TECHNISCHE UNIVERSITÄT
CHEMNITZ

Term Paper
Advanced Management of Data

Winter Semester 2020/21

Pizza World- Pizza Shop Management System

S M Tanvir Abid

Matriculation no: 625881

Master in Automotive Software Engineering

Table of Contents

1. Introduction

Despite being a traditional Italian dish, pizza is one the most selling and popular fast food around the world. There are a lot of variant of pizzas offered by the restaurants but people also wants to have their very own customized pizza. Also for the employee, it takes time to receive orders from the customers individually. They also take orders by phone which is more time consuming than necessary. The system will allow the customers to order their pizza from anywhere by a website and also it will connect the baker in the same platform so that he gets the orders instantly. The website will play the role of a virtual manager as well. The focus is to create an "easy to use" website, which will allow customers to complete their order with ease.

This project aims to fulfill the want of the customers as well as give the opportunity to the employees to work more in the kitchen rather than taking order manually. Also it aims to increase the sales of the restaurant by easing the operations.

2. Tools and Technologies

Several tools and technologies are used for making the system.

2.1 HTML

Hypertext Markup Language (HTML) is the standard markup language for reports intended to be shown in an internet browser. Internet browsers get HTML reports from a web worker or nearby aptitude and solidify the archives into mixed media site pages. HTML portrays the construction of a site page semantically and primarily, included signals for the occurrence of the record [1]. HTML components are the structure squares of HTML pages. With HTML builds, pictures, and different articles, for example, intuitive structures might be implanted into the delivered page. HTML gives a way to make organized archives by meaning primary semantics for text, for example, headings, sections, records, connections, cites, and different things. HTML components are outlined by labels, composed utilizing point sections. Labels, for example, <img/> and <input/> straightforwardly bring content into the page. Different labels, for example, <p> encompass and give data about archive text and may incorporate different labels as sub-components. Programs don't show the HTML labels, however, use them to decipher the substance of the page [1].

HTML is used in the project also because that it is broadly utilized. Each program underpins HTML language, simple to learn and utilize. It is of course in each window, so developer doesn't have to buy additional software.

2.2 CSS

Cascading Style Sheets (CSS) is a template language exploited for portraying the introduction of an archive written in a markup language, for example, HTML. CSS is a substance innovation of the World Wide Web, close by HTML and JavaScript. CSS is anticipated to endow the impartiality of introduction and substance, including design, shadings, and textual styles. This partition can improve content availability, give greater adaptability and control in the particular of introduction attributes, empower various website pages to share arranging by determining the applicable CSS in a different .css document which decreases multifaceted nature and reiteration in the underlying substance just as empowering the .css record to be reserved to improve the page load speed between the pages that share the document and its designing [2].

In this project, CSS is used as a secondary designing language because of its simplicity of introducing various styles to various viewers. Also, it is a lightweight code that is simple and quick to download.

2.3 W3.CSS

W3.CSS is a cutting edge CSS structure with worked in responsiveness. It underpins responsive portable first plan naturally, and it is more modest and quicker than comparative CSS systems. It utilizes standard CSS just (No jQuery or JavaScript library) [3]. It gives CSS fairness to all programs. Chrome, Firefox, IE, Safari, and that's just the beginning. It gives CSS balance to all gadgets like PC, tablet, and portable. W3.CSS can likewise accelerate and streamline web advancement since it is simpler to learn, and simpler to use than other CSS systems [4].

In this project, W3.CSS is used as the main designing language of the front-end view because of the mentioned facilities.

2.4 JavaScript

Alongside HTML and CSS, JavaScript is one of the center innovations of the World Wide Web. JavaScript empowers intuitive site pages and is a fundamental piece of web applications. By far most of the sites use it for customer-side page conduct, and all significant internet browsers have a devoted JavaScript motor to execute it [5]. It is a text-based programming language utilized both with respect to the customer side and server side that permits you to make website pages intelligent.

In this project, JavaScript is used to respond to the various buttons.

2.5 PHP

PHP is a recursive abbreviation for Hypertext Preprocessor. PHP is a server-side scripting language that is installed in HTML. It is utilized to oversee dynamic substance, data sets, meeting following, even form whole internet business destinations [6]. PHP performs framework capacities, for example from documents on a framework it can make, open, read, compose, and close them. PHP can deal with structures, for example, accumulate information from records,

save information to a document, through the email you can send information, return information to the user. Operation of add, erase, alter components inside the data set can be done through PHP. It Access treats factors and set cookies. Using PHP, you can confine clients to get to certain pages of your website. It can scramble information [6].

In this project, PHP is mostly used for establishing connections between the backend database and the front end. And it is used for showing the values which are retrieved from the database.

3. Project Requirements

This section describes different types of users of the system as well as the functional requirement of the project.

3.1 User Requirement

There are mainly 2 types of users who should be able to use the system.

- Customers
- Baker

3.2 Functional Requirements

The users of the system should be able to perform some specific functions according to their role.

Application Stack	TO DO
Baker view	- View all suppliers - Add new supplier to the list - Update existing suppliers - Remove specific supplier from the list - View all ingredient - Add new ingredient to the list - Update existing ingredients - Remove specific ingredient from the list - View recent pending orders - View recent delivered orders - Remove orders from the list
Customer view	- View base pizza with size and price - View all available ingredients with their province and price. - Delete from selected ingredient - Place order by the combination - View total price

Database **PostgreSQL**	-Stores all data -Stores all computational logic in PL/pgSQL

4. Implementations

This section describes how the project is implemented and how the database is designed, also visualize the database using a UML diagram as well as a relational diagram.

4.1 Database Design and Diagrams

PostgreSQL relational database management system is used as the database of the project, and PL/SQL is used as the main logical language.

4.1.1 UML Diagram

UML stands for Unified Modeling Language which is used for specifying, visualizing, constructing, and documenting the artifacts of the systems. The bellow UML diagram represents the database tables of the system and their attributes as well as the methods.

Here, the table ‘cart’ is made out of two other tables, ‘ingredients’ and ‘pizza’. That is why there is a composition relation between the ‘pizza’ and ‘cart’ as well as ‘ingredients’ and ‘cart’. In another way ‘cart’ table can’t be existed without any of the other two tables. As only one pizza can be added at a time to the cart, that’s why there are 1 to 1 relationship between ‘cart’ and pizza. On the other hand, many ingredients can be added to the cart at the time of one order, so there is one to many relation between ‘cart’ and ‘ingredients’.

The ‘order’ table is only created when the customer confirms the order from the cart. So that there is a composition relation between the ‘cart’ and the ‘order’. From one cart, there will be created one order, so that there are 1 to 1 relation between ‘cart’ and ‘order’

The table ‘supplier’ and the table ‘ingredient’ is joined by the association line and they have the many to many relation. As one supplier can supply many ingredients and even one ingredient can be supplied by multiple supplier.

The UML diagram is given bellow:

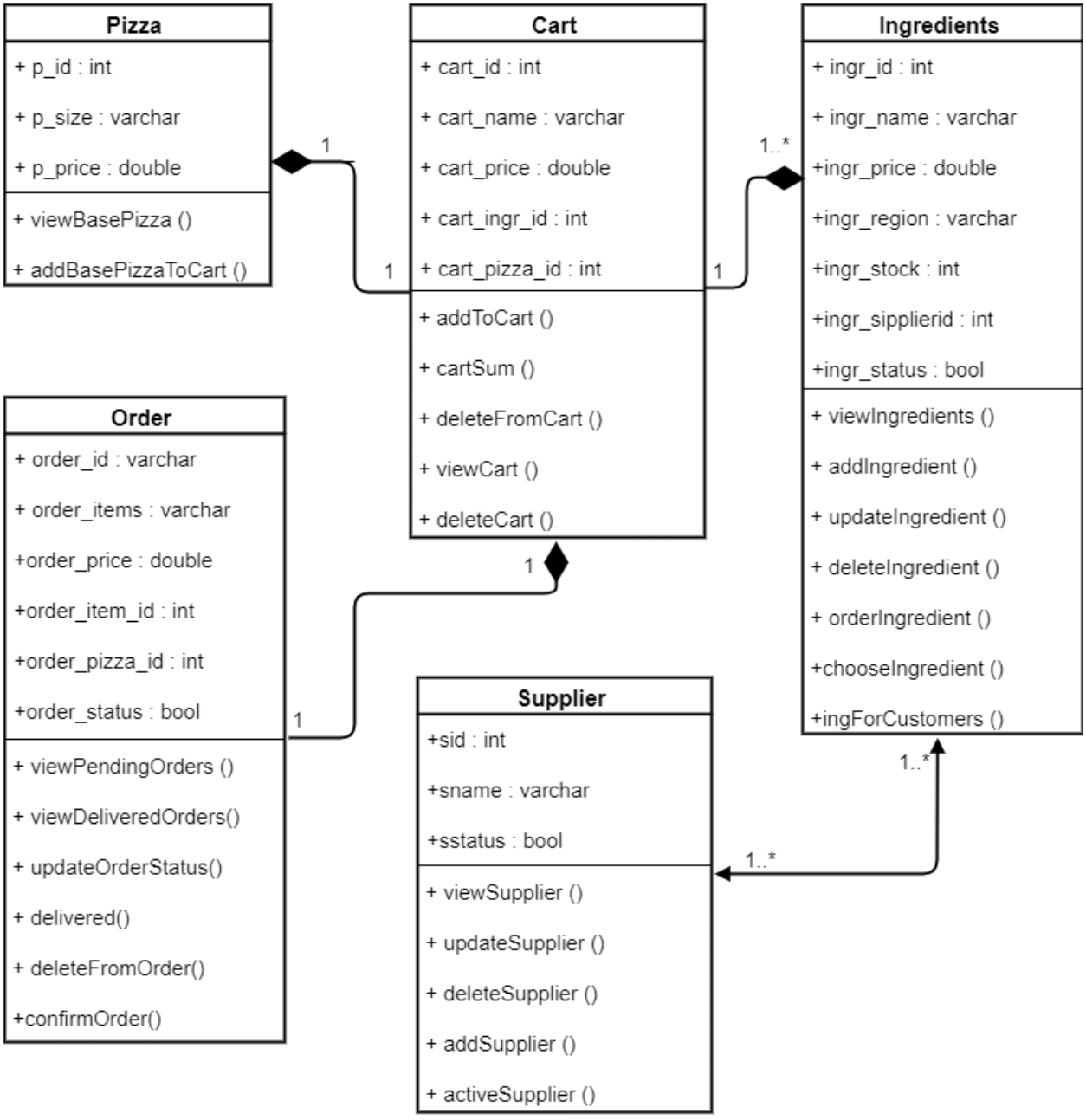

Figure 01: UML Diagram

4.1.2 Relational Schema

Relational schema denotes to the meta-data that describes the erection of data within a convinced domain. A relational schema for a database is the framework of how data is prearranged. It typically stipulates which columns in which tables comprise orientations to data in other tables, frequently by comprising primary keys from other table so that rows can be easily joined.

The following diagram is the relational schema of the system. Here, in the ingredient table, primary key of the supplier table is used as the foreign key. In the cart table, and the order table, primary key of the pizza table and ingredient table is used as the foreign keys to indicate which pizza and ingredient is selected by the customers during an order.

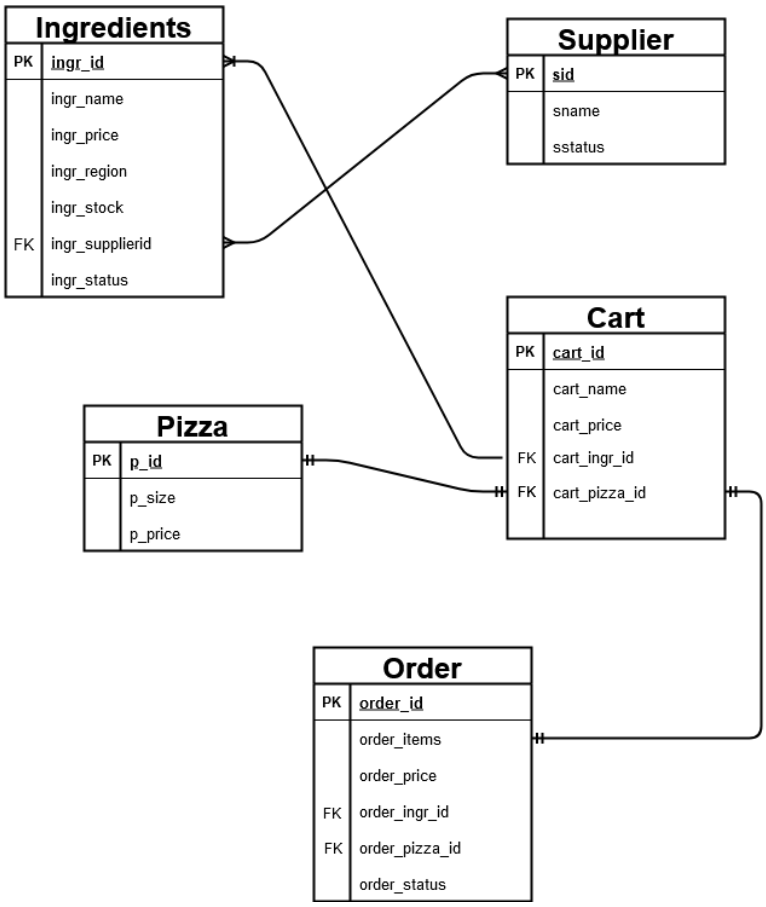

Figure 02: Relational schema diagram.

4.2 Project Operations

4.2.1 Customer

Customers are the users who is able to perform the operation sequence,

- Select base pizza which is the size of the raw dough
- Compose a pizza by selecting ingredients from the list of available ingredients along with the knowledge of their provenance and price.
- Create a cart so that they can also remove the selected ingredients just before placing the order.
- View the total price of his chosen pizza composition.
- Place the order

A demonstration of front-end view of one of the customer's operation is given bellow:

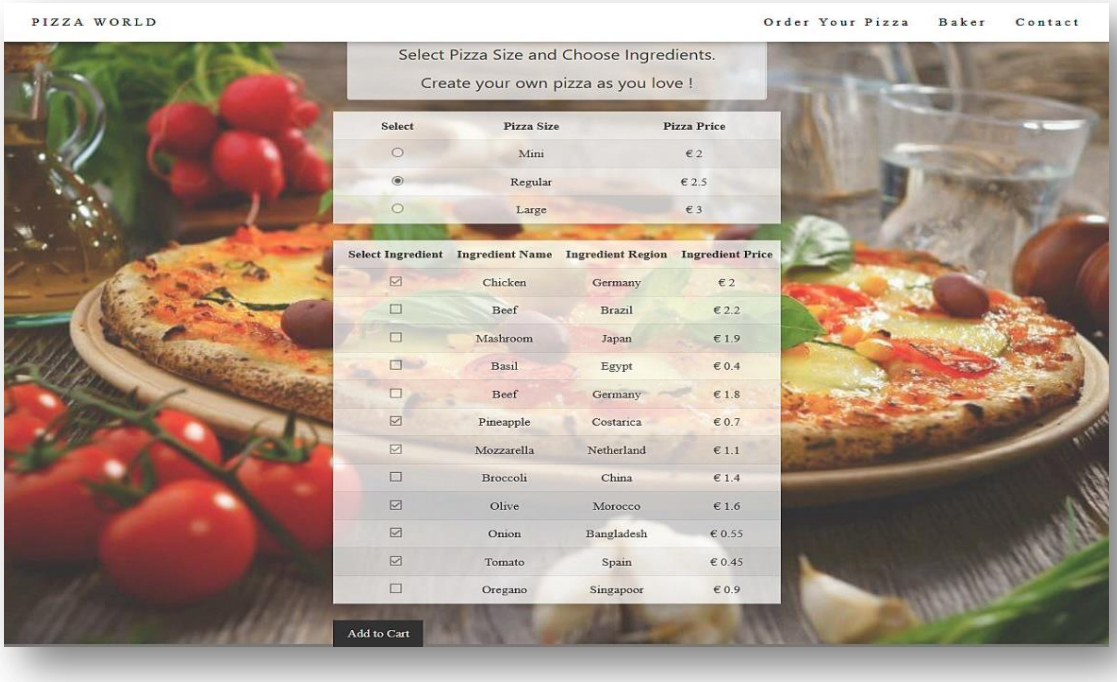

Figure 03: Customer view while composing a pizza

4.2.2 Baker

Baker is able to perform the operations,

- Manage and view all the ingredient suppliers. The operations such as
  - Adding new suppliers with their details and status.
  - Removing existing suppliers from the supplier's list
  - Making changes to the existing suppliers (change name and status).

- Manage and view all the ingredients. The operations such as
  - Adding new ingredients
  - Removing existing ingredients.
  - Making changes to the existing ingredients (updating name, provenience, price, supplier and visibility)
  - Restock ingredients when they are out of stock (from different available suppliers)

- Manage and view the orders that are placed by the customer
  - View the pending and delivered pizza order details separately.
  - Deliver the pending orders
  - Delete or cancel orders from both tables if necessary.

A demonstration of front-end view of one of the baker's functions is given bellow:

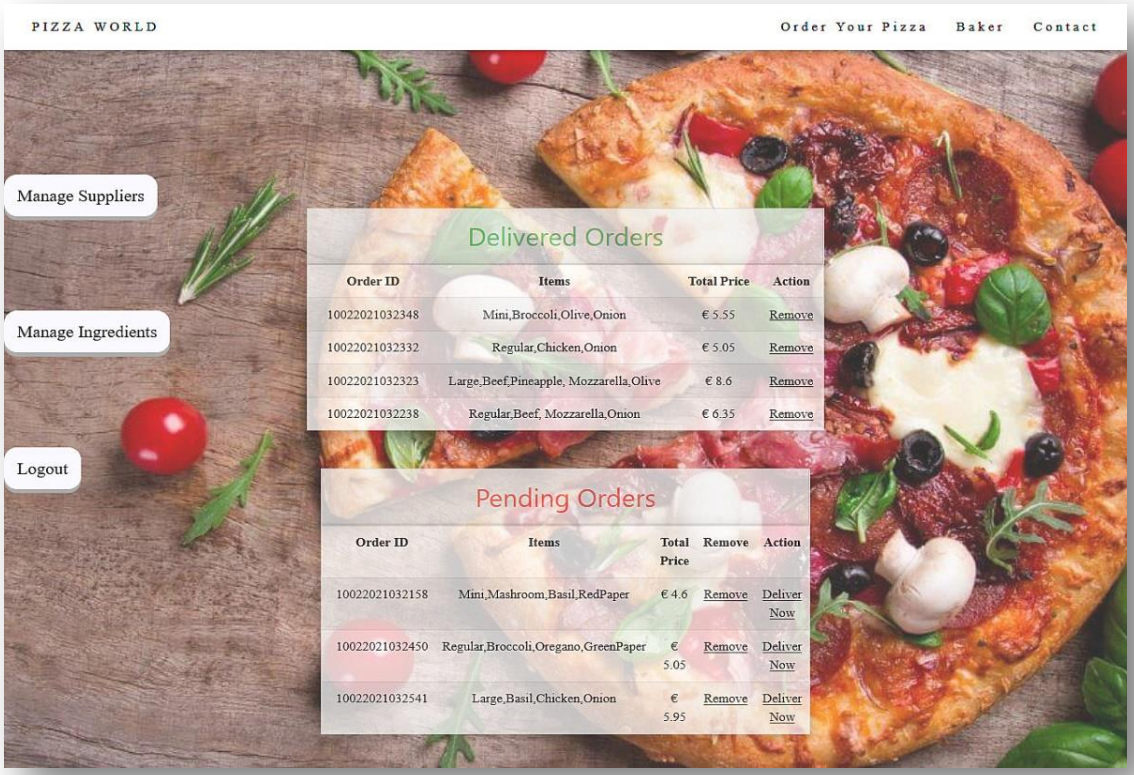

Figure 04: Baker view of delivered and pending orders

5. Code Analysis

This section describes and analyzes some of the major operation of the system using the respective codes.

5.1 Connection to the database

Connecting to the database and fetching data is used every time when there is an operation in the database is occurred. For example, when the baker wants do delete an order from the front end, the connection is established in this way

```php
<?php
    $host        = "host = 127.0.0.1";
    $port        = "port = 5432";
    $dbname      = "dbname = postgres";
    $credentials = "user = postgres password=1234";

    $db = pg_connect( "$host $port $dbname $credentials"  );

    if( isset($_GET['delPendItem']) )
      {
        $order = $_GET['delPendItem'];


        $sql = pg_query($db, "select  deletefromorder('$order');");


        echo "<meta http-equiv='refresh' content='0;url=bakerProfile.php'>";
    }
    ?>
```

Figure 05: Connection to the database

The main operations of the systems are, add, view, update and delete. As discussed in the functional requirements, baker and customer perform these functions based on different scenarios.

5.2 Add

Various add/insert operations are used in this project. For example one of the function called public.confirmorder () inserts the selected base pizza and ingredients to the table where the baker views that specific order.

```
CREATE OR REPLACE FUNCTION public.confirmorder(
    )
    RETURNS character varying
    LANGUAGE 'plpgsql'
    COST 100
    VOLATILE PARALLEL UNSAFE
AS $BODY$
declare
oid varchar;
begin
select to_char(now(), 'DDMMYYYYHH24MISS') into oid;

insert into public.order(order_id, order_items, order_item_id, order_item_price, order_status, order_pizza_id)
select oid,  crt.cart_name,
crt.cart_ingr_id, crt.cart_price, FALSE, crt.cart_pizza_id
from cart crt;

   return 'inserted';
end;
$BODY$;
```

Figure 06: Add / insert operation

5.2 View

These type of operations retrieve the data from database and shows it to the specific user. For example, public.viewdeliveredorders() functions show the baker which orders are already delivered.

```
CREATE OR REPLACE FUNCTION public.viewdeliveredorders(
    )
    RETURNS TABLE(dlvrorderid character varying, dlvrorderitems text, dlvrorderprice double precision)
    LANGUAGE 'plpgsql'
    COST 100
    VOLATILE PARALLEL UNSAFE
    ROWS 1000

AS $BODY$
begin
   return query

select  order_id, STRING_AGG(order_items, ','), sum(order_item_price) from public.order o
where order_status=TRUE
group by order_id
order by order_id desc;

end;
$BODY$;
```

Figure 07: View / show operation

5.3 Update

These type of operations updates the data of database such as, when the baker edits the details of supplier or ingredient. For example, a function named public.delivered() allows the baker to change the status of an order from pending to delivered.

```
CREATE OR REPLACE FUNCTION public.delivered(
    orderid character varying)
    RETURNS character varying
    LANGUAGE 'plpgsql'
    COST 100
    VOLATILE PARALLEL UNSAFE
AS $BODY$
begin
  update public.ingredients i
  set ingr_stock= ingr_stock-1

  where i.ingr_id in (
      select order_item_id
  from public.order  where order_id in (orderid)

);

   return 'updated';
end;
$BODY$;
```

Figure 08: Update / edit operation

5.4 Delete

This operation allows the user to delete data from the database such as, the baker delete the details of a supplier or an ingredient. Customer deletes ingredients from the cart. For example, a function public.deletefromcart() allows the customer to delete from his cart if he wants.

```
CREATE OR REPLACE FUNCTION public.deletefromcart(
    itemid integer)
    RETURNS character varying
    LANGUAGE 'plpgsql'
    COST 100
    VOLATILE PARALLEL UNSAFE
AS $BODY$
begin
   DELETE FROM public.cart
   WHERE cart_id= itemid;
   return 'deleted';
end;
$BODY$;
```

Figure 09: Delete operation

6. Distributed Database

A distributed database is a special kind of database which is comprises of two or more files which is located in different sites. It can be located on the same network or can be located on entirely different networks [7].

6.1 Distributed Database with Pizza World

Although the current system of Pizza World is not big enough to be in a DDB system, if we think it as a world biggest vendors like Dominos, KFC, Mac-Donalds, in these cases concept of distributed database comes.

If the implemented system is used worldwide by the vendor, people from different part of the world will use this in their local areas and the baker needs to have his own supply chain. So that it is important to have their database locally so that it can be more reliable, cost effective, faster and seured.

6.2 Designing of DDB

The distribution can be achieved in some good ways such as,

- Data Replication:
- Fragmentation.

Data Replication: It is the process of storing copies of database in different sites. If we stores the database of our system in different sites,

- Even if one site is down, the system will not collapse since there is another copy is existed in another site which increases reliability.
- Query processing can be done with less bandwidth usage because of local database.
- Local database ensures quicker response which increases speed.

Fragmentation: It is the process of dividing a table into smaller tables. This fragmentation has to be done in a way that from the fragments, the original table can be reconstructed. The fragmentation technique,

- Increases efficiency because irrelevant data is not available in all sites.
- Increases efficiency because data is stored close to the site of usage.
- Local query optimization technique is also becomes efficient.

7. Conclusion

The overall development experience of this system was satisfying. Using PostgreSQL for the first time was a little problematic in starting, but day by day I was getting used to this. Working with PHP and PostgreSQL was fun part which helped me lot to better understand the technology and how procedure querying works in practical applications. It was really helpful to deal with some misconceptions to work with some well-defined project requirements. As a concluding statement, it can be declared confidently that the pizza shop management system 'Pizza world' meets all its requirements. This user friendly website is able to serve standalone to the customer as well as the baker and can work as a virtual pizza shop manager.

8. References

[1]"HTML", *En.wikipedia.org*, 2021. [Online]. Available: https://en.wikipedia.org/wiki/HTML. [Accessed: 07- Feb- 2021].

[2]"CSS", *En.wikipedia.org*, 2021. [Online]. Available: https://en.wikipedia.org/wiki/CSS. [Accessed: 07- Feb- 2021].

[3]"What is W3.CSS", *W3schools.com*, 2021. [Online]. Available: https://www.w3schools.com/whatis/whatis_w3css.asp. [Accessed: 08- Feb- 2021].

[4]"w3.css – CSS Frameworks", *Cssframeworks.org*, 2021. [Online]. Available: https://cssframeworks.org/details/w3-css/. [Accessed: 08- Feb- 2021].

[5]"JavaScript", *En.wikipedia.org*, 2021. [Online]. Available: https://en.wikipedia.org/wiki/JavaScript . [Accessed: 09- Feb- 2021].

[6]“PHP - Introduction – Tutorialspoint”. [Online]. Available: https://www.tutorialspoint.com/php/php_introduction.htm. [Accessed: 09- Feb- 2021].

[7]“What is distributed database”. [Online]. Available: https://searchoracle.techtarget.com/definition/distributed-database. [Accessed: 10- Feb- 2021].