

# CS 4750 Databases: Milestone 2

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**Project Concept:** We plan on implementing/developing a Pokemon team builder. Users can select Pokemon from our database and add or remove them to form a team of six Pokemon. Returning users are able to access their previously created parties.

## Database Server

We are currently hosting our server on the UVa CS server. Our database satisfies the project requirements because multiple people can use the database concurrently. The database contains over 2,500 rows of data.

## Table Schemas

This is our table schema for the entire database:

Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> base_info	★ Browse Structure Search Insert Empty Drop	11	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/> base_pokemon	★ Browse Structure Search Insert Empty Drop	807	InnoDB	utf8mb4_0900_ai_ci	16.0 KiB	-
<input type="checkbox"/> holding	★ Browse Structure Search Insert Empty Drop	6	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/> item	★ Browse Structure Search Insert Empty Drop	955	InnoDB	utf8mb4_0900_ai_ci	208.0 KiB	-
<input type="checkbox"/> learned	★ Browse Structure Search Insert Empty Drop	12	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/> member	★ Browse Structure Search Insert Empty Drop	11	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/> move	★ Browse Structure Search Insert Empty Drop	746	InnoDB	utf8mb4_0900_ai_ci	128.0 KiB	-
<input type="checkbox"/> party	★ Browse Structure Search Insert Empty Drop	4	InnoDB	utf8mb4_0900_ai_ci	16.0 KiB	-
<input type="checkbox"/> specific_pokemon	★ Browse Structure Search Insert Empty Drop	11	InnoDB	utf8mb4_0900_ai_ci	16.0 KiB	-
<input type="checkbox"/> team	★ Browse Structure Search Insert Empty Drop	4	InnoDB	utf8mb4_0900_ai_ci	32.0 KiB	-
<input type="checkbox"/> user	★ Browse Structure Search Insert Empty Drop	11	InnoDB	utf8mb4_0900_ai_ci	16.0 KiB	-
11 tables	Sum	2,578	InnoDB	utf8mb4_0900_ai_ci	560.0 KiB	0 B

Below are the table schemas for each table:

Base\_info:

```
DESC base_info
```

+ Options

Field	Type	Null	Key	Default	Extra
pk_id	int	NO	PRI	NULL	
pokedex_number	int	YES	MUL	NULL	

```
SELECT COUNT(*) from base_info
```

+ Options

COUNT(\*)

11

Base\_pokemon:

```
DESC base_pokemon
```

+ Options

Field	Type	Null	Key	Default	Extra
pokedex_number	int	NO	PRI	NULL	
name	varchar(255)	YES		NULL	
type1	varchar(255)	YES		NULL	
type2	varchar(255)	YES		NULL	
hp	int	YES		NULL	
attack	int	YES		NULL	
defense	int	YES		NULL	
special_attack	int	YES		NULL	
special_defense	int	YES		NULL	
speed	int	YES		NULL	
sprite_data	varchar(255)	YES		NULL	

```
SELECT COUNT(*) from base_pokemon
```

+ Options

COUNT(\*)

807

Holding:

```
DESC holding
```

+ Options

Field	Type	Null	Key	Default	Extra
pk_id	int	NO	PRI	NULL	
item_name	varchar(255)	YES	MUL	NULL	

```
SELECT COUNT(*) from holding
```

+ Options

COUNT(\*)

6

Item:

```
DESC item
```

+ Options

Field	Type	Null	Key	Default	Extra
item_name	varchar(255)	NO	PRI	NULL	
item_description	varchar(2047)	YES		NULL	

```
SELECT COUNT(*) from item
```

+ Options

COUNT(\*)

955

Query results operations

Learned:

```
DESC learned
```

+ Options

Field	Type	Null	Key	Default	Extra
move_name	varchar(255)	NO	PRI	NULL	
pk_id	int	NO	PRI	NULL	

Query results operations

```
SELECT COUNT(*) from learned
```

+ Options

COUNT(\*)

12

Member:

```
DESC member
```

+ Options

Field	Type	Null	Key	Default	Extra
pk_id	int	NO	PRI	NULL	auto_increment
party_id	int	YES	MUL	NULL	

```
SELECT COUNT(*) from member
```

+ Options

COUNT(\*)

11

Move:

```
DESC move
```

+ Options

Field	Type	Null	Key	Default	Extra
move_name	varchar(255)	NO	PRI	NULL	
power	varchar(255)	YES		NULL	
accuracy	varchar(255)	YES		NULL	
type	varchar(255)	YES		NULL	
pp	varchar(255)	YES		NULL	
effect	varchar(255)	YES		NULL	

```
SELECT COUNT(*) from move
```

+ Options

COUNT(\*)

746

Party:

DESC party

+ Options

Field	Type	Null	Key	Default	Extra
party_id	int	NO	PRI	NULL	

SELECT COUNT(\*) from party

+ Options

COUNT(\*)

4

Specific\_pokemon:

DESC specific\_pokemon

+ Options

Field	Type	Null	Key	Default	Extra
pk_id	int	NO	PRI	NULL	
level	int	YES		NULL	
nickname	varchar(255)	YES		NULL	

SELECT COUNT(\*) from specific\_pokemon

+ Options

COUNT(\*)

11

Team:

DESC team

+ Options

Field	Type	Null	Key	Default	Extra
party_id	int	NO	PRI	NULL	auto_increment
user_id	int	YES	MUL	NULL	

SELECT COUNT(\*) from team

+ Options

COUNT(\*)

4

User:

DESC user

+ Options

Field	Type	Null	Key	Default	Extra
User_id	int	NO	PRI	NULL	auto_increment
username	varchar(255)	YES		NULL	

Query results operations

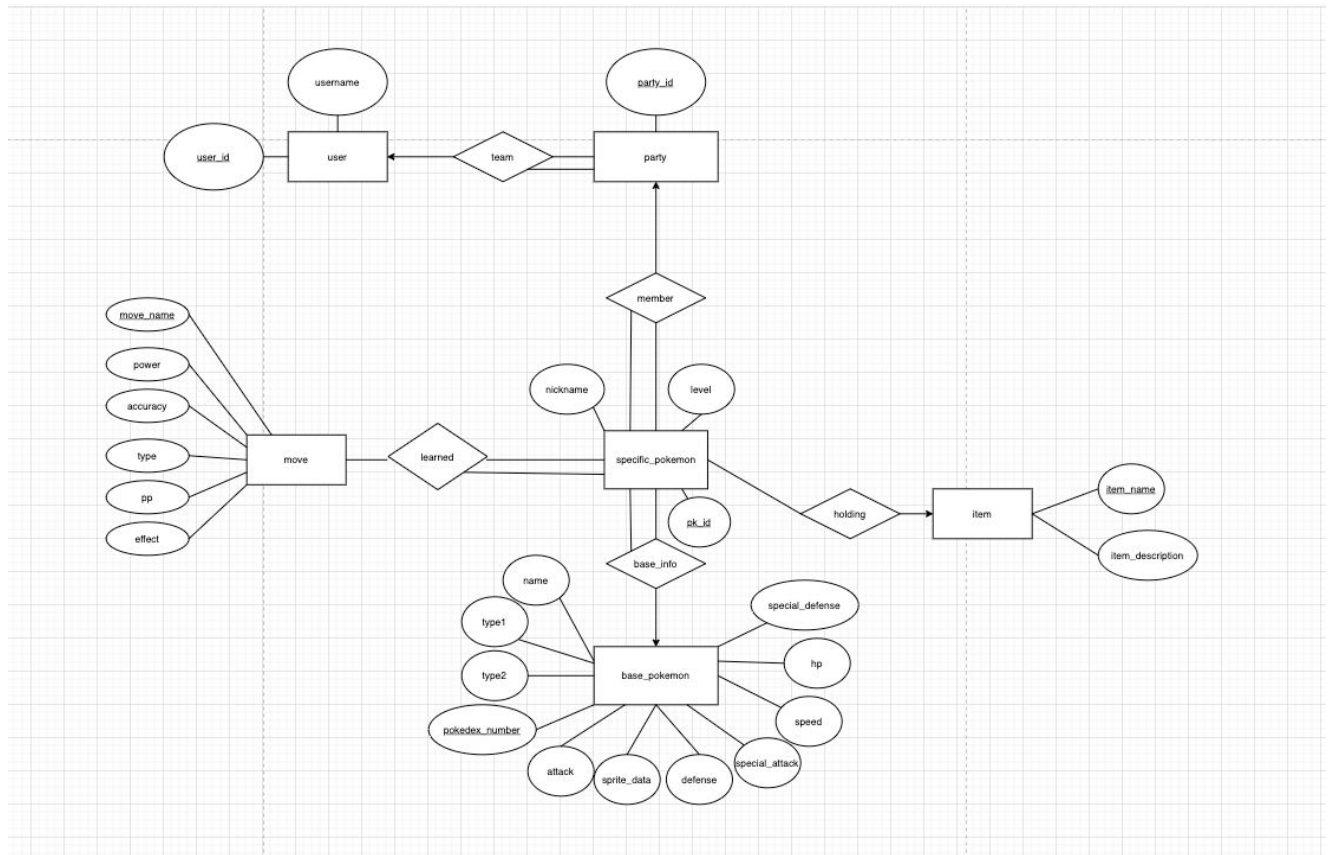
SELECT COUNT(\*) from user

+ Options

COUNT(\*)

11

## Updated ER Diagram



party(party\_id)

user(user\_id, username)

moves(move\_name, power, accuracy, type, pp, effect)

item(item\_name, item\_description)

specific\_pokemon(pk\_id, level, nickname)

base\_pokemon(pokedex\_number, name, type1, type2, family, attack, defense, special\_attack, special\_defense, speed, hp, sprite\_data)

team(party\_id, user\_id)

base\_info(pk\_id, pokedex\_number)

holding(pk\_id, item\_name)

learned(move\_name, pk\_id)

member(pk\_id, party\_id)

In our updated ER diagram, we removed the **family** attribute because family is only necessary for breeding, and our application is for developing a competitive battling party for pokemon. We also changed move to singular, as each move has its own attributes. Since we had 13 tables originally, we ended up dropping the ability table and its corresponding link table.

## Data

Our data was all generated and built from a Pokemon Github database that contained many CSV files that listed out all the information related to the game. This data is realistic as it is pulled directly from the Pokemon game over time. It contains all the relevant information we need to build our web application, including all the attributes of the Pokemon game. Thus, this data is sufficient for our needs to build Pokemon parties.

### Sample Data

---

Base\_info

pk_id	pokedex_number
1	1
2	2
10	2
3	3
4	3
5	7
6	25
7	69
8	95
9	122
11	152

---

Base\_Pokemon

base: jw8kc » Table: base\_pokemon

SQL Search Insert Export Import Privileges Operations Triggers

pokedex_number	name	type1	type2	hp	attack	defense	special_attack	special_defense	speed	sprite_data
1	Bulbasaur	Grass	Poison	45	49	49	65	65	45	https://img.pokemondb.net/
2	Ivysaur	Grass	Poison	60	62	63	80	80	60	https://img.pokemondb.net/
3	Venusaur	Grass	Poison	80	100	123	122	120	80	https://img.pokemondb.net/
4	Charmander	Fire	None	39	52	43	60	50	65	https://img.pokemondb.net/
5	Charmeleon	Fire	None	58	64	58	80	65	80	https://img.pokemondb.net/
6	Charizard	Fire	Flying	78	104	78	159	115	100	https://img.pokemondb.net/
7	Squirtle	Water	None	44	48	65	50	64	43	https://img.pokemondb.net/
8	Wartortle	Water	None	59	63	80	65	80	58	https://img.pokemondb.net/
9	Blastoise	Water	None	79	103	120	135	115	78	https://img.pokemondb.net/
10	Caterpie	Bug	None	45	30	35	20	20	45	https://img.pokemondb.net/
11	Metapod	Bug	None	50	20	55	25	25	30	https://img.pokemondb.net/
12	Butterfree	Bug	Flying	60	45	50	90	80	70	https://img.pokemondb.net/
13	Weedle	Bug	Poison	40	35	30	20	20	50	https://img.pokemondb.net/
14	Kakuna	Bug	Poison	45	25	50	25	25	35	https://img.pokemondb.net/
15	Beedrill	Bug	Poison	65	150	40	15	80	145	https://img.pokemondb.net/
16	Pidgey	Normal	Flying	40	45	40	35	35	56	https://img.pokemondb.net/
17	Pidgeotto	Normal	Flying	63	60	55	50	50	71	https://img.pokemondb.net/
18	Pidgeot	Normal	Flying	83	80	80	135	80	121	https://img.pokemondb.net/

Holding

← T →





































		pk_id	item_name
<input type="checkbox"/>	Edit  Copy  Delete	1	apicot-berry
<input type="checkbox"/>	Edit  Copy  Delete	3	apicot-berry
<input type="checkbox"/>	Edit  Copy  Delete	2	berry-pouch
<input type="checkbox"/>	Edit  Copy  Delete	4	big-root
<input type="checkbox"/>	Edit  Copy  Delete	5	blue-apricorn
<input type="checkbox"/>	Edit  Copy  Delete	7	fluffy-tail



## Item

← T →					item_name	item_description
<input type="checkbox"/>					ability-capsule	Switches a Pokemon between its two possible (non-H...
<input type="checkbox"/>					ability-urge	Forcibly activates a friendly Pokemon's ability.
<input type="checkbox"/>					abomasite	Held: Allows Abomasnow to Mega Evolve into Mega Ab...
<input type="checkbox"/>					absolute	Held: Allows Absol to Mega Evolve into Mega Absol.
<input type="checkbox"/>					absorb-bulb	Held: Raises the holder's Special Attack by one st...
<input type="checkbox"/>					acro-bike	More maneuverable than the Mach Bike, and allows h...
<input type="checkbox"/>					adamant-orb	Boosts the damage from Dialga's Dragon-type and St...
<input type="checkbox"/>					adrenaline-orb	Makes wild Pokemon more likely to summon allies. ...
<input type="checkbox"/>					adventure-rules	Contains basic gameplay information.
<input type="checkbox"/>					aerodactylite	Held: Allows Aerodactyl to Mega Evolve into Mega A...
<input type="checkbox"/>					aggronite	Held: Allows Aggron to Mega Evolve into Mega Aggro...
<input type="checkbox"/>					aguav-berry	Held: Consumed at 1/2 max HP to restore 1/8 max HP...
<input type="checkbox"/>					air-balloon	Held: Grants immunity to Ground-type moves, Spikes...
<input type="checkbox"/>					air-mail	Lets a Trainer write a message and send it via Pok...
<input type="checkbox"/>					alakazite	Held: Allows Alakazam to Mega Evolve into Mega Ala...
<input type="checkbox"/>					aloraichium-z--bag	XXX new effect for aloraichium-z--bag
<input type="checkbox"/>					aloraichium-z--held	Held: Allows Alola Raichu to upgrade Thunderbolt i...

## Learned

← T →					move_name	pk_id
<input type="checkbox"/>					flamethrower	1
<input type="checkbox"/>					hyper-beam	1
<input type="checkbox"/>					splash	1
<input type="checkbox"/>					tail-whip	1
<input type="checkbox"/>					explosion	2
<input type="checkbox"/>					meditate	2
<input type="checkbox"/>					sing	2
<input type="checkbox"/>					sky-attack	2
<input type="checkbox"/>					hyper-beam	3
<input type="checkbox"/>					megahorn	3
<input type="checkbox"/>					metal-claw	3
<input type="checkbox"/>					meteor-mash	3



Member

<div><div>←T→</div><div></div></div>	pk_id	party_id
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	1	1
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	2	1
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	3	1
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	4	1
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	5	2
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	6	2
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	7	2
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	8	2
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	9	2
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	10	2
<div><div><div></div><div>Edit</div><div>Copy</div><div>Delete</div></div></div>	11	3

Move

move_name	power	accuracy	type	pp	effect
10-000-000-volt-thunderbolt	195		electric	1	Inflicts regular damage with no additional effect.
absorb	20	100	grass	25	Drains half the damage inflicted to heal the user.
accelerock	40	100	rock	20	Inflicts regular damage with no additional effect.
acid	40	100	poison	30	Has a chance to lower the target's Special Defense...
acid-armor			poison	20	Raises the user's Defense by two stages.
acid-downpour--physical			poison	1	Inflicts regular damage with no additional effect.
acid-downpour--special			poison	1	Inflicts regular damage with no additional effect.
acid-spray	40	100	poison	20	Lowers the target's Special Defense by two stages.
acrobatics	55	100	flying	15	Has double power if the user has no held item.
acupressure			normal	30	Raises one of a friendly Pokemon's stats at random...
aerial-ace	60		flying	20	Never misses.
aeroblast	100	95	flying	5	Has an increased chance for a critical hit.

Party

party_id
1
2
3
4

## Specific\_pokemon

<div>←T→</div>				pk_id	level	nickname
<input type="checkbox"/>	 Edit	 Copy	 Delete	1	10	Bulbasaur
<input type="checkbox"/>	 Edit	 Copy	 Delete	2	30	Ivysaur
<input type="checkbox"/>	 Edit	 Copy	 Delete	3	50	Venusaur
<input type="checkbox"/>	 Edit	 Copy	 Delete	4	50	Venusaur
<input type="checkbox"/>	 Edit	 Copy	 Delete	5	1	Squirtle
<input type="checkbox"/>	 Edit	 Copy	 Delete	6	15	Pikachu
<input type="checkbox"/>	 Edit	 Copy	 Delete	7	25	Bellsprout
<input type="checkbox"/>	 Edit	 Copy	 Delete	8	60	Onix
<input type="checkbox"/>	 Edit	 Copy	 Delete	9	60	Mr.Mime
<input type="checkbox"/>	 Edit	 Copy	 Delete	10	30	Ivysaur
<input type="checkbox"/>	 Edit	 Copy	 Delete	11	3	Chikorita

---

## Team

party_id	user_id
1	1
2	1
3	2
4	3

---

## User

User_id	username
1	larry.cai
2	charles.fang
3	eldon.luk
4	jammie.wang
5	rickey.guo
6	vivi.pham
7	yiff.li
8	charles.darwin
9	darwin.walter
10	Ash
11	Brock
12	Misty

---

# SQL Commands

## SQL Code Generation

In order to gather move, item, and base pokemon data, we wrote Python and Java programs that would read in CSV and JSON files, strip unrelated data, manually construct the SQL insert statements via string concatenation, and output the results into a text file. Microsoft Excel was used to join separate datasets prior to the SQL generation step.

## Non-advanced Commands

```
CREATE TABLE user (  
  User_id int NOT NULL AUTO_INCREMENT,  
  username varchar(255),  
  PRIMARY KEY (user_id)  
);  
CREATE TABLE base_pokemon(  
  pokedex_number int,  
  name varchar(255),  
  type1 varchar(255),  
  type2 varchar(255),  
  hp int,  
  attack int,  
  defense int,  
  special_attack int,  
  special_defense int,  
  speed int,  
  sprite_data varchar(255),  
  PRIMARY KEY (pokedex_number)  
);  
CREATE TABLE team(  
  party_id int NOT NULL AUTO_INCREMENT,  
  user_id int,  
  PRIMARY KEY (party_id),  
  FOREIGN KEY (user_id) REFERENCES user(user_id)  
  ON DELETE CASCADE  
);  
CREATE TABLE party (  
  party_id int,  
  PRIMARY KEY (party_id),  
  FOREIGN KEY (party_id) REFERENCES team(party_id)
```

ON DELETE CASCADE

);

...

INSERT INTO user (username) VALUES ("Ash");

INSERT INTO user (username) VALUES ("Brock");

...

INSERT INTO user (username) VALUES ("Misty");

...

INSERT INTO base\_pokemon VALUES (001, "Bulbasaur", "Grass", "Poison", 45, 49, 49, 65, 65, 45, "https://img.pokemondb.net/artwork/bulbasaur.jpg");

INSERT INTO base\_pokemon VALUES (002, "Ivysaur", "Grass", "Poison", 60, 62, 63, 80, 80, 60, "https://img.pokemondb.net/artwork/ivysaur.jpg");

INSERT INTO base\_pokemon VALUES (003, "Venusaur", "Grass", "Poison", 80, 100, 123, 122, 120, 80, "https://img.pokemondb.net/artwork/venusaur.jpg");

INSERT INTO base\_pokemon VALUES (004, "Charmander", "Fire", "None", 39, 52, 43, 60, 50, 65, "https://img.pokemondb.net/artwork/charmander.jpg");

INSERT INTO base\_pokemon VALUES (005, "Charmeleon", "Fire", "None", 58, 64, 58, 80, 65, 80, "https://img.pokemondb.net/artwork/charmeleon.jpg");

INSERT INTO base\_pokemon VALUES (006, "Charizard", "Fire", "Flying", 78, 104, 78, 159, 115, 100, "https://img.pokemondb.net/artwork/charizard.jpg");

...

INSERT INTO move (move\_name, power, accuracy, type, pp, effect) VALUES ("pound", "40", "100", "normal", "35", "Inflicts regular damage with no additional effect.");

INSERT INTO move (move\_name, power, accuracy, type, pp, effect) VALUES ("karate-chop", "50", "100", "fighting", "25", "Has an increased chance for a critical hit.");

INSERT INTO move (move\_name, power, accuracy, type, pp, effect) VALUES ("double-slap", "15", "85", "normal", "10", "Hits 2-5 times in one turn.");

...

INSERT INTO item (item\_name, item\_description) VALUES ("identifier", "short\_effect");

INSERT INTO item (item\_name, item\_description) VALUES ("master-ball", "Catches a wild Pokemon every time.");

INSERT INTO item (item\_name, item\_description) VALUES ("ultra-ball", "Tries to catch a wild Pokemon. Success rate is 2x.");

...

SELECT \* FROM user;

SELECT \* from base\_pokemon WHERE name = "Charmander";

SELECT type FROM move WHERE move\_name = "pound";

SELECT \* FROM item WHERE item\_name = "identifier";

...

UPDATE user SET username = "charles.fang" WHERE user\_id = 2;

```
DELETE FROM user WHERE username = "charles.darwin";
```

## **Advanced Commands**

### **Constraint Check**

```
CREATE TABLE specific_pokemon(  
pk_id int,  
level int,  
nickname varchar(255),  
PRIMARY KEY (pk_id),  
FOREIGN KEY (pk_id) REFERENCES member(pk_id)  
ON DELETE CASCADE,  
CHECK (level >= 1 && level <= 100 )  
);
```

```
DELIMITER $$  
CREATE PROCEDURE clearParty (IN partyID INT)  
BEGIN  
DELETE FROM member WHERE party_id = partyID;  
END  
$$  
DELIMITER ;
```

```
DELIMITER $$  
CREATE PROCEDURE clearUser (IN userID INT)  
BEGIN  
DELETE FROM team WHERE user_id = userID;  
END  
$$  
DELIMITER ;
```

```
DELIMITER $$  
CREATE PROCEDURE getUserID (IN username varchar(255), OUT id INT)  
BEGIN  
SELECT user_id INTO id FROM user WHERE username = username;  
END  
$$  
DELIMITER ;
```

```
DELIMITER $$  
CREATE PROCEDURE addPokemon(
```

```

    IN pokedex_number INT,
    IN level INT,
    IN nickname varchar(255),
    IN party_id int,
    OUT pk_id int
)
BEGIN
INSERT INTO member (party_id) VALUES (party_id);
SELECT @@IDENTITY INTO pk_id;
INSERT INTO specific_pokemon (pk_id, level, nickname) VALUES (pk_id, level, nickname);
INSERT INTO base_info (pk_id, pokedex_number) VALUES (pk_id, pokedex_number);
END
$$
DELIMITER ;

```

```

DELIMITER $$
CREATE PROCEDURE generateParty(
    IN user_id int,
    OUT party_id int
)
BEGIN
INSERT INTO team (user_id) VALUES (user_id);
SELECT @@IDENTITY INTO party_id;
INSERT INTO party(party_id) VALUES (party_id);
END
$$
DELIMITER ;

```

```

call generateParty(1, @party_id);

```

```

DELIMITER $$
CREATE PROCEDURE setItem(
    IN pk_id INT,
    IN item_name varchar(255)
)
BEGIN
INSERT INTO holding (pk_id, item_name) VALUES (pk_id, item_name);
END

```



\$\$

DELIMITER ;

CALL setItem(1, "amulet-coin");

DELIMITER \$\$

**CREATE PROCEDURE setMoves(**

IN pk\_id INT,

IN move1 varchar(255),

IN move2 varchar(255),

IN move3 varchar(255),

IN move4 varchar(255)

)

BEGIN

DELETE FROM learned WHERE learned.pk\_id = pk\_id;

INSERT INTO learned (pk\_id, move\_name) VALUES (pk\_id, move1);

INSERT INTO learned (pk\_id, move\_name) VALUES (pk\_id, move2);

INSERT INTO learned (pk\_id, move\_name) VALUES (pk\_id, move3);

INSERT INTO learned (pk\_id, move\_name) VALUES (pk\_id, move4);

END

\$\$

DELIMITER ;

call setMoves(1, "tackle", "ember", "hyper-beam", "splash");

DELIMITER \$\$

**CREATE PROCEDURE getBasePokemonInfo(**

IN pk\_id INT

)

BEGIN

SELECT \* FROM base\_pokemon as base WHERE pk\_id = base.pokedex\_number;

END

\$\$

DELIMITER ;

Call getBasePokemonInfo(1)

DELIMITER \$\$

**CREATE PROCEDURE getSpecificPokemon(**

```
    IN pk_id INT
)
BEGIN
SELECT * FROM specific_pokemon as pokemon WHERE pk_id = pokemon.pk_id;
END
$$
DELIMITER ;
```

Call getSpecificPokemon(1)

```
DELIMITER $$
CREATE PROCEDURE getUser(
    IN user_id INT
)
BEGIN
SELECT * FROM user WHERE user_id = user.user_id;
END
$$
DELIMITER ;
```

Call getuser(1)

```
DELIMITER $$
CREATE PROCEDURE getParty(
    IN party_id INT
)
BEGIN
SELECT party.* FROM party, team WHERE party_id = team.party_id;
END
$$
DELIMITER ;
```

Call getParty(1)

```
DELIMITER $$
CREATE PROCEDURE getPokemonMoves(
    IN move_name varchar(255)
)
BEGIN
SELECT * FROM move WHERE move_name = move.move_name;
```

END

\$\$

DELIMITER ;

CALL getPokemonMoves("tackle")

DELIMITER \$\$

**CREATE PROCEDURE** getPokemonItem(  
 IN item\_name varchar(255)

)

BEGIN

SELECT \* FROM item WHERE item\_name = item.item\_name;

END

\$\$

DELIMITER ;

Call getPokemonItem("iron")