CSCI126 Term Project

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DATA SETS SOURCES AND BACKGROUND

USDA(United States Department of Agriculture): https://www.fns.usda.gov/

KAGGLE: https://www.kaggle.com/

Domains

- Food (Kaggle)
- Nutrition of the food (Kaggle)
- Food Category (Kaggle)
- People (USDA)
- Nutrition of the people (USDA)

QUESTIONS

- **How much meat such as beef, pork, or lamb, is good enough for providing the daily essential protein for an adult ?**
- **Will it provide enough calories if one person eat only one certain food in a day?**
- **Which food is a good source of protein?**
- **...etc.**

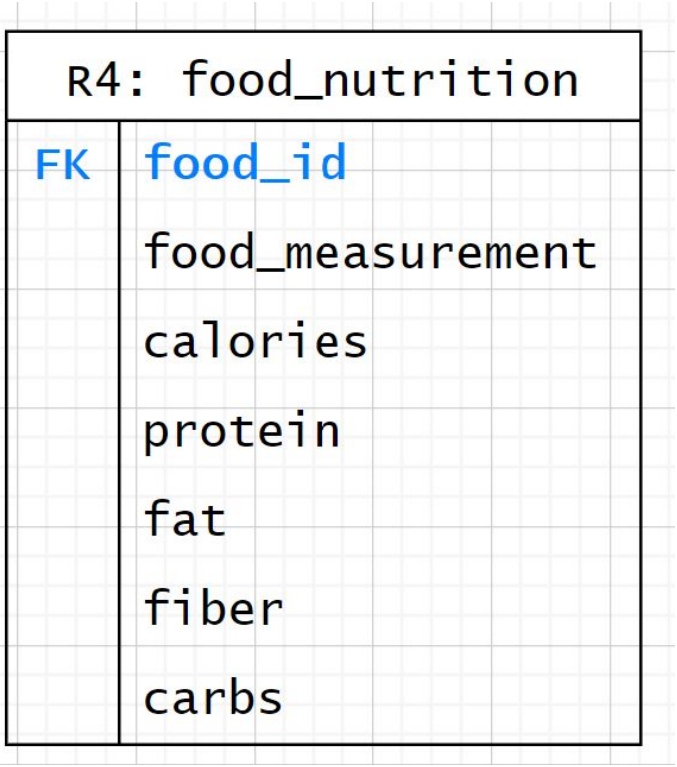
ATTRIBUTES

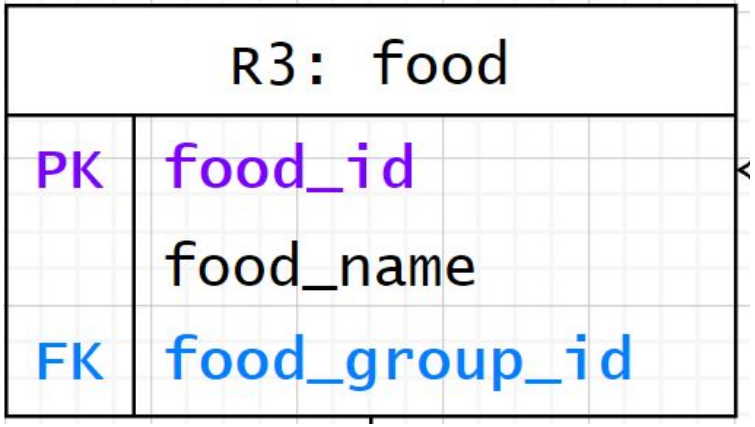
R1: people	
PK	people_id
	people_age
	gender

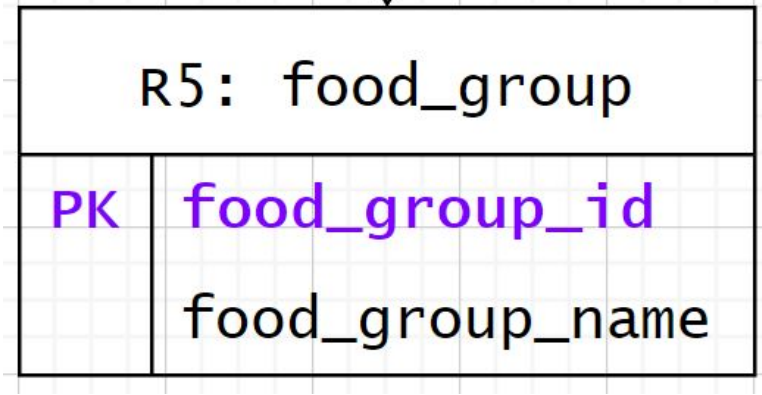
R2: people_daily_calorie_nutrition	
FK	people_id
	calorie_level
	protein
	fat
	fiber
	carbs

R6: people_calorie_level	
FK	people_id
	calorie_level

ATTRIBUTES

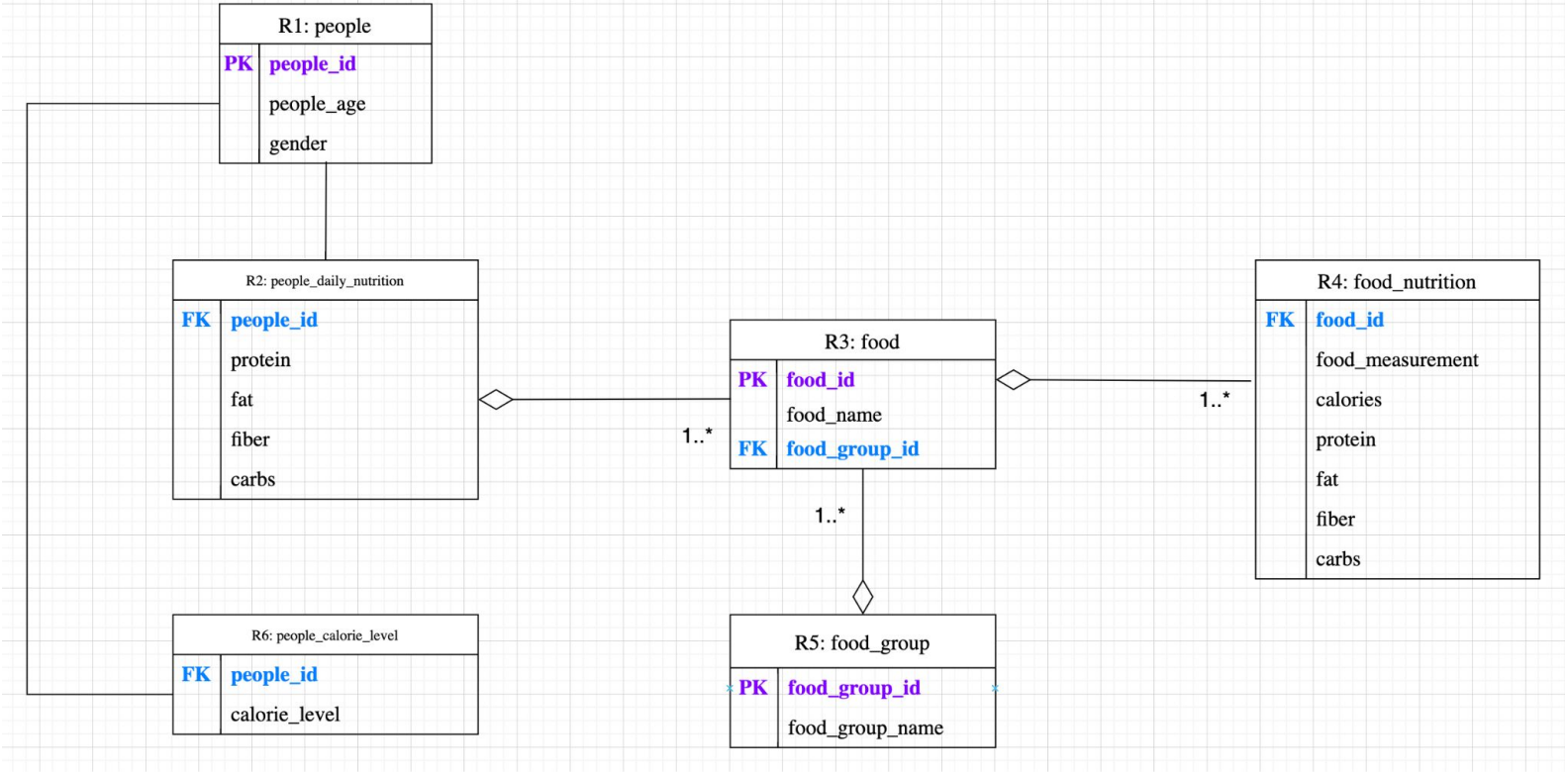

R4: food_nutrition
FK
food_id
food_measurement
calories
protein
fat
fiber
carbs


R3: food
PK
food_id
food_name
FK
food_group_id


R5: food_group
PK
food_group_id
food_group_name

DATABASE DESIGN & SCHEMA

UML



FDs and MVDs

People_ID -> Age_Group, Gender

People_ID -> Protein, Fat, Fiber, Carbs

People_ID-> Calorie_level

Food_ID -> Food_Name, Food_Group_ID

Food_ID, Food_Measurement -> Food_Calorie, Protein, Fat, Fiber, Carbs

Food_Group_ID -> Food_Group_Name

NO MVDs in this schema

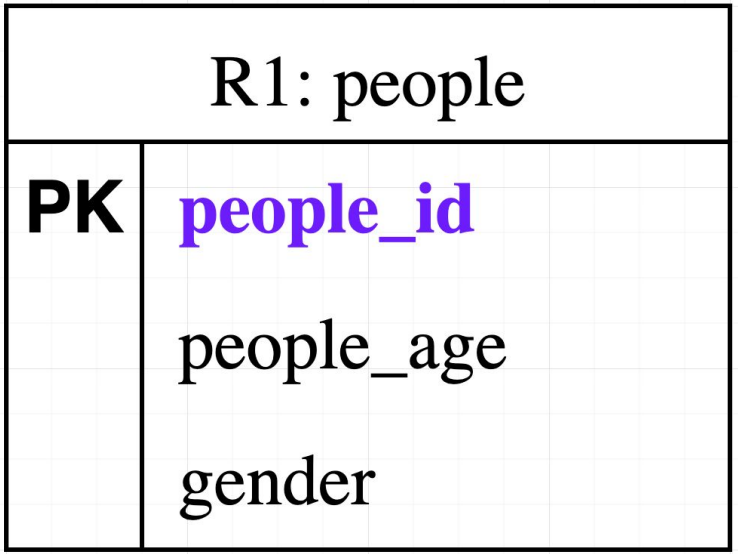
NORMAL FORM

R1 PEOPLE

3NF: No Transitive Dependency

BCNF: No non-prime → prime

4NF: no MVDs



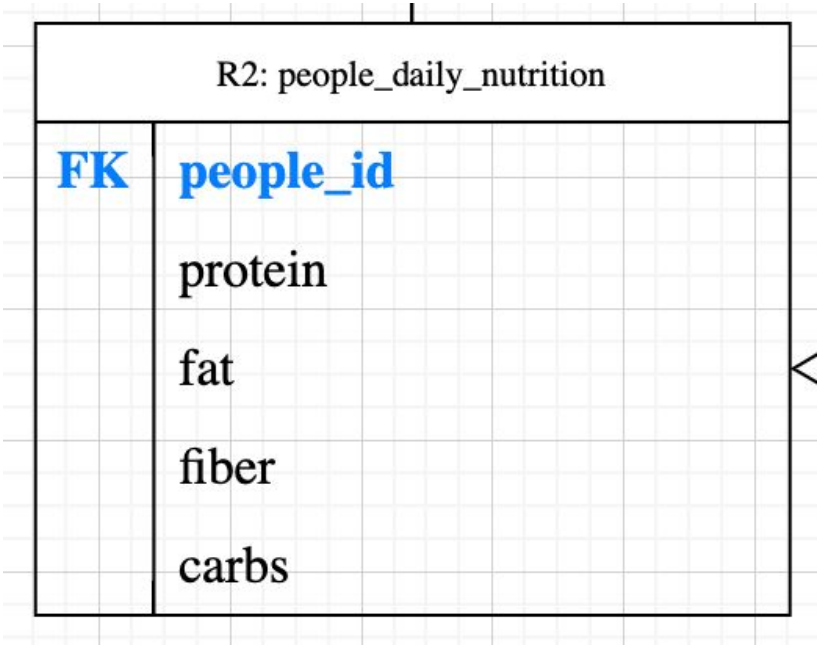
NORMAL FORM

R2 PEOPLE_DAILY_NUTRITION

3NF: No Transitive Dependency

BCNF: No non-prime → prime

4NF: no MVDs



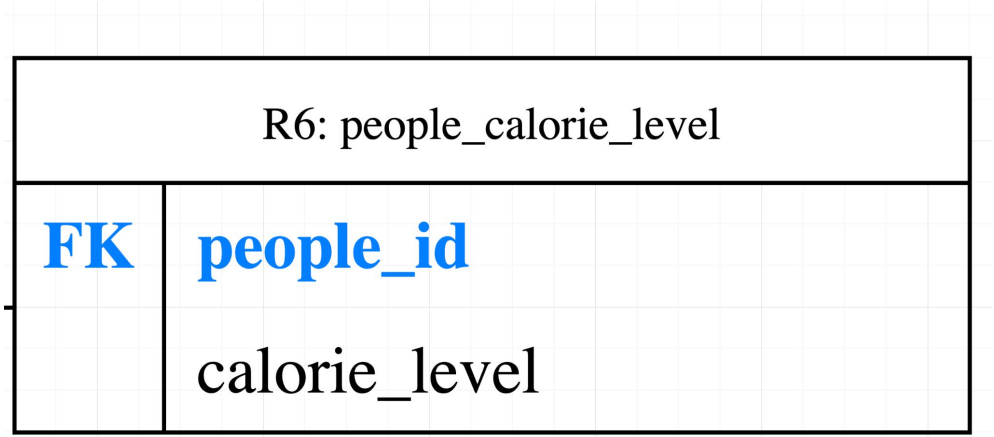
NORMAL FORM

R6 PEOPLE_CALORIE_LEVEL

3NF: No Transitive Dependency

BCNF: No non-prime → prime

4NF: no MVDs



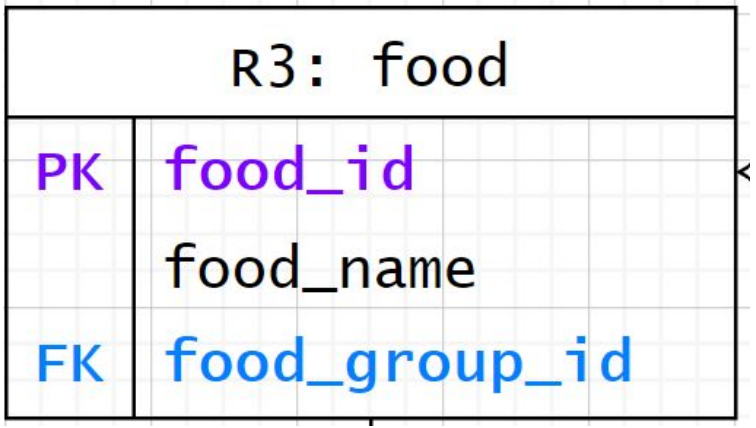
NORMAL FORM

R3 FOOD

3NF: No Transitive Dependency

BCNF: No none-prime -> prime

4NF: no MVDs



NORMAL FORM

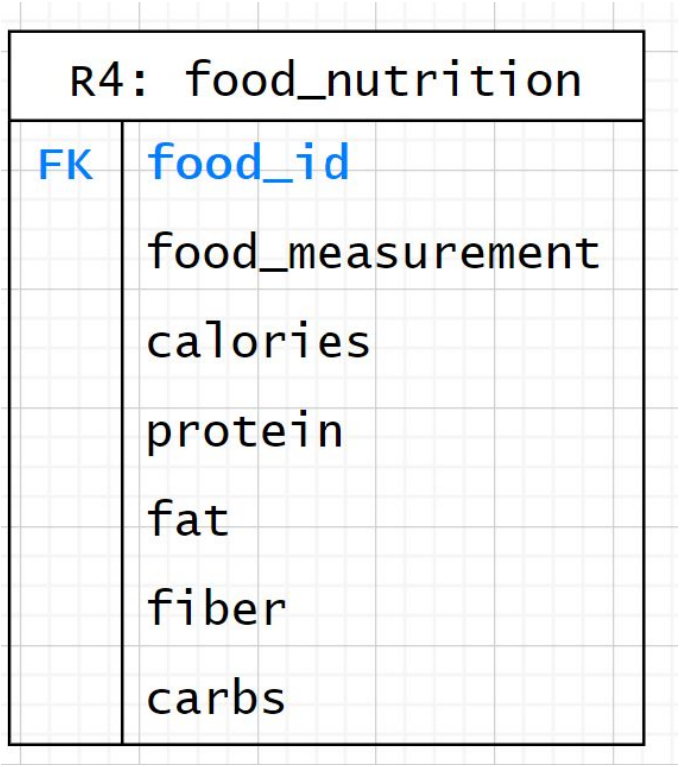
FOOD_NUTRITION

SUPER KEY: Food_ID+ Food Measurement

3NF: No Transitive Dependency

BCNF: No none-prime -> prime

4NF: No MVDs



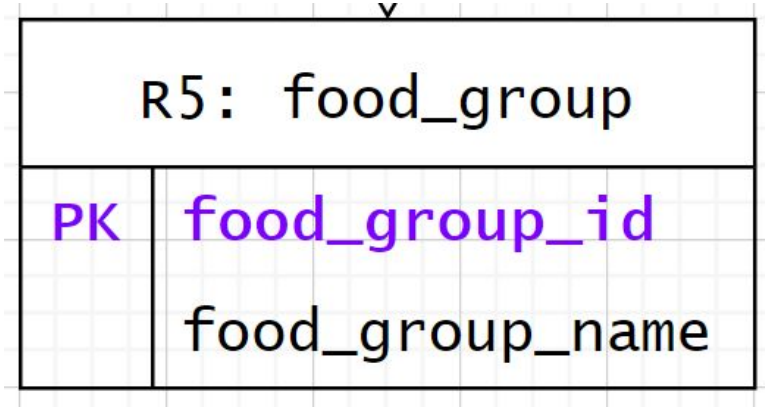
NORMAL FORM

R5 FOOD GROUP

3NF: No Transitive Dependency

BCNF: No none-prime -> prime

4NF: no MVDs



TRIGGERS

- **A new valid key created before the INSERTION operation.**
- **Problem found:**

  CSV file cannot be imported into an empty table, if a trigger for BEFORE INSERT is created before data being imported.

```
-- Create Triggers for the table before Insertion Operation
-- Trigger for assigning a new primary key for a new tuple for the table "food"
delimiter //
CREATE TRIGGER food_id_creator
BEFORE INSERT ON food
FOR EACH ROW
BEGIN
    DECLARE newID INT;
    IF NOT EXISTS(SELECT food_id FROM Food WHERE Food_ID = new.Food_ID) THEN
        SELECT MAX(food_ID)+1 INTO newID from Food;
        SET NEW.Food_ID = newID;
    END IF;
END;//
delimiter ;
```

QUERIES: AGGREGATION

```
13      -- Aggregation Query
14      -- Return the number of food items grouped by the food group name
15      SELECT
16      count(food_id) AS the_food_items_count,
17      food_group_name
18      FROM food NATURAL JOIN food_group
19      GROUP BY food_group_name
20      ORDER BY count(food_id) asc;
21
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

the_food_items_count	food_group_name
3	Vegetables A-E
3	Vegetables F-P
3	Vegetables R-Z
3	Fruits A-F
3	Fruits G-P
3	Fruits R-Z
8	Dairy Products
8	Fats, Oils, Shortenings
8	Meat
8	Seafood
8	Grains

QUERIES: SUBQUERY

```
1     -- Subquery
2     -- Return the essentailly daily amount of beef if a person is 28 years old.
3     SELECT
4     age,
5     gender,
6     food_name,
7     people_daily_nutrition.protein * (food_nutrition.food_measurement/food_nutrition.protein) as amount,
8     measurement_unit
9     FROM  ( people NATURAL JOIN people_daily_nutrition NATURAL JOIN people_calorie_level) CROSS JOIN (food NATURAL JOIN food_nutrition)
10    WHERE age = 28 AND food_name = 'beef';
11
12
13    -- Aggregation Query
14    -- Return the number of food items grouped by the food group name
15    SELECT
16    count(food_id) AS the_food_items_count,
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

age	gender	food_name	amount	measurement_unit
28	Female	Beef	6.0000	oz.
28	Male	Beef	7.3043	oz.

QUERIES: INSERTION & UPDATE

```
71    -- Insertion Query
72    -- Insertion a new item into food table
73    INSERT INTO food VALUE (
74        -1, 'Biscuits', 3010
75    );
76
77    SELECT *
78    FROM food;
79
80
```

Result Grid | Filter Rows: | Edit: | Export/Import:

food_id	food_name	food_group_id
1290	Rice flakes	3010
1297	Spanish rice	3010
1299	Waffles	3010
1300	Biscuits	3010
NULL	NULL	NULL

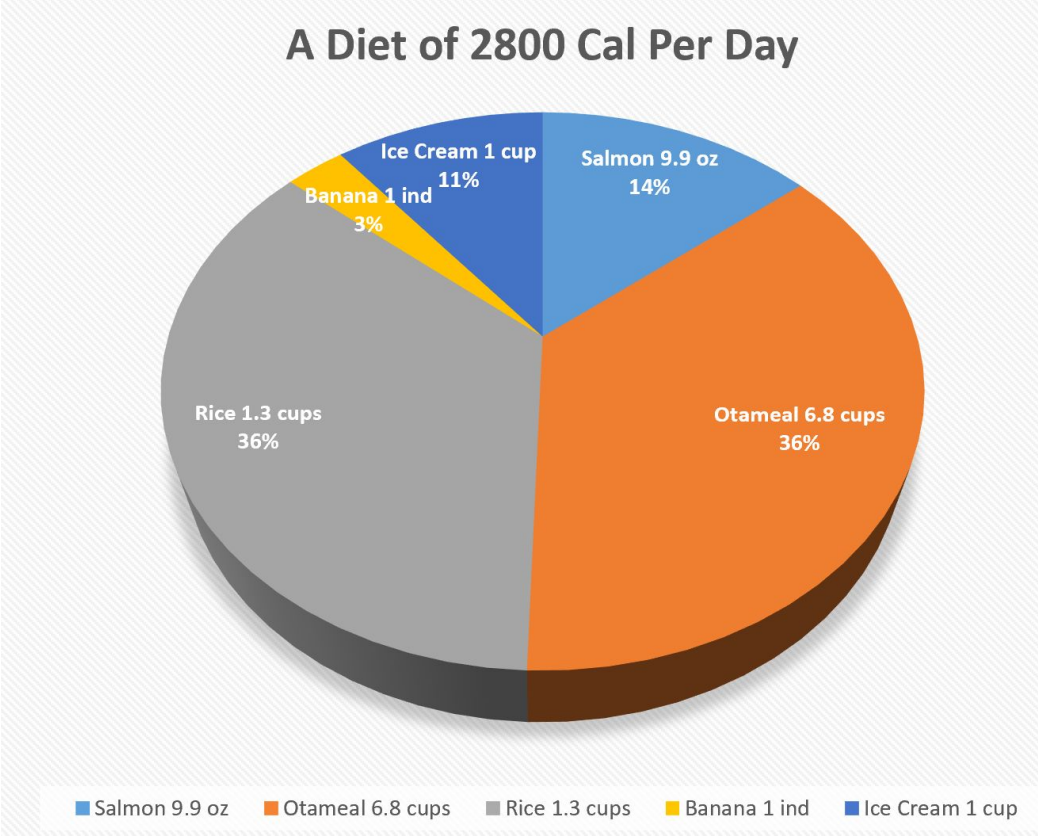
```
81    -- UPDATE Query
82    DELETE FROM food
83    WHERE food_id= 1300;
84
85    SELECT*
86    FROM food
87    WHERE food_name = 'Biscuits' ;
88
89
90
91
92
```

Result Grid | Filter Rows: | Edit:

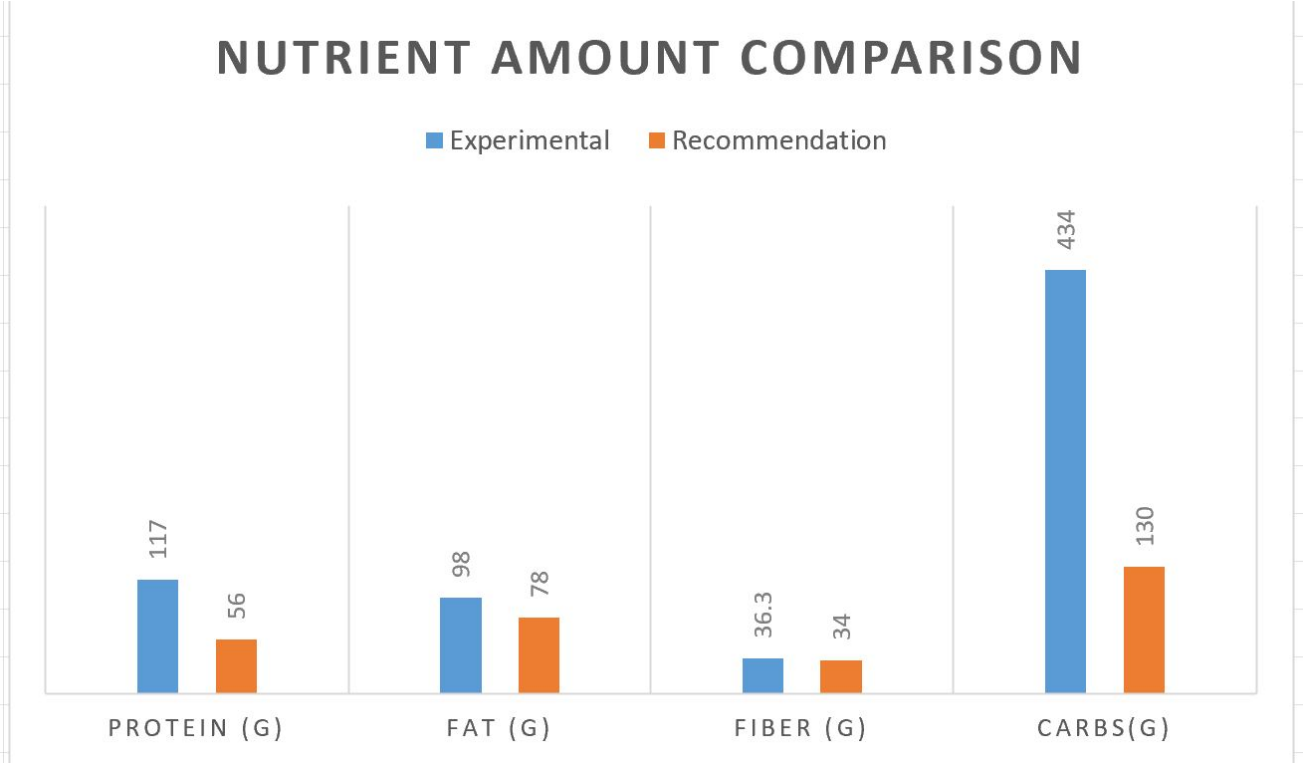
food_id	food_name	food_group_id
NULL	NULL	NULL

RESULT & ANALYSIS

- Create a reasonable diet
- Age: 19-25
- 2800 Cal per day
- Food Choice:
  - Salmon (protein source)
  - Oatmeal (fiber source)
  - Banana(supplementary)
  - Ice Cream (supplementary)
  - Rice (carbs source/ 1000 cal)
  -



RESULT& ANALYSIS (Cont')



FUTURE IMPROVEMENT and APPLICATION

Improvements

- Fix 3NF violations for people_daily_calorie_nutrition table
- Include more nutritional data
  - Vitamins
  - Minerals
  - Etc.

Future Applications

- Use database to compare famous food’s Nutrition Facts
  - Big Mac, Subway Sandwiches, Etc.