

Database project-G609 project description

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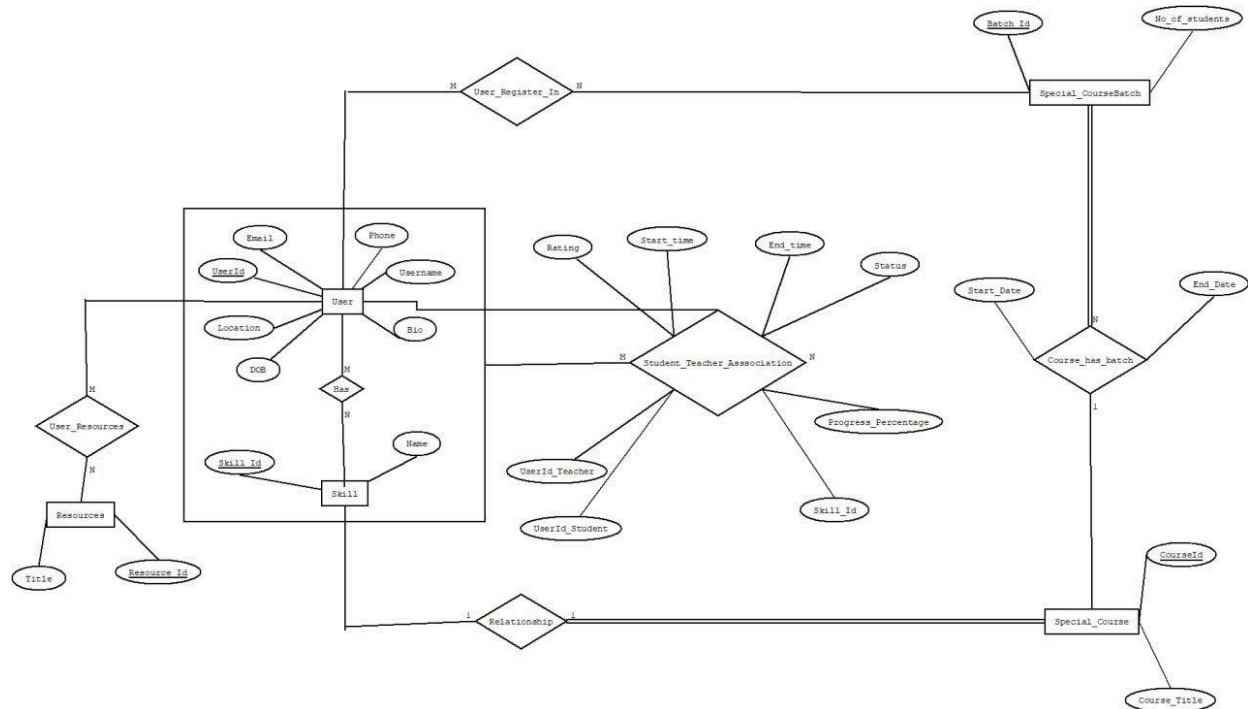
Group Representative:

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Project Title:

SkillSwap – Teach What You Know, Learn What You Love

ER Diagram:

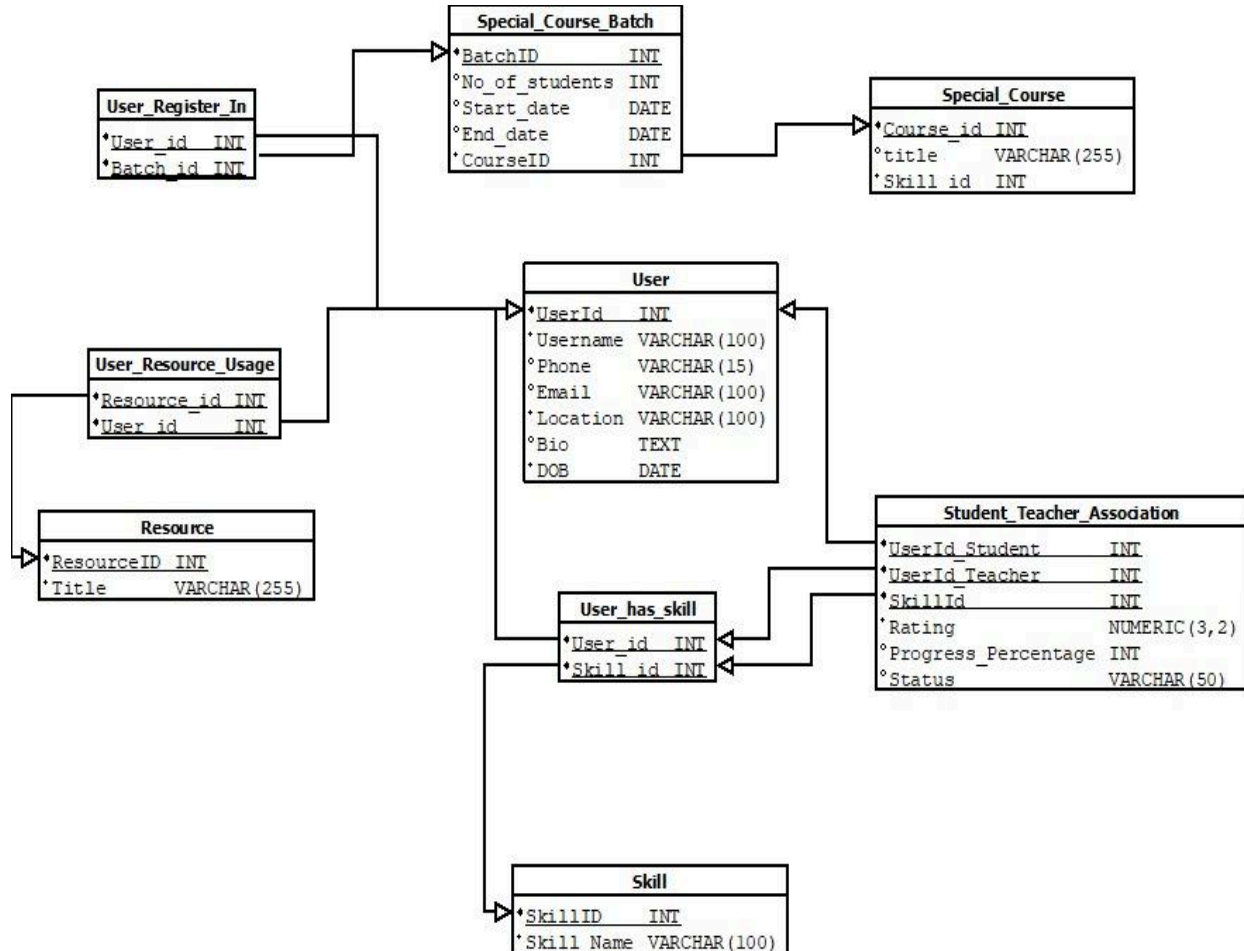


We have updated our previous ER diagram to reflect recent changes in functionality. Some new features have been added, while certain elements were removed after identifying redundancies. Specifically, we found that some functionalities were already implicitly covered, and others could be effectively handled through querying, making them unnecessary in the diagram.

Relational Schema:

1. User(UserID, Username, Phone, email, Location, Bio, DOB)
2. Skill(SkillID, SkillName)
3. UserhasSkill(UserID(FK to User), SkillID(FK to Skill))
4. StudentTeacherAssociation(UserID_Student(FK to User), UserID_Teacher(FK to UserhasSkill), SkillID(FK to UserhasSkill), Rating, ProgressPercentage, Status, Start_Time, End_Time)
5. Resource(ResourceID, Title)
6. UserResourceUsage(ResourceID(FK to Resource), UserID(FK to User))
7. SpecialCourse(CourseID, Title, SkillID(FK to Skill))
8. SpecialCourseBatch(BatchID, NoOfStudent, StartDate, EndDate, CourseID(FK to Course))
9. UserRegisterIn(UserID(FK to User), BatchID(FK to SpecialCourseBatch))

Relational Schema Diagram:



Minimal FD set & BCNF check:

A relation is in BCNF if, for every non-trivial functional dependency $X \rightarrow Y$, X is a superkey.

User:

UserID \rightarrow Username
UserID \rightarrow Phone
UserID \rightarrow email
UserID \rightarrow Location
UserID \rightarrow Bio
UserID \rightarrow DOB

Equivalently: UserID \rightarrow (Username, Phone, email, Location, Bio,DOB)

The above FD set is minimum and it's key is: UserID

BCNF (Key on the left)

Skill:

SkillID \rightarrow SkillName

The above FD set is minimum and it's key is: SkillID

BCNF (Key on the left)

UserHasSkill:

No FDs \Rightarrow BCNF

StudentTeacherAssociation:

(UserID_Student, UserID_Teacher, SkillID) \rightarrow Rating

(UserID_Student, UserID_Teacher, SkillID) \rightarrow ProgressPercentage

(UserID_Student, UserID_Teacher, SkillID) \rightarrow Status

(UserID_Student, UserID_Teacher, SkillID) \rightarrow Start_Time

(UserID_Student, UserID_Teacher, SkillID) \rightarrow End_Time

Equivalently: (UserID_Student, UserID_Teacher, SkillID) \rightarrow (Rating, ProgressPercentage, Status,Start_Time,End_Time)

The above FD set is minimum and it's key is: (UserID_Student, UserID_Teacher, SkillID)

BCNF (Key on the left)

Resource:

ResourceID \rightarrow Title

The above FD set is minimum and it's key is: ResourceID

BCNF (Key on the left)

UserResourceUsage:

No FDs \Rightarrow BCNF

SpecialCourse:

CourseID \rightarrow Title

CourseID \rightarrow SkillID

Equivalently: CourseID \rightarrow (Title, SkillID)

The above FD set is minimum and it's key is: CourseID

BCNF (Key on the left)

SpecialCourseBatch:

BatchID \rightarrow NoOfStudent

BatchID \rightarrow StartDate

BatchID \rightarrow EndDate

BatchID \rightarrow CourseID

Equivalently: BatchID \rightarrow (NoOfStudent, StartDate, EndDate, CourseID)

The above FD set is minimum and it's key is: BatchID

BCNF (Key on the left)

UserRegisterIn:

No FDs \Rightarrow BCNF

- **Now, in all above relations, we saw that all these relations are in BCNF and therefore we can say that our entire database comprises the BCNF properties and thus, our database is in Boy's Codd Normal Form with minimum possible redundancies.**