Mini World of the Project: Clash of Clans

Introduction to the Mini World:
The Mini World we create in the project is the World of Clash of Clans. We gather and store the data of all of the elements in clash of clans.

Purpose of the Database:
1. The Main Purpose of the database is to act as a repository for each user, to keep track of the various elements in their bases.
2. To store and keep track of the various elements in clash of clans.
3. To keep track of the strength of individual users, to help recruiters decide whether or not a player is strong enough to be recruited into a clan or not.

Users of the database:
1. The administrators of various clans need all the player's data to make recruitment decisions.
2. The spectators interested in the game and wanted to know that logistics of the games can use the database.
3. The users of the clash of clans itself, who would like to keep track of the state of the bases of the people they are interested in. (For Example, A person would like to see how well their friends base was growing).

Applications of the Database:
1. To keep track of the statistics of the individual bases.
2. To keep track of one's own base i.e., the levels of the buildings and amount of resources present.
3. To keep track of the statistics of clans.
4. To keep track of the current loyalties of the individual players.

Entity Types:
Strong Entity Types:

1. **Village Base**
   a. Village ID (Key Attribute)
   b. Season Points
   c. Rewards
2. **Magic Items**

    a. Name of the magic item (Key Attribute)

    b. Maximum number of items can be acquired

    c. Effective period

3. Barracks

    a. Name of the troop(Key Attribute)

    b. Level of the troop

    c. Current hitpoint

    d. Favourite target

    e. Housing space

    f. Moment speed

    g. Damage per second

    h. Hitpoints

4. Defences

    a. Defence name(Key Attribute)

    b. Defence type(Multi valued Attribute for the defence name ie, can be air, ground or air/ground).

    c. Level

    d. Range

    e. Targets(Multi valued Attribute)

    f. Favourite Targets

    g. Damage Type

    h. Hitpoints

    i. Damage per second

5. Obstacles

    a. Name of the obstacle(Key Attribute)

    b. Number of the corresponding obstacles

    c. Amount to remove them

6. Builder Huts

    a. Name of the Hut(Key Attribute)

    b. Status of builder

    c. Hitpoints

7. Spell factory

    a. Name of the spell(Key Attribute)

    b. Level of the spell

    c. Brewing time

    d. Target

    e. Housing space

f. Effective period

g. Hitpoints

8. **Army**(Entity with 2 key attributes)
   a. Name of the item/building(Key Attribute)
   b. Level of the item/Building
   c. Hitpoints of the item/Building
   d. Damage per second of the item/Building
   e. Regeneration time(Key Attribute)
   f. Movement speed
   g. Target
   h. Favourite target

9. **Traps**
   a. Name of the trap(Key Attribute)
   b. Number of those specific traps
   c. Level
   d. Favourite target
   e. Trigger Radius

Weak Entity Types:

1. **Town Hall**
   a. Level
   b. Total amount of resources (Composite Attribute)
      i. Total amount of gold
      ii. Total amount of elixir
      iii. Total amount of dark elixir
   c. Hitpoints

2. **Clan Castle**
   a. Clan name
   b. Level
   c. Received Troops
   d. Status
   e. Hitpoints

3. **Resource Collectors**
   a. Type of resource it collects
   b. Level of the collector
   c. Production rate
   d. Capacity

      e. Hitpoints(c, d, e are the derived attributes from b)
4. **Lab**
      a. Level of the lab
      b. Troop which is updating at the present moment
      c. Current level of the troop
      d. Updated level of the troop
      e. Hitpoints
      f. Change in the level(Derived attribute, derived from c, d)
5. **Treasury**
      a. Type of treasure
      b. Amount of that treasure
6. **Resource Storage**
      a. Type of Resource
      b. Storage capacity
      c. Hitpoints
      d. Level

Relations:
Binary Relations:
1. Contains the:
      a. This is the relation between the Townhall and the magic items.
      b. Min max cardinality
         i. Townhall(1, 1).
         ii. Magic Items(0, N).
2. Stores the:
      a. This is the relation between the Clan castle and the Treasury.
      b. Min max cardinality
         i. Clan castle(1, 1).
         ii. Treasury(0, N).
3. Transfer to:
      a. This is the relation between the Resource collectors and resource storages.
      b. Min max cardinality
         i. Resource Collectors(1, N).
         ii. Resource Storages(1, N).

Ternary Relations:
1. Unlock the Troop or spell:
    a. This is the relation between the Barracks, Spell factory and laboratory.
    b. Min max cardinality
        i.   Barracks(1, 1).
        ii. Spell factory(1, 1).
        iii. Laboratory(1, 1).

N-ary Relations:
1. Consist of:
    a. This is the relation between the village base and the town hall, clan castle, resource collectors, resource storages, builder huts.
    b. Min Max cardinality
        i.   Village base(1, 1).
        ii. Townhall(1, 1).
        iii. Clan Castle(1, 1).
        iv. Resource Collectors(1, N).
        v.   Resource Storages(1,N).
        vi. Builder huts(1, 5).

Functional Requirements:
Retrieval:
1. **Selection:**
    a. Retrieve all the data tuples of the troops, trained in a given base
    b. Retrieve all the data tuples of the status of the builders in the builder huts.
    c. Retrieve all the data tuples of the air defences of a particular base.
2. **Projection:**
    a. Select all the troops of a certain level, who have a hit-rate greater than a given threshold.
    b. Select all Clan castles, with an amount of gold greater than a given threshold.
3. **Aggregate:**
    a. The maximum gold present in one town hall in the entire

b. The average number of working builders in a builder hut.

4. **Search:**
   a. Search for the town halls with levels above a certain threshold.
   b. Search for all the resource collectors with productivity above a given threshold.

5. **Analysis:**
   a. The Base, that corresponds to the town hall with the highest amount of gold within a given clan.
   b. The Base, that corresponds to the town hall with the highest levelled troop.

Modifications:

1. **Insert:**
   a. When a new user logs into COC for the first time, insert a new village base, with his unique id.
   b. On unlocking a troop/spell, insert that new troop/spell, with all of its given attributes.
   c. On purchasing a building insert it into all of its given attributes.

2. **Update:**
   a. Update the Town hall or any building if the user decides to and pay's the required amount of gold.
   b. Update the amount of gold in the storages over time when collected/spent.
   c. Update the level and remaining attributes of a troop is it is selected for an upgrade with the new ones.

3. **Delete:**
   a. Delete a user when he requests to terminate his account.
   b. Delete selected obstacles, by removing the required amount of resources from the storages.

Summary:

The Database created above gives the clear information of a village base and its capability to sustain in wars. This database can be used by the clan leaders to invite a user into the clan or by spectators interested to join the Clash of Clans family.