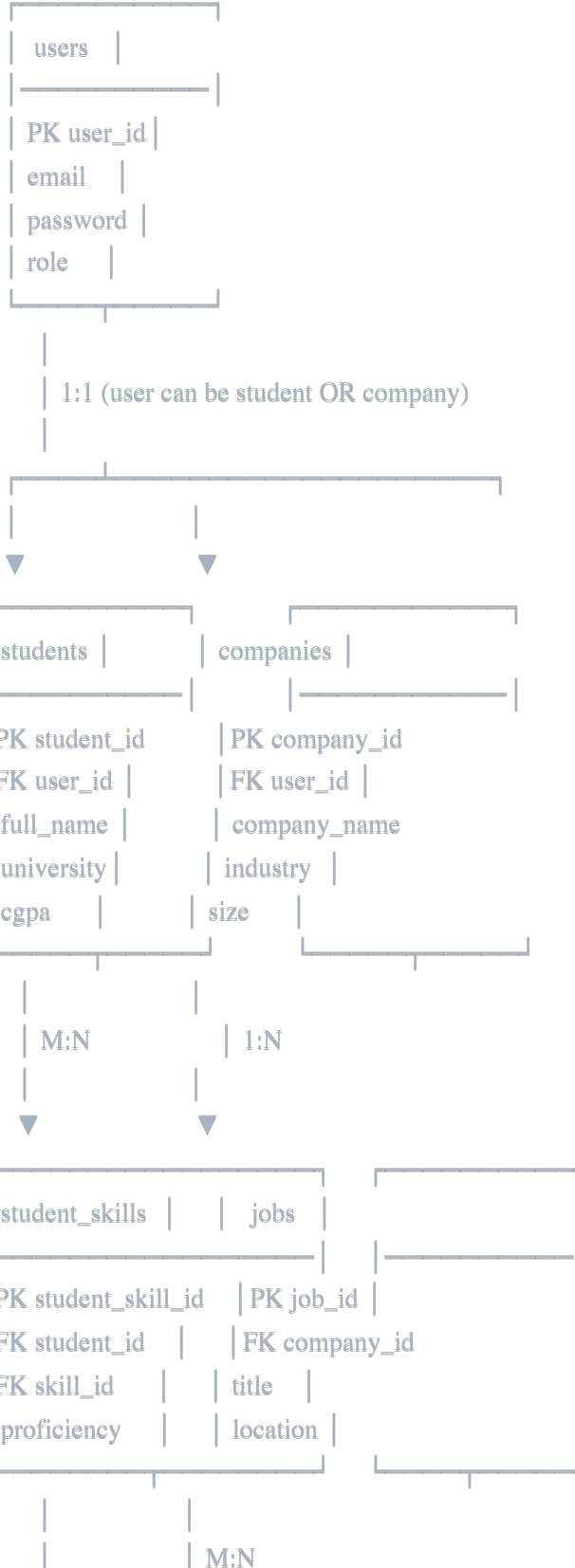
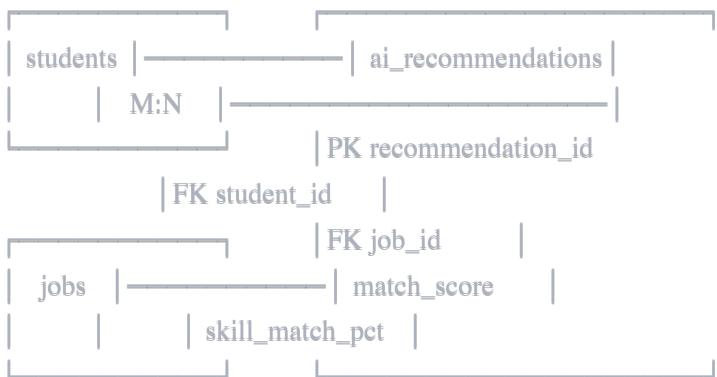
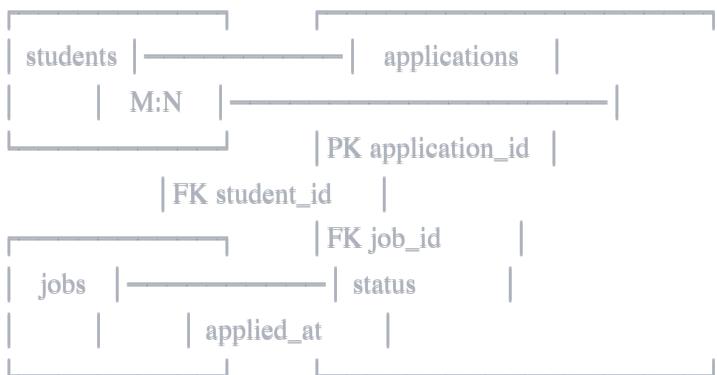


Entity-Relationship Diagram Documentation

Tables and Relationships

PLACEMENT PLATFORM ER DIAGRAM





Relationship Summary

| Relationship | Type | Description |
|-----------------------------------|------|--|
| users → students | 1:1 | One user can have one student profile |
| users → companies | 1:1 | One user can have one company profile |
| companies → jobs | 1:N | One company posts many jobs |
| students ↔ skills | M:N | Via student_skills junction table |
| jobs ↔ skills | M:N | Via job_required_skills junction table |
| students ↔ jobs (applications) | M:N | Via applications junction table |
| students ↔ jobs (recommendations) | M:N | Via ai_recommendations table |

Normalization Proof

First Normal Form (1NF) ✓

- All columns contain atomic values
- No repeating groups (skills are in separate table, not comma-separated)
- Each table has a primary key

Second Normal Form (2NF) ✓

- Already in 1NF
- No partial dependencies (all non-key columns depend on entire primary key)
- Junction tables only contain FKs and relationship-specific attributes

Third Normal Form (3NF) ✓

- Already in 2NF
- No transitive dependencies
- Example: company_name is in companies, not duplicated in jobs

Key Design Decisions

1. **Separate users table:** Authentication concerns are isolated
2. **Skills as master table:** Enables normalization and analytics
3. **Junction tables with attributes:** student_skills has proficiency, job_required_skills has is_mandatory
4. **MongoDB references:** resume_mongo_id and jd_mongo_id link to document store
5. **AI recommendations in SQL:** Structured output from AI is stored relationally for querying