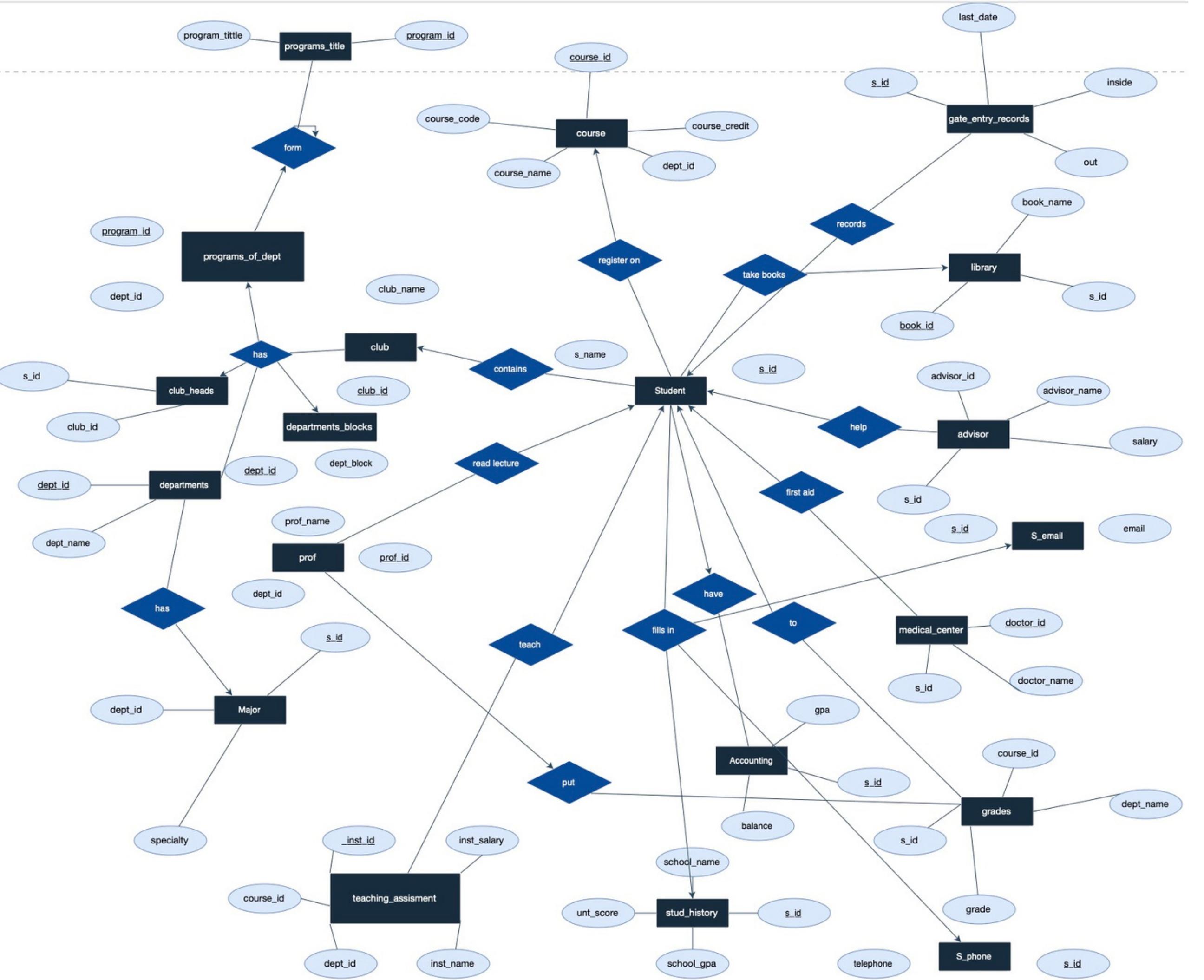


DATABASE MANAGEMENT SYSTEMSI

Yerman Berik
Tastan Yernar
Tursumkan Meruyert

DATABASE OF UNIVERSITY

ERD SCHEMA



Functional Dependencies

01 student:

$\{s_id\}+ = \{s_id, s_name\}$

02 s_info

$\{s_id\}+ = \{s_id, gender, social_status, birth_place, date_of_birth\}$

03 s_phone

$\{s_id\}+ = \{s_id, telephone\}$

$\{telephone\}+ = \{s_id, telephone\}$

s_email

04 $\{s_id\}+ = \{s_id, email\}$

$\{email\}+ =$

$\{s_id, email\}$

Functional Dependencies

05 accounting

{s_id}+={s_id,gpa,balance}

departments

06 {dept_id}+={dept_id,dept_name}

{dept_name}+={dept_id,dept_name}

departments_blocks

07 {dept_id}+={dept_id,dept_block}

{dept_block}+={dept_id,dept_block}

Functional Dependencies

```
course
08 {course_id}+={course_id, course_code, course_name, course_credit, dept_id}
    {course_code}+={course_id, course_code, course_name, course_credit, dept_id}
    {course_name}+=          {course_id, course_code, course_name, course_credit, dept
    _id}


---


09 advisor
    {course_id}+={advisor_id, advisor_name, s_id, Salary}


---


10 library
    {book_id}+={book_id, book_name, s_id}
```

Functional Dependencies

11 prof
 $\{prof_id\}+=\{prof_id, prof_name, dept_id\}$

programs_of_dept
12 $\{program_id\}+=\{program_id, dept_id\}$
 $\{dept_id\}+=\{program_id, dept_id\}$

programs_title
13 $\{program_id\}+=\{'program_id', 'program_title'\}$
 $\{program_title\}+=\{'program_id', 'program_title'\}$

Functional Dependencies

14 gate_entry_records
 $\{s_id\}+=\{s_id, last_date, inside, out\}$

clubs
15 $\{club_id\}+=\{club_id, club_name\}$
 $\{club_name\}+=\{club_id, club_name\}$

16 club_heads
 $\{club_id\}+=\{club_id, s_id\}$

Functional Dependencies

17 major
 $\{s_id\}+=\{s_id, specialty, dept_id\}$

18 teaching_assisment
 $\{inst_id\}+=\{inst_id, inst_name, inst_salary, dept_id, course_id\}$

19 stud_history
 $\{s_id\}+=\{s_id, school_name, unt_score, school_gpa\}$

Functional Dependencies

20 grades
 {s_id}+={s_id, course_id, dept_name, grade}

21 medical_center
 {doctor_id}+={doctor_id, doctor_name, s_id}

Relational Algebra

```
SELECT *
  FROM student
 WHERE s_name LIKE '%_a_%'
   AND s_id >= 243832695
```

```
SELECT s_email . email
  FROM s_email, stud_history
 WHERE stud_history . s_id =
       s_email . s_id AND
stud_history . school_gpa = 'A'
```

$$\sigma s_name \text{ LIKE } \%_a\% \text{ AND } s_id \geq 243832695 \text{ student}$$
$$\begin{aligned} &\pi s_email . email \\ &\sigma \text{stud_history . s_id} = s_email . s_id \text{ AND stud_history .} \\ &\text{school_gpa} = "A" (s_email \times \text{stud_history}) \end{aligned}$$

```
SELECT doctor_name from  
    medical_center,grades  
where grades.grade = 'FX' and  
grades.s_id = medical_center.s_id  
order by doctor_id
```

$$\tau \text{doctor_id} \ \pi \text{doctor_name} \ \sigma \text{grades . grade} = "FX" \text{ AND } \\ \text{grades . s_id} = \text{medical_center . s_id} (\text{medical_center} \times \text{grades})$$

```
SELECT * FROM grades  
WHERE grade NOT IN ('FX', 'F')  
order by dept_name DESC
```

$$\tau \text{dept_name} \downarrow \sigma \text{NOT (grade} = "FX" \text{ OR grade} = "F") \text{ grades}$$

```
SELECT s_id FROM student  
    INTERSECT  
SELECT s_id FROM club
```

$\pi_{s_id} \text{student} \cap \pi_{s_id} \text{club}$

```
SELECT book_name  
      FROM library  
INNER JOIN grades  
ON library.s_id = grades.s_id and  
grades.grade = 'A'
```

$\pi_{book_name} (library \bowtie library.s_id = grades.s_id
AND grades.grade = "A" \text{grades})$

```
SELECT * FROM grades  
WHERE grade NOT IN ('FX', 'F')  
order by dept_name DESC
```

$$\tau_{dept_name} \downarrow \sigma_{NOT(grade = "FX" \text{ OR } grade = "F")} grades$$

```
SELECT s_id  
FROM student  
EXCEPT  
SELECT s_id  
FROM club
```

$$\pi_{s_id} student \setminus \pi_{s_id} club$$

```
SELECT s_id  
FROM student UNION SELECT s_id  
FROM club
```

$$\pi_{s_id} \text{student} \cup \pi_{s_id} \text{club}$$

```
SELECT s_id FROM student  
INTERSECT  
SELECT s_id FROM club
```

$$\pi_{s_id} \text{student} \cap \pi_{s_id} \text{club}$$

```
SELECT advisor_name  
FROM advisor EXCEPT SELECT  
    advisor_name  
    FROM advisor  
    WHERE salary < 500000
```

$$\begin{aligned} &\pi_{\text{advisor_name}} \text{advisor} \setminus \pi_{\text{advisor_name}} \\ &\sigma_{\text{salary} < 500000} \text{advisor} \end{aligned}$$