



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, Huanyu Li
- Labs: Ying Li, Huanyu Li
- Director of studies: Patrick Lambrix



Course literature

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



Databases / Data sources

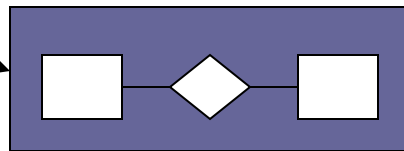
- One (of several) ways to store data in electronic format
- Used in everyday life: bank, hotel reservations, library search, shopping

Databases

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

Databases / Data sources

Information

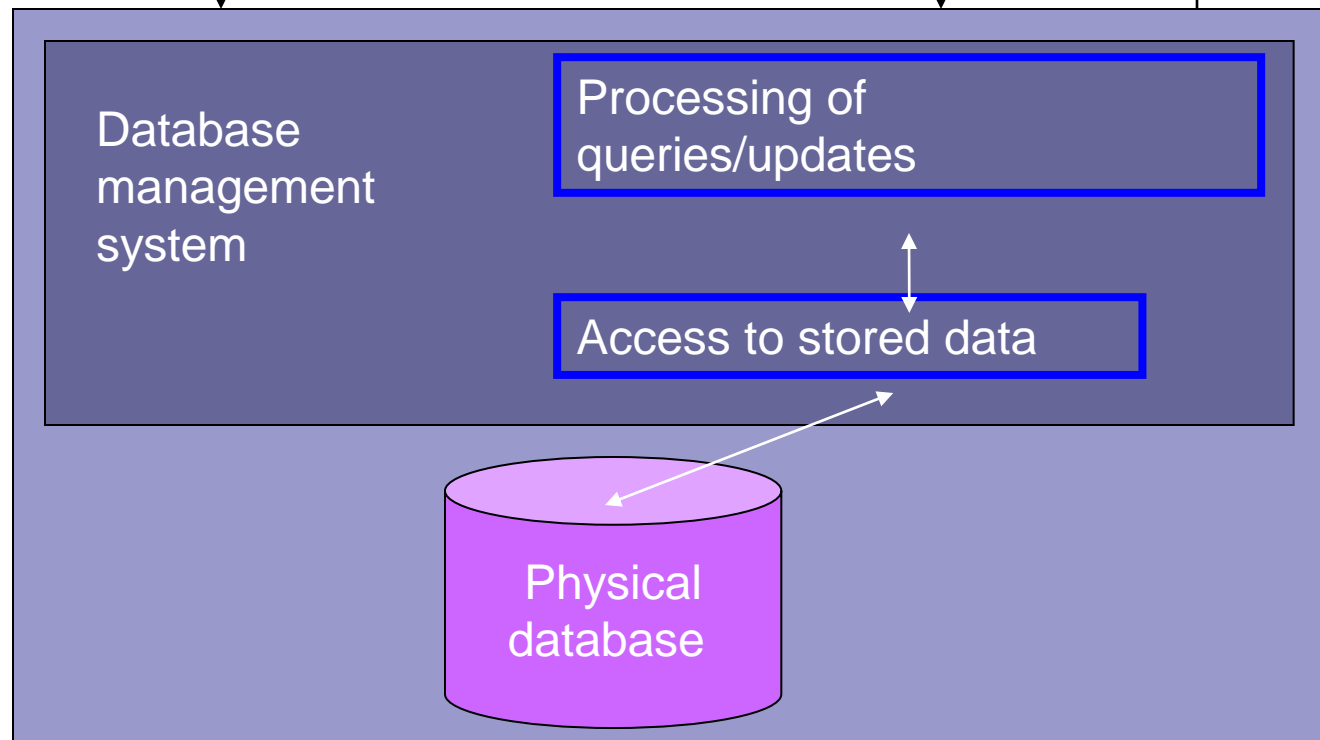


Model

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

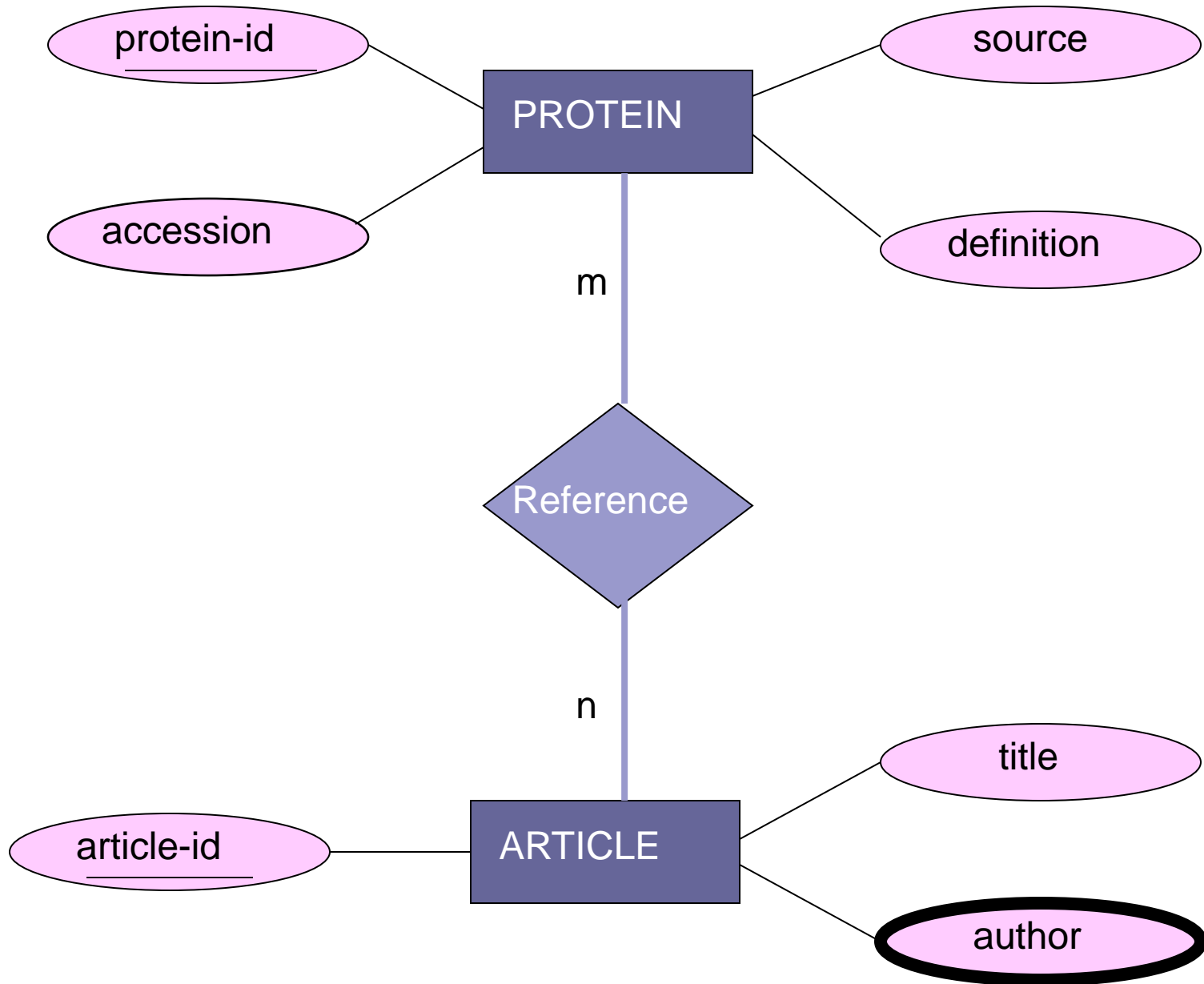
- EER: sub-types

1 tgctacccgc gcccgggctt ctggggtgtt cccaaccac ggcccagccc tgccacaccc
61 cccgccccg gcctccgag ctgcatg ggcgggggt gctcgtctg ggcgctccg
121 agccccgtaa cctgctgctg gccgaccgc tccccgacgg cgcggccacc ggcgcgggc
181 tgctggtgcc cgcgtcgccg cccgctctg tgctgcctcc cgccagcgaa agccccgagc
241 cgctgtctca gcagtggaca ggggcatgg gtctgctgat ggcgctcctc gtgctgtca
301 tcgtggcggg caatgtgctg gtgatcgtg ccatcgccaa gacgccgagg ctgcagacgc
361 tcaccaacct ctcatcatg tcctggcca ggcggacct ggtcatgggg ctgctggtg
421 tgccgttcgg ggcaccatc tgggtgtgg gccgctggga gtacggctcc ttcttctg
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721 accccaagt ctgcgactc gtcaccaacc gggcctacgc catcgctctg tccgtagtct
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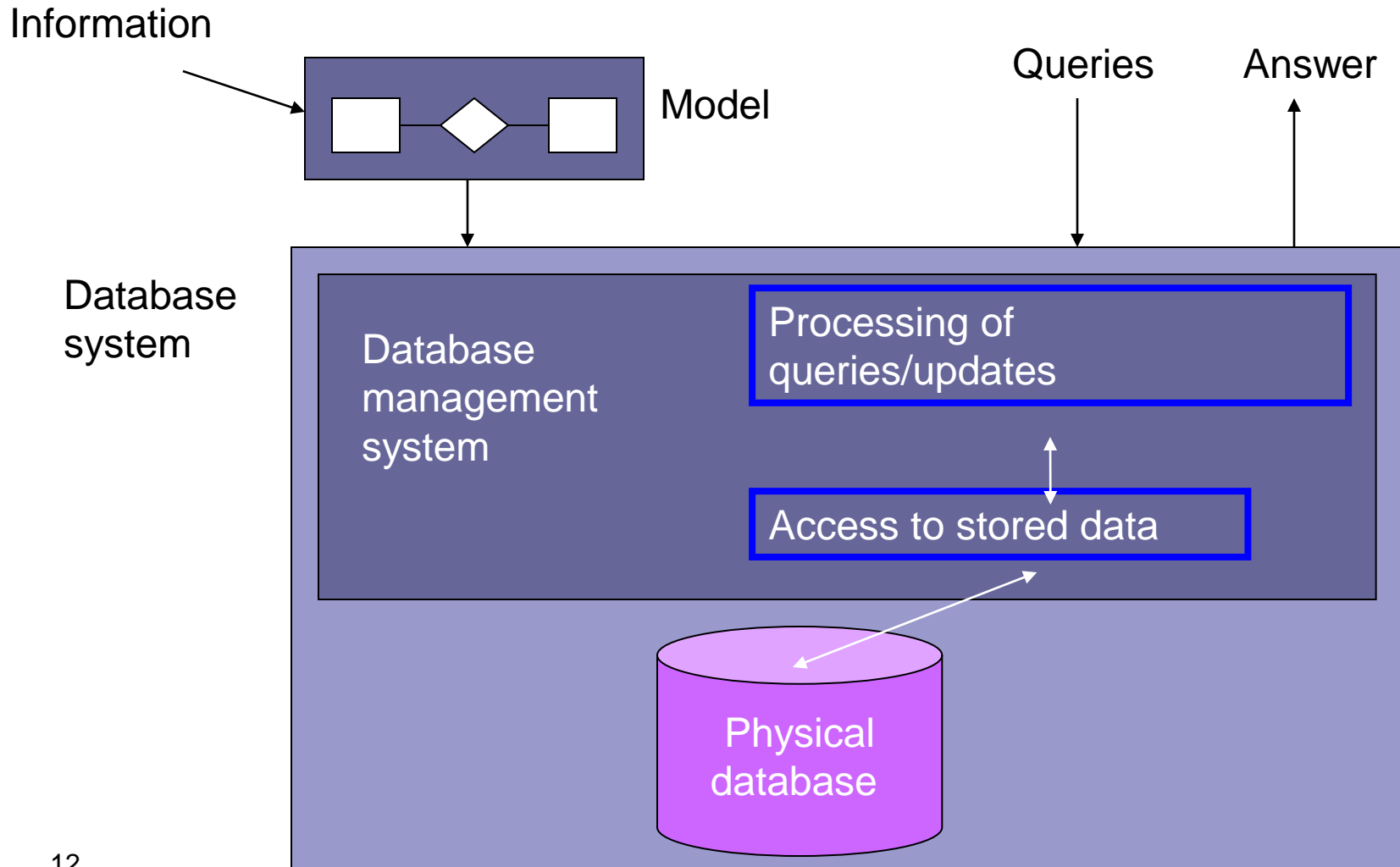


DEFINITION Homo sapiens adrenergic, beta-1-, receptor
ACCESSION NM_000684
SOURCE ORGANISM human
REFERENCE 1
AUTHORS Frielle, Collins, Daniel, Caron, Lefkowitz,
Kobilka
TITLE Cloning of the cDNA for the human
beta 1-adrenergic receptor
REFERENCE 2
AUTHORS Frielle, Kobilka, Lefkowitz, Caron
TITLE Human beta 1- and beta 2-adrenergic
receptors: structurally and functionally
related receptors derived from distinct
genes

Entity-relationship



Databases / Data sources



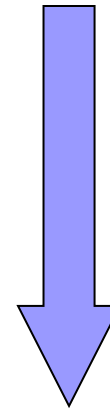
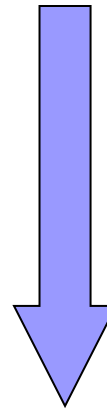
How is the information stored?
(high level)

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

- Labs

- PhD students

- Take home exam

- Labs



Changes w.r.t. last time

- New lecturer
- 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>