



**Middlesex
University
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CST1510 Programming for Data Communication and Networking

Final Coursework



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Introduction

This project is based on designing and implementing a 'Vending Machine' for sushi. It is a Client/Server-Side software system built in Python to interact with the user on the client-side and the data storage is processed on the server-side. The vending machine under the name of 'ケシャフ sushi' (Keshav in Japanese) will allow the user to carry out the following operations when generating an order.

- 1) Start with a welcome message.
- 2) Choose sushi according to a category and then, he/she will have to enter the quantity the latter wish to purchase.
- 3) A window will display the sushi ID, sushi's name, individual price, and the total price.
- 4) After each order place, the vending machine will allow the following list of options:
 - a. Add Another
 - b. Finish and Pay
 - c. Cancel
- 5) Add Another operation will allow the user to add another sushi to his/her cart.
- 6) Finish and Pay will display the final receipt containing the list of items, individual price, total price and proceed to make the payment.
- 7) Cancel will display a message and go back to the Welcome window.
- 8) The user can make payment either by cash or card. If payment is done by cash, then the change will also be displayed.
- 9) Finally, after payment, a goodbye message will be displayed and redirecting the user back to the welcome message.

Python

Python is a high-level programming language that can be used for the following applications:

- 1) Web Development: Django, Pyramid, Bottle, Tornado, Flask, web2py
- 2) GUI Development: tkinter, PyGObject, PyQt, PySide, Kivy, wxPython
- 3) Scientific and Numeric: SciPy, Pandas, IPython
- 4) Software Development: Buildbot, Trac, Roundup

For this coursework, tkinter was used for the GUI development.

Tkinter

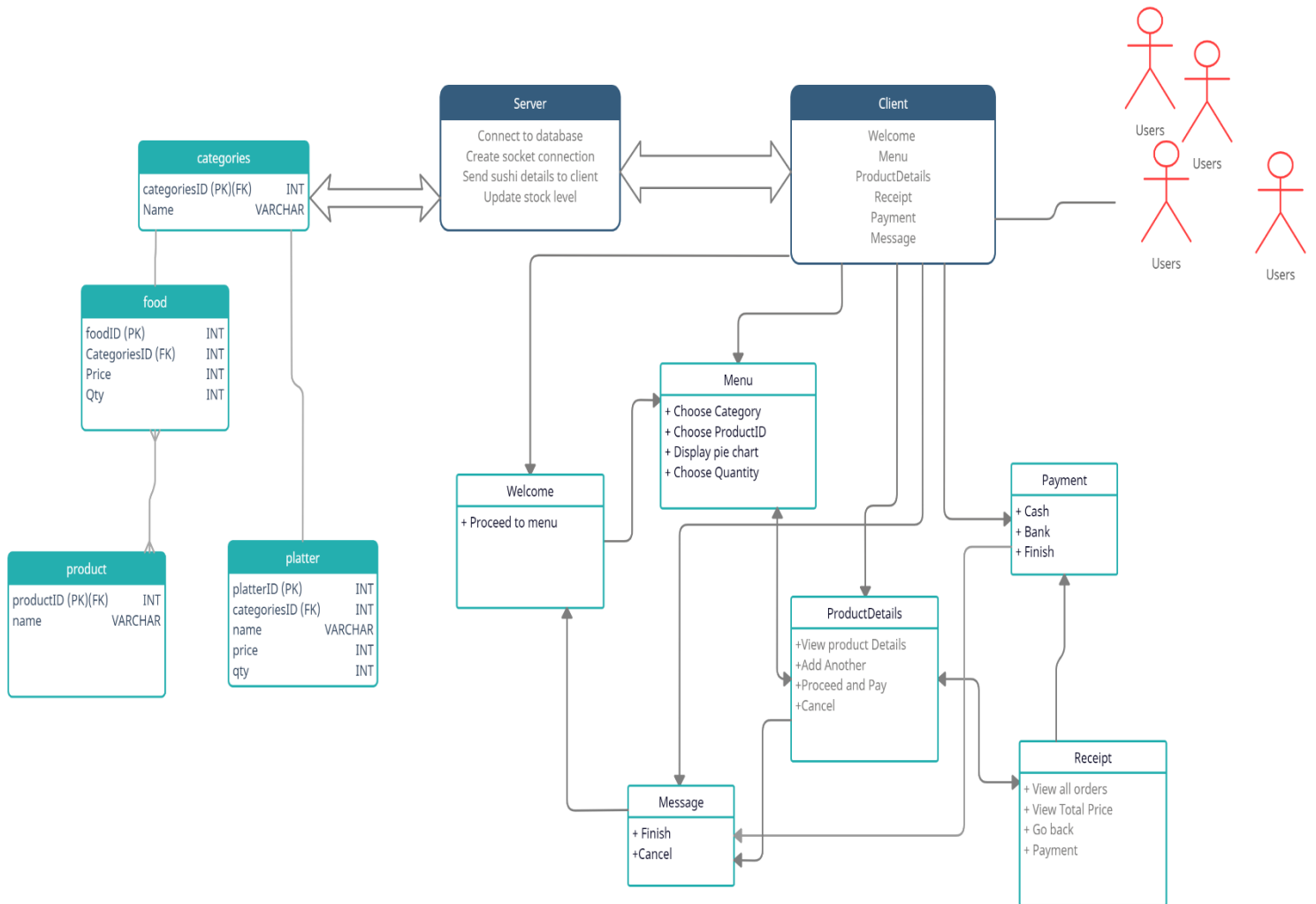
Tkinter is not the only GUI Programming toolkit for python as mentioned above, but it is the most commonly used one. It provides a powerful object-oriented interface to the Tk GUI toolkit.

Tkinter was imported by running the following code as shown in fig1:

fig 1

```
from tkinter import *
```

UML Diagram



Steps for running

- 1) Update the details of the database and execute a file by the name 'execution.sql' in the database. (More details below)
- 2) Run the server.py file.
- 3) Run the client.py file to start the application.

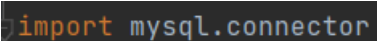
Server-Side Software System

The server will carry out the following operations:

- 1) The server will set up the connection to communicate to the client and also with the database.
- 2) It will retrieve the sushi details from a database stored in MySQL database service into a list.
- 3) The server will send the list to the client.
- 4) After the order is placed at the client-side, the quantity ordered along with the sushi ID will be sent back to the server-side.
- 5) The server will update the quantity in the database according to the sushi ID.

MySQL Database Service

To connect to a database from python, we have to import MySQL library as shown in fig 2 below.

fig 2 

In order, for the server software system able to extract records from the database, a connection has to be set up.

Fig 3 will show a screenshot of the code to be amended in server.py. The database name to be inserted is the name of your database as shown in Fig 3A

Fig 3

```
HOST = '127.0.0.1' # ← insert the HOST of the database
PORT = 3306 # ← insert the PORT of the database

mydb = mysql.connector.connect(
    user='root', # ← insert the username
    password='*****', # ← insert the user password
    host=HOST,
    database='sushi', # ← insert the database name here
    port=PORT,
    raise_on_warnings=True, # whether warnings should raise exceptions.
)
```

Fig 3A

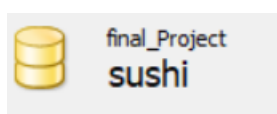
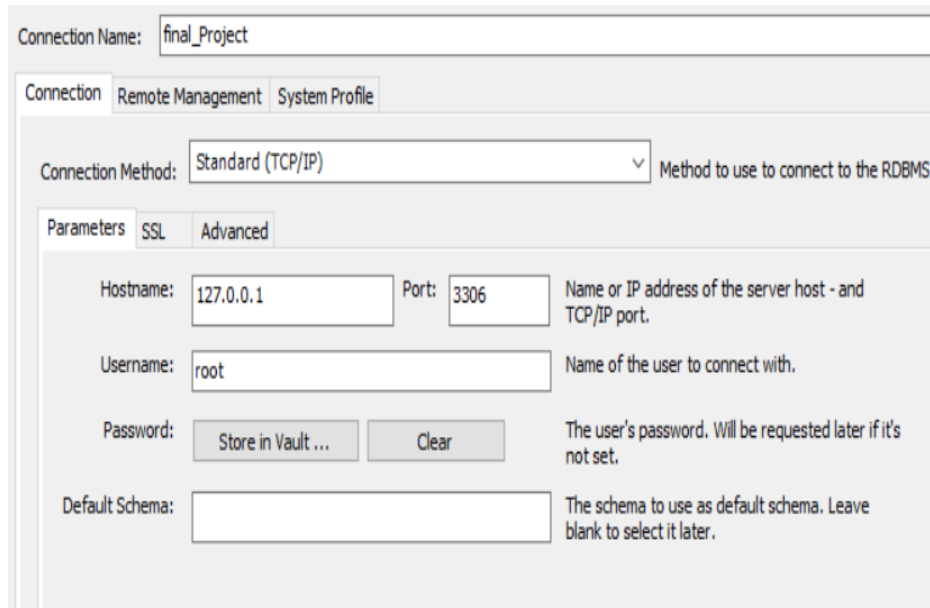


Fig 4 will show a screenshot of how to find the Hostname, Port, Username, Password.

Fig 4



The screenshot shows a database connection configuration window. At the top, the 'Connection Name' is 'final_Project'. Below this are three tabs: 'Connection', 'Remote Management', and 'System Profile'. The 'Connection' tab is active, showing a 'Connection Method' dropdown set to 'Standard (TCP/IP)' with a description 'Method to use to connect to the RDBMS'. Below this are three sub-tabs: 'Parameters', 'SSL', and 'Advanced'. The 'Parameters' sub-tab is active, displaying fields for 'Hostname' (127.0.0.1), 'Port' (3306), 'Username' (root), 'Password' (with 'Store in Vault ...' and 'Clear' buttons), and 'Default Schema' (empty). Each field has a descriptive text label to its right.

Socket Programming

Sockets will act as a point-to-point channel of communication between the client and the server. The socket library was imported as shown in fig 5 below.

fig 5

```
import socket
```

Threading in communication

When communication is set up, once it received or sent information from/to the client, the communication will terminate. In order, to keep the communication active, threading was used.

Threading was imported as shown in fig 6 below.

fig 6

```
from _thread import *
```

Client-side Software System

On the client-side, the GUI will be implemented which will allow the user to carry out the following operations:

- 1) Choose a category
- 2) Choose sushi from that specific category and choose the quantity (0 to 10) and place the order.
- 3) The user can choose another sushi.
- 4) The final receipt will be displayed and then, proceeding to pay (either by cash or by card).

Some screenshots of the GUI

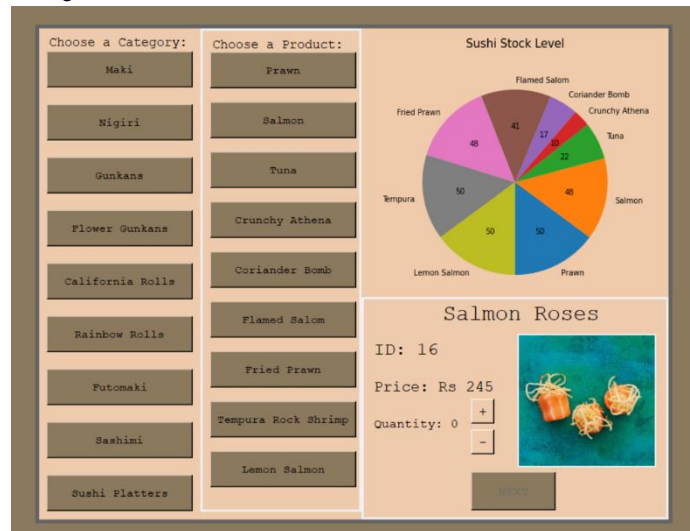
1) Fig 7 shows the welcome window.

2) Fig 8 shows the menu window

Fig 7



Fig 8



3) Fig 9 shows the individual product details window.

Fig 9



4) Fig 10 shows the final receipt window.

Fig 10

RECEIPT

Product Name	Individual Price	Qty	Total Price Per Product
Salmon Roses	245	2	490
Tuna	145	2	290
Bonsai Platt...	455	2	910

Total Price: Rs 1690

Back Payment

5) Fig 11 shows the payment method.

Please Choose
A Button
Below

CASH CARD

Finish

Fig 11.A

CASH CARD

Cash due: Rs 1050

Cash entered: 0

Your change: Rs 0

Enter your cash

2000	1000	500	200	100
50	25	10	5	1

UNDO

Finish

Fig 11.B

CASH CARD

Name

Account Number

CVV

VALID THRU

VALIDATE

Finish

How can it be improved?

- 1) Delete a single order instead of canceling the whole order.
- 2) After each card payment, the user receives a successful payment email.

Special thanks to:

Waseemah Moedeen, Lecturer in IT, Programme Coordinator for BSc CSSE (October) who was always there to help us with our queries and guide us on the right path.

References:

- <https://www.python.org/about/apps/> [Accessed 16 March 2021].