Assignment 1

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Introduction to the mini world

This mini world is based on the movie Monsters Inc. It stores information pertaining to the company run by the monsters. The city runs on the basis of the energy harvested from the kid's screams. The screams are created by monsters scaring the children.

Purpose of the database

To carefully store the different entities appearing in the movie such as Monsters, Kids, Doors, Agency, etc and how they relate to each other. It also has functions which can be used to retrieve other information in order to help the users of the database. With the help of this database, data can be organized in an intuitive and logical manner which leads to clarity and quick access.

Users of the database

The incorporation's headquarters, monsters, assistants, accountants.

Application of the database

Assistants can assign monsters to children. They can check for the availability of the monsters. Kids behind the doors can be identified. Monster earning the highest screams can be identified. Total number of doors and kids can be viewed.

Strong Entities:

Monster:

Role {scarer, assistant, trainee, accountant}	simple attribute	varchar
SkinColour {}	Multivalued Attribute	varchar
MonsterID {8 digit number}	Primary key, simple attribute	int(8)
Name {}	Composite Attribute	varchar
TotalScreamsHarvested	simple attribute	int
CDA:		
Name {}	Composite Attribute	varchar
Id	primary key	int
Department	Composite Attribute	varchar
Doors:		
doorID	primary key	int
doorColour	Multivalued Attribute	varchar
doorLocation	Composite Attribute	varchar
SmuggledChildItem:		
ItemID	primary key	int
ItemColour:	Multivalued Attribute	varchar
IfItemWasCapturedByCDA {y/n}	simple attribute	varchar
OwnerOfItem:	simple attribute	varchar

Weak entities:

Child:

Name {}	Partial Key	varchar

Door Color	Multivalued attribute	varchar
Gender	Multivalued attribute	varchar
PrisonCell:		
CellNo	primary key	int
MonsterName	Multivalued Attribute	varchar

Relationship Types

Assistant and scarer -> ASSIGNED_TO

Degree: 1
Participating entity: Monsters
Cardinality ratio: 1:1
Participation constraint: Partial Participation: Partial Participation
(min, max) constraint : (0,1):(0,1)

CDA manager and its employee-> MANAGES

Degree: 1
Participating entity: CDA
Cardinality ratio: 1:N
Participation constraint: Partial Participation: Partial Participation
(min, max) constraint : (0,N):(0,1)

Monster and Child:-> SCARES (identifying relationship)

Degree: 2
Participating entity: Monsters, Child
Cardinality ratio: 1:N
Participation constraint: Partial Participation: Total Participation
(min, max) constraint : (0,N):(1,1)

Prison and Monster:-> HOSTS (identifying relationship)

Degree: 2
Participating entity: PrisonCell, Monster
Cardinality ratio: 1:N
Participation constraint: Total Participation: Partial Participation
(min, max) constraint : (1,N):(0,1)

the cda employee assigned to the prison cell and the monster in it :-> WHICHCELL

Degree : 3
Participating entity: CDA, PrisonCell, Monster
Cardinality ratio: 1: 1: N
Participation constraint: Partial Participation: Total Participation: Partial Participation
(min, max) constraint : (0,1):(1,N):(0,1)

Monster and Door/Child -> IS_ASSIGNED_TO

Degree : 3
Participating entity: Monster, Door, Child
Cardinality ratio: N: 1: 1
Participation constraint: Partial Participation: Partial Participation: Total Participation
(min, max) constraint : (0,N):(0,1):(1,1)

Functional Requirements

Modifications:

1. Insert
    1.1. Monsters: After they are hired for the Inc
    1.2. Human Babies: After they are born
2. Delete
    2.1. Monster: is fired from the company
    2.2. PrisonCell : Monsters from that PrisonCell are released
3. Update
    3.1. Monster upgraded from trainee to scarer
    3.2. Monster scares a new child and upgrades their score

Retrievals

1. Selection (rows)
    1.1. List all details of monsters having a particular role
    1.2. List all details of officers who are at managerial positions in the CDA
2. Projections (Column)
    2.1. List the name of the children who are of a particular gender
    2.2. List names of monsters belonging to a particular cellNo.
3. Aggregate
    3.1. The total screams harvested by the incorporation (SUM)
    3.2. The monster with the highest number of screams harvested (MAX)
4. Search
    4.1. List all monsters whose name starts with a particular letter
    4.2. List all doors whose colour starts with a particular alphabet
5. Analysis
    5.1. List all monsters whose kids have brought in an item and the item has not yet been confiscated by the CDA (Red-listed monsters)

Assumptions

- Each monster has a unique idNumber, two monsters can have the same name.
- Each child has one door and each door has a child behind it.
- Every child has a scarer assigned to him, i.e child cannot exist without a scarer.
- Each employee in the CDA has only one manager.
- Each monster is of a particular type {scarer, assistant, trainee}.
- Each prison cell can have multiple monster
- CDA employees arrest and guard the prison cell
- There is at least one monster in prison at all times.

Summary

The database has 6 entities in total. It has 6 relationships (2 ternary, 2 binary, and 2 recursive relationships). Through the database the many characters in the film, including Monsters, Kids, Doors, Agency, etc., as well as their relationships with one another are stored and analyzed. In order to assist database users, it also provides functions that can be used to retrieve more data.