CSC 545: Term Project

Schema Refinement and Justification

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Improved ER Diagram

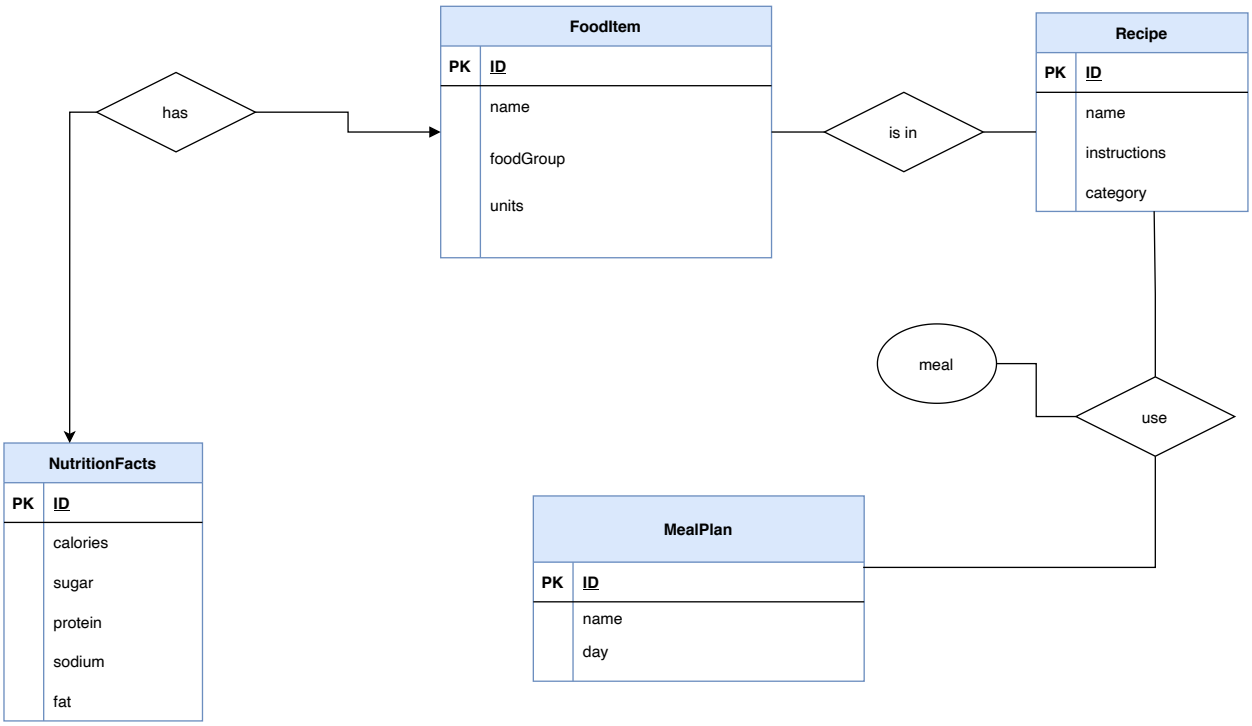

Figure 1: Updated Database ER Diagram

Relational Schema

Reference: How to make a column an auto-generating identity column

```
create table NutritionFacts (
    id number generated always as identity primary key,
    calories number(*, 0) not null,
    sugar number(*, 0) not null,
    protein number(*, 0) not null,
    sodium number(*, 0) not null,
    fat number(*, 0) not null
);

create table FoodItem (
    id number generated always as identity primary key,
    name varchar2(50) not null,
    foodGroup varchar2(30) not null,
    units number(*, 0) default 0 not null,
    nutritionFactsId number not null,
    constraint nutritionFactsFk foreign key (nutritionFactsId)
        references NutritionFacts(id) on delete cascade
);
```

```sql
create table Recipe (
    id number generated always as identity primary key,
    name varchar2(100) not null,
    instructions clob not null,
    category varchar2(60) not null
);

create table RecipeFoodItem (
    recipeId number,
    foodItemId number,
    primary key (recipeId, foodItemId),
    constraint foodItemRecipeFk foreign key (recipeId)
        references Recipe(id) on delete cascade,
    constraint recipeFoodItemFk foreign key (foodItemId)
        references FoodItem(id) on delete cascade
);

create table MealPlan (
    id number generated always as identity primary key,
    name varchar2(20) not null,
    day char(3) not null unique,
    constraint validateDayOfWeekCheck
        check (day in ('mon', 'tue', 'wed', 'thu', 'fri', 'sat', 'sun'))
);

create table RecipeMealPlan (
    recipeId number,
    mealPlanId number,
    primary key (recipeId, mealPlanId),
    meal varchar2(20) not null,
    constraint recipeFk foreign key (recipeId)
        references Recipe(id) on delete cascade,
    constraint mealPlanFk foreign key (mealPlanId)
        references MealPlan(id) on delete cascade
);
```

Justification

NutritionFacts

$$id \rightarrow calories, sugar, protein, sodium, fat$$

id determines all other attributes of `NutritionFacts`, so this would fall into both *BCNF* and *3NF*.

`FoodItem`

$$id \rightarrow name, foodGroup, units, nutritionFactsId$$

id determines all other attributes of `FoodItem`, so this would fall into both *BCNF* and *3NF*.

`Recipe`

$$id \rightarrow name, instructions, category$$

id determines all other attributes of `Recipe`, so this would fall into both *BCNF* and *3NF*.

`RecipeFoodItem`

This table would fall under *BCNF* since there are only two attributes.

`MealPlan`

$$id \rightarrow name, day$$

id determines all other attributes of `MealPlan`, so this would fall into both *BCNF* and *3NF*.

`RecipeMealPlan`

$$recipeId, mealPlanId \rightarrow meal$$

This table would fall under *BCNF* since $\{recipeId, mealPlanId\}$ is a superkey.