



TDDD43 Advanced Data Models and Databases

<http://www.ida.liu.se/~TDDD43>

6hp

Advanced Data Models and Databases

<http://www.ida.liu.se/~patla00/courses/AdvDB/>

6hp



Teachers

- Examiner: Patrick Lambrix
- Lectures: Patrick Lambrix, Sebastian Ferrada
- Labs: Mina Abd Nikooie Pour, Ying Li, Huanyu Li
- Director of studies: Patrick Lambrix



Course literature

- Articles (on web/handout)
- Lab descriptions (on web)



Databases / Data sources

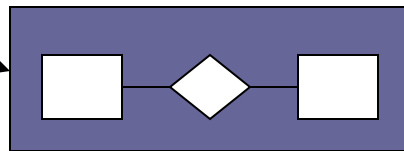
- One (of several) ways to store data in electronic format
- Used in everyday life: bank, hotel reservations, library search, shopping

Databases

- Database management system (DBMS): a collection of programs to create and maintain a database
- Database system = database + DBMS

Databases / Data sources

Information

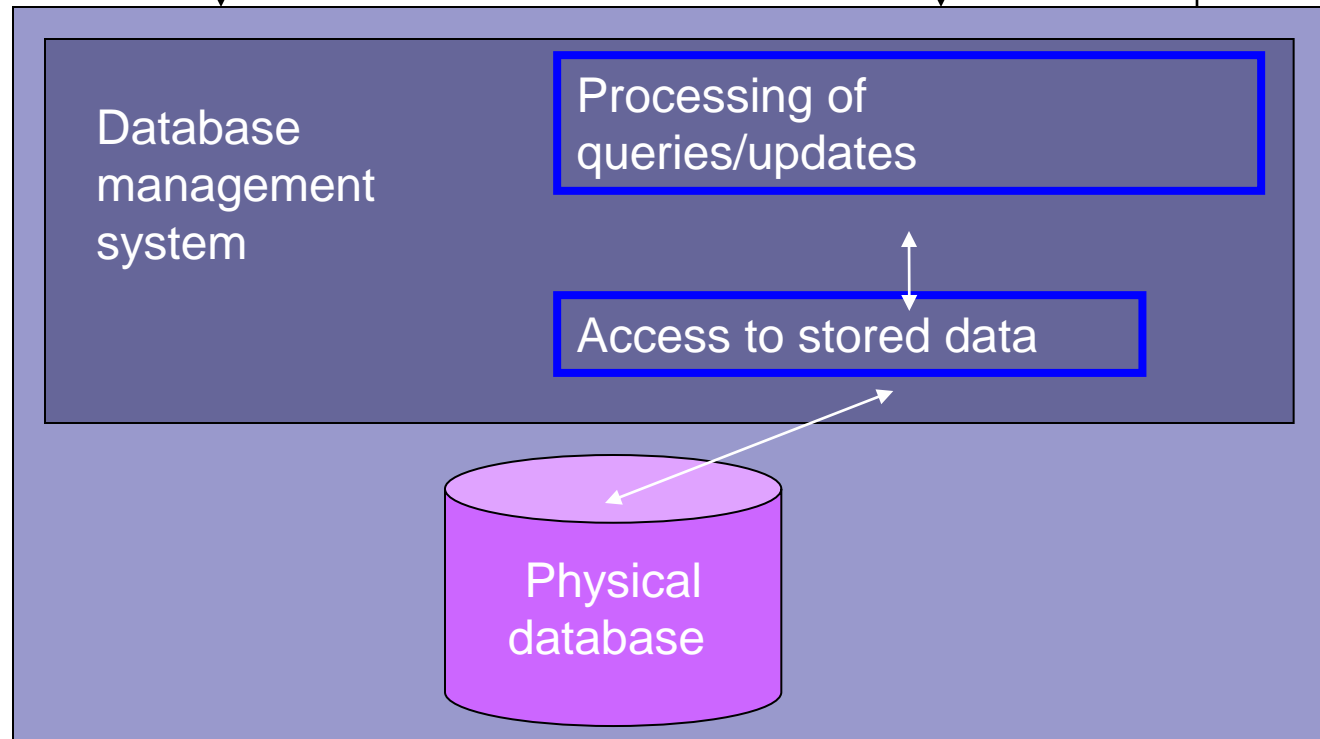


Model

Queries

Answer

Database system





What information is stored?


- Model the information
 - Entity-Relationship model (ER)
 - Unified Modeling Language (UML)

What information is stored? - ER

- entities and attributes
- entity types
- key attributes
- relationships
- cardinality constraints

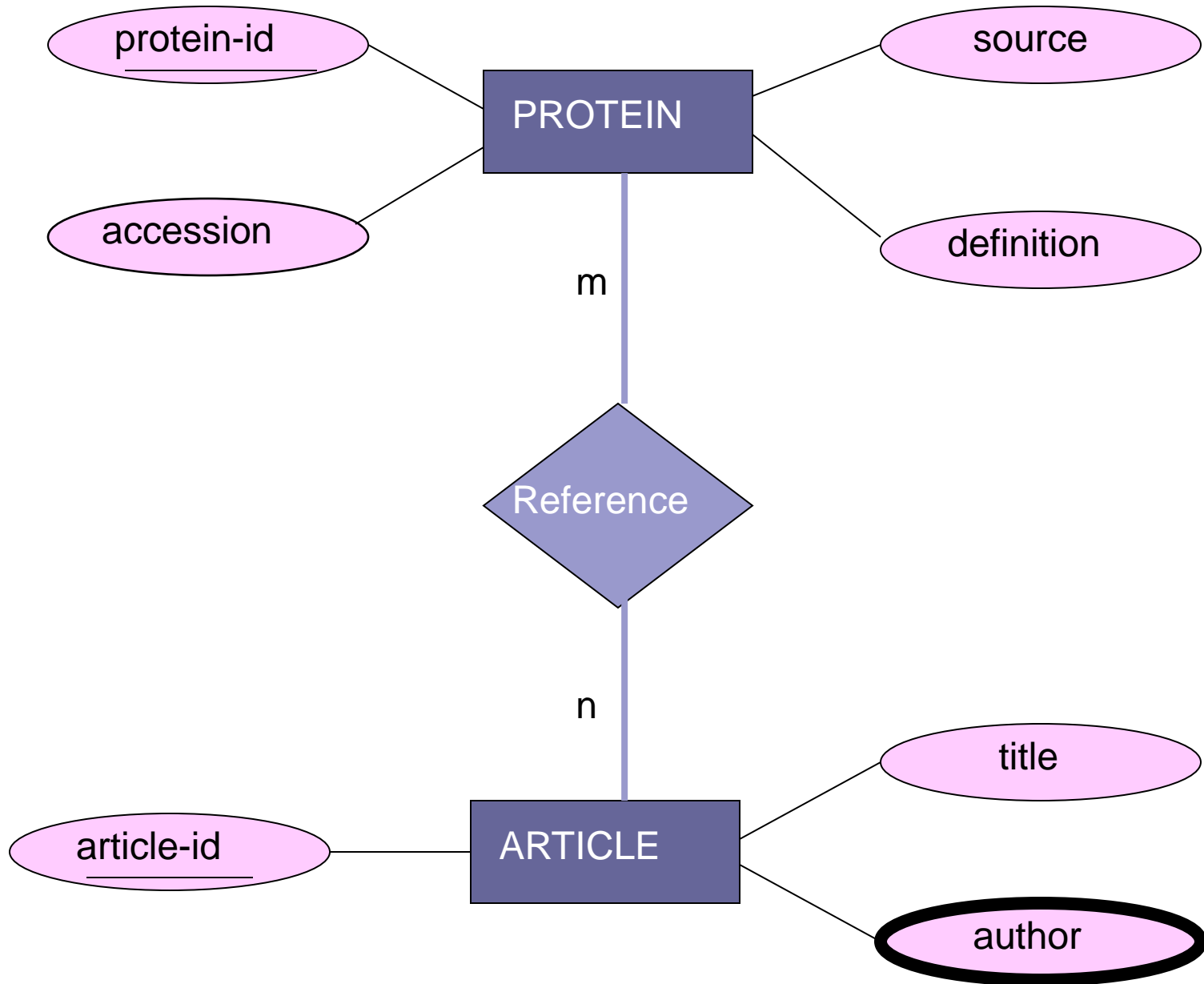
- EER: sub-types

1 tgctacccgc gcccgggctt ctggggtgtt cccaaccac ggcccagccc tgccacaccc
61 cccgccccg gcctccgag ctggcatgg gcgcggggt gctcgtctg ggcgctccg
121 agccccgtaa cctgtcgtc gccgcaccgc tccccgacgg cgcggccacc gcgcgcggg
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241 cgctgtctca gcagtggaca ggggcatgg gtctgtgat ggcgctcgc gtgtgtctca
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1621 cctcgtctga atcatccgag gcaaagagaa aagccacgga ccgtgcaca aaaaggaaag
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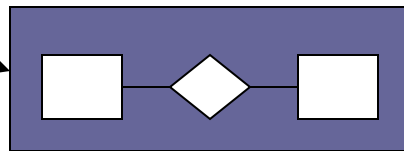
DEFINITION Homo sapiens adrenergic, beta-1-, receptor
ACCESSION NM_000684
SOURCE ORGANISM human
REFERENCE 1
AUTHORS Frielle, Collins, Daniel, Caron, Lefkowitz,
Kobilka
TITLE Cloning of the cDNA for the human
beta 1-adrenergic receptor
REFERENCE 2
AUTHORS Frielle, Kobilka, Lefkowitz, Caron
TITLE Human beta 1- and beta 2-adrenergic
receptors: structurally and functionally
related receptors derived from distinct
genes

Entity-relationship



Databases / Data sources

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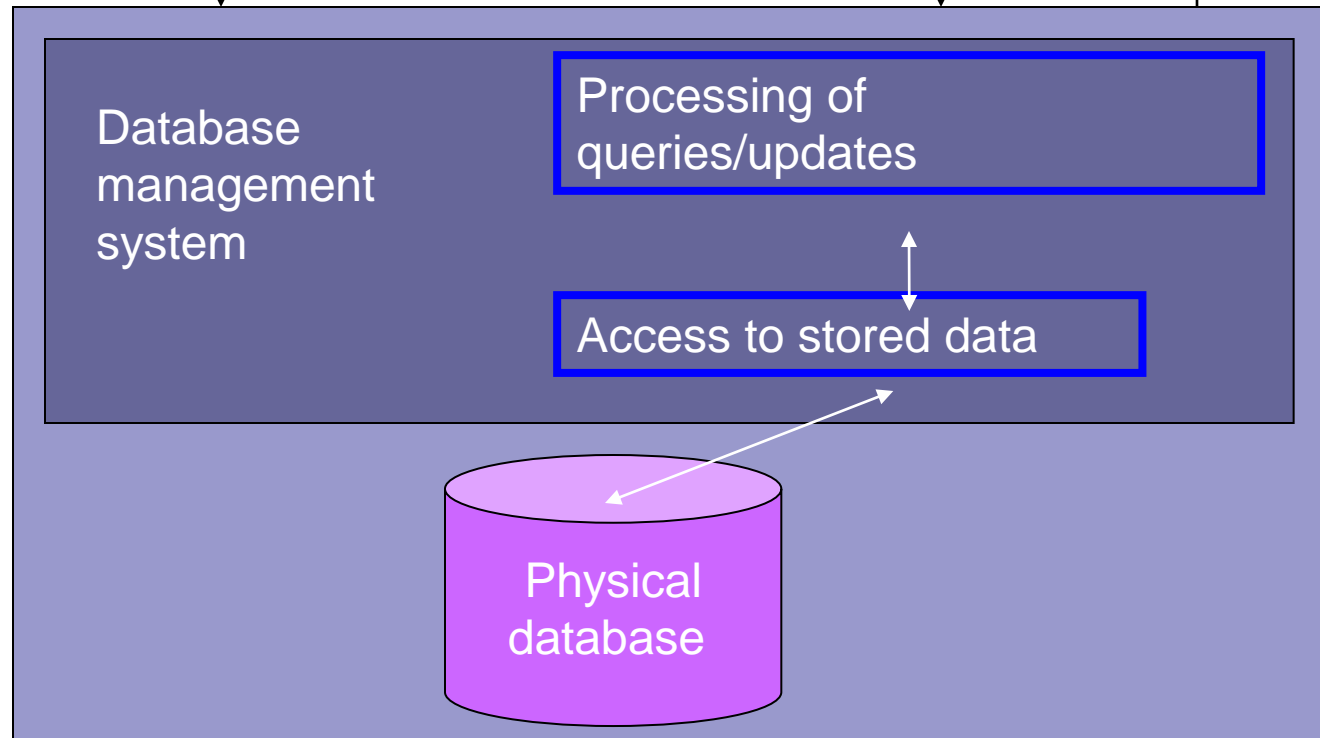


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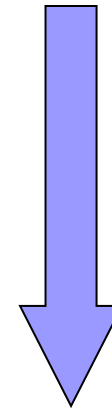
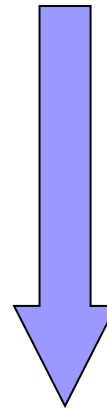
How is the information stored?
(high level)

How is the information accessed?
(user level)

- Text (IR)
- Semi-structured data
- Data models (DB)
- Rules + Facts (KB)

structure

precision



Course overview

- Information Retrieval (HT1 – lectures)
- Semi-structured data, XML and RDF (HT1 - lectures + labs)
- NoSQL databases (HT2 - lectures + lab)
- Semantic Web, Ontologies, OWL (HT1+HT2 - lectures + lab)
- Data integration (HT1+HT2 – lectures + lab)

Info

- Results reported in connection to exams
- Info about handing in labs on web; strong recommendation to hand in as soon as possible
- Sign up for labs via web **in pairs (TDDD43); individual (PhD students)**
- Apply for special account for NoSQL lab (NSC) – we will let you know when

Examination

- TDDD43

- Written exam / Online exam **TBD**

- Labs

- PhD students

- Take home exam

- Labs



Changes w.r.t. last year

- New lecturer and lab assistants
- Minor clarifications in labs

My own interest and research

- Modeling of data
 - Ontologies (for Life sciences, animal health surveillance, materials design, crime scene investigation, sports analytics)
- Ontology engineering
 - Ontology alignment
(Winner Anatomy track OAEI 2008 / Organizer OAEI tracks since 2013)
 - Ontology debugging and completion
(Founder and organizer WoDOOM/CoDeS 2012-2016)
 - Ontology visualization
(Founder and organizer VOILA since 2015)

My own interest and research

- Sports Analytics
 - Course in VT2
 - <https://www.ida.liu.se/research/sportsanalytics/>
- Former work: knowledge representation, data integration, knowledge-based information retrieval, object-centered databases
- <http://www.ida.liu.se/~patla00/research.shtml>