Assignment Project Exam Help

Relational Data Model – Part 1

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What is the Relational Data Model?

- Introduced by Edgar F. Codd of IBM Research in 1970.

  "A Relational Model for Large Shared Data Banks", Communications of the ACM

  - A database contains tables (called relations), and each table is made

- Used as the standard for relational DBMSs (e.g., Oracle, IBM DB2, Microsofts Access, Microsofts SQL Server, MySQL, postgreSQL, etc.).

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- Correspondence of informal and formal terms:

INFORMAL TERMS	
Table	Relation
Column	Attribute
Data type	Domain
Row	Tuple
Table definition	Relation schema

The Basics

- Attributes are used to describe the properties of information. In the relational model, they usually refer to atomic data.

- **D**... STRING { }

Example:
- STRING { }
- DATE = $\{01/01/2005, 03/$
- INT $= \{..., -1, 0, 1, 2, ...\}$

- Recall that, **cartesian product** $D_1 \times ...$ combinations of values from the sets $D_1, ..., {}_n$

Example: Let $D_1=\{book,pen\}$, $D_2=\{1,2\}$ and $D_3=\{red\}$. Then

- $D_1 \times D_2 \times D_3 = \{(book,1,red),(book,2,red),(pen,1,red),(pen,2,red)\}$

The Basics

- The attributes are StudentID, CourseNo, Semester, Status and EnrolDate.
- The domains of attributes are as follows:

  dom(StudentID)=INT; dom(CourseNo)=STRING;

- T... ...1 S2,
  ac...
  C...

ENROL				
StudentID	CourseNo	Seme...		
456	COMP2400	2016		
458	COMP1130	2016		
459	COMP2400	2016 S2	active	11/06/2016

- Is the above set a subset of

  INT × STRING × STRING × STRING × DATE?

Answer: Yes.

The Basics

- A relation schema has a **relation name** and a list of **attributes**.

- Each attribute is associated with a **domain**.

- A r
  -
  - $R(A_1 : dom(A_1), ..., A_n : dom(A_n))$,

where $A_1 ... A_n$ are attributes of R and d

Example: The relation schema in the previous ex

- ENROL(StudentID, CourseNo, Semester, Status, EnrolDate), or
- ENROL(StudentID: INT, CourseNo: STRING, Semester: STRING, Status: STRING, EnrolData: DATE).

The Basics

- Let $R(A_1, \ldots, A_n)$ be a relation schema.
- A **tuple** in R is a list t of values, i.e., $t \in dom(A_1) \times \ldots \times dom(A_n)$.

  E

  $$\text{INT} \times \text{STRING}$$

- (459, COMP2400, 2016 S2, active, 11/06)

  $$\text{INT} \times \text{STRING}$$

- A **relation** $r(R)$ is a set of tuples $r(R) \subseteq dom(A_1) \times \ldots \times dom(A_n)$.

  Example: The previous example has the following relation:

  - $r(\text{ENROL}) \subseteq \text{INT} \times \text{STRING} \times \text{STRING} \times \text{STRING} \times \text{DATE}$.

The Basics

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- A **relational database state** of *S* is a set of re
  - there is just one relation for each relation sch Add WeChat edu_assist_pr
  - all the relations satisfy the integrity constrai

The Basics

- Consider a relational database schema STUENROL that has three relation schemas:

  - STUDENT(StudentID, Name, DoB, Email).
  -
  -

StudentID	Name	D	

COURSE		
No	Cname	

ENROL				
StudentID	CourseNo	Semester	Status	EnrolDate

- That is, STUENROL={STUDENT, COURSE, ENROL}.

The Basics

- Relational Database State – Example

STUDENT

StudentID	Name	DoB	Email

COURSE

No	Cname
COMP1130	Introduction to Advanced C...
COMP2400	Relational Data...

ENROL

StudentID	CourseNo	Semester	Status	EnrolDate
456	COMP2400	2016 S2	active	25/05/2016
458	COMP1130	2016 S1	active	20/02/2016
459	COMP2400	2016 S2	active	11/06/2016