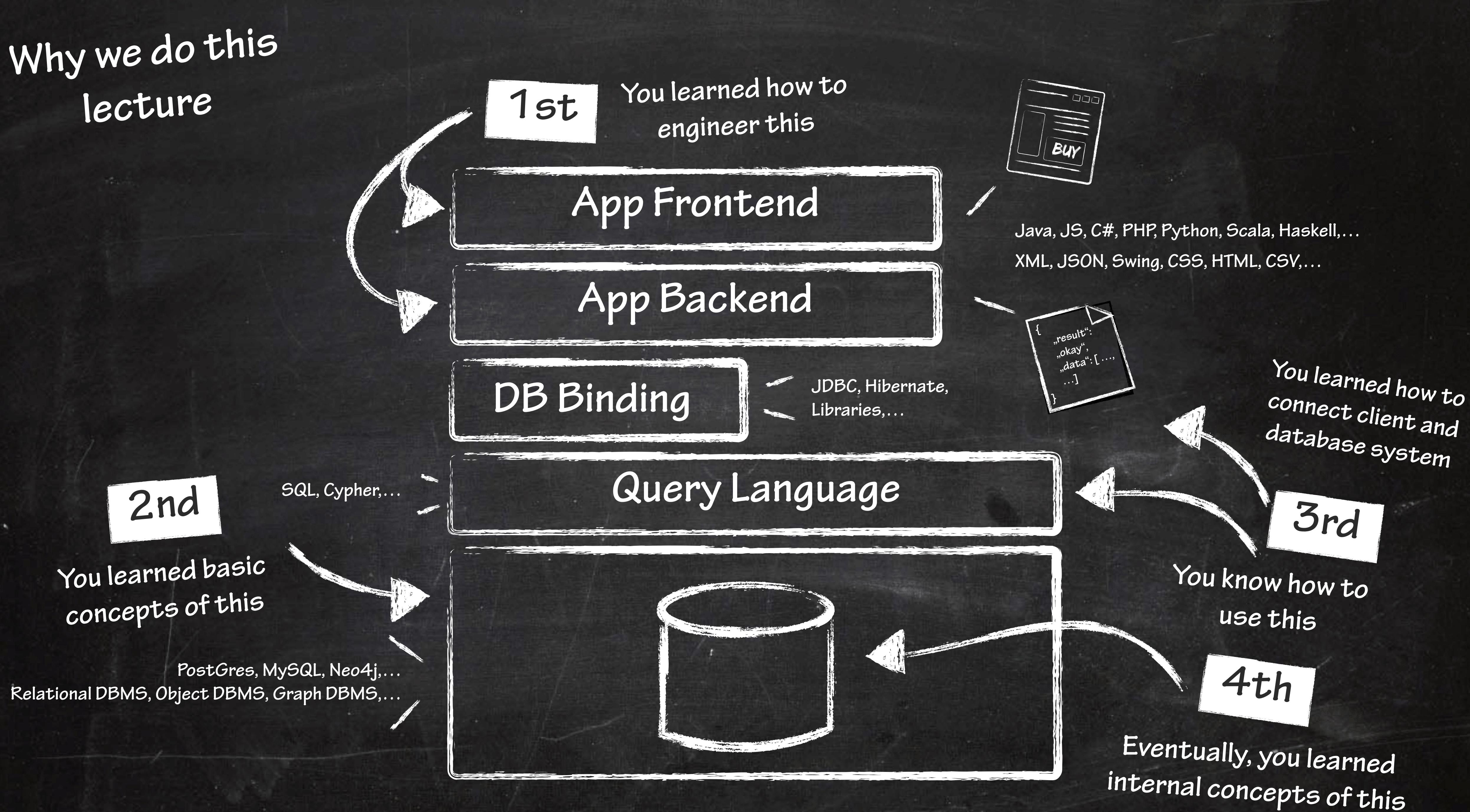




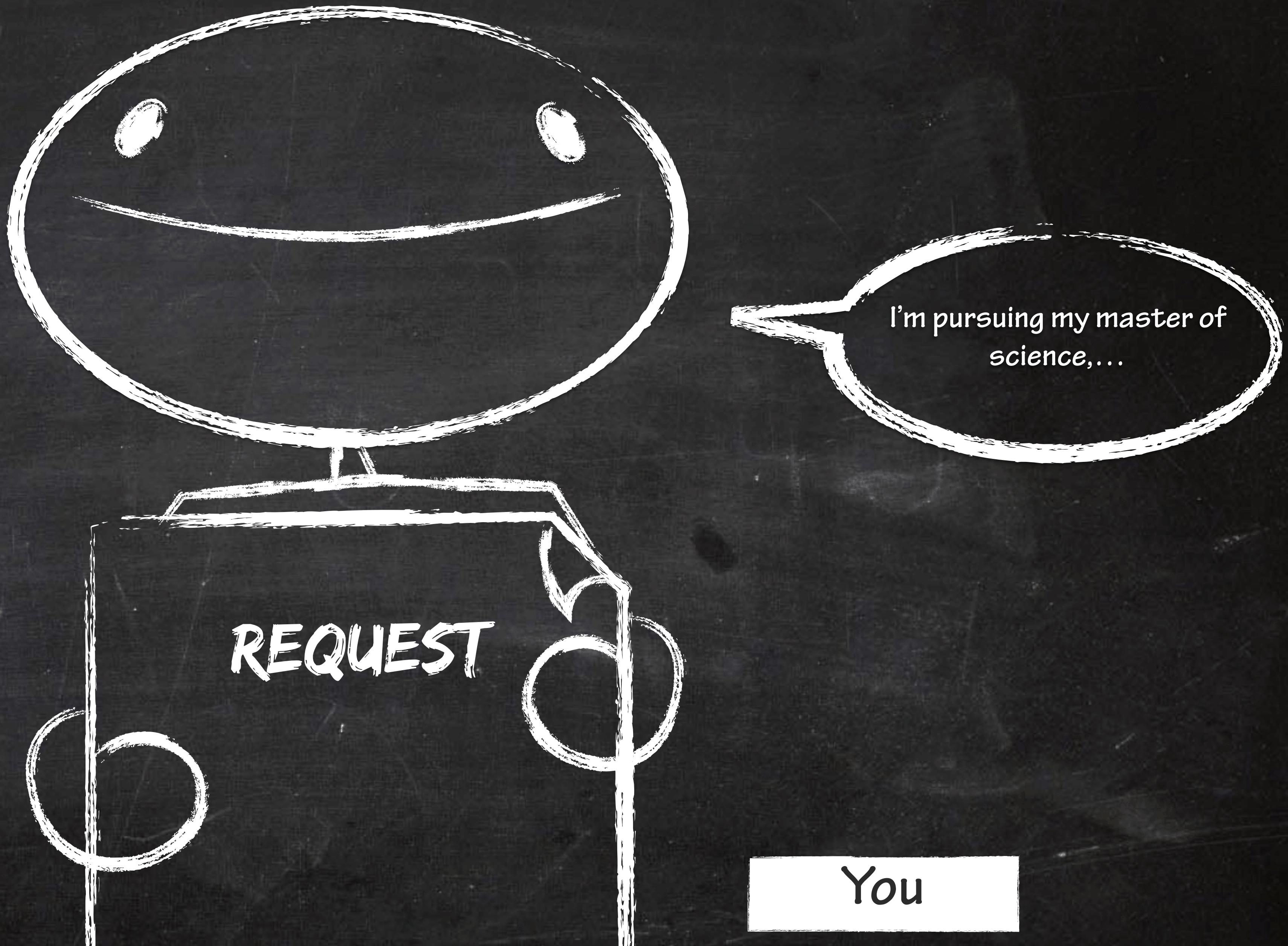
Why we do this lecture



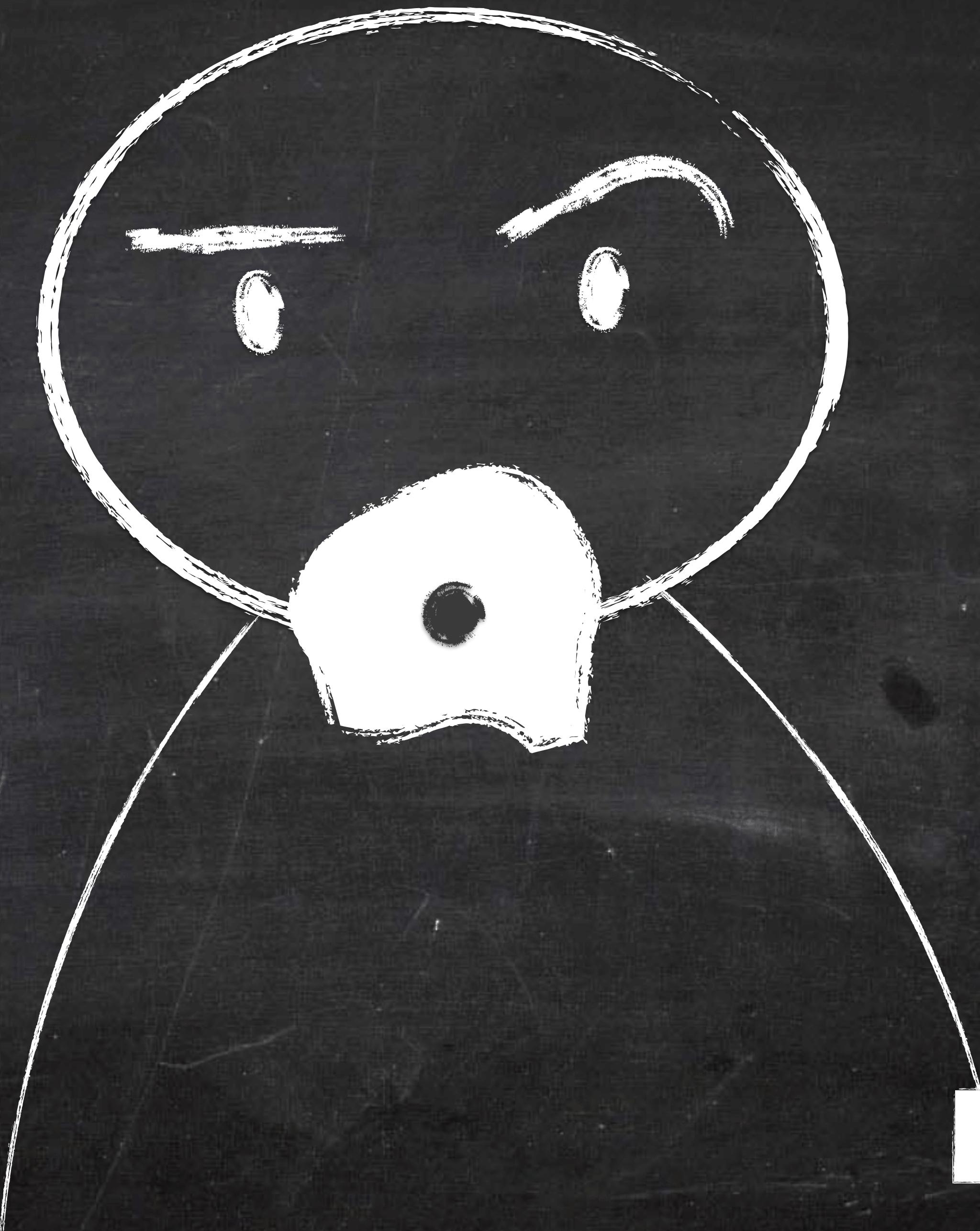
Why we do this lecture



Why we do this
lecture

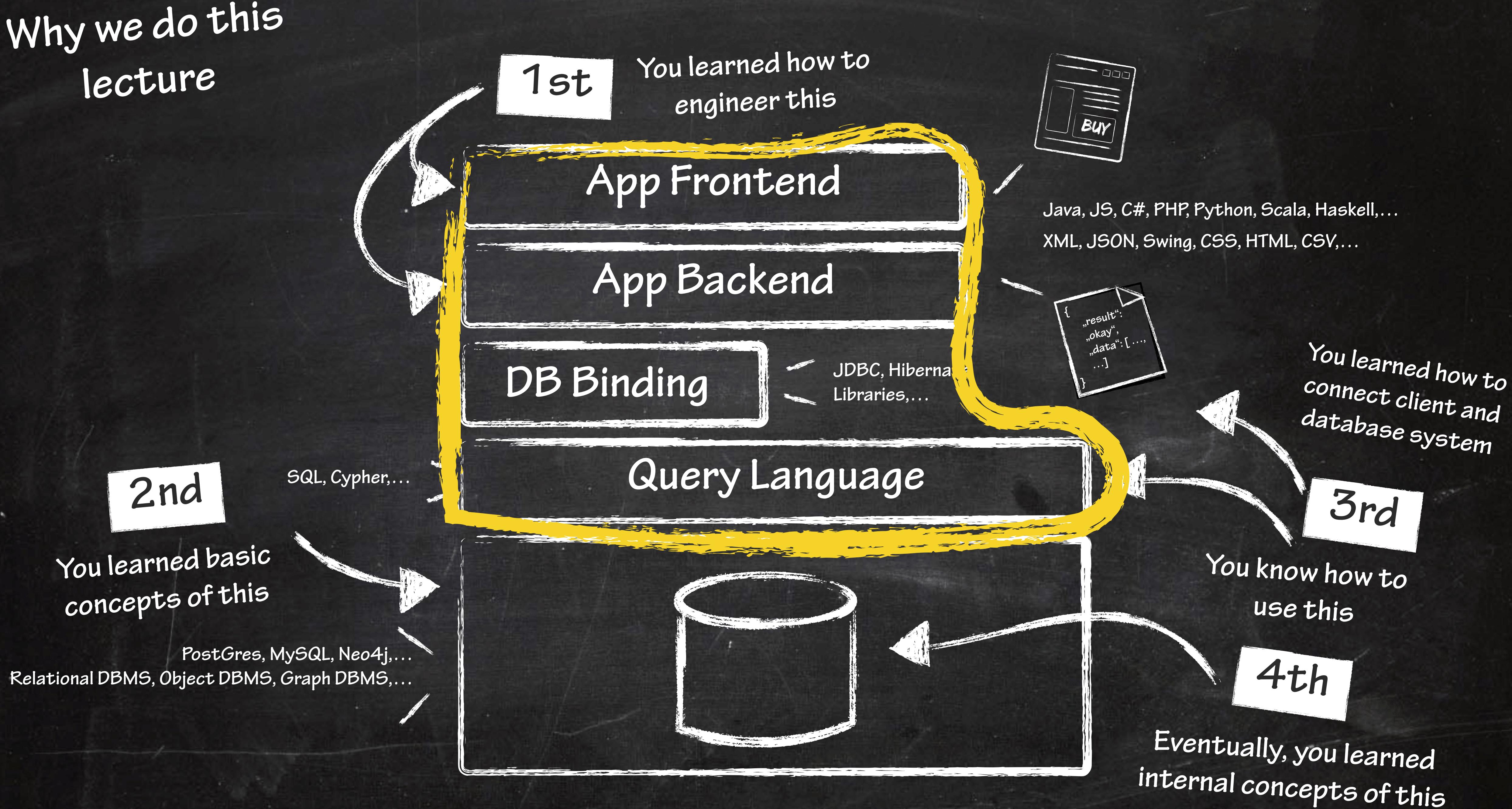


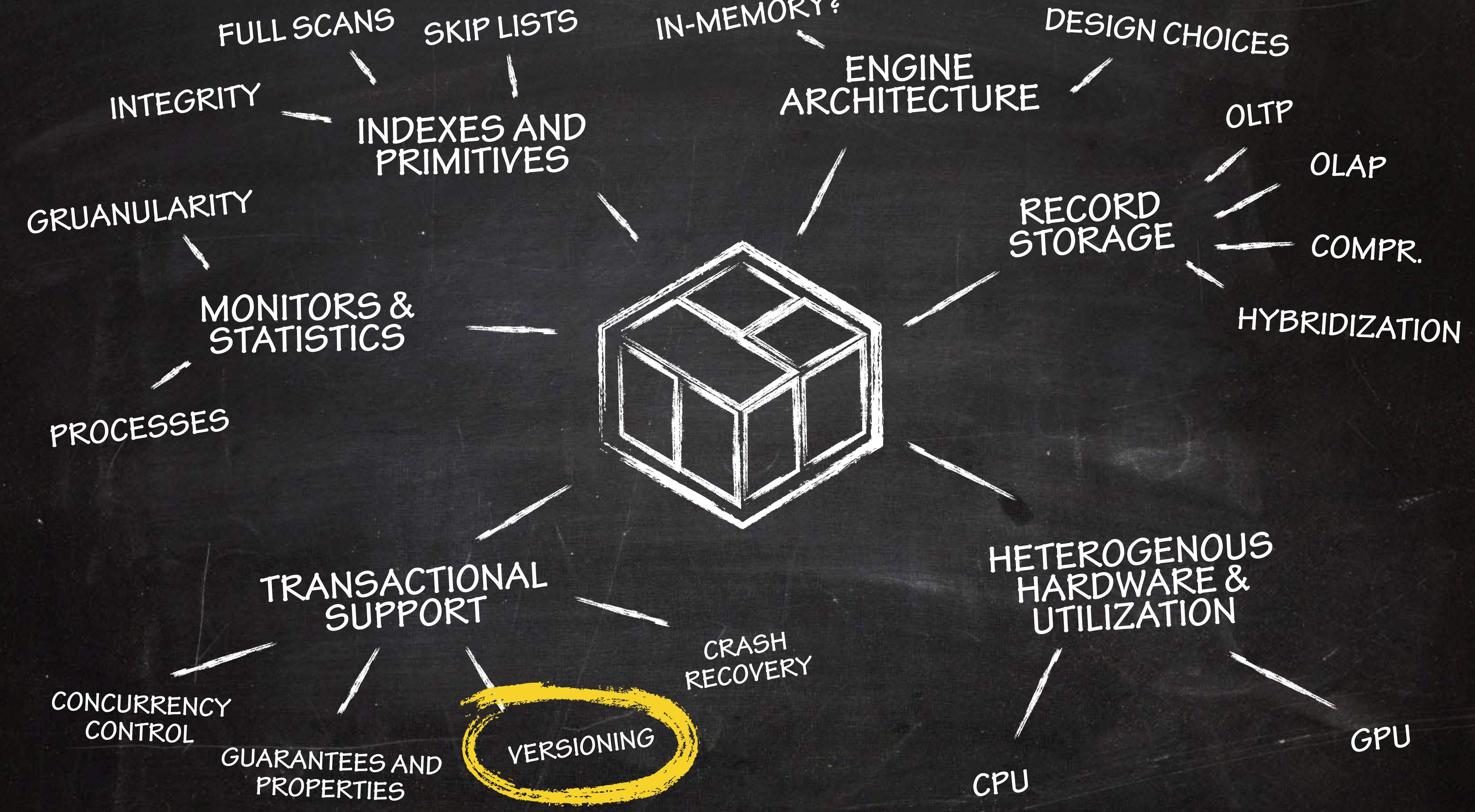
Why we do this
lecture



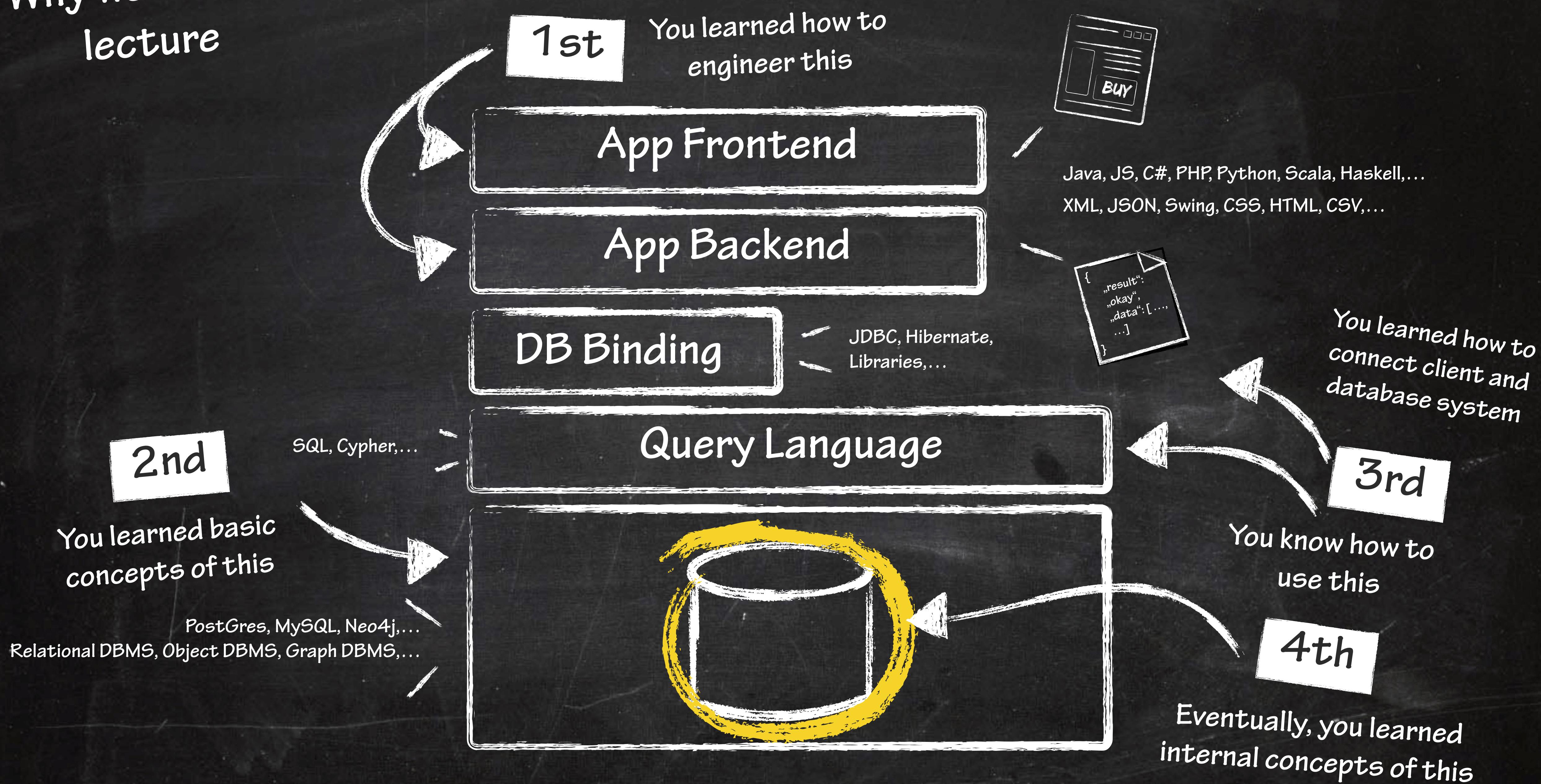
Supervisor

Why we do this lecture





Why we do this lecture



Why we do this lecture

you have not much time to do the job and to understand the state of the art

you don't know the language

you don't know the standard functions

you know „only“ the basics of the domain

you rarely know how to avoid pitfalls

```
#define FLAG_NULLABLE 1 << 3

#define DELEGATE_CALL(instance, fun)
({
    REQUIRE_NONNULL(instance);
    REQUIRE_IMPL(instance->fun);
    instance->fun(instance);
})

static inline void field_update(tuplet_field_t *field, const void *data) {
    assert(field && data);
    const attr_t *attr = schema_attr_by_id(field->tuplet->fragment->schema, field->att
if(attr_isstring(attr)) {
    const char *str = *(const char **) data;
    strcpy(field->attr_value_ptr, str);
} else memcpy(field->attr_value_ptr, data, tuplet_field_size(field));
```

you don't know the toolchain

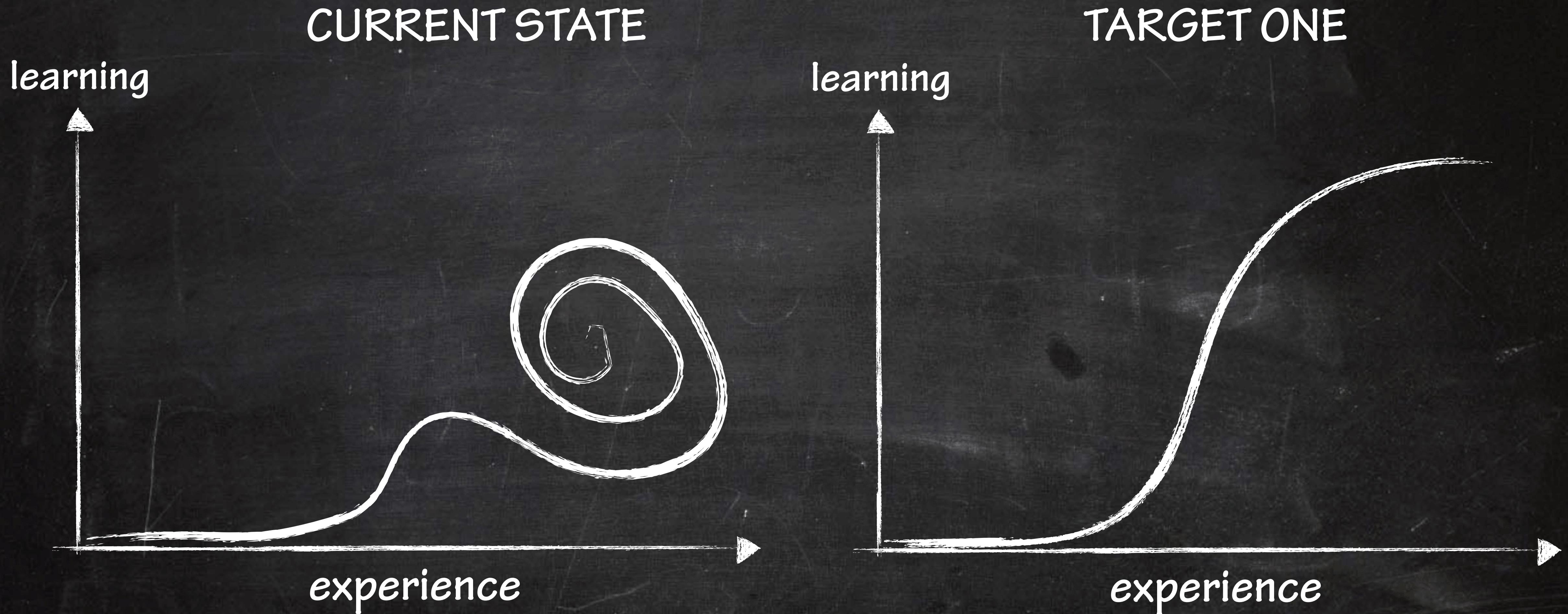
you might never get in touch w/ such a large code base

you don't know best practise

you don't know performance knobs

Why we do this
lecture

LEARNING CURVE



Why we do this lecture

App Frontend

App Backend

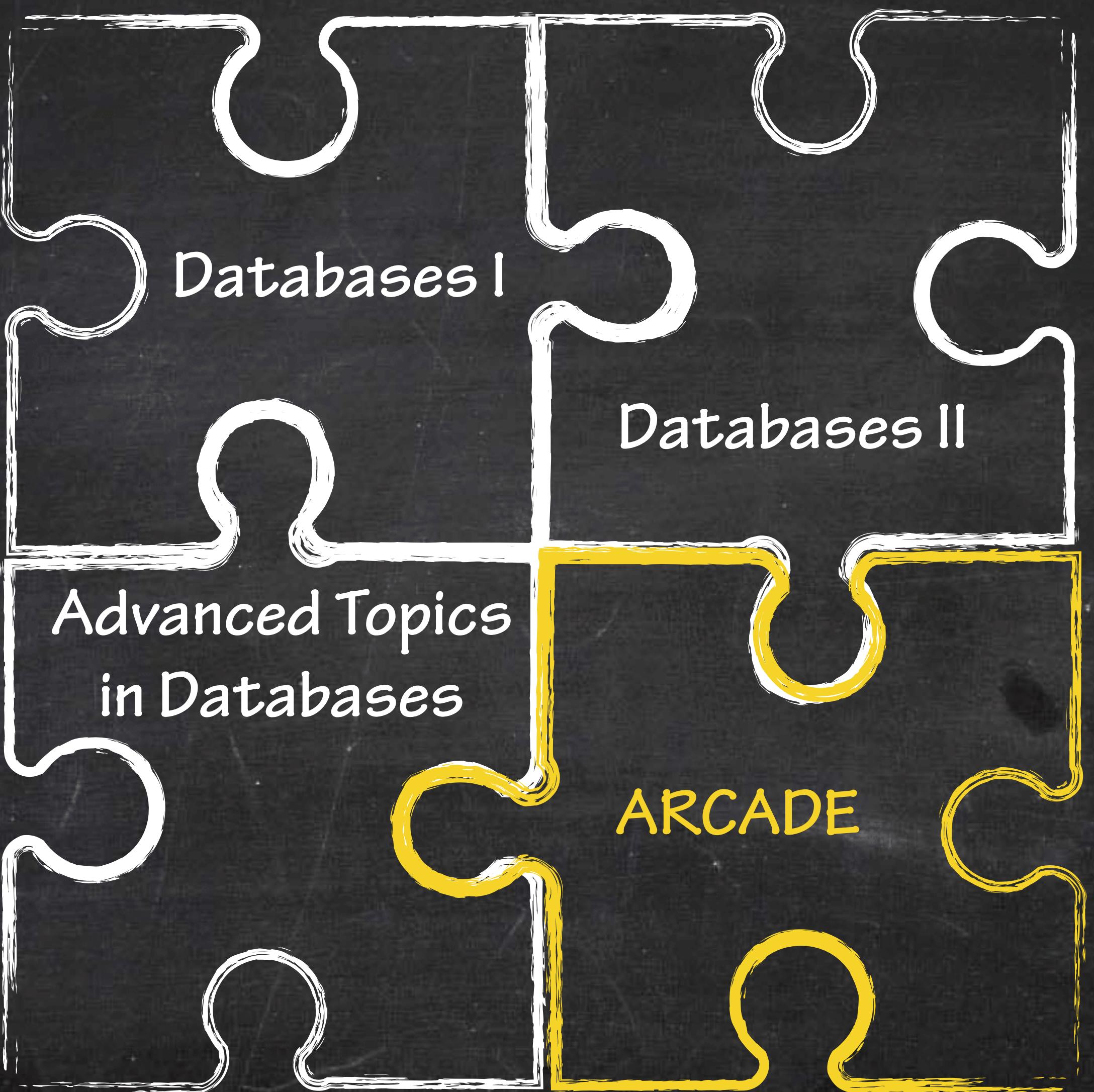
DB Binding

Query Language

In this lecture you
will learn the black
magic of architecting
and engineering one
of these



Why we do this
lecture



ACKNOWLEDGEMENTS

Thanks to

Prof. Dr. Bernhard Seeger, full professor at Philipps University Marburg & chair of AG Datenbanksysteme
... for his slides to „Programming in C++“ and also for the mentorship through the years

Dr. Sebastian Breß, researcher at German Research Center for Artificial Intelligence (DFKI)
... for all his guidance on database systems internals (go CoGaDB go!), and his focus on co-processors

Dr. Thomas Neumann, full professor at Technical University Munich & chair of Datenbanksysteme
... for fruitful discussion and sharing best practices on teaching system-level programming to students

Dr. Gunter Saake, full professor at Otto-von-Guericke University Magdeburg and chair of AG DBSE
... for his support to bring novel ideas into existence and his trust into his employees

Gabriel Campero Durand, M.Sc., research associate at our working group Database & Software Engineering
... for „being the most collaborative person (one) will ever meet“, his support for this lecture, and drive

David Broneske, M.Sc. and Andreas Meister, M.Sc. for fruitful discussion & help with administrative tasks.

Last but not least, thanks to my wife Pinni for being so pinnifull.

ORGANIZATION

Course Materials and Sources



facebook

NEWS,
DISCUSSION,...

[https://www.facebook.com/
Arcade-479499219098113/](https://www.facebook.com/Arcade-479499219098113/)



GitHub

SLIDES AND
MATERIALS

<https://github.com/Arcade-Lecture>



GitHub

YOUR EXERCISE
SUBMISSIONS

Up to you

About the Course

Schedule Time

Lecture Part



11:00am to 1:00pm

Location
G05-312

Material
Slides-Only

Schedule Time

Exercise Part („Tutorium“)

11:00am to 1:00pm



Location
G22A-113

Start
16th Oktober

The course is
held in english!

Make notes!

About the Course

Schedule Time

Lecture Part

11:00am to 1:00pm

Monday

Tuesday

Wednesday

Thursday

Friday

Schedule Time

Exercise Part („Tutorium“)

11:00am to 1:00pm

Monday

Tuesday

Wednesday

Thursday

Friday

Location
G22A-113

Start
16th Oktober

The course is
held in english!

Location
G05-312

Material
Slides-Only

Make notes!

Make Notes!

WHAT YOU ARE
ALLOWED TO DO...

*Everything else that is not not
allowed.*

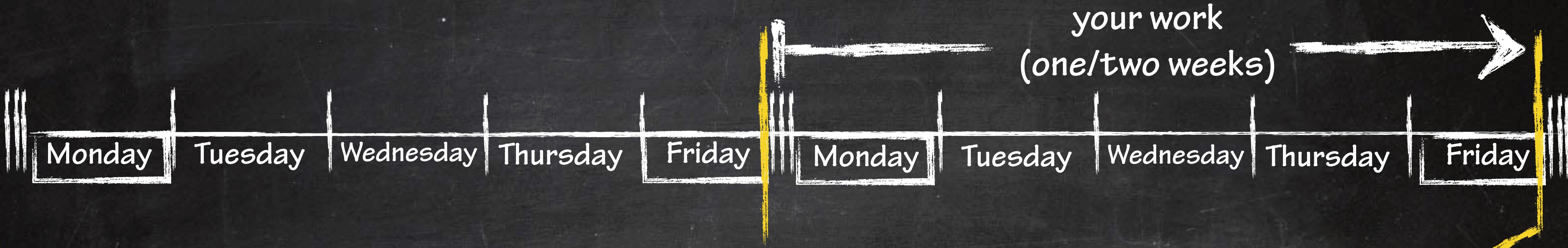
WHAT YOU ARE **NOT**
ALLOWED TO DO...



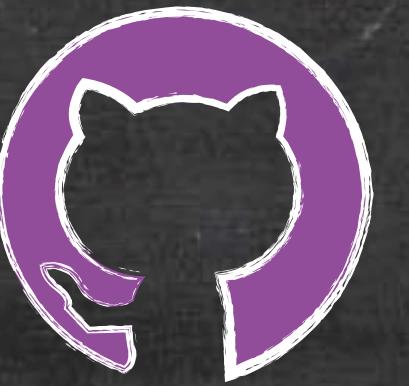
Recording

Exercise Proceeding

Issuing & Submission



The first sheet
will be published
today



Issuing

Each Friday during the day the
exercise sheet will be published

<https://github.com/Arcade-Lecture/exercises>

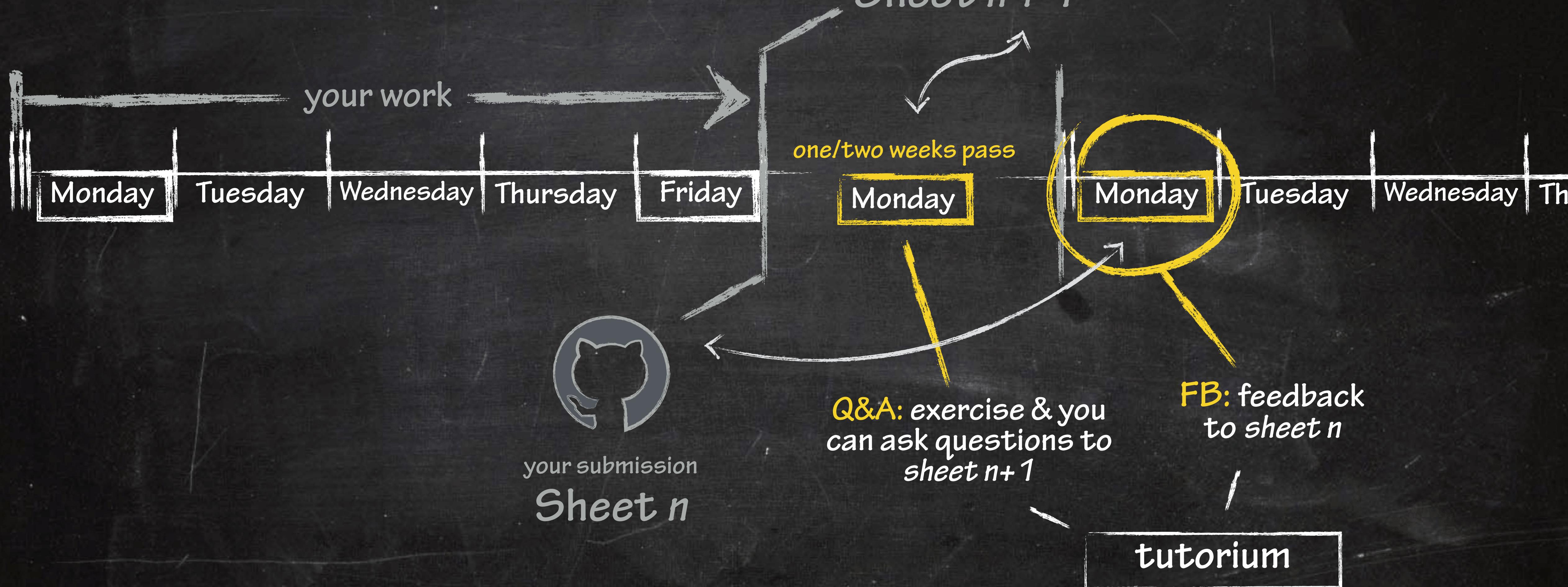


Submission

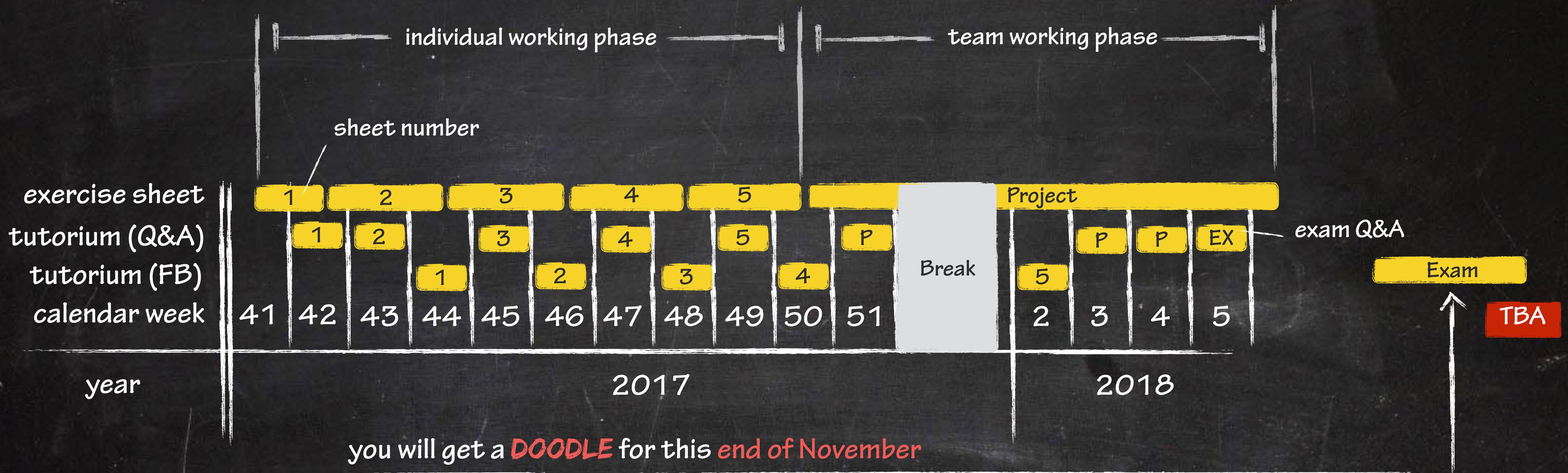
The latest change to your
repository until 11:59pm
of the (next) following
Friday is your submission

Exercise Proceeding

Feedback & Exercise



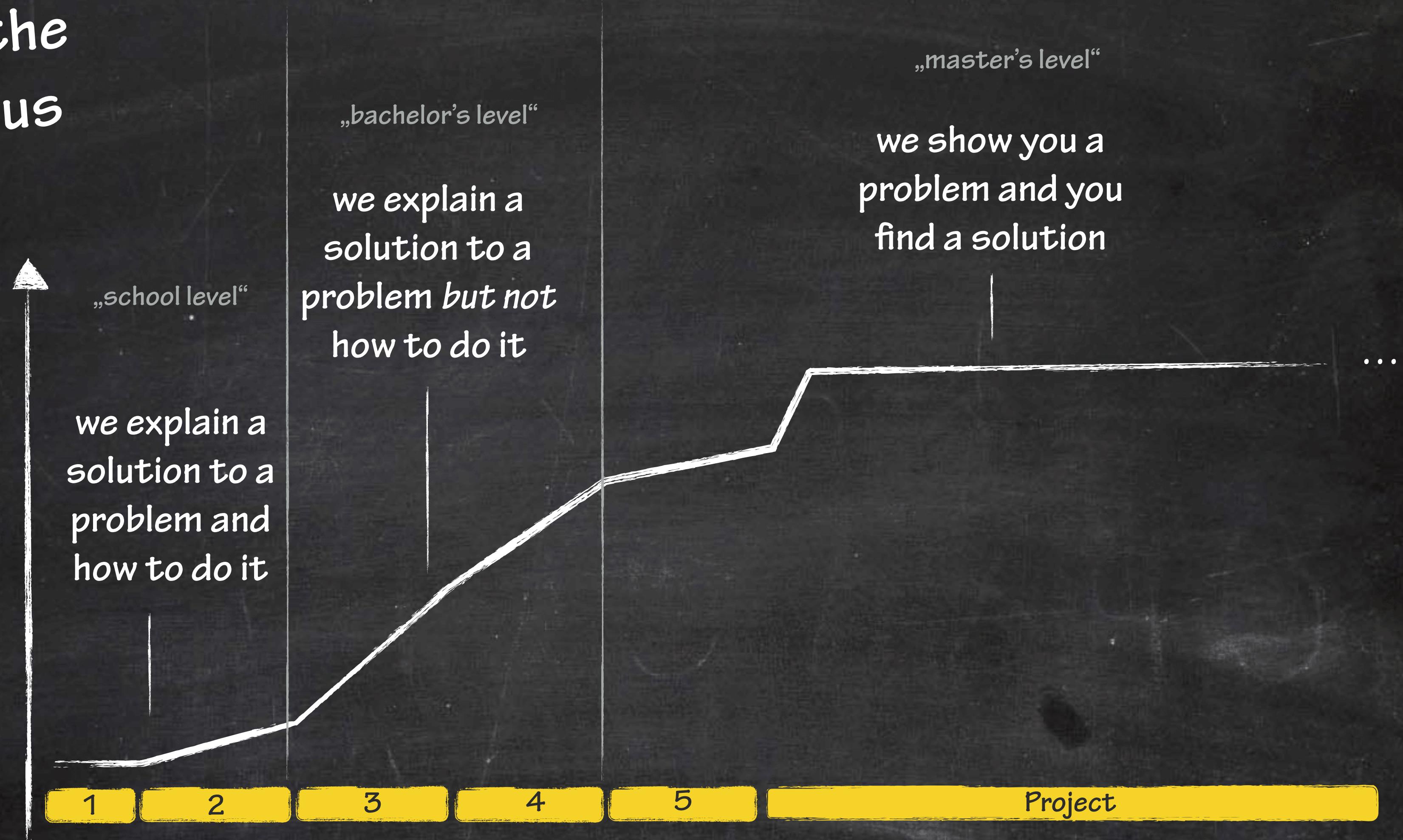
Lecture Proceeding at a Glance



Intention of the Exercise Focus

self-driven

guided



“ This is a picture and it should be on the wall since the wall is too naked. Take that hammer and that nail. Do the following move over and over again. ”

“ This is a picture and it should be on the wall using a hammer and some nails since the wall is too naked. ”

“ The wall is too naked. Something must be changed. ”

“ People don't like my flat. Maybe there's something wrong. ”

Your Way to your Grade

6 CP

Note the difference
to „volunteering“!

- manage to have **50%** of the **5** exercise sheets tasks **correct in total** (individual work).
- find **team mates** to form a group of at least two and at most k^* students. Do the **project sheet** together.
- do an **oral exam** that takes **30min**:
individual check of your knowledge (15min)
team presentation & defense of your project (15min)

* the number k depends on the actual number of students participating the course.

Feel free to visit or
not to visit the
lecture or tutorium

What's Next after your Grade?

you are trained in a more complex engineering process rather than „just exercising”

it's easier to find a topic that you like

- you are a better engineer than now*
- individual and team projects
- software projects
- bachelor's/master's thesis
- ... maybe even jobs ;)

you are skilled enough to write code that remains in the code base

you are more productive in a shorter time; you can do high-quality tasks

you're already familiarized with the system

Important Dates

1st Sheet
Today

1st Tutorial (Q&A)
16th Okt 17

1st Sheet Deadline
20th Okt 17

1st Sheet Feedback
30th Okt 17

Last Sheet Deadline / Project Start
15th Dec 17

Exam
TBA

feedback is welcome!