CS 327 Spring 2025

Midterm 1 (Practice)

There are 23 questions on this test.

You may get partial credit for questions 22 and 23. If you finish early, use the extra time to double check your work. You may use notes, slides, videos and all other material given in class on Moodle. You are not allowed to use web search or communicate with anyone during the exam.

The actual exam will be a Moodle quiz, not a printed exam like this.

Time: 80 minutes

Good luck!

Full Name _____

Do not write below this line. Your exam begins on the next page.

EXAM SCORES

Q1-Q10	Q11	Q12-Q21	Q22	Q23	Total

Circle True of False in questions 1-10 (1 point each)

1. SQL works both as a DDL and a DML. (FALSE / TRUE)
2. All Database Management Systems save data in the form of tables. (FALSE / TRUE)
3. All relationship types are binary. (FALSE / TRUE)
4. The primary key of a table may be null. (FALSE / TRUE)
5. A many-to-many relationship is modeled as a separate relation (table) with foreign keys to each of the participating entities. (FALSE / TRUE)
6. We can run *SELECT* queries on views. (FALSE / TRUE)
7. *IN* and *=ANY* mean the same thing. (FALSE / TRUE)
8. In a query, *SELECT COUNT(*)* and *SELECT COUNT(Column_Name)* always return the same result (from the same table). (FALSE / TRUE)
9. In case of nested queries, the queries are evaluated from the inside out. (FALSE / TRUE)
10. The *GROUP BY* and *HAVING* clauses cannot be used together in a query. (FALSE / TRUE)

11. Match by writing the letter from column 1 in the space provided (1 point each)

A	An attribute of an entity type for which each entity must have a unique value	Total participation	E
B	The number of entity types participating in a relationship	Cardinality ratio	D
C	Attribute of a weak entity type that uniquely identifies entities of that type associated with the same identifying entity.	Key attribute	A
D	The number of relationship instances an entity can participate in	Partial Key	C
E	Every entity of a type participating in a relationship	Degree	B

Choose the correct answer in questions 12-21 (1 point each)

12. In a database of employees, which of the following attributes would be the best key?

a. Date of birth
b. Sex
c. Email ID
d. Address

13. Which of the following cannot be represented by an ER diagram?

a. Weak entities
b. Subclass and Superclass
c. Ternary relationships
d. Multi-valued attributes

14. A column in a table that contains data from a column in another table is called

a. Foreign key
b. Partial key
c. Candidate key
d. Primary key

15. A NULL value in a column in a database table may mean:

a. Not applicable
b. Unknown value
c. Missing value
d. Any of the above

16. A rule that specifies what values can or cannot be put in a field is called a:

a. Constraint
b. Query
c. Trigger
d. None of the above

17. Which of these is NOT an aggregate function in SQL?

a. COUNT
b. SUM
c. EXISTS
d. AVG

18. When we delete all records in a table without deleting the table, it is called

a. Dropping
b. Deleting
c. Erasing
d. Truncating

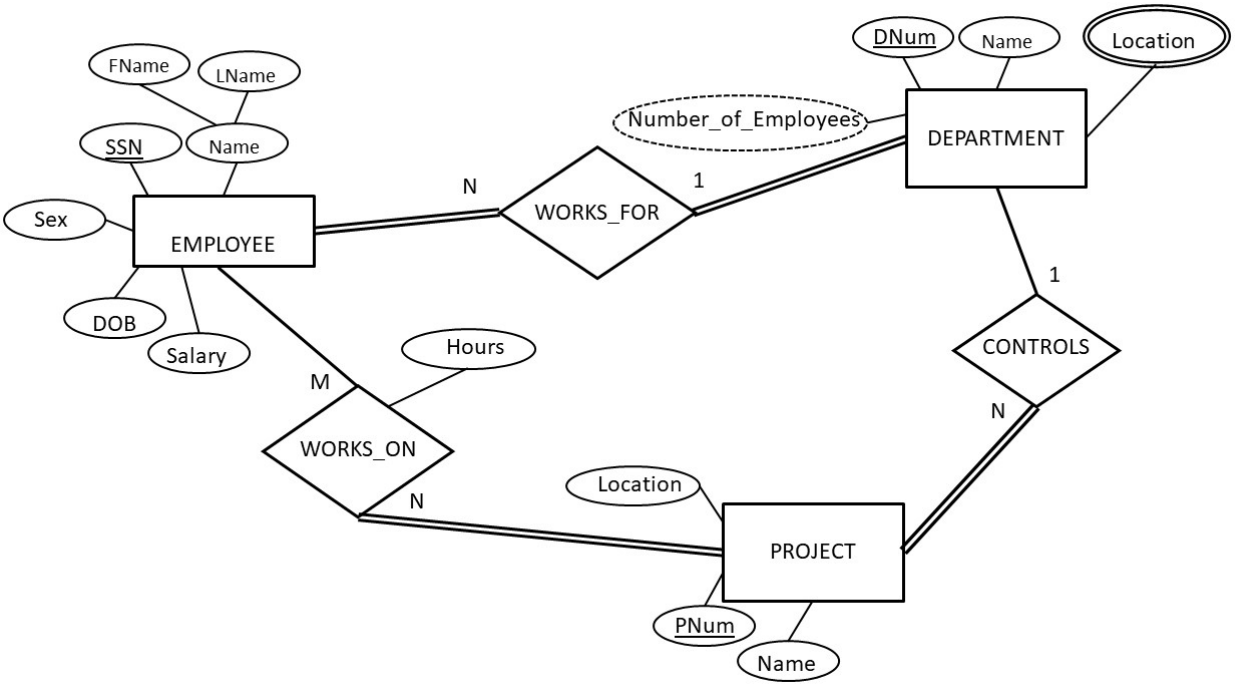
19. A virtual table created for simplifying common queries is called

a. Table
b. View
c. Schema
d. Record

20. If DNO is NULL and SALARY is 40000, the value of the expression *DNO = 5 AND SALARY > 30000* is
    a. True
    b. False
    c. Unknown
    d. NULL

21. Which of these allows us to compare similar (but not identical) strings:
    a. LIKE
    b. EXISTS
    c. =
    d. IN

22. Study the following E-R diagram representing a company database and then answer the questions that follow. (Assume no other entities or relationships exist) **[2 points each]**



a. Give ONE example EACH of a composite attribute, a key attribute and a derived attribute

   Composite – Name
   Key – SSN
   Derived – Number_of_Employees

b. What is the minimum number of departments that an employee can work for? What is the maximum? How do you know?

   Minimum = 1 (Because of double line on employee side)
   Maximum = 1 (Because of 1 on department side)

c. How would this diagram change if every employee was required to work on at least one project?

   There would be a double line between Employee and Works_on

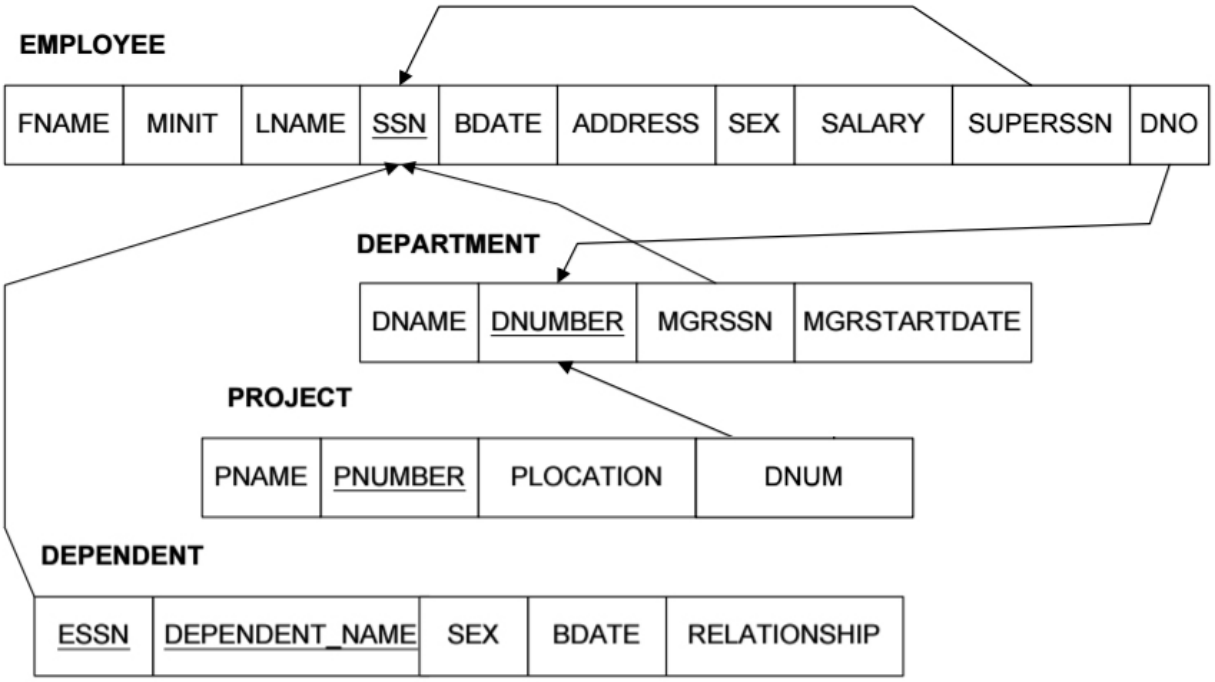
d. While converting this to a relational model, which relationship type(s) will become a relation (table)? Explain briefly.

   Works_on. Because it is an M:N relationship type.

e. While converting to a relational model, if we create a primary-key foreign-key relationship to show CONTROLS between the two relations for DEPARTMENT and PROJECT, which relation will get the foreign key field?

   Project. The foreign key field ALWAYS goes to the relation on the N side of 1:N

13. Study the following relational schema representing a company database and then write MySQL queries for the questions that follow. (Assume no other entities or relationships exist) **[3 points each]**



a. List the first names and last names of all employees born in the 1980s who work in the "Administration" department.

```
select fname, lname
from employee, department
where dno = dnumber and dname = 'Administration' and bdate like '198%'
```

b. List the names of all departments that control a project in Chicago.

```
select dname
from department, project
where dnum = dnumber and plocation = 'Chicago'
```

c. List the names of all departments whose managers do not work in them.

```
select dname
from department, employee
where mgrssn=ssn and dno <> dnumber
```

d. List the first name, last name and SSN of all employees who have a dependent who is the same sex as them

```
select fname, lname, ssn
from employee, dependent
where essn=ssn and employee.sex=dependent.sex
```

e. List the names of all projects that are controlled by departments whose managers started managing them in 2015.

```
select pname
from project, department
where dnum=dnumber and mgrstartdate like '2015%'
```