Data And Applications HW-1

Team Number : 3

- Swayam Agrawal [2021101068]
- Yash Kawade [2021101032]
- Rohan Kumar [2021101070]

****

The Mini-World

It's the end of the fourth year at Hogwarts and House-Cup points have not been calculated yet for this year .Professor McGonagall is very concerned as she has to report the points to the headmaster (Dumbledore) , so she plans to hire some Computer Science students from the Muggle World to make a database which will help them calculate the House Cup points and then she later plans to obliviate them (remove their memory of the Wizarding-world).

The purpose of this database thus is to assist them by designing a lucid database which will help count points very easily.

The users of this database thus will be the Professors at Hogwarts which are calculating the House-Cup points.

This database enables everyone to see how much each student in each house contributed to the House-cup points calculation and motivates every student to excel in all fields such as scoring well in all courses , doing well in sports/extracurriculars and developing skills. These are some of the applications / benefits of this database.

Database Requirements

Assumption : Quidditch has not been shown in the movie (Goblet Of Fire) , so we assume the Quidditch happened just at the beginning of the year which went like : Slytherin defeated Hufflepuff (Draco Malfoy although helped their team win but he played with poor sportsman spirit. Hufflepuff's seeker Cedric Diggory saved Gregory Goyle of Slytherin from falling off his wand while he was keeping the hoop) and Gryffindor defeated Ravenclaw (where Harry helped them win the match by acquiring the Golden Snitch just at half-time and Cho Chang who is the Ravenclaw's striker performed extremely well by scoring 6-7 goals in the game).

Entity types :

- ## Students:
    Names: (Attribute)
    1. Harry Potter
    2. Hermione Granger
    3. Ron Weasley
    4. Draco Malfoy
    5. Cedric Diggory
    6. Cho Chang
    7. Fred & George Weasley
    8. Parvati
    9. Padma
    10. Seamus Finnigan
    11. Viktor Krum
    12. Fleur Delacour

    Above twelve are some of the attribute values.

    Appearance: (multivalued attribute)

    e.g. Ron has a tall, thin and gangling, with freckles, big hands and feet, a long nose and red hair.
    Ginny Weasley has a flaming red hair (which she wears in a long mane) and a freckled complexion.

- ## Professors:
    Names: (Attribute)
    1. Albus Dumbledore
    2. McGonagall
    3. Severus Snape
    4. Mad Eye-Moody
    5. Hagrid
    6. Filius Flitwick
    7. Pomona Sprout

    Above seven are some of the attribute values.

- ## Villains:
    Names: (Attribute)
    1. Voldermort
    2. Wormtail
    3. Barty Crouch Jr.
    4. Lucius Malfoy
    5. Death Eaters

    Above five are some of the attribute values.

- ## Spells:

Names: (Attribute)
1. Expelliarmus
2. Expecto Patronum
3. Avada Kedavra
4. Crucio
5. Imperio
6. Accio
7. Confundo
8. Alohomora
9. Incendio
10. Wingardium-Leviosa

Above ten are some of the attribute values.

- **Houses :**
  Names: (Attribute)
  1. Gryffindor
  2. Ravenclaw
  3. Hufflepuff
  4. Slytherin

  Above four are the attribute values.

- Here these attribute values are the <u>primary keys</u> for the houses entity type.

- **Courses:**
  Names: (Attribute)
  1. Potions
  2. Charms
  3. Defense against the dark arts
  4. Herbology

  Above four are the attribute values.

- **Quidditch Game:**
  Seekers (Attribute)
  Keepers (Attribute)
  Beaters (Attribute)
  Chasers (Attribute)

  e.g. Attribute value for the seeker attribute is Harry Potter.

- **Pets: (Weak Entity)**

  Names: (Attribute)
  Owl (of Harry)
  Rat (of Ron)
  Cat (of Hermione)
  Toad (of Neville)

  - Pets entity is a <u>weak entity</u> because we cannot uniquely identify them without

the owner entity (here students).
- Here these attribute values are the <u>partial keys</u> for the pets entity type.

<u>Composite Attribute</u> in this database : The names of students (First name, middle name, last name).

This database can derive some other useful attributes from the pre-existing attributes such as :
 For example : The color of students' hair (<u>derived attribute</u> from appearance attribute of students').

Relationship Types :

- <u>Taught:</u>
  Professors <u>taught</u> students
  E.g. Severus Snape taught Harry Potter, Ron, etc.
  Degree - 2
  Participating entity types - Professor and Student
  Cardinality ratio - 1 : N

- <u>Belongs to:</u>
  Each student <u>belongs to</u> a particular house.
  E.g. Ron belongs to Gryffindor house
  Degree - 2
  Participating entity types - Student and House
  Cardinality ratio - 1 : 1

- <u>Scored:</u>
  Each student <u>scored</u> some marks in OWL's of courses.
  E.g. Ron <u>scored</u> 50 in Potions course.
       Hermione <u>scored</u> 100 in Charms course.
  Degree - 2
  Participating entity types - Student and Course
  Cardinality ratio - 1 : N

Degree > 2 Relationship Types:

- <u>Used against:</u>
  Student <u>used</u> spells <u>against</u> villains
  E.g. Harry Potter <u>used</u> Expecto Patronum <u>against</u> Voldermort.
  Degree - 3
  Participating entity types - Student , Spells and Villains
  Cardinality ratio - 1 : N : 1 for Student : spells : villain

- Positioned in:
  Student positioned in some house as some attribute of the Quidditch game entity.
  E.g Cedric Diggory <u>positioned in</u> Hufflepuff as Seeker of the Quidditch game.
  Degree - 3
  Participating entity types - Student , House and Quidditch Game.
  Cardinality ratio - 1 : 1 : 1 for Student : House : Quidditch game.

Functional Requirements

Retrievals:

- Selections:
  1. List of all students
  2. List of all houses

- Projections:
  1. Head of a house
  2. Show students with brown hair

- Aggregate:
  1. Total numbers of students in a house
  2. Days between two quidditch tournament

- Search:
  1. Search professors by name
  2. Search professors by course

- Analysis:
  1. Most frequent spell used by a student
  2. List of students who participated in consecutive quidditch tournament

Modification:

- Insertion:
  1. Adding student to a house
  2. Adding student to a course

- Updation:
  1. Modify the seeker of house
  2. Modify the professor of course

- Deletion:
  1. Removing student from a house
  2. Removing student from a course

Summary:

The above database can provide information about quite a lot of things like the Logistics, Administration, Student Body ,and extra activities at Hogwarts like Quidditch.

It can be also used to judge a student's abilities in Wizardry as well as skills in all the courses provided there (For example : To estimate how good Neville is in potions; or how does Ginny perform in the Charms class) thus can be helpful to gauge a plan to improve themselves in all aspects possible.

Overall, it fulfills the purpose of calculating the points for the house cup tournament and a lot of extra useful things.

The journey ends here, McGonagall proceeds to use obliviate on the students erasing their memory of this insightful database.

Thank You.

****