Cairo University
Faculty of Engineering
Computer Engineering Department
CMP2020

SEM - TEAM I

Introduction to Database Systems

Corrival Competitions

ER Diagram Report

Team Number: One

Team Members

Name	Section	Bench Number
Abeer Hussein Mohamed	01	42
Abdullah Adel Abdullah	01	41
Essam Wisam Fouad	02	01
Hazem Khaled Kasim	01	25

Contact Info:

AbdullahAdel.aam@gmail.com
Eman.ameen69@gmail.com
EssamWisam@outlook.com
HazemKasim3@gmail.com

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Project Description

The database project of our choice is a web-hosted examination and competition portal, where users can register in order to host & create competitions and exams that participants (other users) can join and attempt to solve in a specified time limit.

The key differences between exams and competitions are that competitions reward participants by ranking them higher in the leaderboard based on both the time taken to finish competition and the grade achieved within that time, the top participants in the leaderboard are also subject to awards and achievements which will be added and displayed on their accounts. Exams on the other hand are only concerned with grades, and unlike competitions they allow users to check for their mistakes.

Overall, this project should allow teachers to create challenging environments among their students, which in return should help them keep up with their subjects while having fun. This doesn't just hold true amongst teachers and students since students themselves can make and engage in competitions that were made by other students, this would potentially help upswing their challenging spirit and help them all learn from each other.

"There's always a new challenge to keep you motivated."

-Sean Connery

List of System Users & Their Privileges

List of system users:

1. Host
2. Teacher
3. Participant

Privileges for each:

- **Shared privileges:**
    1. Create an account (Register)
    2. Log in / Log out
    3. Edit profile info or settings
    4. View users' profile
    5. Donate to the website
- **Host privileges:**
    1. Create competitions
    2. Publish competitions
    3. Modify competitions
    4. Delete competitions
    5. Kick competitors
- **Teacher privileges:**
    1. Create exams
    2. Publish exams
    3. Modify exams
    4. Delete exams
    5. Grant entry to exams
    6. View & modify students' results
- **Participant privileges:**
    1. Participate in available competitions & exams
    2. Submit responses to the competition or exam
    3. Give a review for competitions after the submission
    4. Review exams' answers after the finish date
    5. Write tasks in his/her to-do list

Entities Description

1. User

The “User” entity describes everything about the registered user. It represents the user on the website so that he/she can uses all the features like creating and/or participating in competitions and/or exams, users are also able to view their profile and other users' profile.

2. Competition

The “Competition” entity represents the competition that a host would create and then publish so that other users can participate in it. A competition is composed of a number of multiple-choice questions in which competitors will attempt to answer. Then, after submitting answers, competitors are ranked in the leaderboard based on their finish time and number of correct answers.

3. Exam

The “Exam” entity represents an exam that was created and published by a teacher, then gives his/her students the access code (password) to the exam so that they can enter the exam and answer the multiple-choice questions. After submitting their answers, each student will be able to see his/her own grade. Students will be also able to see the correct answers after the exam's end date.

4. Award

The “Award” entity is represented in our website in the shape of a badge/achievement that users can earn by being ranked up in the top five [Bronze, Silver, Gold, Platinum, Diamond] in a leaderboard of a competition. These badges/achievements will be then displayed in the user's profile. Awards are only granted for participating in competitions.

5. Leaderboard

The "Leaderboard" entity represents a list which contains the results of a competition's participants. The results are sorted by the score of each participant. The score calculated from the time taken for this participant to finish and the number of correct answers. Top five participants will earn awards. A Leaderboard is only created with competitions.

6. Question

The "Question" entity describes how a question will be displayed on the website. Any question is represented by the question itself, the answer choices, and the correct answer.

7. Answer

The "Answer" entity represents the answers of a participant in exams. We store the answers of the participants in the exams in order to make them able to review their answers and compare them to the correct answers.

8. To-Do

The "To-Do list" entity represents a list of tasks which a user can manage on their profile to add tasks that he/she wants to do. Each user has only one to-do list.

9. Review

The "Review" entity represents the user review on a competition. After a participant submits his answers in a competition, he/she will be then directed to review the competition by giving it a rating and a comment if he/she wants to review the competition. Reviews are then displayed in a separate tab in order to let other users to see them.

10. Donations

The "Donations" entity represents the donations that are made by the users who wants to support us and help us keep this service free. A donation is composed of the doner details, and donation amount.

Relationships Description

1) "Earns"

Identifying Relationship "User - Award":

the relation defines if the user has received an award in a competition or not, where “Award” is a weak entity which is identified by the “User” & “Competition” entity types.

2) "From"

Identifying Relationship "Award - Competition":

The relation defines the competition from which a certain award was granted to any specific user (i.e. this and the previous relation are complementary; “Users earn awards from competitions”)

3) "Participates"

Relationship "User - Competition":

This is a many-to-many relation which will list all the competitions the user has participated in and all the users that participated in the competition.

4)"Has"

Identifying Relationship "Competition - Leaderboard":

Each competition will have one leaderboard to show the ranking of participants in it according to their score.

5) "RanksIn"

Identifying Relationship "User - Leaderboard":

Any user participating in a competition will be ranked in the competition's leaderboard according to his/her score in the competition.

6) "HasQ"

Relationship "Competition - Questions":

Each competition must have one or more questions in it.

7) "Solves"

Relationship "User - Exams":

This is a many-to-many relation which will list all the exams the user has solved and all the users that solved the exam.

8) "Contains"

Relationship "Exam - Questions":

Each exam must have one or more questions in it.

9) "Gives"

Identifying Relationship "User - Answers":

Answers are identified by the user who gave them.

10) "To"

Identifying Relationship "Questions - Answers":

Answers are also identified also by the question for which the answer was given.

11) "Writes"

Identifying Relationship "User - Review":

The review is identified by the user who wrote it.

12) "For"

Identifying Relationship "Competition - Review":

The review is also identified by the competition for which the review was written.

13) "Creates"

Identifying Relationships "User - To-do List":

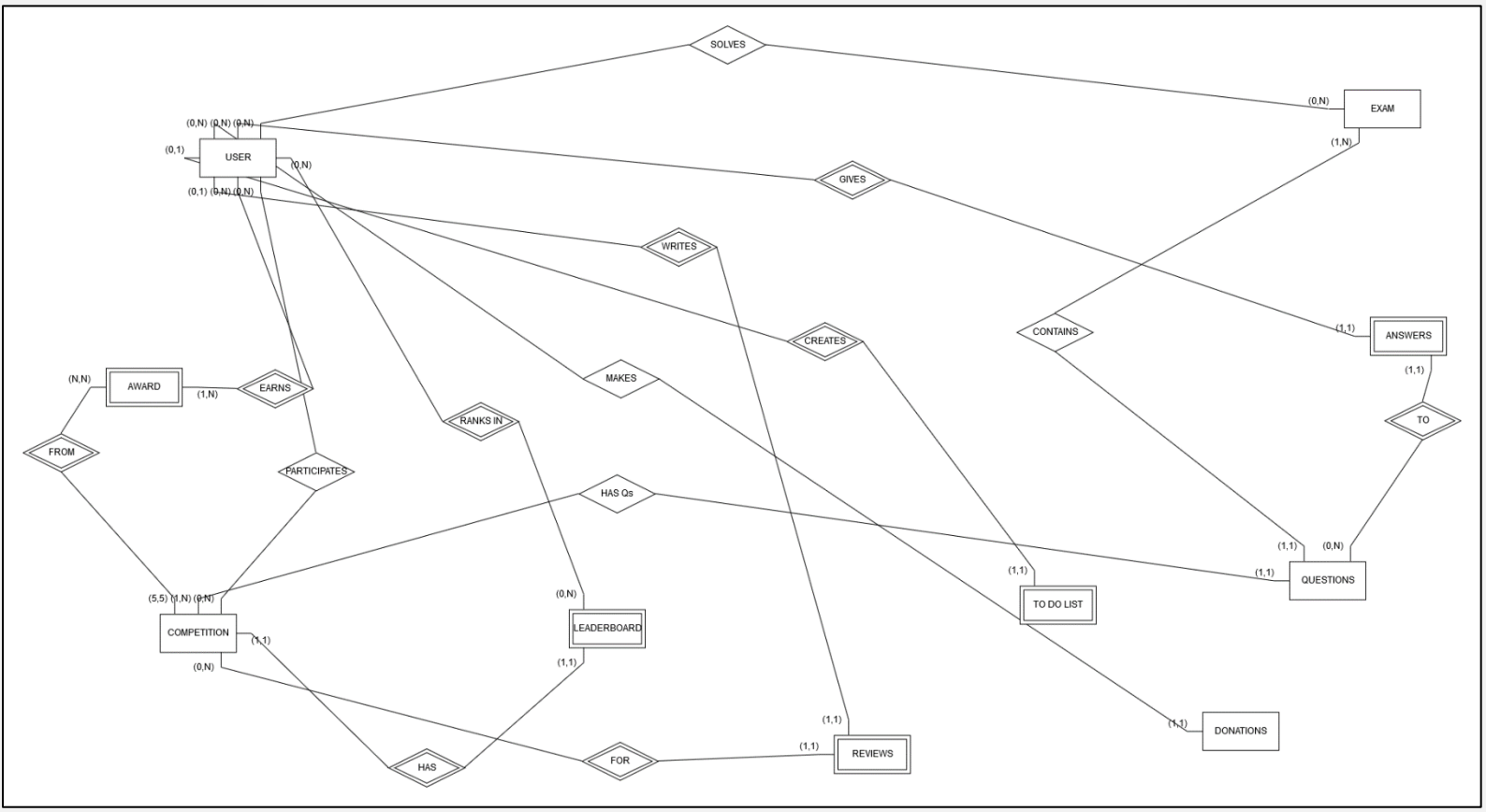
The relation connects the user with his/her to-do-list where they can add tasks, reminders, and deadlines once created.

14) "Makes"

Relationship "User - Donations":

Users are able to support the website by giving donations via multi-payment methods.

ER Diagram [Hidden Attributes]



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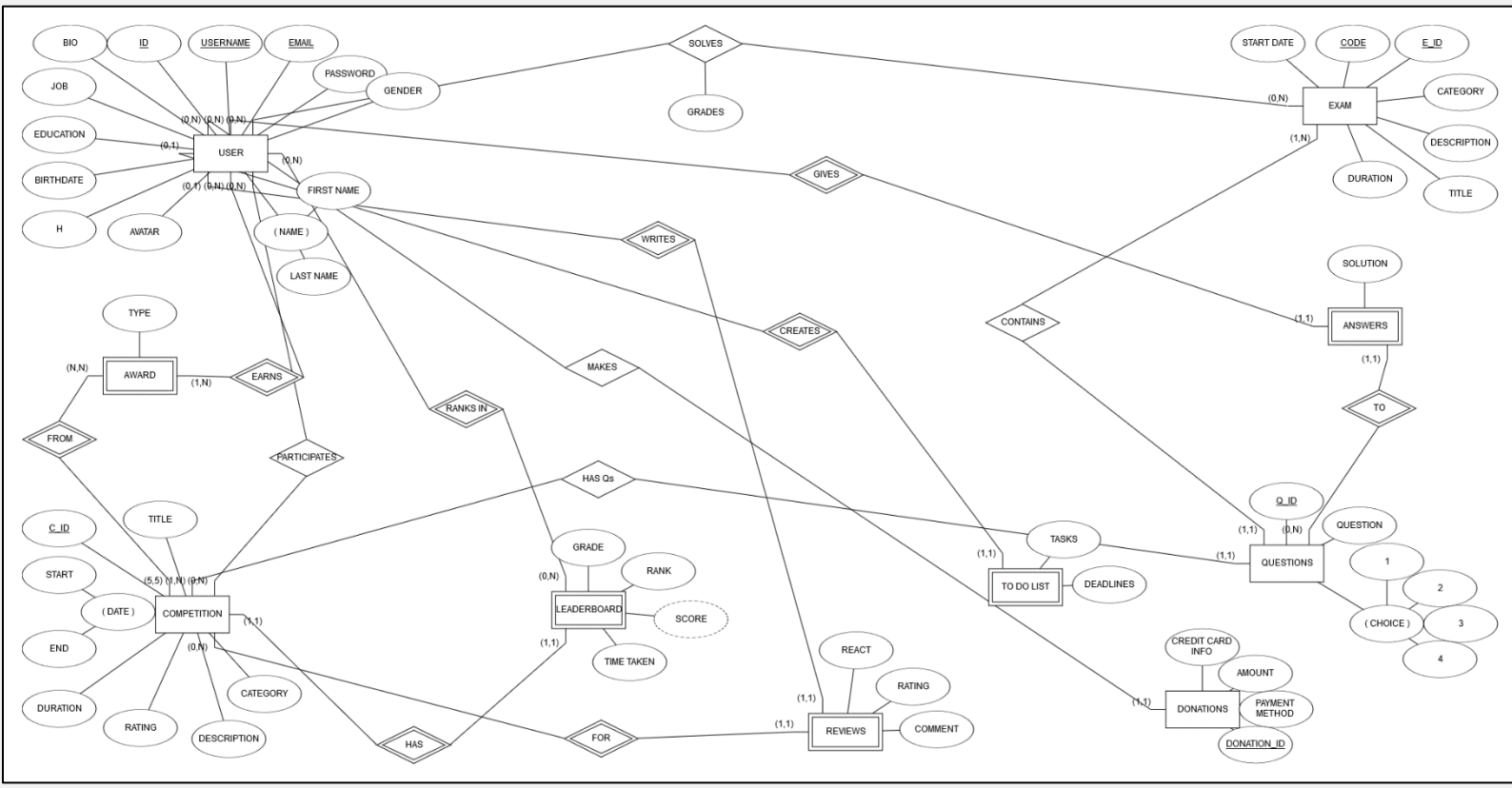

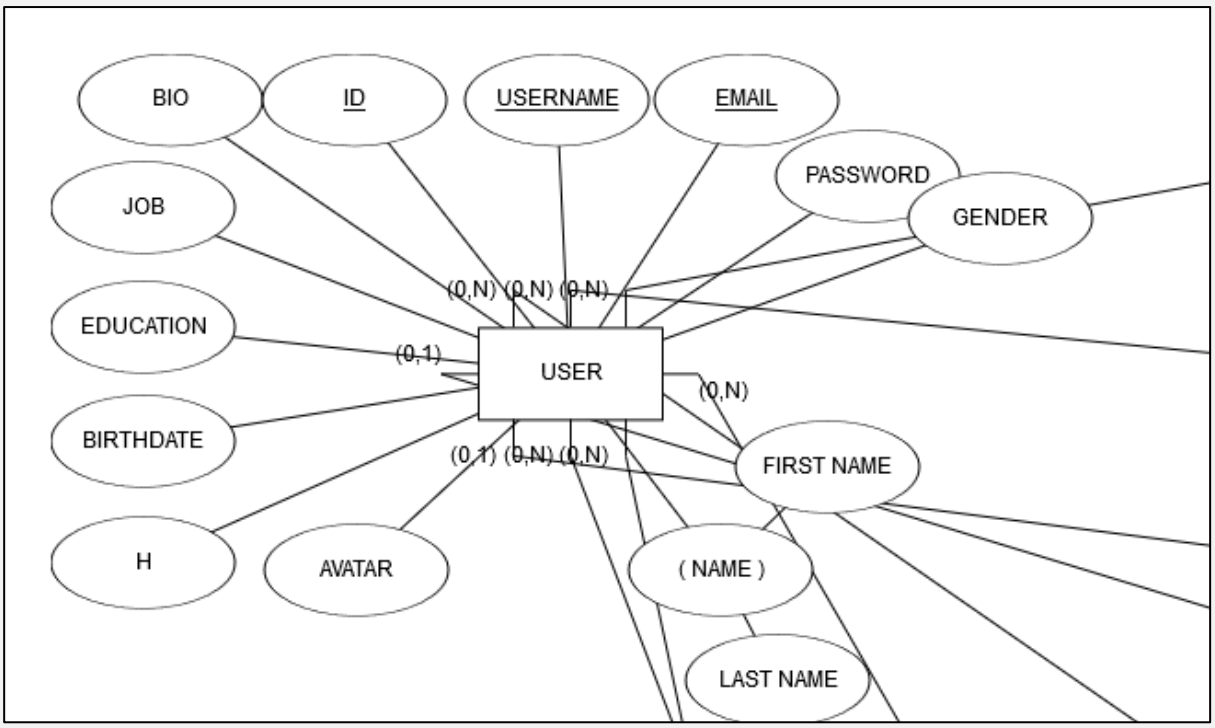
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JOB
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(0,N)
(0,1) (0,N) (0,N)
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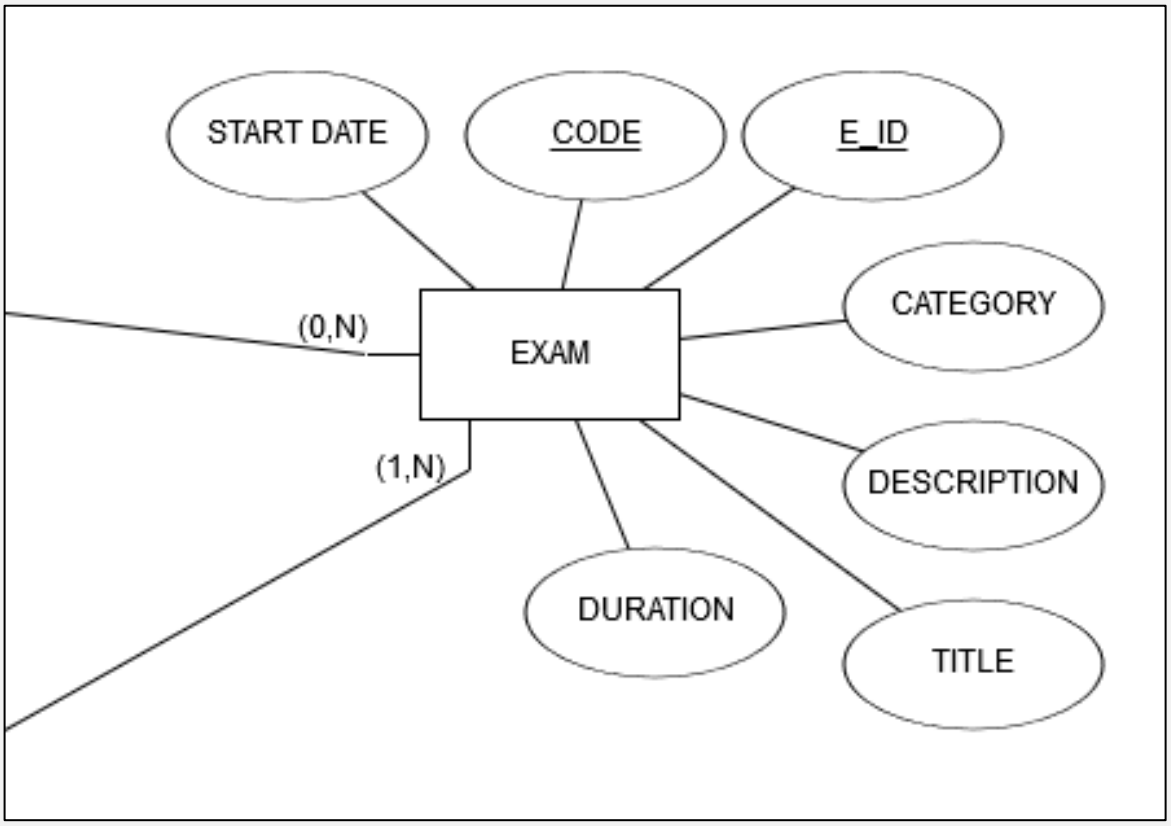
(NAME)
LAST NAME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TITLE

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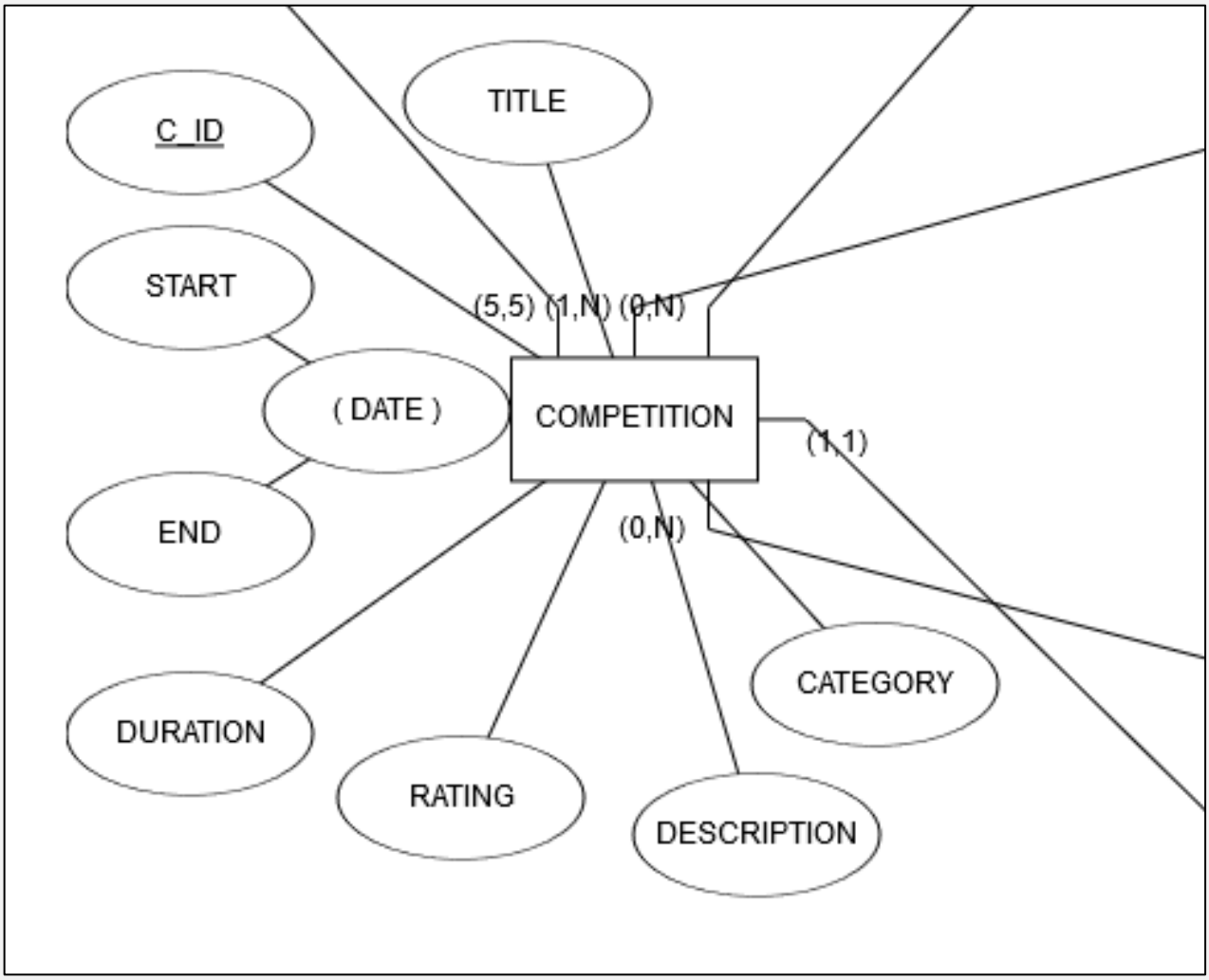
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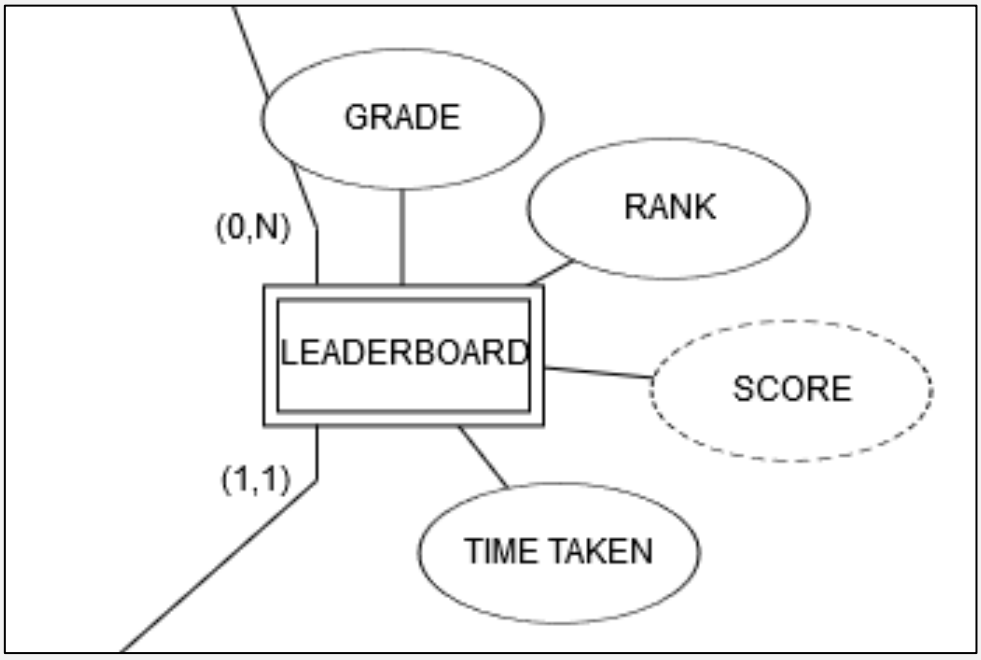
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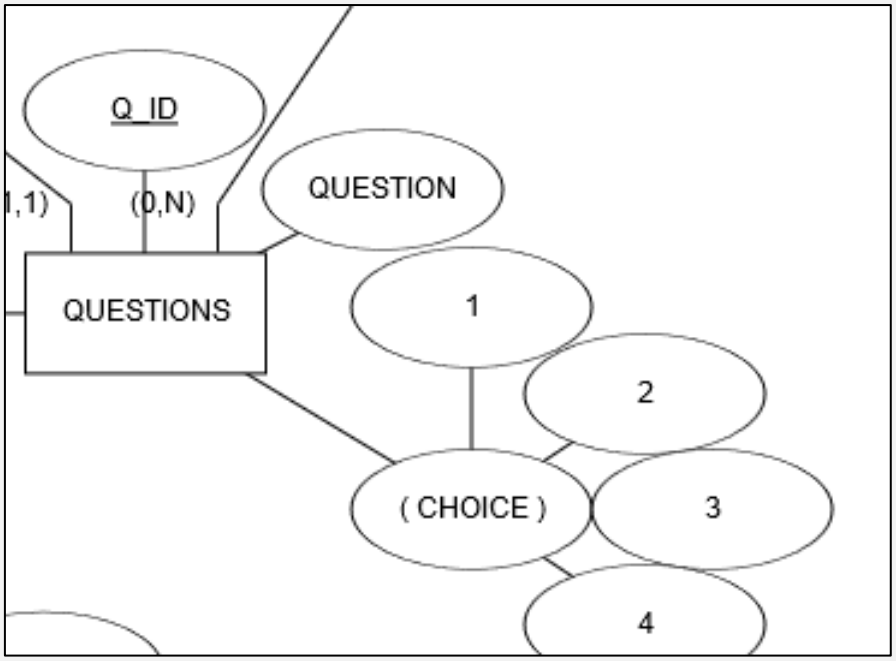
TIME TAKEN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2
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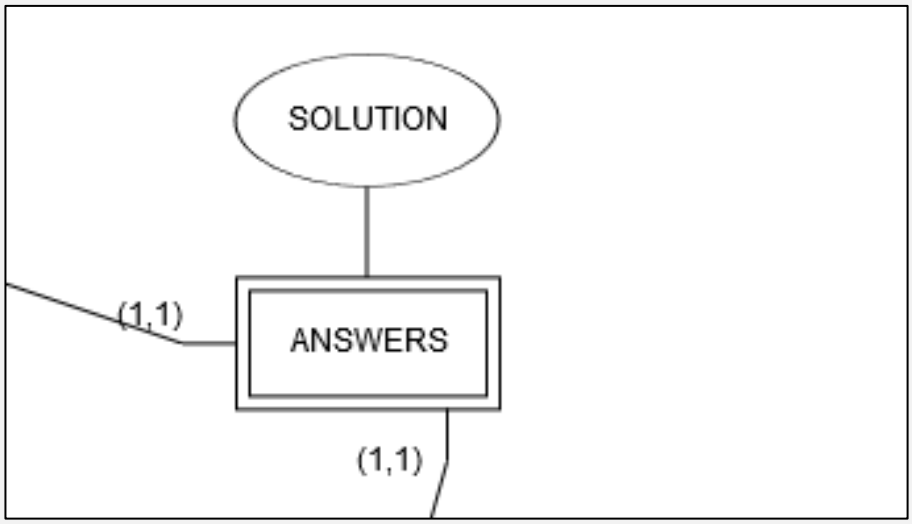
3
4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ANSWERS
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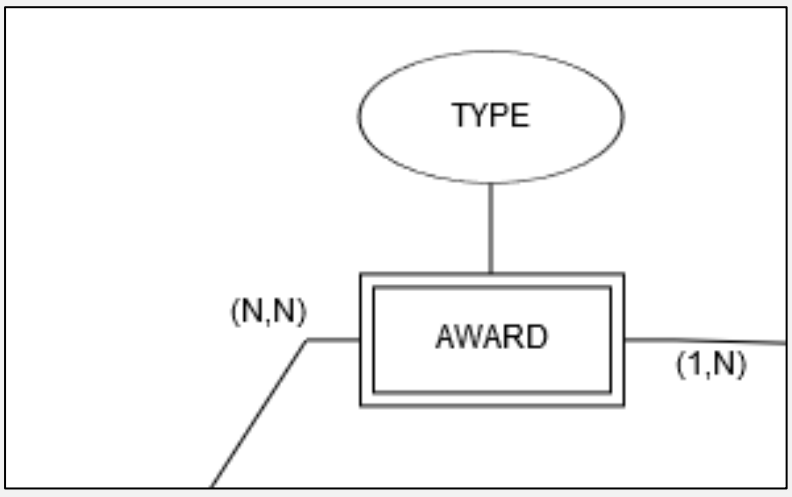
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AWARD
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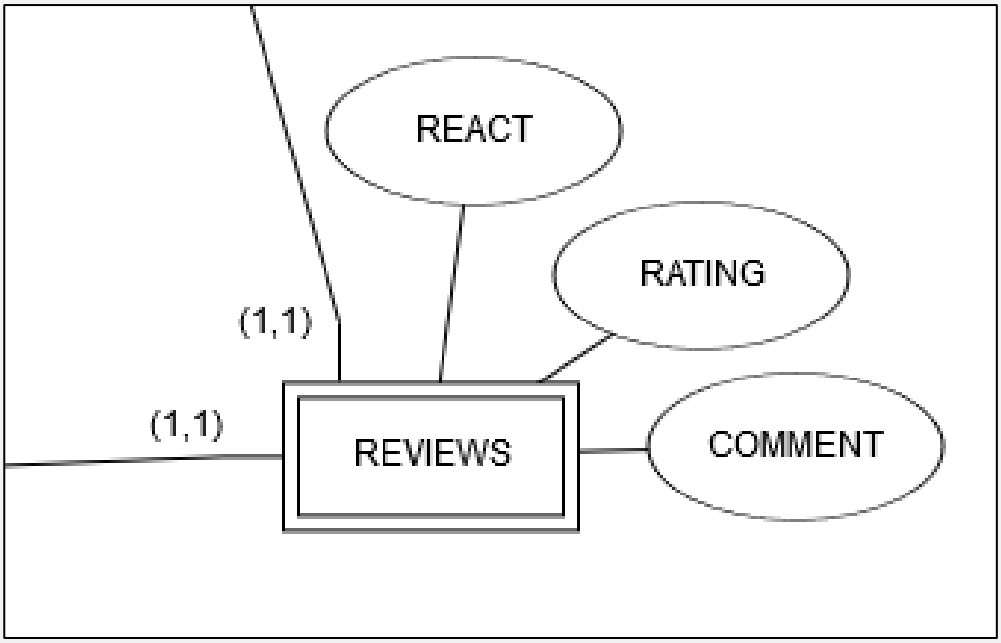
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RATING
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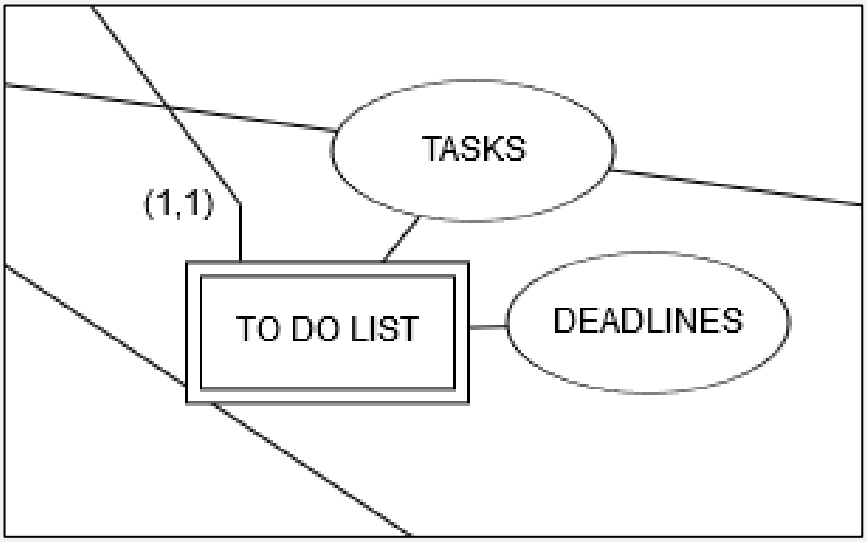
REVIEWS
COMMENT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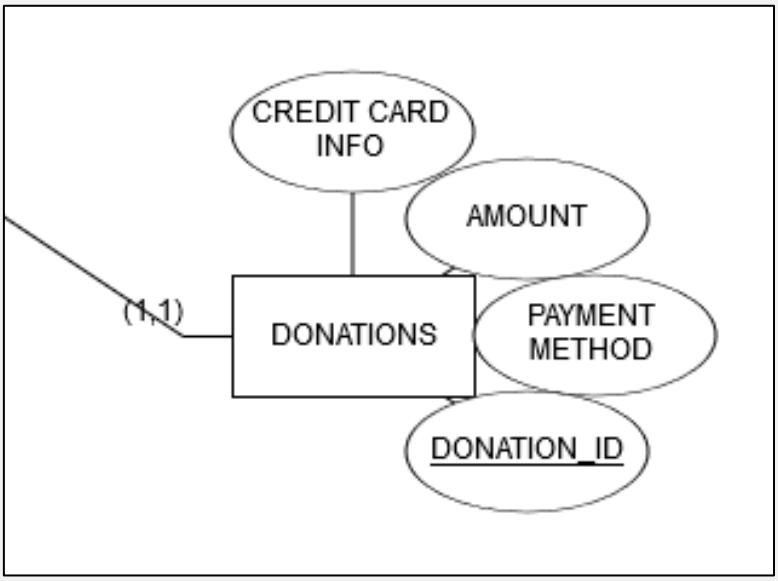
DEADLINES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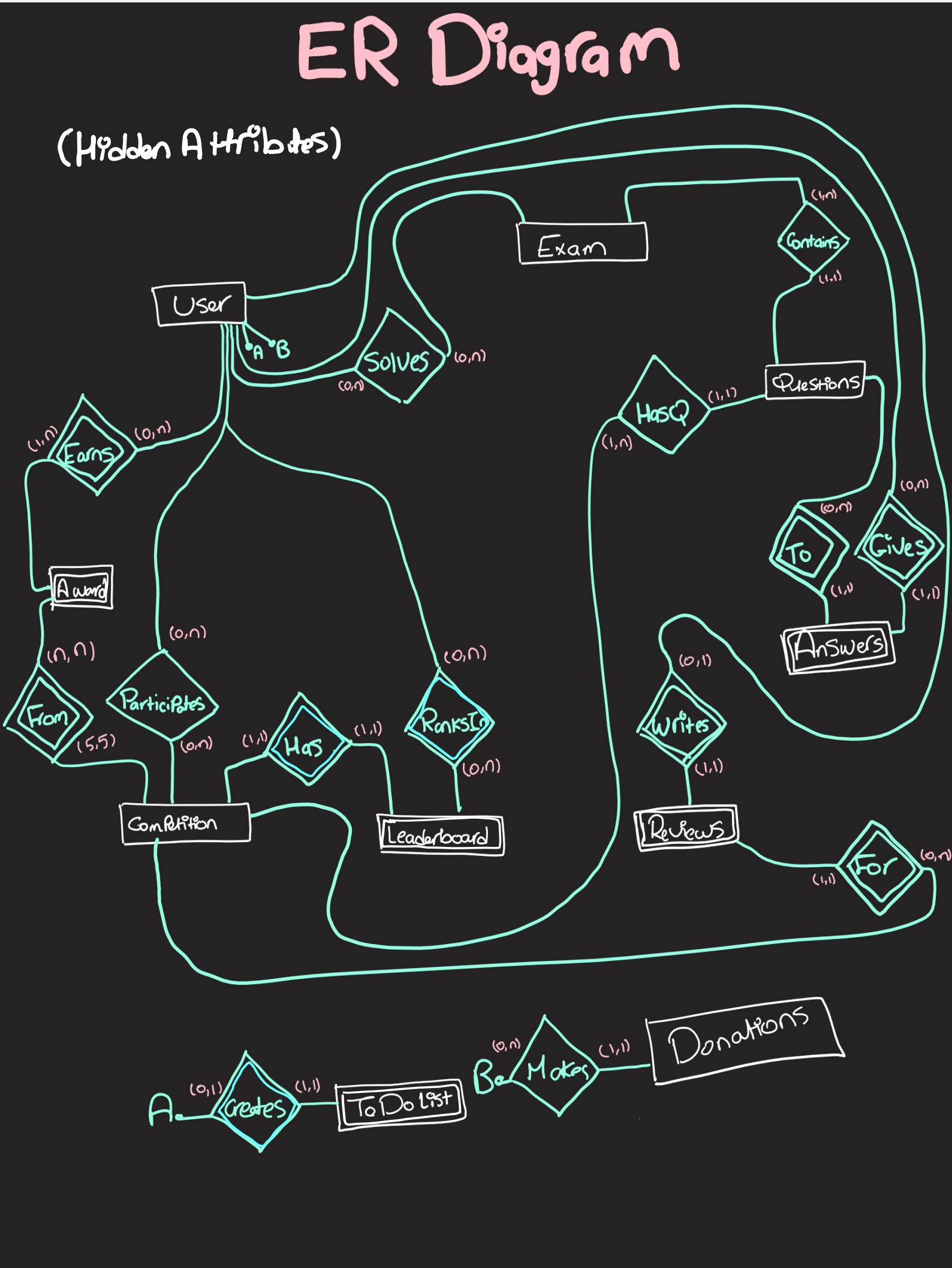
PAYMENT METHOD
DONATION_ID


ER Diagram
(Hidden Attributes)
User
A
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Solves
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(0,n)
Exam
Contains
(1,n)
(1,1)
Questions
HasQ
(1,1)
(1,n)
Earns
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Award
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To
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Gives
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Answers
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Writes
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Reviews
For
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From
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Participates
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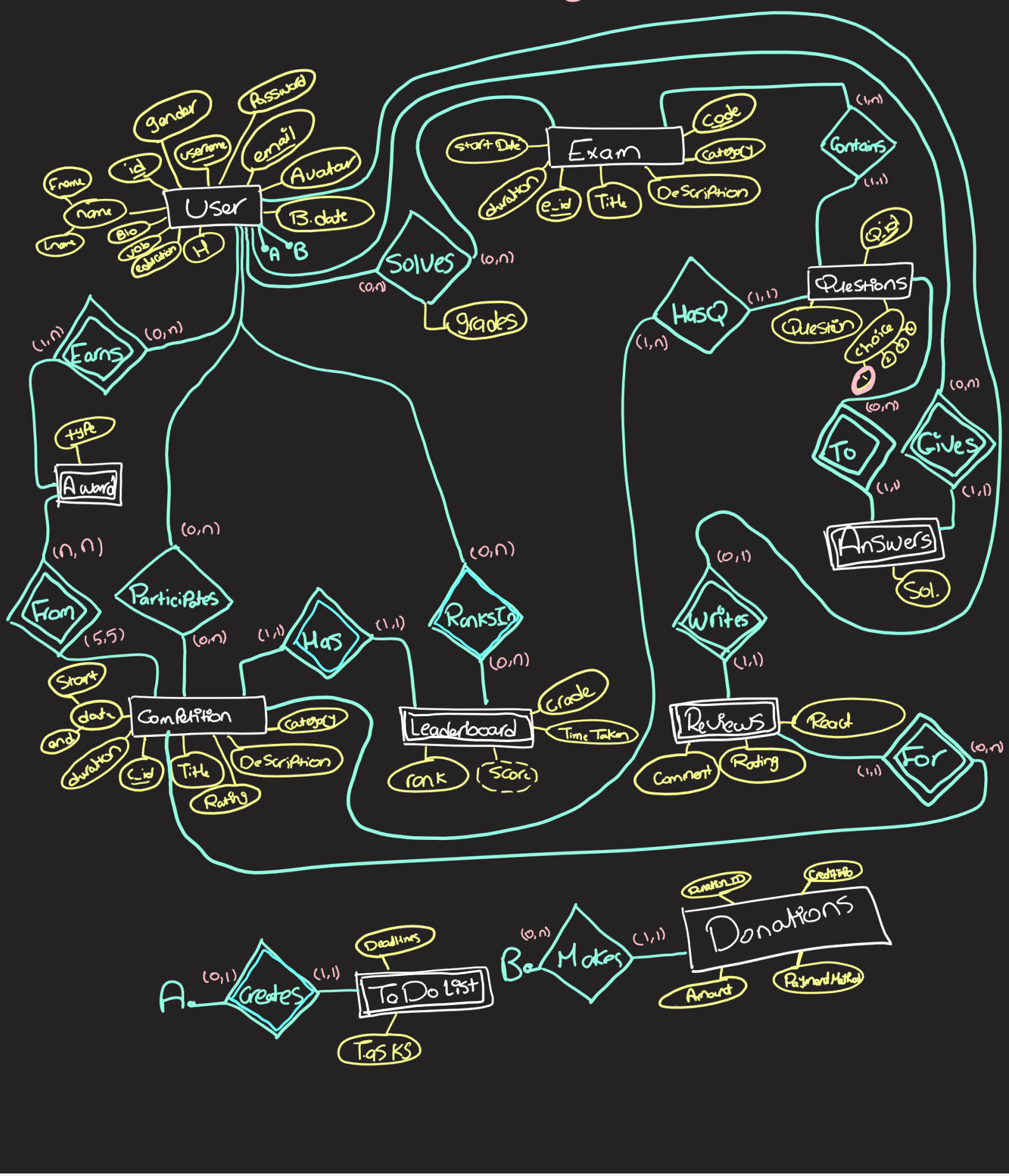
Competition
(1,1)
Has
(1,1)
RanksIn
(0,n)
Leaderboard
A
(0,1)
Creates
(1,1)
To Do List
B
(0,n)
Makes
(1,1)
Donations

ER Diagram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Start
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Leaderboard
Grade
Time Taken
rank
Score
Reviews
React
Comment
Rating
For
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Creates
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ToDo List
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Tasks
B
Makes
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Donations
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