OOPS PROJECT

QT BASED POINT-OF-SALE (POS) SYSTEM FOR SELF SERVICE AND TAKEOUT FOCUSED RESTAURANTS

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AIM

TO CREATE A C++ POINT-OF-SALE (POS) SYSTEM FOR SELF-SERVICE AND TAKEOUT FOCUSED RESTAURANTS WITH INVOICE GENERATION AND MAILING FUNCTIONALITY.

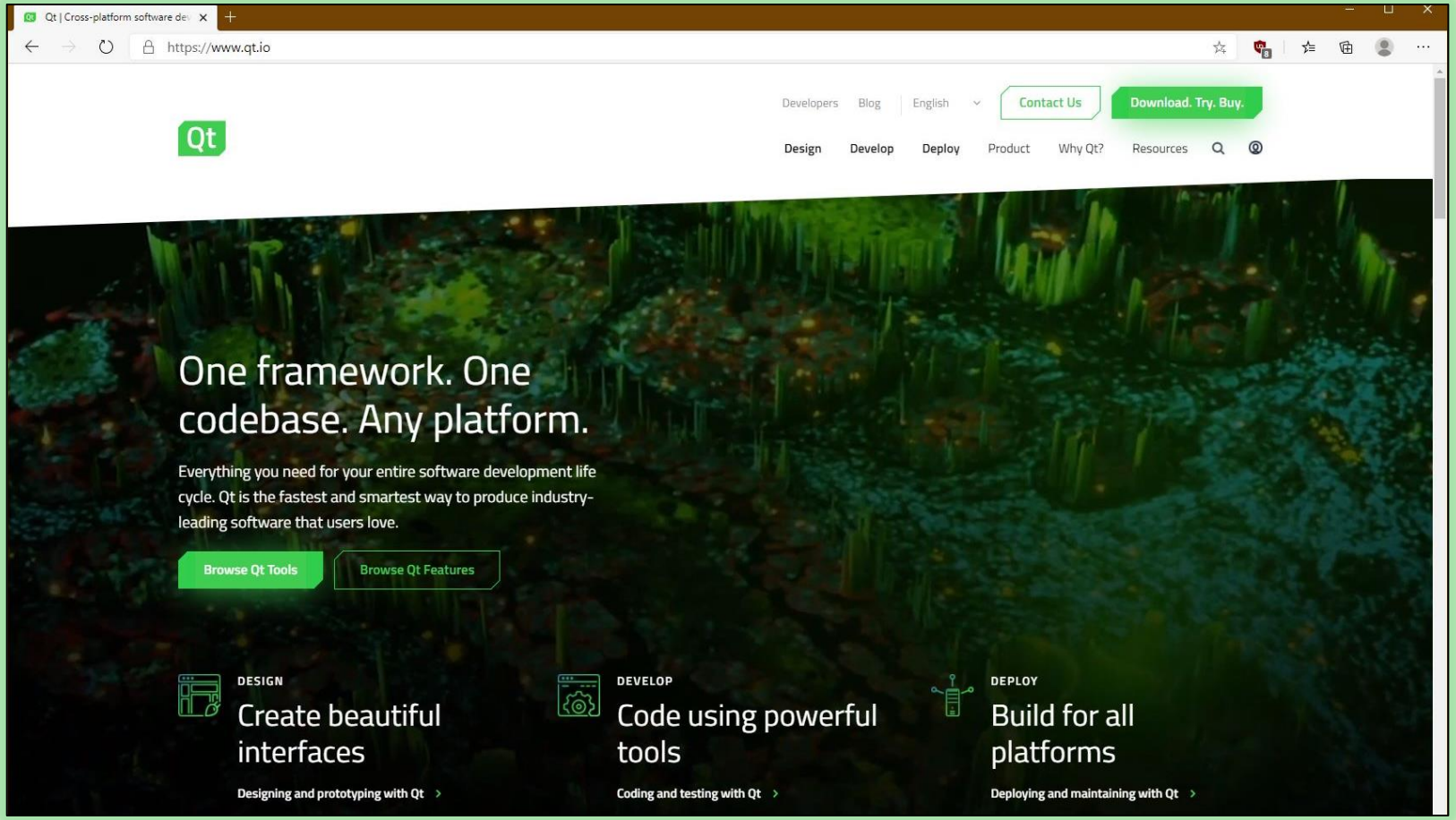
ABSTRACT

- COVID-19 pandemic: more and more dine-in restaurants have had to change their business model to focus more on takeout and delivery (to avoid large gatherings within their premises).
- The proposed C++ application aims to provide a digitized way of taking orders, managing inventory and PAPERLESS INVOICE MANAGEMENT for such restaurants.

INTRODUCTION

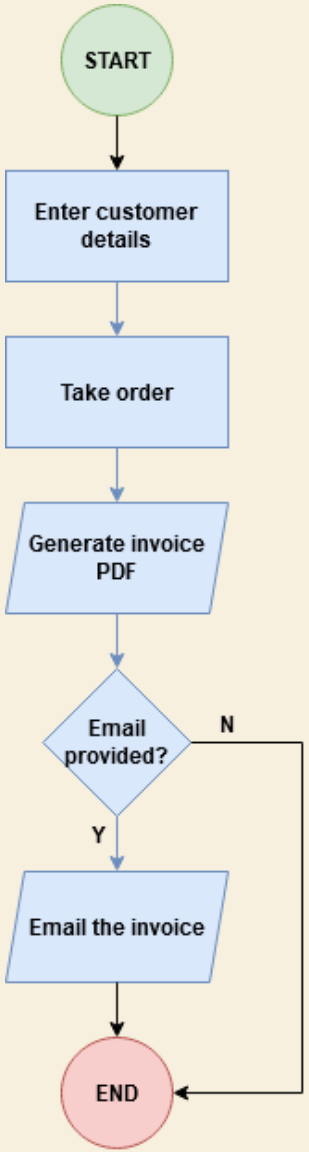
WHAT IS QT?

Qt is a free and open-source widget toolkit for creating GUIs as well as cross-platform applications that run on various software and hardware platforms such as Linux, Windows, macOS, Android or embedded systems.



Credits:
https://www.qt.io

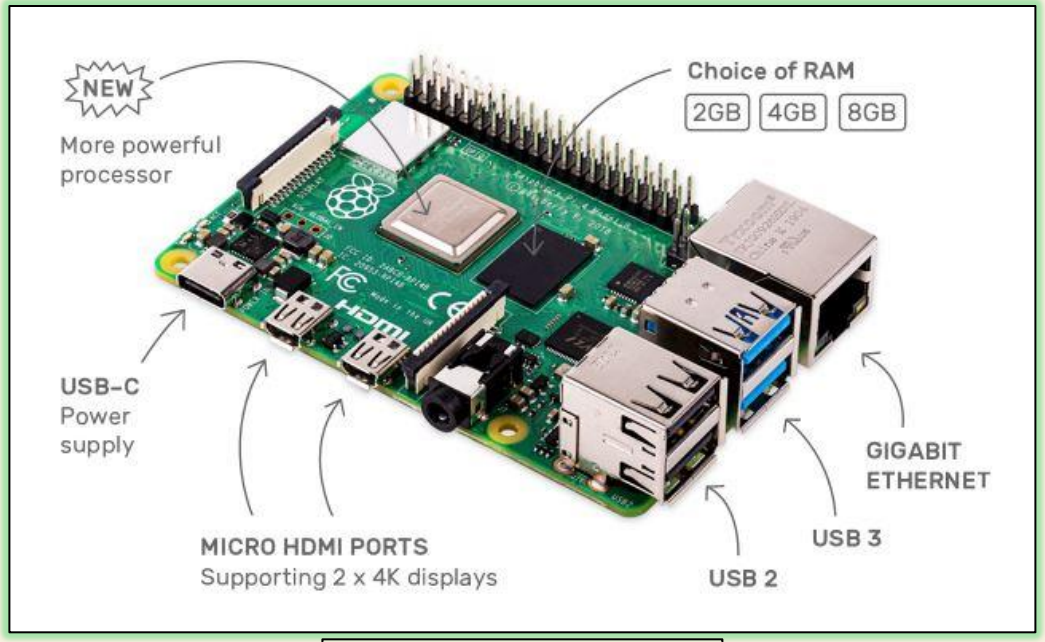
HOW OUR PROGRAM WORKS...



Flowchart created using:
https://app.diagrams.net/

PROPOSED USECASE

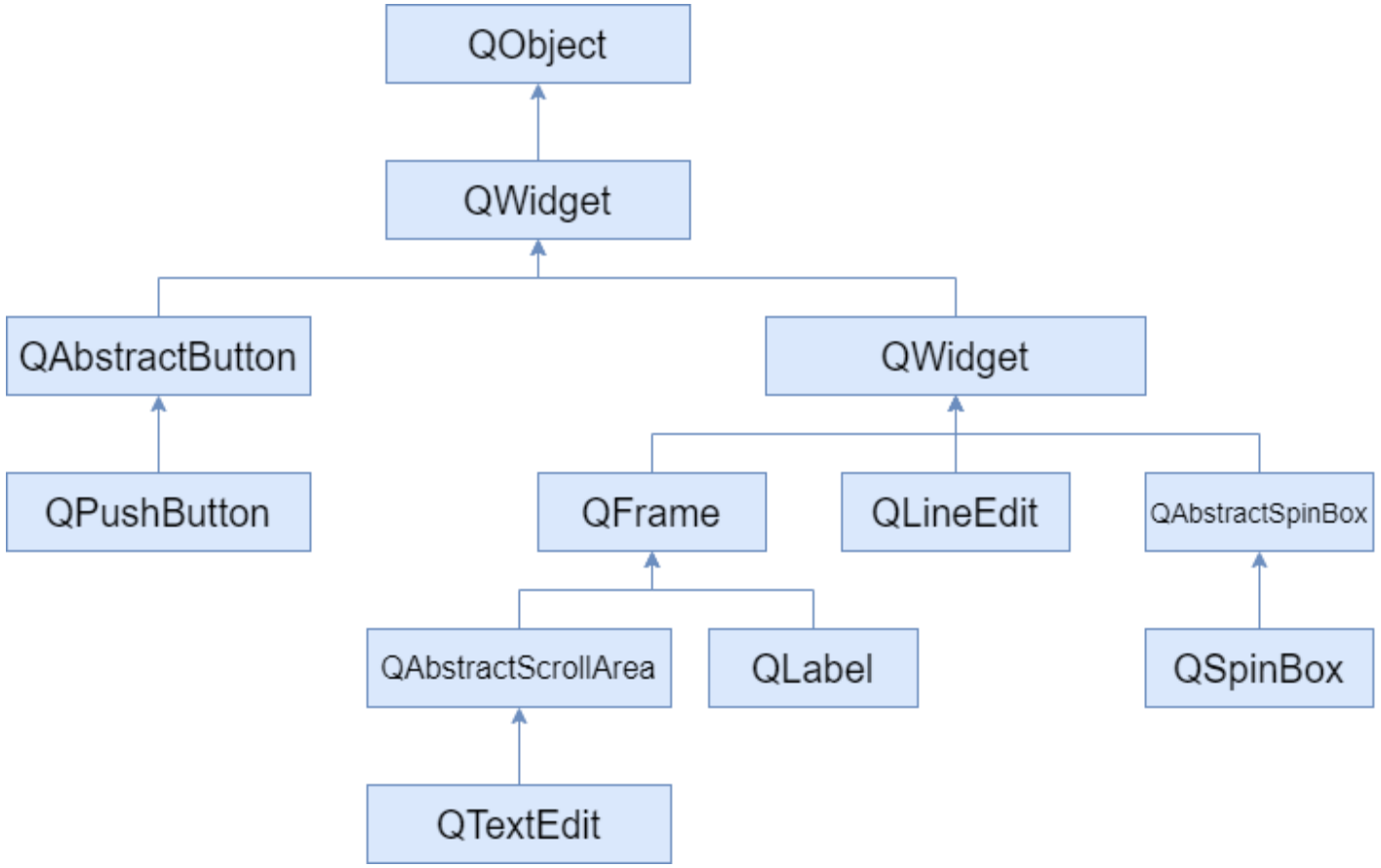
- Our program, with all its dependencies is completely capable of running on a **Raspberry Pi** attached to an external display. (Tested on a VM due to not having access to an actual Raspberry Pi)
- This means that it is capable of providing a **low-cost solution** to the aforementioned restaurants



Credits:
https://raspberrypi.org

MODULES USED

CLASSES



food_item
int item_id string name string category float costPerUnit float margin int stock
int getCost() int getStock() void decreaseStock(int quantity) void addToBill(ofstream &bill)

customer
string name bool emailProvided string email unordered_map<int, int> order
void addItemToOrder(....) void copyOrderMap(....) string createBill(....)

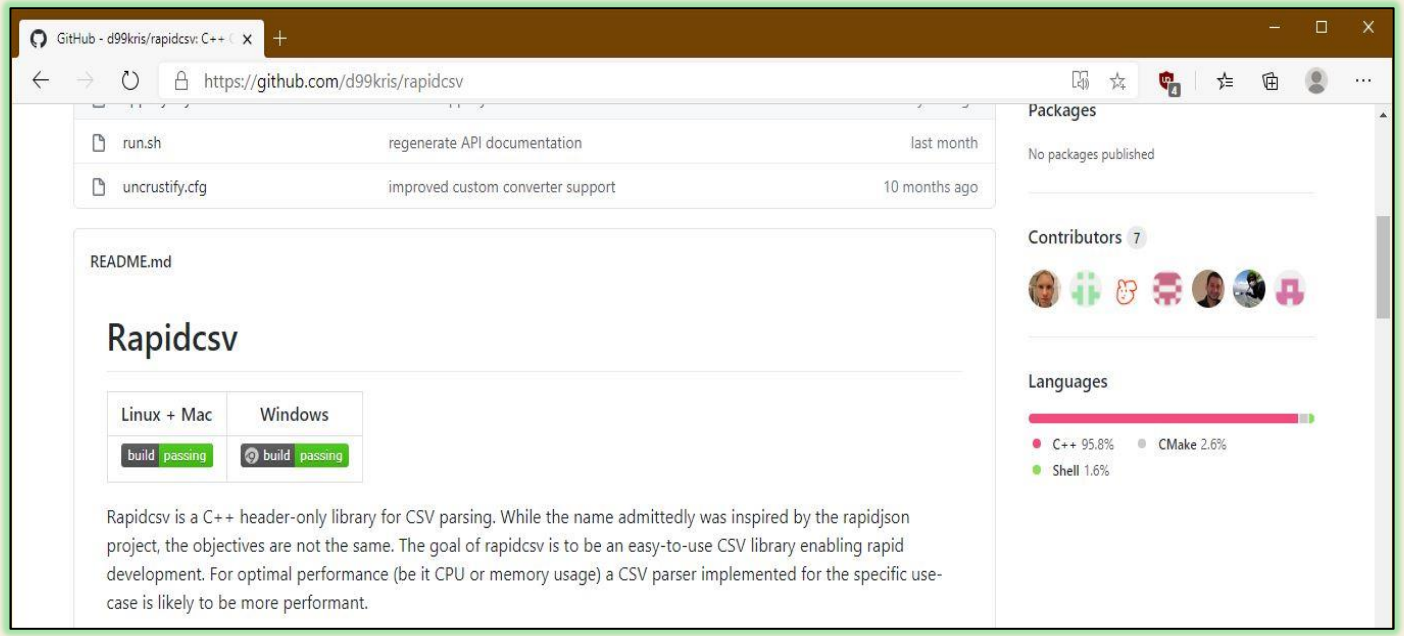
Provided by Qt Framework

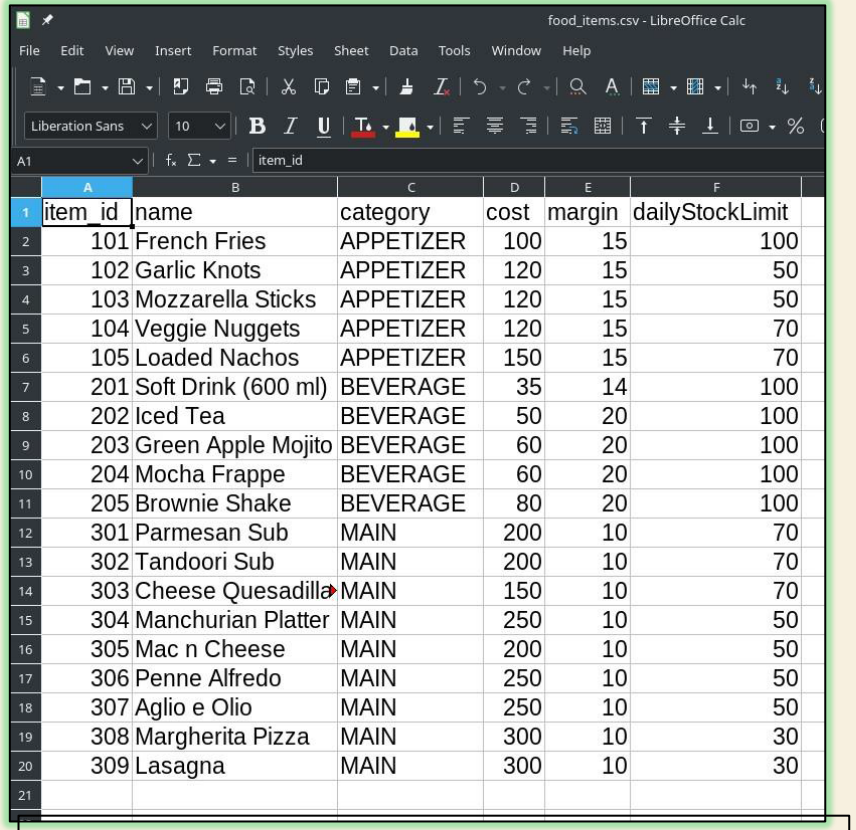
Self-Created

Class diagram created using:
https://app.diagrams.net/

EXTERNAL DEPENDENCY 1: RAPIDCSV.H

- Open source header-file only C++ library used to parse Comma Separated Values (CSV files). [6]
- **Use in our program:** To parse **food_items.csv** file and display the menu. This allows use to make changes to the menu by using *any spreadsheet program* to make changes in the CSV file which are reflected in the program in real time.





item_id	name	category	cost	margin	dailyStockLimit
101	French Fries	APPETIZER	100	15	100
102	Garlic Knots	APPETIZER	120	15	50
103	Mozzarella Sticks	APPETIZER	120	15	50
104	Veggie Nuggets	APPETIZER	120	15	70
105	Loaded Nachos	APPETIZER	150	15	70
201	Soft Drink (600 ml)	BEVERAGE	35	14	100
202	Iced Tea	BEVERAGE	50	20	100
203	Green Apple Mojito	BEVERAGE	60	20	100
204	Mocha Frappe	BEVERAGE	60	20	100
205	Brownie Shake	BEVERAGE	80	20	100
301	Parmesan Sub	MAIN	200	10	70
302	Tandoori Sub	MAIN	200	10	70
303	Cheese Quesadilla	MAIN	150	10	70
304	Manchurian Platter	MAIN	250	10	50
305	Mac n Cheese	MAIN	200	10	50
306	Penne Alfredo	MAIN	250	10	50
307	Aglio e Olio	MAIN	250	10	50
308	Margherita Pizza	MAIN	300	10	30
309	Lasagna	MAIN	300	10	30

The menu CSV open in LibreOffice Calc

EXTERNAL DEPENDENCY 2: LIBREOFFICE

- It's a free and open-source office suite that comes preinstalled in almost all major Linux distributions. [7, 8]
- **Use in our program:** To convert the .txt version of the invoice generated using C++'s built-in file I/O functionality to a PDF version for sharing to the customer.
- This helps us in providing a paperless experience if the customer provides their email as we can simply mail them the invoice instead of printing it.

Credits: libreoffice.org

The bash command used in the program:

```
$ soffice –convert-to pdf file.txt –outdir output_folder
```

EXTERNAL DEPENDENCY 3: MUTT

- Open source text-bases email client. [10,11]
- **Use in our program:** To provide a paperless experience to customers by directly emailing the generated invoice instead of printing it.

The Mutt E-Mail Client

"All mail clients suck. This one just sucks less." -me, circa 1995

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Stable

Mutt 2.0.0 was released on November 7, 2020. This release has new features, bug fixes, and a few backward incompatible changes. Please read the release notes, and see the UPDATING file for all the changes.

Mutt 1.14.7 was released on August 29, 2020. This is a bug-fix release, fixing a variety of small issues.

Mutt 1.14.6 was released on July 11, 2020. This is a bug-fix release, fixing an error resetting access-time for relative path mailboxes.

Mutt 1.14.5 was released on June 23, 2020. This fixes a regression when using $tunnel to connect to a preauthenticated IMAP connection.

Mutt 1.14.4 was released on June 18, 2020. This is an important bug-fix release. It fixes a possible machine-in-the-middle response injection attack when using STARTTLS with IMAP, POP3, and SMTP (CVE-2020-14954).

Mutt 1.14.3 was released on June 14, 2020. This is an important bug-fix release. It fixes a possible IMAP fcc/postpone machine-in-the-middle attack (CVE-2020-14093). It also fixes some GnuTLS certificate prompt issues.

Mutt 1.14.2 was released on May 25, 2020. This is a bug-fix release, fixing a few prompt buffer-size issues

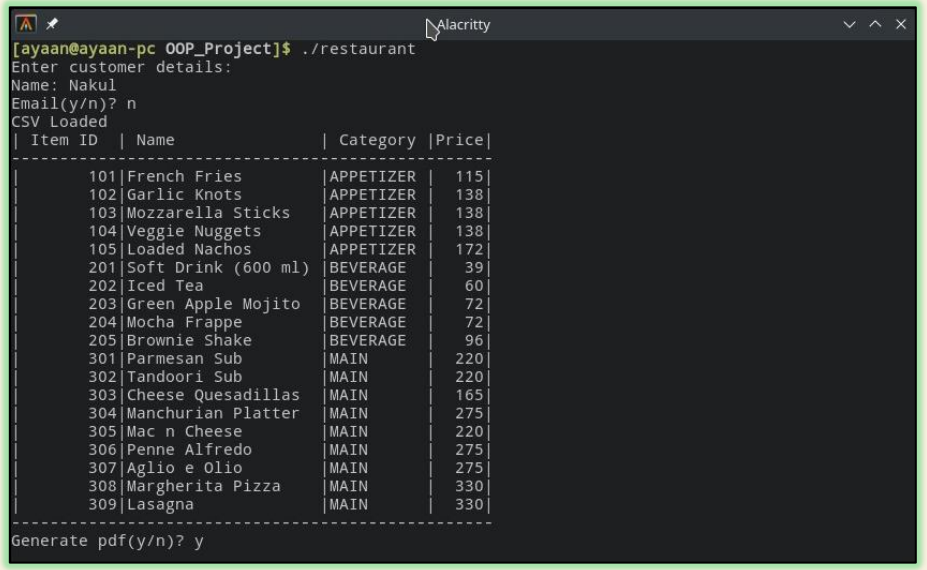
Credits: mutt.org

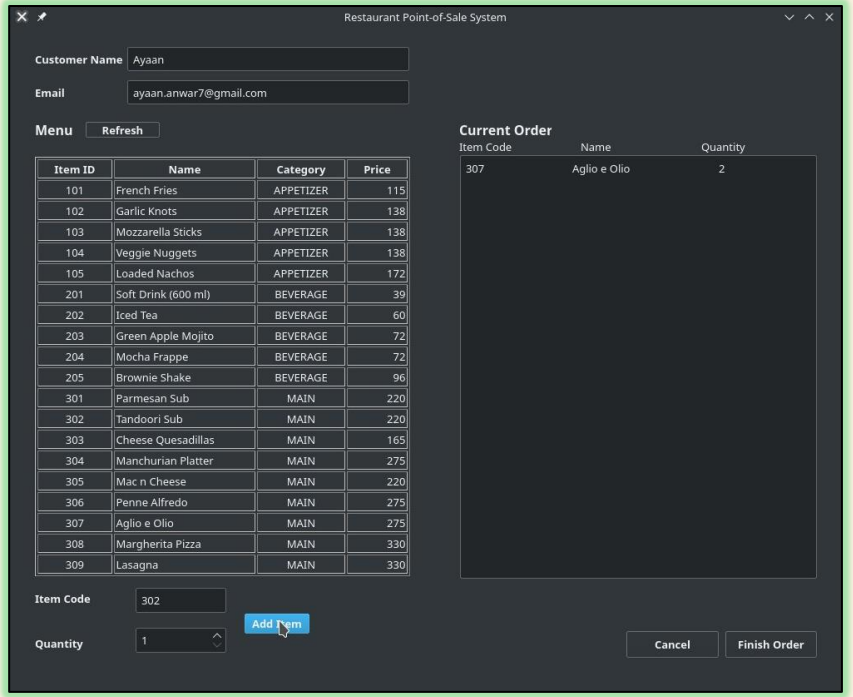
The bash command used in the program:

$ echo "*Thank you for dining with us*" | mutt -s "*Restaurant Invoice*" –a bill_path recipient@example.com

THE BUILDING PROCESS

FIRST REVIEW VS. CURRENT STAGE





- Console based.
- Bills generated were in .txt format.
- No emailing functionality.
- Changes done to the menu could not be seen in real-time.

- Fully functional GUI.
- Bills are generated as PDF's.
- Bills are automatically emailed to the customers if they provide their email.
- Changes done to the menu can be seen by just clicking the "Refresh Menu" button. No need to restart the program.

CONSOLE BASED PROGRAMS VS GUI APPLICATIONS

- In console based applications, there's a predetermined flow of control.
- The programmers, instead of the user, decides how the program will execute from start to finish.

- In GUI applications, we rely on signals from the OS regarding possible user actions.
- The program needs to take care of all possible actions the user can take at any point of time.
- The program doesn't run linearly, instead it sits in an idle state until a message is received from the OS and performs the pre-coded action.

RESULT

WE WERE SUCCESSFUL IN CREATING A FULLY FUNCTIONAL GUI-BASED POINT-OF-SALE SYSTEM FOR RESTAURANTS WITH INVOICE GENERATION AND MAILING FUNCTIONALITY USING C++ AND QT.

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