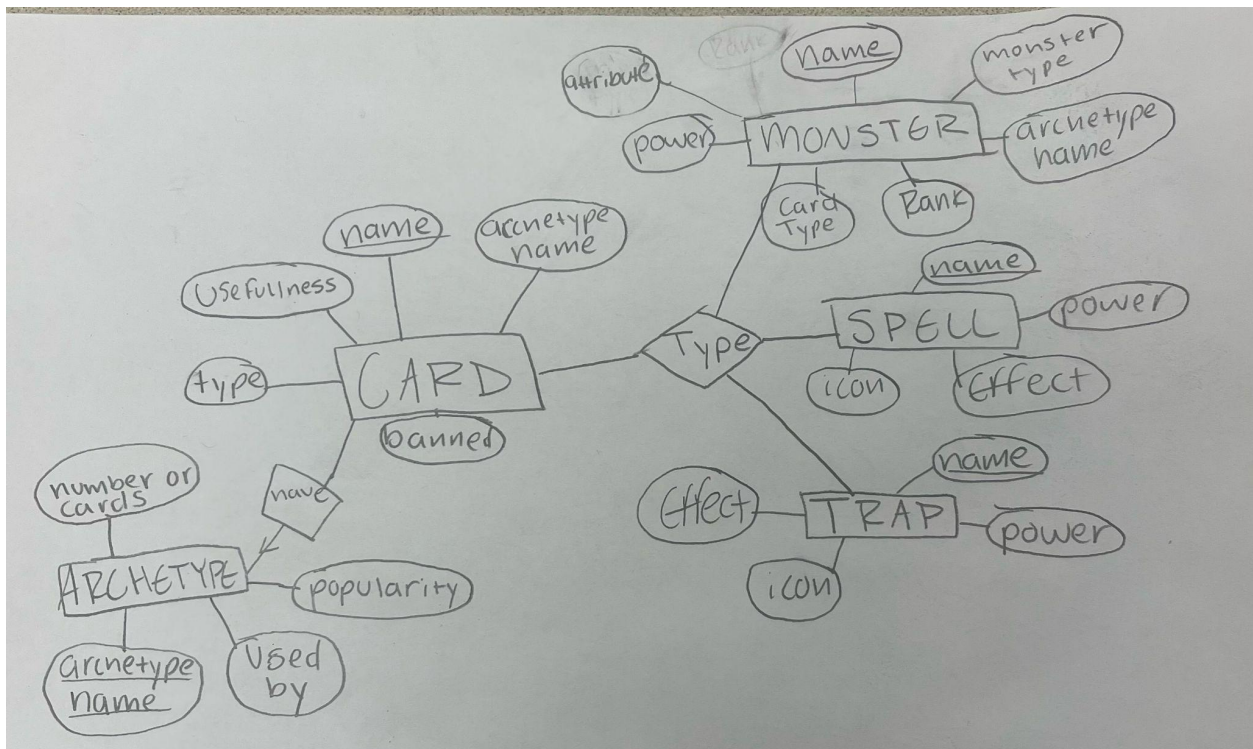# Yu-Gi-Oh! Database System

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Introduction

First and foremost I would like to thank you for the opportunity to work at the Butler Computer Database Design Consulting Company (BCDDCC), I will not let you down. In this report I will showcase the database system I have built based on the anime trading card game, Yu-Gi-Oh! This is a game that has been very important to me especially in my childhood so I hope you like it! Its time to code!(A   spin   of   a   catchphrase   from   the   show)

Part 1:

The first step of me creating this database was to first build an E-R diagram(pictured down below) that showed the different entities and how they are related. In this I created a "Card" entity, which is related to an "Archetype" entity with a one to many relationship as one card can have many archetypes. I also created "Monster", "Spell" and "Trap" entities all related to "Card" with a one to one relationship. Each entity has many attributes that help describe the most important things about it and the primary key is underlined.

After creating this diagram I wrote the code for each table and input many different types of cards into the database. The tables are pictured below.

Card:

name	type	archetype	usefullness	banned
Annihilator Archfiend	Monster	Archfiend	6	no
Apoqliphort Skybase	Monster	Qli	10	yes
Apoqliphort Towers	Monster	Qli	10	no
Archfiend Black Dragon	Monster	Archfiend	7	yes
Archfiend Black Skull Dra	Monster	Archfiend	7	yes
Archfiend Cavalry	Monster	Archfiend	4	no
Archfiend Commander	Monster	Archfiend	6	no
Archfiend Palabyrinth	Spell	Archfiend	9	no
Archfiend's Oath	Spell	Archfiend	7	no
Beacon of White	Spell	Blue-Eyes	8	no
Black Whirlwind	Spell	Blackwing	4	no
Blackwing-Backlash	Trap	Blackwing	4	no
Blackwing-Bombardment	Trap	Blackwing	6	no
Blackwing-The Raven	Monster	Blackwing	3	no
Blue-Eyes Toon Dragon	Monster	Toon	9	no
Blue-Eyes White Dragon	Monster	Blue-Eyes	9	no
Call of the Archfiend	Trap	Archfiend	2	yes
Chaos Form	Spell	Blue-Eyes	9	no
Clock Wyvern	Monster	Cyber	7	yes
Code Radiator	Monster	Cyber	3	no
Cyber Blader	Monster	Cyber	6	no
Cyber Dragon	Monster	Cyber	8	no
Cyber Network	Trap	Cyber	4	no
Cyber Revsystem	Spell	Cyber	6	no
Emergency Call	Trap	X-Saber	6	no
Eternal Galaxy	Trap	Galaxy	9	yes
Fake Feather	Trap	Blackwing	3	no
Galactic Charity	Spell	Galaxy	2	no
Galaxy Brave	Monster	Galaxy	6	no
Galaxy Cyclone	Spell	Galaxy	8	no
Galaxy Dragon	Monster	Galaxy	6	no
Harpie Feather Duster	Spell	Harpie	10	yes
Harpie Lady 1	Monster	Harpie	3	no
Harpie Lady Elegance	Trap	Harpie	6	no
Harpie Lady Sisters	Monster	Harpie	5	no
Harpie's Pet Dragon	Monster	Harpie	8	no
Kaibaman	Monster	Blue-Eyes	6	no
Laser Qlip	Spell	Qli	8	no
Maiden with Blue Eyes	Monster	Blue-Eyes	7	no
Malefic Claw Stream	Trap	Malefic	7	yes
Malefic Cyber End Dragon	Monster	Malefic	9	no
Malefic Divide	Spell	Malefic	5	no
Malefic Rainbow Dragon	Monster	Malefic	8	no
Malefic Stardust Dragon	Monster	Malefic	8	no
Malefic Truth Dragon	Monster	Malefic	10	yes
Malefic Tune	Trap	Malefic	6	no
Malefic World	Spell	Malefic	9	no
Neutron Blast	Spell	Blue-Eyes	9	no
Photon Vanisher	Monster	Galaxy	5	no
Qlife's End	Trap	Qli	7	no
Qlimate Change	Trap	Qli	6	no
Qliphort Genius	Monster	Qli	5	no
Red-Eyes Toon Dragon	Monster	Toon	9	no
Saber Hole	Trap	X-Saber	7	no
Saber Reflection	Spell	X-Saber	5	no
Toon Barrel Dragon	Monster	Toon	8	no
Toon Buster Blader	Monster	Toon	7	no
Toon Defense	Trap	Toon	5	no
Toon World	Spell	Toon	9	yes
X-Saber Axel	Monster	X-Saber	2	no
X-Saber Souza	Monster	X-Saber	5	no
XX-Saber Gottoms	Monster	X-Saber	9	no

Archetype:

aname	used_by	popularity	num_of_cards
Archfiend	antagonist	6	48
Blackwing	antagonist	7	57
Blue-Eyes	protagonist	9	67
Cyber	antagonist	9	45
Galaxy	protagonist	8	55
Harpie	protagonist	3	53
Malefic	antagonist	2	23
Qli	protagonist	8	27
Toon	antagonist	5	36
X-Saber	antagonist	6	32

Monster:

name	aname	attribute	rank	monster_type	Card_type	power
Annihilator Archfiend	Archfiend	Dark	9	Fiend	Effect	2000
Apoqliphort Skybase	Qli	Earth	9	Machine	Effect	2900
Apoqliphort Towers	Qli	Earth	10	Machine	Effect	3000
Archfiend Black Skull Dra	Archfiend	Dark	9	Dragon	Fusion	3200
Archfiend Cavalry	Archfiend	Dark	4	Fiend	Effect	1900
Archfiend Commander	Archfiend	Dark	6	Fiend	Effect	2500
Blackwing-The Raven	Blackwing	Dark	6	Winged-Beast	Effect	2200
Blue-Eyes Toon Dragon	Toon	Light	8	Dragon	Effect	3000
Blue-Eyes White Dragon	Blue-Eyes	Light	8	Dragon	Effect	3000
Clock Wyvern	Cyber	Wind	4	Cyberse	Effect	1800
Code Radiator	Cyber	Water	4	Cyberse	Effect	1600
Cyber Blader	Cyber	Earth	7	Warrior	Fusion	2100
Galaxy Brave	Galaxy	Light	8	Warrior	Effect	0
Galaxy Dragon	Galaxy	Light	4	Dragon	Effect	2000
Harpie Lady 1	Harpie	Wind	6	Winged-Beast	Effect	1950
Harpie Lady Sisters	Harpie	Wind	4	Winged-Beast	Effect	1350
Harpie's Pet Dragon	Harpie	Wind	7	Dragon	Effect	2000
Kaibaman	Blue-Eyes	Light	3	Warrior	Effect	200
Maiden with Blue Eyes	Blue-Eyes	Light	1	Spellcaster	Effect	0
Malefic Cyber End Dragon	Malefic	Dark	10	Machine	Effect	4000
Malefic Rainbow Dragon	Malefic	Dark	10	Dragon	Effect	4000
Malefic Stardust Dragon	Malefic	Dark	8	Dragon	Effect	2500
Malefic Truth Dragon	Malefic	Dark	12	Dragon	Effect	5000
Photon Vanisher	Galaxy	Light	4	Warrior	Effect	2000
Qliphort Genius	Qli	Earth	2	Machine	Link	1800
Red-Eyes Toon Dragon	Toon	Dark	8	Dragon	Effect	2400
Toon Barrel Dragon	Toon	Dark	7	Machine	Effect	2600
Toon Buster Blader	Toon	Earth	7	Warrior	Effect	2600
X-Saber Axel	X-Saber	Earth	1	Beast-Warrior	Effect	400
X-Saber Souza	X-Saber	Earth	7	Warrior	Synchro	2500
XX-Saber Gottoms	X-Saber	Earth	9	Beast-Warrior	Synchro	3100

Spell:

name	icon	effect	power
Archfiend Palabyrinth	field	Summon	5
Archfiend's Oath	continous	Draw	4
Beacon of White	equip	Summon	7
Black Whirlwind	continous	Draw	8
Chaos Form	ritual	Summon	9
Cyber Revsystem	normal	Summon	9
Galactic Charity	normal	Draw	6
Galaxy Cyclone	normal	Destroy	10
Harpie Feather Duster	normal	Destroy	10
Laser Qlip	field	Summon	9
Malefic Divide	quick_play	Summon	8
Malefic World	field	Draw	8
Neutron Blast	normal	Strength	9
Saber Reflection	quick_play	Strength	9
Toon World	continous	Summon	7

Trap:

name	icon	effect	power
Blackwing-Backlash	normal	destroy	6
Blackwing-Bombardment	normal	Strength	5
Call of the Archfiend	continous	summon	7
Cyber Network	continous	summon	7
Emergency Call	normal	draw	6
Eternal Galaxy	normal	summon	8
Fake Feather	normal	destroy	3
Harpie Lady Elegance	normal	summon	7
Malefic Claw Stream	normal	destroy	8
Malefic Tune	normal	draw	8
Qlife's End	normal	summon	10
Qlimate Change	normal	draw	9
Saber Hole	counter	destroy	8
Toon Defense	continous	protect	3

The functional dependencies of each table are listed down below

Card = (N, T, A, U, B)

N → T, A, B

NB → U

I can confirm that this is in BCNF because N+ gives N, T, A, B and with the NB present that also gives U. NB+ gives N, B, U and with the N, it adds T, A, B making them both a superkey.

Archetype = (A, U, P, N)

A → U, N

AN → P

I can confirm that this is in BCNF because A+ gives A, U, N and with the AN present that also gives P. AN+ gives A, N, P and with the N, it adds U, making them both a superkey.

Monster = (N, AN, A, R, M, C, P)

NAN → A, R, M, C, P

I can confirm that this is in BCNF because NAN+ gives N, AN, A, R, M, C, P which is all it needs to be a superkey.

Spell = (N, I, E, P)

N → I, E

NE → P

I can confirm that this is in BCNF because N+ gives I, E and with the NE present that also gives P. NE+ gives N, E, P and with the N, it adds I, making them both a superkey.

Trap = (N, I, E, P)

N → I, E

NE → P

I can confirm that this is in BCNF because N+ gives I, E and with the NE present that also gives P. NE+ gives N, E, P and with the N, it adds I, making them both a superkey.

Part 2:

In this part I have created a list of queries to show the functionality of my database. It has been designed to handle a plethora of different things and has an answer for any question you may have. The queries plus the needed code to fulfill these queries are down below.

1.List the possible archetypes.

```
mysql> select distinct archetype from card;
+-----------+
| archetype |
+-----------+
| Archfiend |
| Qli       |
| Blue-Eyes |
| Blackwing |
| Toon      |
| Cyber     |
| X-Saber   |
| Galaxy    |
| Harpie    |
| Malefic   |
+-----------+
```

2.There are some meaningless cards, list the spells who are powerful(greater than 5) but not useful(less than 5).

```
mysql> select * from card natural join spell where power>5 and usefullness<5;
+-----------------+-------+-----------+-------------+--------+-----------+--------+-------+
| name            | type  | archetype | usefullness | banned | icon      | effect | power |
+-----------------+-------+-----------+-------------+--------+-----------+--------+-------+
| Black Whirlwind | Spell | Blackwing |           4 | no     | continous | Draw   |     8 |
| Galactic Charity| Spell | Galaxy    |           2 | no     | normal    | Draw   |     6 |
+-----------------+-------+-----------+-------------+--------+-----------+--------+-------+
```

3.List all dragons that are not in the toon archetype.

```
mysql> select name from card natural join monster where archetype not in ('toon') and monster_type="Dragon";
+--------------------------+
| name                     |
+--------------------------+
| Archfiend Black Skull Dra|
| Blue-Eyes White Dragon   |
| Galaxy Dragon            |
| Harpie's Pet Dragon      |
| Malefic Rainbow Dragon   |
| Malefic Stardust Dragon  |
| Malefic Truth Dragon     |
+--------------------------+
```

4.Juggernaut: List all monsters whose rank is atleast 5.

```
mysql> select name from monster where rank >4;
+--------------------------+
| name                     |
+--------------------------+
| Annihilator Archfiend    |
| Apoqliphort Skybase      |
| Apoqliphort Towers       |
| Archfiend Black Skull Dra |
| Archfiend Commander      |
| Blackwing-The Raven      |
| Blue-Eyes Toon Dragon    |
| Blue-Eyes White Dragon   |
| Cyber Blader             |
| Galaxy Brave             |
| Harpie Lady 1            |
| Harpie's Pet Dragon      |
| Malefic Cyber End Dragon |
| Malefic Rainbow Dragon   |
| Malefic Stardust Dragon  |
| Malefic Truth Dragon     |
| Red-Eyes Toon Dragon     |
| Toon Barrel Dragon       |
| Toon Buster Blader       |
| X-Saber Souza            |
| XX-Saber Gottoms         |
+--------------------------+
```

5.Oxymoron: List all light monsters used by an antagonist.

```
mysql> select name from monster natural join archetype where attribute ="Light" and used_by="antagonist";
+----------------------+
| name                 |
+----------------------+
| Blue-Eyes Toon Dragon |
+----------------------+
```

6.What is the strongest trap?

```
mysql> select name from trap where power =(select max(power) as max from trap);
+-------------+
| name        |
+-------------+
| Qlife's End |
+-------------+
```

7.Which archetype has the highest monster power level(max of average)?

```
mysql> select aname from (select avg(power) as avg,aname from monster group by aname)
    -> as s where avg=(select max(max) from(select avg(power) as max,aname
    -> from monster group by aname) as k);
+---------+
| aname   |
+---------+
| Malefic |
+---------+
```

8.List the archetypes sorted by popularity highest to lowest.

```
mysql> select aname from archetype order by popularity desc;
+-----------+
| aname     |
+-----------+
| Blue-Eyes |
| Cyber     |
| Galaxy    |
| Qli       |
| Blackwing |
| Archfiend |
| X-Saber   |
| Toon      |
| Harpie    |
| Malefic   |
+-----------+
```

9.You just traded cards, remove all cards of the qli archetype.

```
mysql> delete from monster where aname="qli";
Query OK, 3 rows affected (0.00 sec)

mysql> select * from monster;
+--------------------------+-----------+-----------+------+---------------+-----------+-------+
| name                     | aname     | attribute | rank | monster_type  | Card_type | power |
+--------------------------+-----------+-----------+------+---------------+-----------+-------+
| Annihilator Archfiend    | Archfiend | Dark      |    9 | Fiend         | Effect    |  2000 |
| Archfiend Black Skull Dra | Archfiend | Dark     |    9 | Dragon        | Fusion    |  3200 |
| Archfiend Cavalry        | Archfiend | Dark      |    4 | Fiend         | Effect    |  1900 |
| Archfiend Commander      | Archfiend | Dark      |    6 | Fiend         | Effect    |  2500 |
| Blackwing-The Raven      | Blackwing | Dark      |    6 | Winged-Beast  | Effect    |  2200 |
| Blue-Eyes Toon Dragon    | Toon      | Light     |    8 | Dragon        | Effect    |  3000 |
| Blue-Eyes White Dragon   | Blue-Eyes | Light     |    8 | Dragon        | Effect    |  3000 |
| Clock Wyvern             | Cyber     | Wind      |    4 | Cyberse       | Effect    |  1800 |
| Code Radiator            | Cyber     | Water     |    4 | Cyberse       | Effect    |  1600 |
| Cyber Blader             | Cyber     | Earth     |    7 | Warrior       | Fusion    |  2100 |
| Galaxy Brave             | Galaxy    | Light     |    8 | Warrior       | Effect    |     0 |
| Galaxy Dragon            | Galaxy    | Light     |    4 | Dragon        | Effect    |  2000 |
| Harpie Lady 1            | Harpie    | Wind      |    6 | Winged-Beast  | Effect    |  1950 |
| Harpie Lady Sisters      | Harpie    | Wind      |    4 | Winged-Beast  | Effect    |  1350 |
| Harpie's Pet Dragon      | Harpie    | Wind      |    7 | Dragon        | Effect    |  2000 |
| Kaibaman                 | Blue-Eyes | Light     |    3 | Warrior       | Effect    |   200 |
| Maiden with Blue Eyes    | Blue-Eyes | Light     |    1 | Spellcaster   | Effect    |     0 |
| Malefic Cyber End Dragon | Malefic   | Dark      |   10 | Machine       | Effect    |  4000 |
| Malefic Rainbow Dragon   | Malefic   | Dark      |   10 | Dragon        | Effect    |  4000 |
| Malefic Stardust Dragon  | Malefic   | Dark      |    8 | Dragon        | Effect    |  2500 |
| Malefic Truth Dragon     | Malefic   | Dark      |   12 | Dragon        | Effect    |  5000 |
| Photon Vanisher          | Galaxy    | Light     |    4 | Warrior       | Effect    |  2000 |
| Red-Eyes Toon Dragon     | Toon      | Dark      |    8 | Dragon        | Effect    |  2400 |
| Toon Barrel Dragon       | Toon      | Dark      |    7 | Machine       | Effect    |  2600 |
| Toon Buster Blader       | Toon      | Earth     |    7 | Warrior       | Effect    |  2600 |
| X-Saber Axel             | X-Saber   | Earth     |    1 | Beast-Warrior | Effect    |   400 |
| X-Saber Souza            | X-Saber   | Earth     |    7 | Warrior       | Synchro   |  2500 |
| XX-Saber Gottoms         | X-Saber   | Earth     |    9 | Beast-Warrior | Synchro   |  3100 |
+--------------------------+-----------+-----------+------+---------------+-----------+-------+
```

10.List all the monsters grouped by their archetype.

```
mysql> select name,aname from monster group by aname,name;
+--------------------------+-----------+
| name                     | aname     |
+--------------------------+-----------+
| Annihilator Archfiend    | Archfiend |
| Archfiend Black Skull Dra | Archfiend |
| Archfiend Cavalry        | Archfiend |
| Archfiend Commander      | Archfiend |
| Blackwing-The Raven      | Blackwing |
| Blue-Eyes White Dragon   | Blue-Eyes |
| Kaibaman                 | Blue-Eyes |
| Maiden with Blue Eyes    | Blue-Eyes |
| Clock Wyvern             | Cyber     |
| Code Radiator            | Cyber     |
| Cyber Blader             | Cyber     |
| Galaxy Brave             | Galaxy    |
| Galaxy Dragon            | Galaxy    |
| Photon Vanisher          | Galaxy    |
| Harpie Lady 1            | Harpie    |
| Harpie Lady Sisters      | Harpie    |
| Harpie's Pet Dragon      | Harpie    |
| Malefic Cyber End Dragon | Malefic   |
| Malefic Rainbow Dragon   | Malefic   |
| Malefic Stardust Dragon  | Malefic   |
| Malefic Truth Dragon     | Malefic   |
| Apoqliphort Skybase      | Qli       |
| Apoqliphort Towers       | Qli       |
| Qliphort Genius          | Qli       |
| Blue-Eyes Toon Dragon    | Toon      |
| Red-Eyes Toon Dragon     | Toon      |
| Toon Barrel Dragon       | Toon      |
| Toon Buster Blader       | Toon      |
| X-Saber Axel             | X-Saber   |
| X-Saber Souza            | X-Saber   |
| XX-Saber Gottoms         | X-Saber   |
+--------------------------+-----------+
```

11.Fight Club: Harpie Lady 1 was destroyed and sent to the graveyard, remove it from the monster table.

```
mysql> delete from monster where name="harpie lady 1";
Query OK, 1 row affected (0.00 sec)

mysql> select * from monster;
+-------------------------+-----------+-----------+------+---------------+-----------+-------+
| name                    | aname     | attribute | rank | monster_type  | Card_type | power |
+-------------------------+-----------+-----------+------+---------------+-----------+-------+
| Annihilator Archfiend   | Archfiend | Dark      |    9 | Fiend         | Effect    |  2000 |
| Archfiend Black Skull Dra | Archfiend | Dark    |    9 | Dragon        | Fusion    |  3200 |
| Archfiend Cavalry       | Archfiend | Dark      |    4 | Fiend         | Effect    |  1900 |
| Archfiend Commander     | Archfiend | Dark      |    6 | Fiend         | Effect    |  2500 |
| Blackwing-The Raven     | Blackwing | Dark      |    6 | Winged-Beast  | Effect    |  2200 |
| Blue-Eyes Toon Dragon   | Toon      | Light     |    8 | Dragon        | Effect    |  3000 |
| Blue-Eyes White Dragon  | Blue-Eyes | Light     |    8 | Dragon        | Effect    |  3000 |
| Clock Wyvern            | Cyber     | Wind      |    4 | Cyberse       | Effect    |  1800 |
| Code Radiator           | Cyber     | Water     |    4 | Cyberse       | Effect    |  1600 |
| Cyber Blader            | Cyber     | Earth     |    7 | Warrior       | Fusion    |  2100 |
| Galaxy Brave            | Galaxy    | Light     |    8 | Warrior       | Effect    |     0 |
| Galaxy Dragon           | Galaxy    | Light     |    4 | Dragon        | Effect    |  2000 |
| Harpie Lady Sisters     | Harpie    | Wind      |    4 | Winged-Beast  | Effect    |  1350 |
| Harpie's Pet Dragon     | Harpie    | Wind      |    7 | Dragon        | Effect    |  2000 |
| Kaibaman                | Blue-Eyes | Light     |    3 | Warrior       | Effect    |   200 |
| Maiden with Blue Eyes   | Blue-Eyes | Light     |    1 | Spellcaster   | Effect    |     0 |
| Malefic Cyber End Dragon | Malefic  | Dark      |   10 | Machine       | Effect    |  4000 |
| Malefic Rainbow Dragon  | Malefic   | Dark      |   10 | Dragon        | Effect    |  4000 |
| Malefic Stardust Dragon | Malefic   | Dark      |    8 | Dragon        | Effect    |  2500 |
| Malefic Truth Dragon    | Malefic   | Dark      |   12 | Dragon        | Effect    |  5000 |
| Photon Vanisher         | Galaxy    | Light     |    4 | Warrior       | Effect    |  2000 |
| Red-Eyes Toon Dragon    | Toon      | Dark      |    8 | Dragon        | Effect    |  2400 |
| Toon Barrel Dragon      | Toon      | Dark      |    7 | Machine       | Effect    |  2600 |
| Toon Buster Blader      | Toon      | Earth     |    7 | Warrior       | Effect    |  2600 |
| X-Saber Axel            | X-Saber   | Earth     |    1 | Beast-Warrior | Effect    |   400 |
| X-Saber Souza           | X-Saber   | Earth     |    7 | Warrior       | Synchro   |  2500 |
| XX-Saber Gottoms        | X-Saber   | Earth     |    9 | Beast-Warrior | Synchro   |  3100 |
+-------------------------+-----------+-----------+------+---------------+-----------+-------+
```

Conclusion:

As you can see I've made a flawless database that millions of people around the world can access and have no issues with. There are many tables that could help users sort their cards, find their strongest cards, create a stellar strategy, and build an unstoppable deck. All relations are normalized and the queries are functional. Now all I have left to say is… Are you ready to duel?