Knowledge representation and reasoning

Milestone 1

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Academic year 2021-2022

1 Introduction

In the frame of the Knowledge representation and reasoning course we have been tasked to develop an ontology with "Recipe" as topic. We choose to develop an ontology about pastry recipes. Our goal is to develop a system which allows to store pastry recipes, more specifically our system should be able to return a pastry recipe under constraints such as vegan recipe, gluten free recipe... Moreover a recipe will be described by ingredients needed as well as tools needed. Thus in this first milestone we had imagine a database schema in order to tackle our problem and we implement the corresponding SQL dump file.

2 Entity Relationship Diagram

2.1 Keys

Entities keys :

- Recipe : ID_R
- Tool : ID_T
- Food : ID_F
- Quantity of food : Quantity + "Food" role of Is

Relationships keys :

- Requires : "Recipe" role + Quantity of food" role

2.2 Integrity constraints not represented

- Value, Fat, Sugar, kcal ≥ 0
- Categories $\in$ {vegetarian, vegan, gluten free,...}

2.3 Diagram

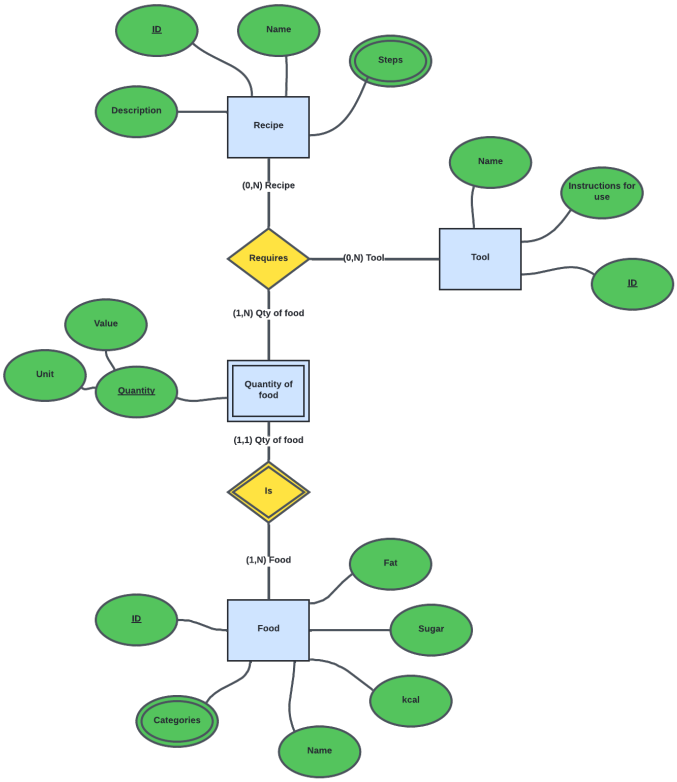

FIGURE 1 – Diagram

3 Relational model

- Recipe(ID_R, Description, Name)
- Steps(#ID_R, Order, Step)
- Requires(#ID_R, #ID_F, #Quantity, #ID_T)
- Quantity_of_food(#ID_F, Quantity)
- Food(ID_F, Name, Fat, Sugar, kcal)
- Categories(#ID_F, Order, category)
- Tool(ID_T, Name, Instruction_for_use)

4 SQL dump file implementation

In this section we provide a MySQL script which can be used to create the database such as described in previous sections.

```
CREATE TABLE IF NOT EXISTS Recipe(
    id INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    description VARCHAR(500) NOT NULL
)ENGINE=InnoDB;

CREATE TABLE IF NOT EXISTS Steps(
    id INT NOT NULL,
    order INT NOT NULL,
    step VARCHAR(500) NOT NULL,
    PRIMARY KEY(id, order),
    FOREIGN KEY (id) REFERENCES Recipe(id)
)ENGINE=InnoDB;

CREATE TABLE IF NOT EXISTS Food(
    id INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    fat DECIMAL NOT NULL,
    sugar DECIMAL NOT NULL,
    kcal DECIMAL NOT NULL
)ENGINE=InnoDB;

CREATE TABLE IF NOT EXISTS Categories(
    id INT NOT NULL,
    order INT NOT NULL,
    Category VARCHAR(500) NOT NULL,
    PRIMARY KEY(id, order),
    FOREIGN KEY (id) REFERENCES Food(id)
)ENGINE=InnoDB;

CREATE TABLE IF NOT EXISTS Tool(
    id INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    instruction_for_use VARCHAR(500) NOT NULL
)ENGINE=InnoDB;

CREATE TABLE IF NOT EXISTS QuantityOfFood(
    id INT NOT NULL,
    quantity INT NOT NULL,
    PRIMARY KEY(id, quantity),
    FOREIGN KEY (id) REFERENCES Food(id)
)ENGINE=InnoDB;

CREATE TABLE IF NOT EXISTS Requires(
    id_r INT NOT NULL,
    id_f INT NOT NULL,
    quantity INT NOT NULL,
    id_t INT NOT NULL,
```

```
49      PRIMARY KEY(id_r, id_f, quantity),
50      FOREIGN KEY (id_r) REFERENCES Recipe(id)
51      FOREIGN KEY (id_f) REFERENCES Food(id)
52      FOREIGN KEY (quantity) REFERENCES QuantityOfFood(quantity)
53  )ENGINE=InnoDB;
```