# Computing Unit 3: Coursework: Investigation Chapter

Oliver Looney

# Investigation of similar, commercially available systems

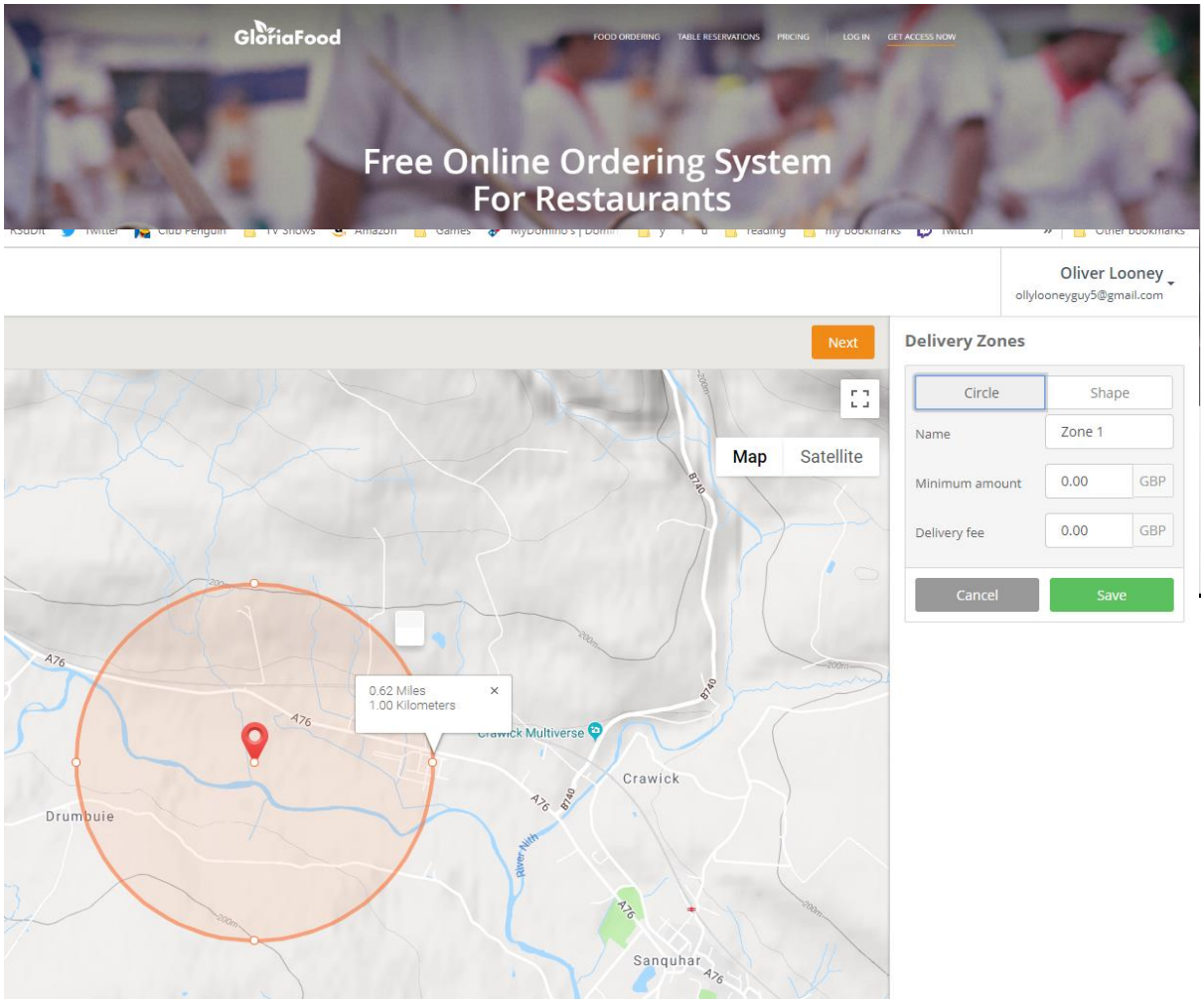
Purpose of fact finding:

To find the user requirements and to take inspiration from commercially available systems, Analysis is the process of finding out exactly what the system will entail by employing various fact finding methods. It is critically important that the result of the analysis is as complete as it can be, as incorrectly defined requirements can lead to big delays and escalating costs. At the end of analysis, the requirements specification is produced. This is a document that contains the exact requirements of the new system. The main questions asked in the section are: what are the user requirements? and are they possible?

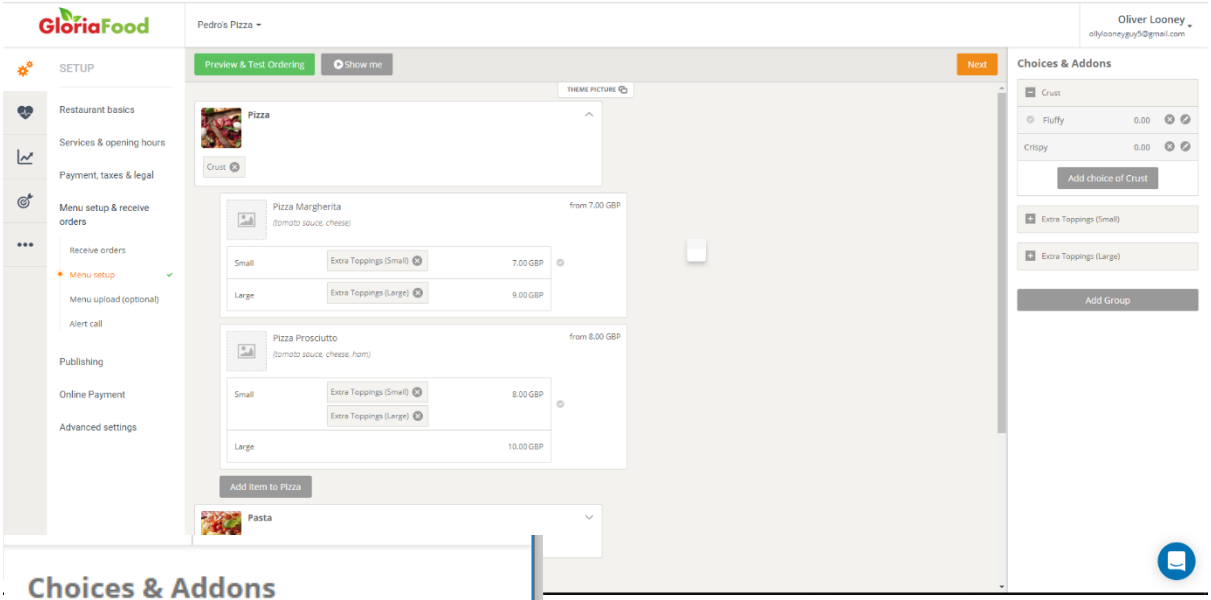
Some advantages of investigating similar systems is that I can see new ways to solve a problem, for example a new algorithm that could handle some data processing. Also, it also gives me an example of how to structure my solution, which will make it easier to make it more modular. This is positive because it will make my code more efficient and increase the reusability of my code, which is one of the core principles of OOP.

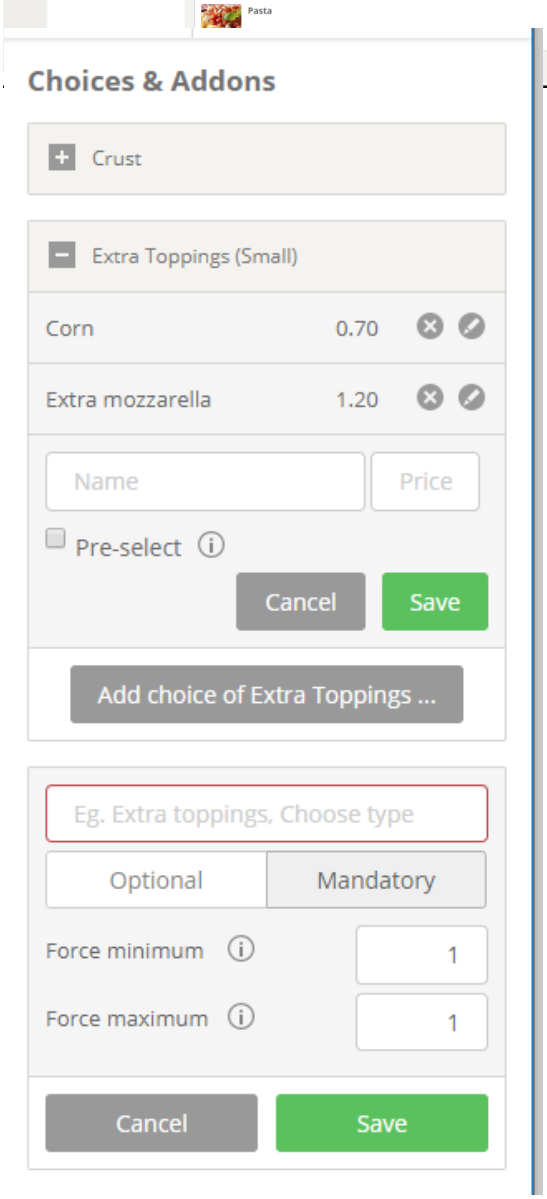
Some disadvantages of investigating similar systems is that they may be solving different problems, have a larger scope and may not be what the user wants. Another disadvantage is that it may lead to my system being too similar to other systems and not innovative enough.

## GloriaFood:



This is a screenshot from what the admin will see when using this software, the software allows the admin to create multiple zones that have varying costs and minimum delivery fees.

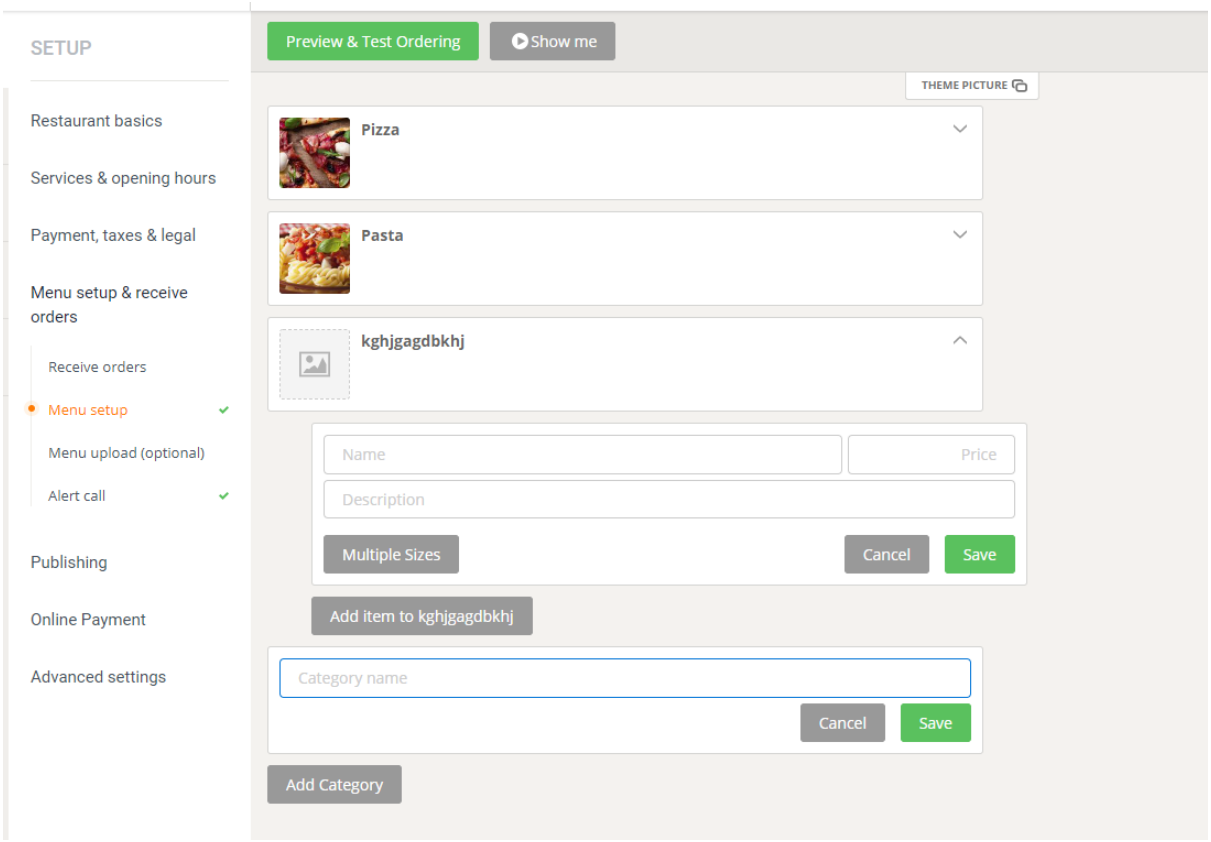



This is the admin's view of the menu. Whenever the admin wants to edit the menu they do it here. Below I shall breakdown the useful features.

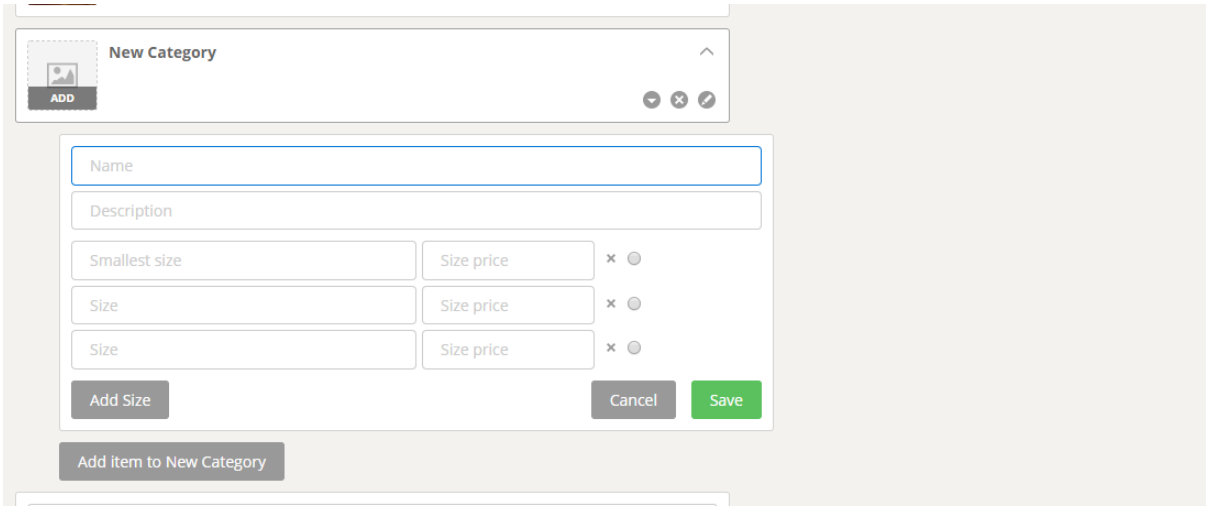
This allows the admin to give the customer to add extra items to their food, e.g: toppings. The admin does this by creating a new 'group'. The admin names this new group whatever they want to. They then add items to the group. This will be a feature that I will incorporate in my project as allows the user to easily add toppings to their pizza for example. The admin must link the group to a category of food on the menu. This method will make it easy for the customer to order a custom pizza.


This allows the admin to preview how the customer will see the menu, with all of the new changes. I shall implement this as well.



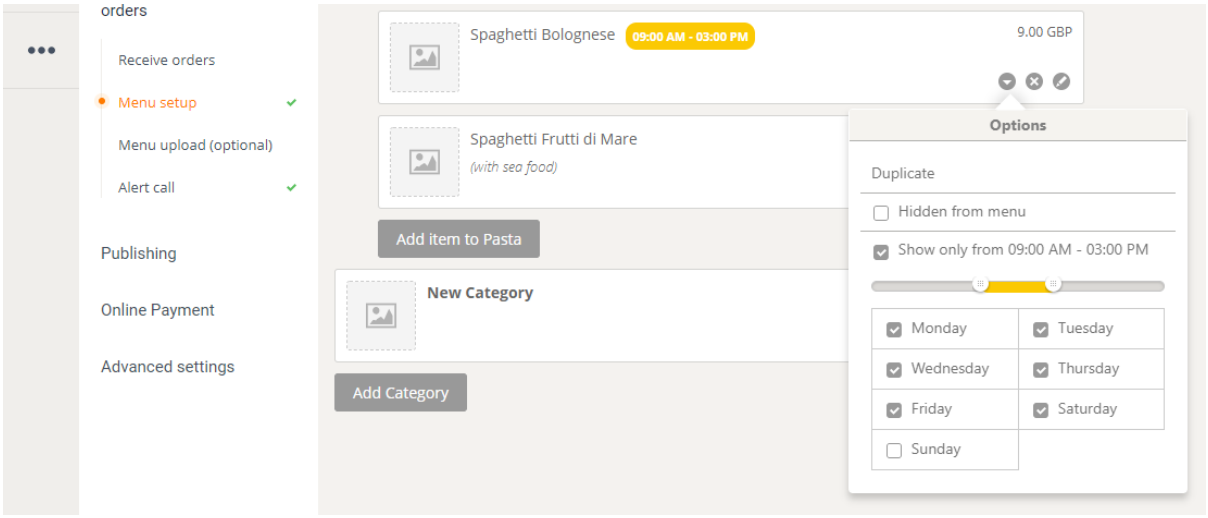

This is where the admin creates, edits and deletes categories and individual food items on the menu.

When the admin clicks ‘Add Category’, they are prompted to input the name and save. This is how the admin creates a new category.

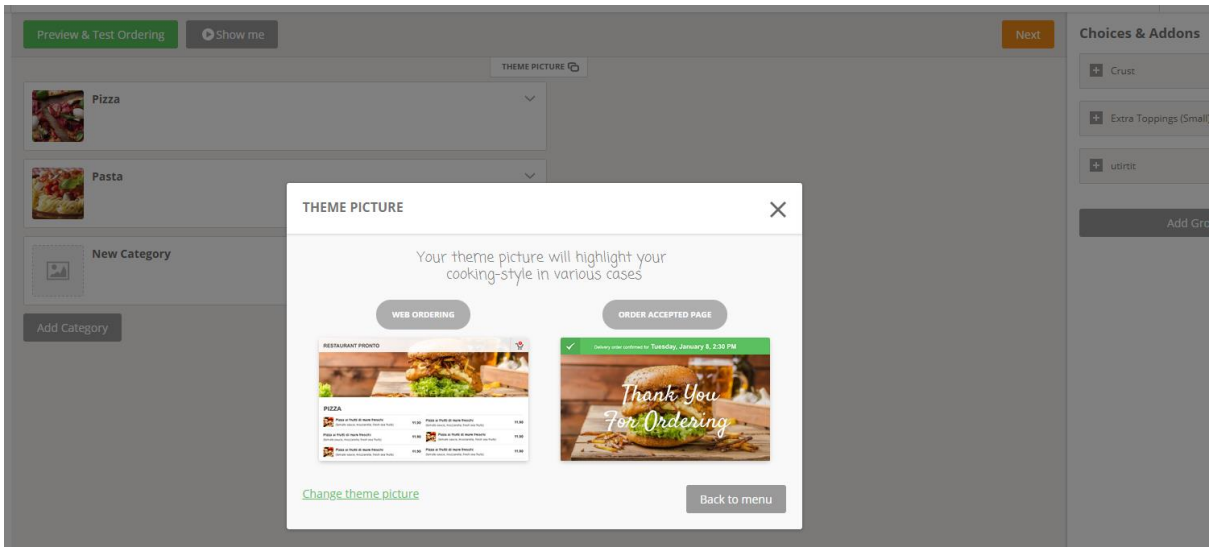



Once the new category has been created the admin will be prompted to add new items. This is the interface that the admin will use. They will add a name, description and price. However, if the admin wants to add multiple sizes they must press ‘Add Size’ and then they can input the price for each size.

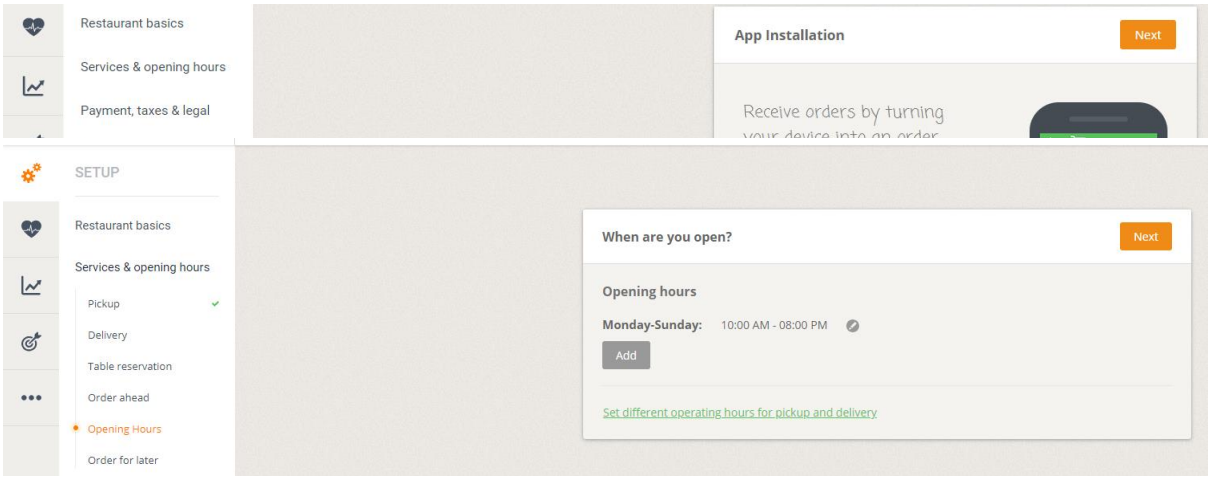
Next to the category name is an option to upload an image that will appear next to the category on the menu. This is a useful feature that I shall implement on my project.




The admin also has these extra features for each category. The admin can set certain items to only be ordered on certain days of the week at certain times. This stops the user from ordering items when they shouldn't be able too. I will implement this into my system, I shall also allow the admin to hide categories from the menu so that can temporarily not sell them, but easily add them back onto the menu in the future.




This view also allows the admin to add a background picture. I shall also include this feature as it is simple to implement, but the restaurant will value it.

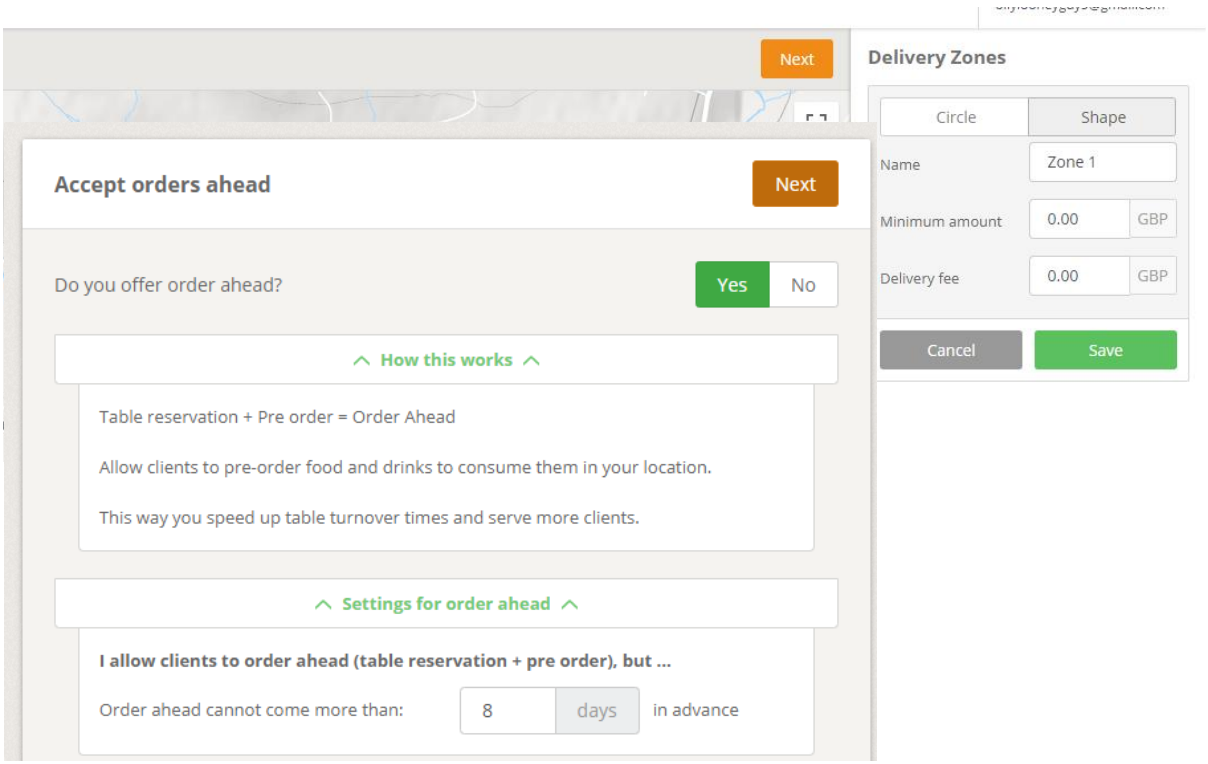


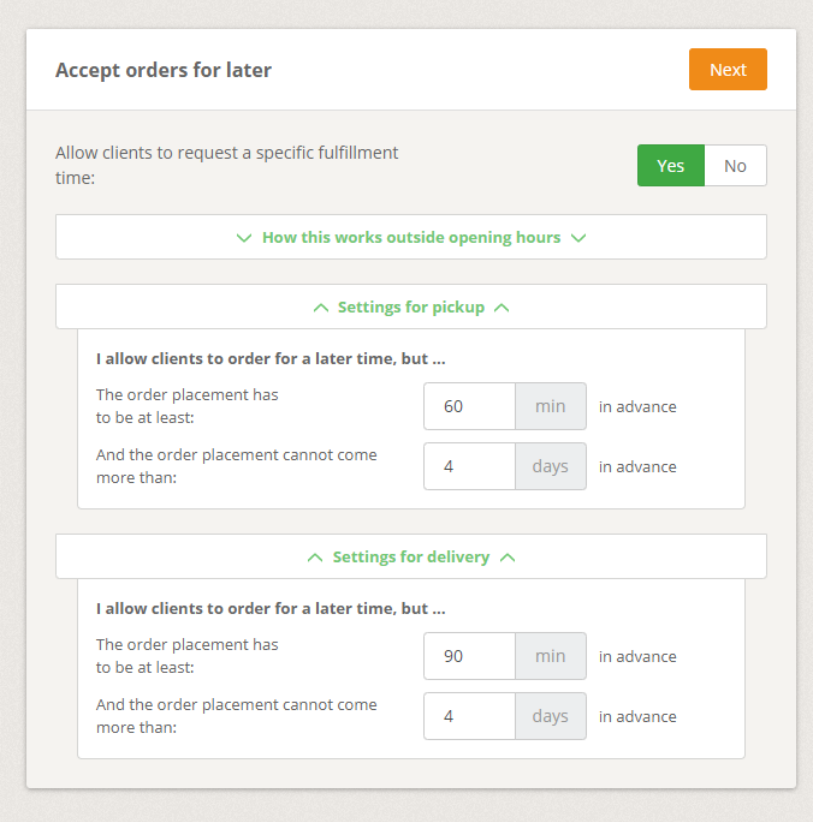

This software also allows the admin to create an app for IOS & Android, which a member of staff will use to receive the orders. However, I shall now be implementing this feature as it is unnecessary and too complicated for this project

This is where the admin can change the opening times of the restaurant. This ensures that no customer will be able to order items when the restaurant is closed so I will implement this into my system.

This is another part of the admin's view that allows the admin to create custom shapes to define delivery zones. I shall not be implementing this as it is unnecessary and too complicated for this project.

Below is where the admin enables the option for the customer to pre-order items.

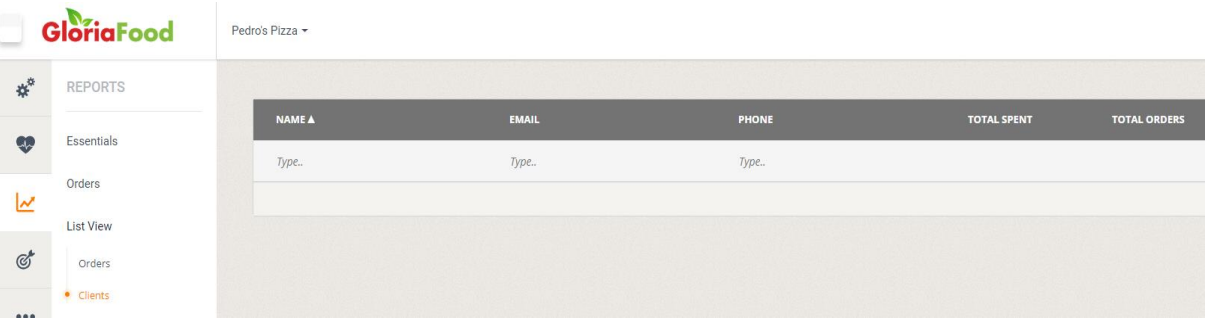





This is where the admin edits the settings for pre-ordering. The admin can select a maximum and minimum time for the pre-order. I shall implement this system.

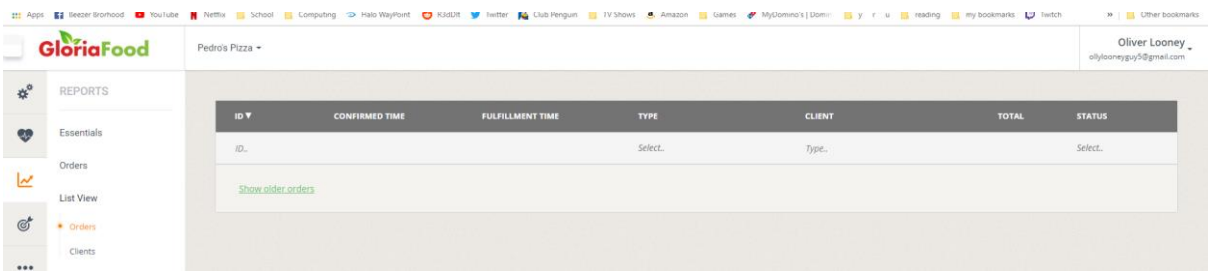
Below is where the admin can view the reports section.

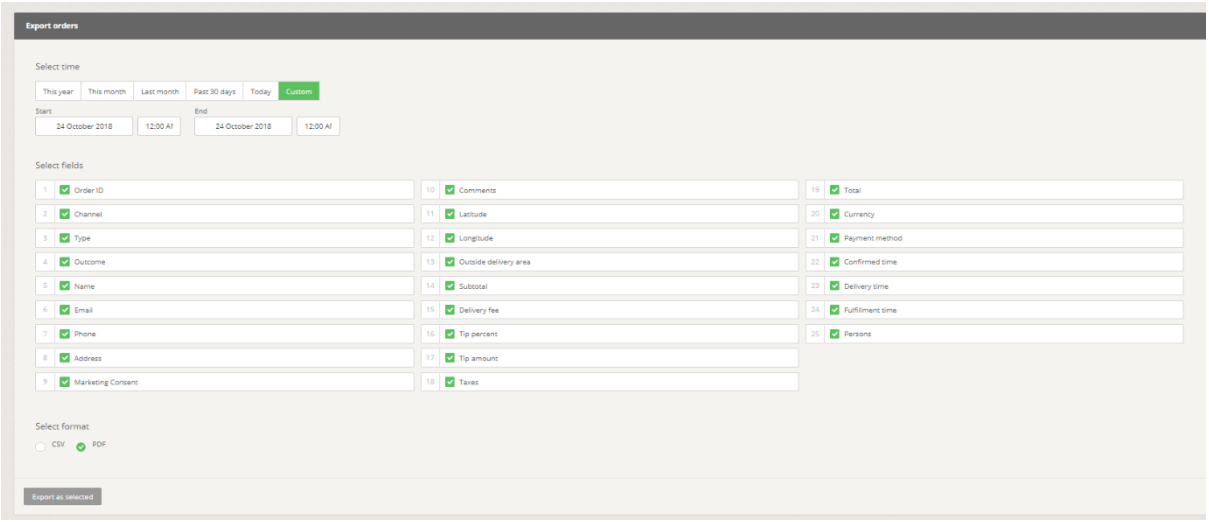
Here they can see the clients and orders table. I will allow the admin to have this view as well, but with more features. In this software, the admin can only have a set amount of fields as it is not bespoke. The




admin cannot create their own fields, they must select from pre-made fields.

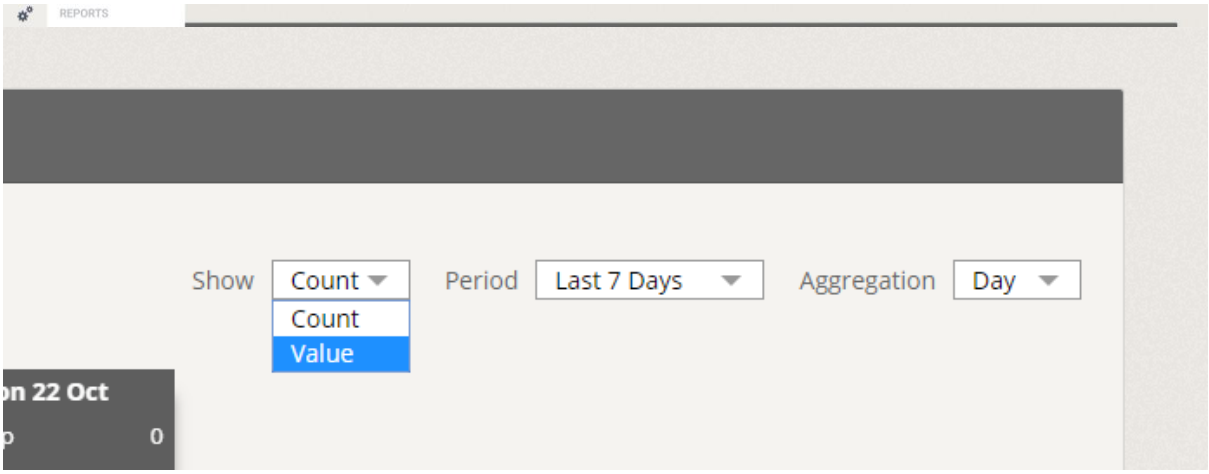
Below is where the admin can export previous data into the new system on GloriaFood automatically from PDF or CSV file type. This is a very useful feature as it means all of the restaurant data will be in one place. However I shall not be implementing this feature as it is too complicated and not feasible as the current data is mostly paper based.

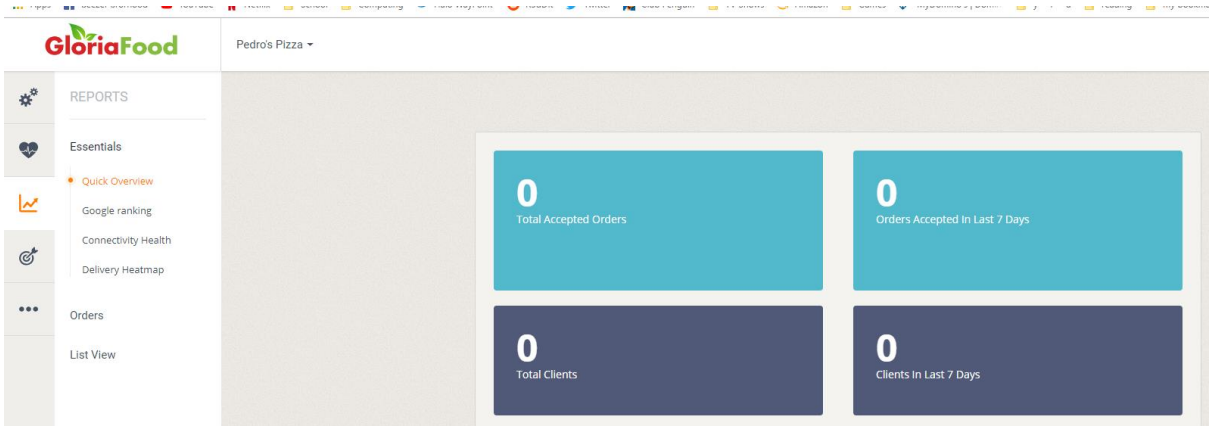


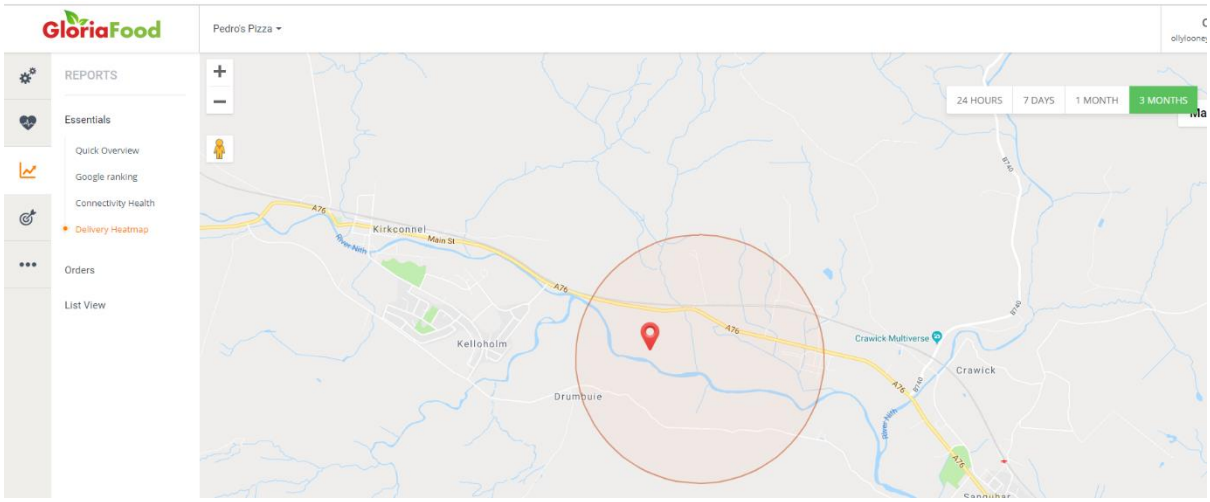



This is an example of one of the tables that the admin can see. This software allows the admin to track different ordering types. I did not think of this, but it is a very useful feature so I shall implement this feature. This software also allows the admin to change whether it tracks the amount of each method of sale or the total value of each method. I shall also implement this. This allows the admin to clearly see which method is most popular and which method takes in the most money.

Below you can see how the system has a quick overview for the admin, this just contains simple information for the amount of orders/items. This is not very useful for the admin as the admin cannot make plans on information this limited. However, I shall have something like this for the customer, such as showing the customer the most popular options when they are ordering.



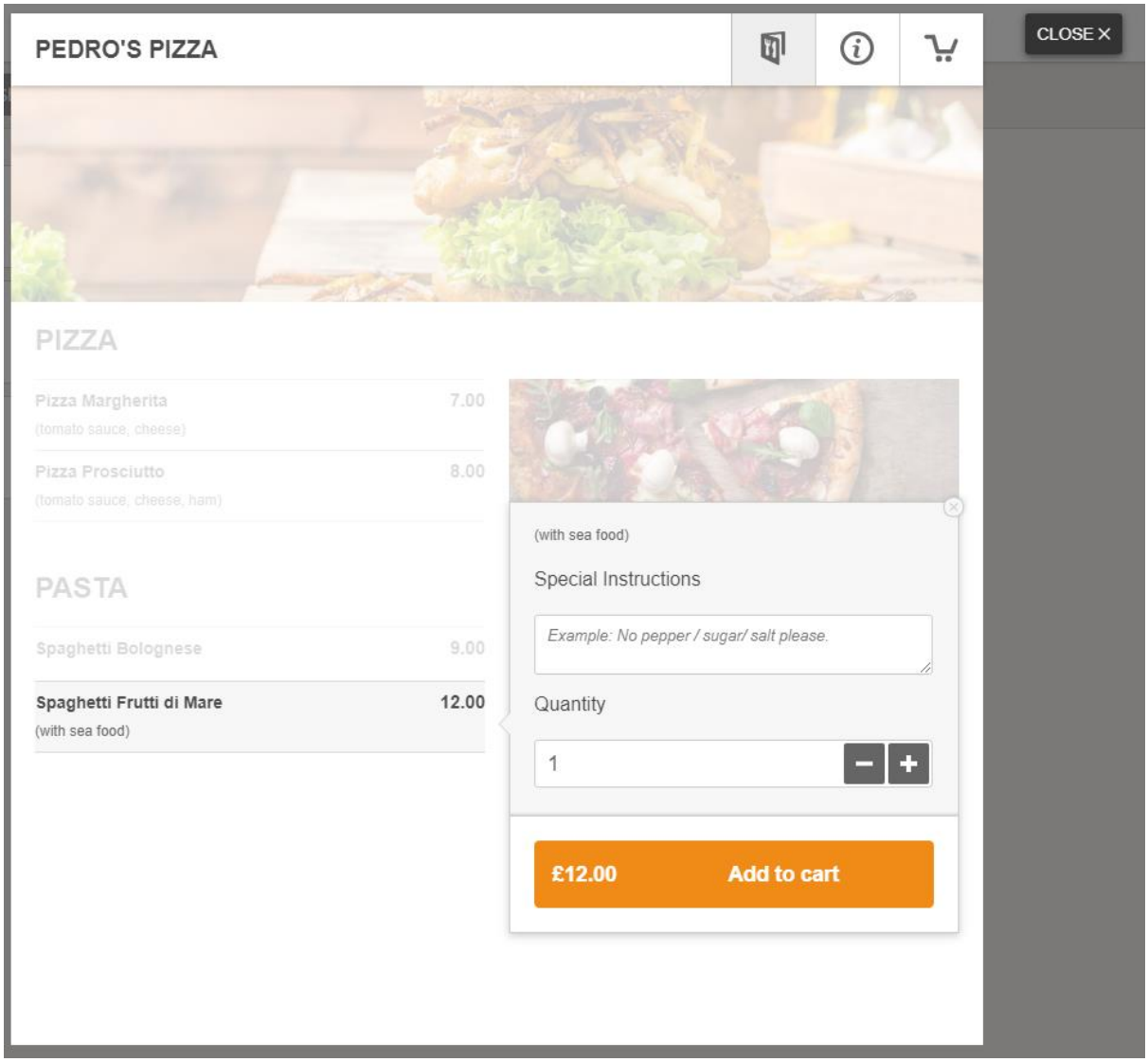


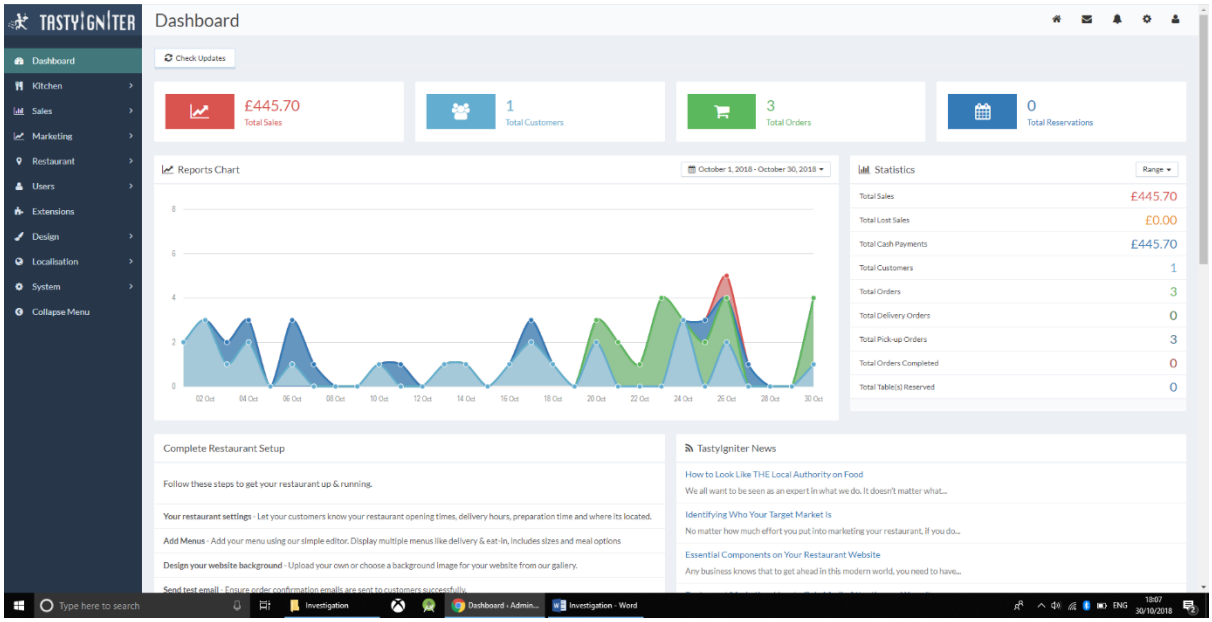

The admin can view delivery information on a heatmap. This is a very useful feature as it makes it extremely easy for the admin to view areas that regularly order deliveries. I shall implement this as well as it can help the admin target areas with ads. The software also allows the admin to easily change the length of time of data that they are looking at.

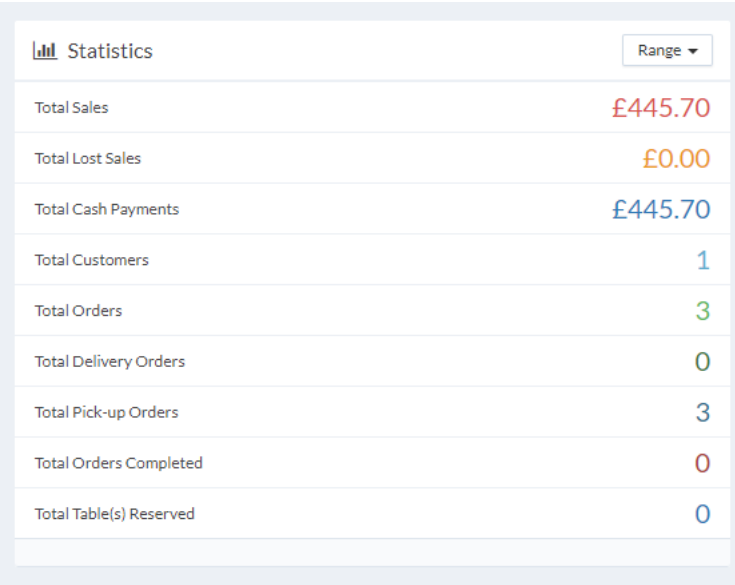
I shall also consider implementing this heatmap feature but with just normal customers as well so that the admin can target certain areas with ads.

Below is a screenshot of the customer's view of the menu. It is broken down into different categories. I think I shall implement my system like this, as it makes it easy to add toppings or chose sizes.



# TastyIgniter




Above is the admin's dashboard. From here the admin can get a quick overview of everything going on.

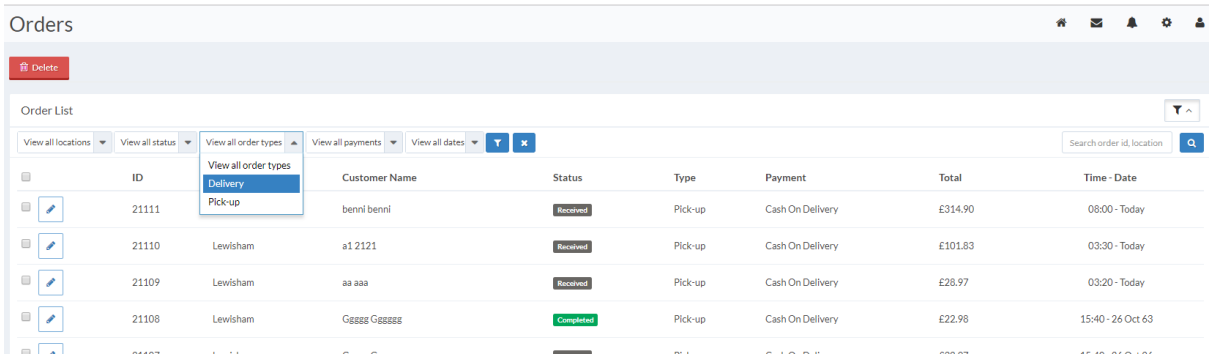
To the left you can see the statistics part of the dashboard.

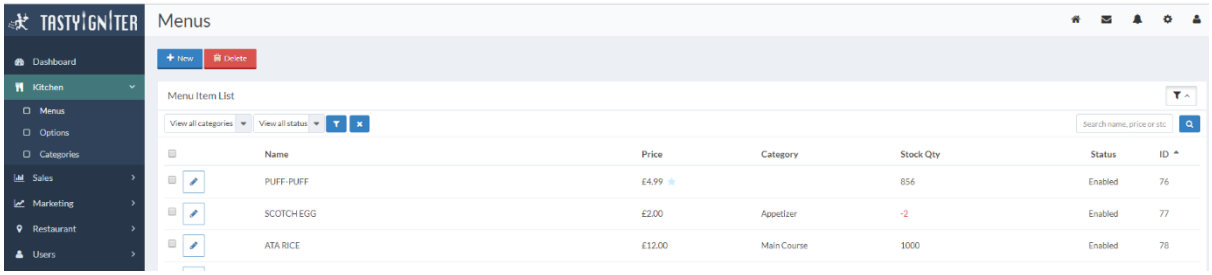
This is very useful for the admin, so I shall implement a dashboard for the counter-staff and managers.

Below is the admin's view of the orders.

This includes a very easy to use search bar, which I shall also implement.

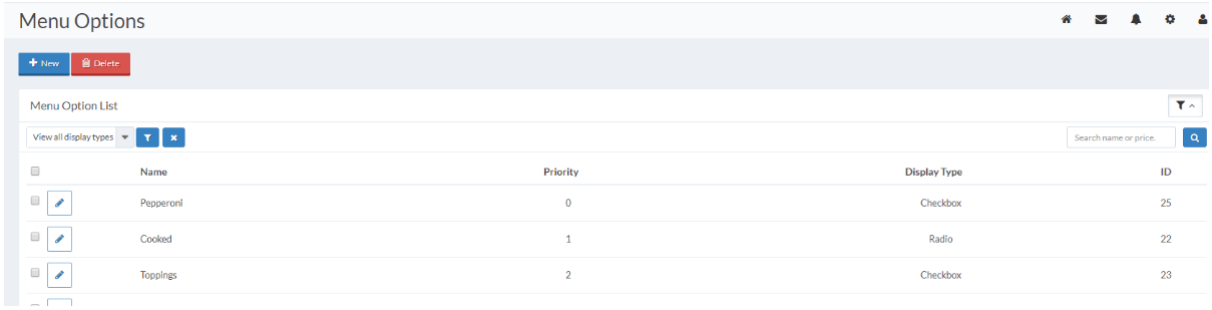
It also has look up tables to specify what orders to view. This allows the admin to quickly differentiate between deliveries or collections for example, so I shall be implementing this as well.

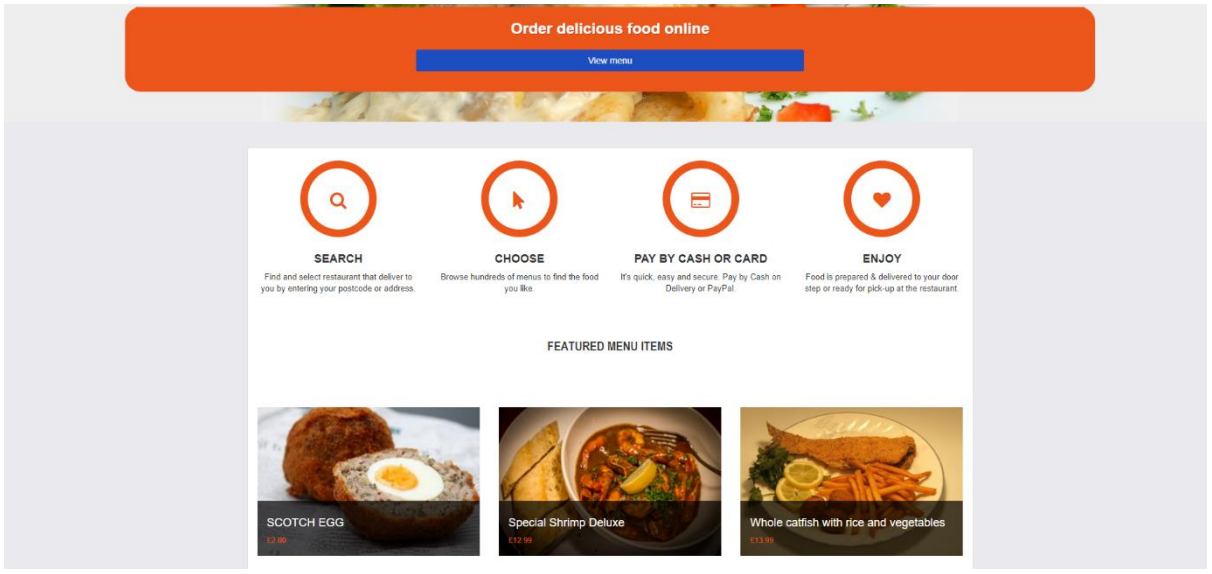




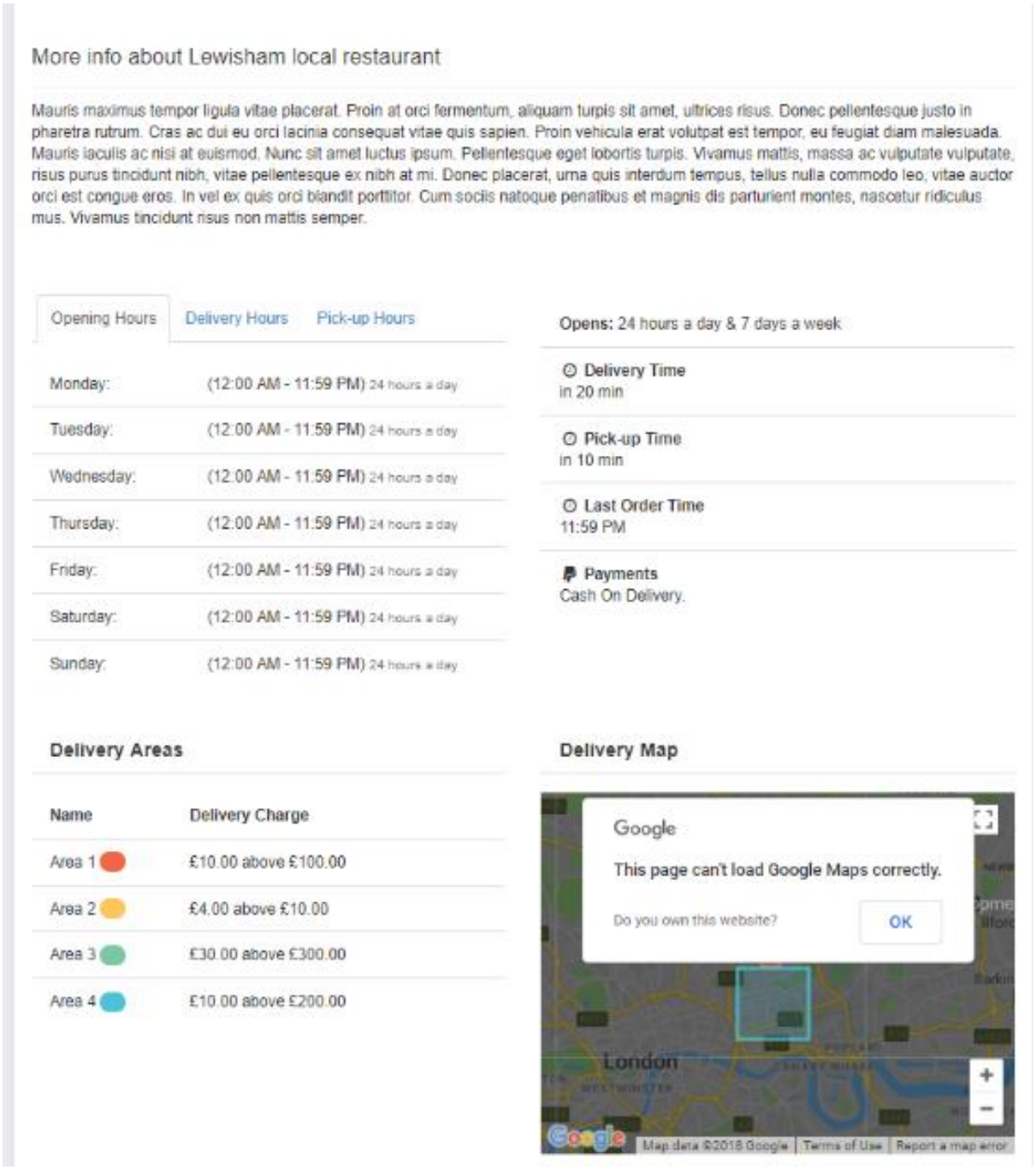

This is where the admin can change edit the menu. This isn't as good as GloriaFoods' so I shall be sticking with GloriaFoods' menu style.

Below is where the admin can edit menu options such as toppings. Here the admin can select different display types such as radio or checkbox. I shall implement this feature.




This is the customer's view. A useful feature here is that the customer can see featured items. I shall implement this.




This is the customer's view of information on the restaurant. This is very useful as all of the information is in one place. I shall implement an information page as well.

## Functionality I will use:

- Delivery zones
- Have many products in a group to easily organise the menu
- Preview
- Allow products & categories to have images stored
- Products can only be ordered on certain days if the manager wishes
- Custom background picture
- Opening & closing times
- Allowing the admin to set up options for pre ordering
- PDF file output
- Table that ranks the products for the manager
- Table that ranks the products for the customer
- Heatmap
- Dashboard
- Search
- View information on the shop

## Functionality I will not use:

- IOS or Android apps that are paired with the website
- CSV file ouput

## Data Processing:

These software solutions take in user input through forms. They are outputted on the website but also through email, pdfs, graphs and CSVs. There must be high level data processing algorithms for generating the graphs. The data that is inputted must be of many different data types, e.g: string, integer, date, time, date time and Boolean.

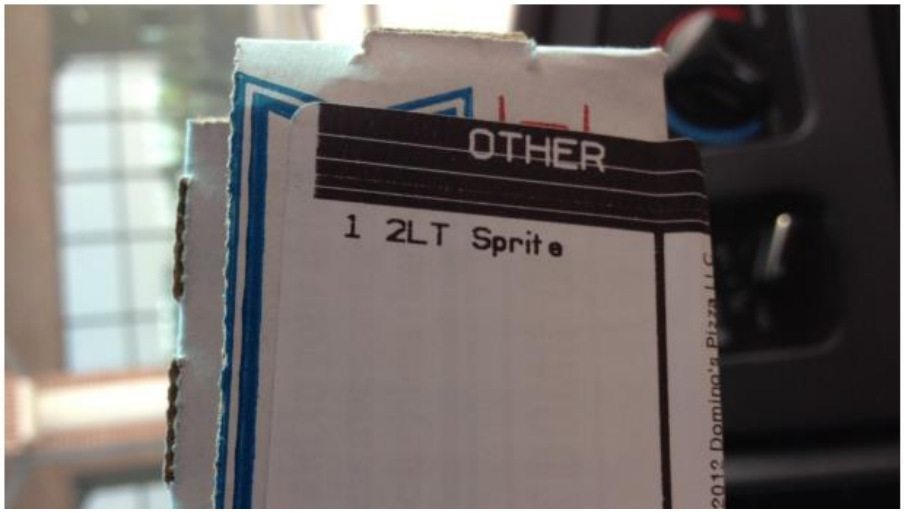
For GloriaFood to have categories & groups, they must have a one to many relationship between the group & product entities. To view all the products of the group they must use a query like the SQL SELECT query with a WHERE clause.

# Current Paper/Data Structures

I am collecting documents to see the data they use and what will need to be stored by the new system and so that the analyst can get a very good understanding of the business process by following the trail of documents and seeing the flow of data from start to finish. One advantage of document collecting is that documents cannot lie, distort or misrepresent information. This means that the information in them can be trusted,

- 349041 is my order number
- 2/2 means that this is Box 2 of 2, which means there should be a Box 1 of 2 also, which completes the customer's order.
- The letter "C" means Carry Out.
- The timestamp of when the customer's order arrived and this is used to track average time to make a pizza, as well as the overall order arrival to pizza delivered process.
- Toward the bottom is the customer's Name.

If there are other items in the order besides pizza, the box label will capture that also. This customer, for example, ordered Sprite with their 2 pizzas.





These are order tickets. These are generated using data from the order item objects and the order object. They are tracked which part of the order they are: 2/5, 1/5, 4/5 by what must be a method in the order class. The rest of the data must be attributes of the order item object. The relationship is one order object has many order item objects.

This is a receipt. The receipt is made up of order data, the order items data and the customer data. The receipt would be made using the order object, and then obtain the customer object that the object's customer id attribute corresponds to, and then obtaining all of the order items the object has a relationship with by using a select SQL statement with a where clause of the order item's order id attribute being equal to the current order's id.


EAT IN Pay By: CASH

Order : 1378 By : JEANETTE

Order Time : 16:27:37 Date : 16/02/13

Table No: No. of Pax:

Pickup Time: 16:42:35

| Qty | Menu | Desc | Coupon | Price |
|---|---|---|---|---|
| 1 | 9"THN | (HW) | NC | 22.80 |
| 1 | GRD | 4 GRD | NC | 5.80 |
| 1 | ORNG | | NC | 3.80 |
| 1 | T/B | | LSM2 | 4.60 |

Sub-Total : 37.20

Copoun Discount : 37.20

Grand Total : 0.00

: 0.00

u for visiting Domino's.
Please Come Again!

Some of the receipt details would have to be created on the spot, for example the subtotal & total. This would require a method in the order class that would obtain the total number of each order item and their induvial cost, and then calculate a total. To create the receipt there would have to be a function that would generate a pdf file using the data obtained as described above.

All of the data described would either have to be stored in a database or calculated by using data stored in a database.

# Questionnaire

Some advantages for using a questionnaire is that a large number of people can be reached relatively easily and economically. A standard questionnaire provides quantifiable answers for a research topic. These answers are relatively easy to analyse.

Questionnaires are not always the best way to gather information. For example, if there is little previous information on a problem, a questionnaire may only provide limited additional insight. On one hand, the investigators may not have asked the right questions which allow new insight in the research topic. On the other hand, questions often only allow a limited choice of responses. If the right response is not among the choice of answers, the investigators will obtain little or no valid information.

Another setback of questionnaires is the varying responses to questions. Respondents sometimes misunderstand or misinterpret questions. If this is the case, it will be very hard to correct these mistakes and collect missing data in a second round.

# Customer Survey

1. How likely is it that you would recommend this company to a friend or colleague?

| NOT AT ALL LIKELY | | | | | | | | | | EXTREMELY LIKELY |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

2. Do you have any other comments, questions, or concerns?

3. Overall, how satisfied or dissatisfied are you with our ordering service as a whole?

- ◯ Very satisfied
- ◯ Somewhat satisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Somewhat dissatisfied
- ◯ Very dissatisfied

4. Overall, how satisfied or dissatisfied are you with our ordering over the phone service?

- ◯ Very satisfied
- ◯ Somewhat satisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Somewhat dissatisfied
- ◯ Very dissatisfied

5. How useful/not-useful is our ordering system?

- ◯ Extremely useful
- ◯ Very useful
- ◯ Somewhat useful
- ◯ Not so useful
- ◯ Not at all useful

10. Do you value knowing how long deliveries take?

- ◯ Extremely valuable
- ◯ Very valuable
- ◯ Somewhat valuable
- ◯ Not so valuable
- ◯ Not at all valuable

7. How often do your order very similar orders?

- ◯ Always
- ◯ Usually
- ◯ Sometimes
- ◯ Rarely
- ◯ Never

8. How often do you respond to e-mail offers from other restaurants?

- ◯ Always
- ◯ Usually
- ◯ Sometimes
- ◯ Rarely
- ◯ Never

9. When ordering online, how often do you add items in the checkout?

- ◯ Always
- ◯ Usually
- ◯ Sometimes
- ◯ Rarely
- ◯ Never

10. Do you prefer to order online?

- ◯ Yes
- ◯ No

## Results

1) For the first question the majority or participants said that they would not recommend the business. This means that the restaurant not only needs a new billing and ordering system, but also needs to use the data captured to improve their marketing, product and service.
2) The vast amount of participants left this question out, below is a list of the answers I received.
    - "It would be cool to see what pizzas are most popular on a leader board"
    - "Ordering over the phone is not as easy as ordering online"
    - "I want to be able to see the where the driver is like deliveroo"
3) 50% said that they were left satisfied, while 25% said they felt unsatisfied, with the rest of the participants spread out roughly equally among the rest of the options.
4) 40% said that they were left dissatisfied with the ordering over the phone service while 30% were neutral. The final 30% were spread out equally among the rest of the options.
5) Only 20% said that the current ordering system is useful. 50% were neutral and 30% said that it wasn't useful.
6) 15% said that the current ordering system was easy to use. 40% were neutral and 45% said that it was difficult to use.
7) 15% of the participants said that they always order similar orders and 55% said that they sometimes order similar orders. 25% said that they rarely order similar orders and 5% said that they never order similar orders. This illustrates that customers would benefit from being to save their favourite orders so that they could quickly re-order it. I shall also have it so that once they select their favourite order, they can make some changes. This means that my solution will benefit 70% of the customers.
8) 5% said that they always respond to e-mails from other restaurants and 30% that they sometimes do. 30% said that they rarely respond and 35% said that they never respond. This means that the restaurant can access a substantial amount of the customers through e-mail.
9) 20% said that they always add extra items at the checkout when ordering online. 35% said that they sometimes do and 45% said that they rarely do. This demonstrates how useful it is, to the customer and the business to have recommendations in the checkout.
10) 80% said that they prefer to order online while 20% said that they do not prefer it. This shows that there is clear demand for this system
11) 90% said that it is extremely valuable knowing how long the delivery will take, while 10% said that it was very valuable.

# Counter-Staff Survey

1. How much time do you spend on the phone taking orders?

- ◯ A great deal
- ◯ A lot
- ◯ A moderate amount
- ◯ A little
- ◯ None at all

2. How many times do you copy data from the original order ticket?

3. How often do you lose order tickets?

- ☐ Always
- ☐ Usually
- ☐ Sometimes
- ☐ Rarely
- ☐ Never

4. How often do customers receive errors in their orders?

- ◯ Always
- ◯ Usually
- ◯ Sometimes
- ◯ Rarely
- ◯ Never

5. Do you think the current ordering system is efficient?

- ◯ Yes
- ◯ No

## Results

1) 6 of the counter staff said that they spend a moderate amount of time on the phone taking orders, 2 said that they spend a little time and 4 said that they spend a lot. This shows that my system could save a lot of time in the restaurant, which could lead to a faster & better service.
2) 3-4 times
3) 3 of the counter staff said that they sometimes lose tickets while 9 said that they rarely lose tickets. This would not happen in a computerised system.
4) All 12 counter staff said that customers rarely receive incorrect orders. This will not happen with my system as all boxes will have a well designed printed sticker on it that will identity it.
5) 8 counter staff said that the current ordering system is efficient while 4 said it wasn't, this shows that my system can improve on the previous.

# Managerial Interview

Firstly, some advantages of using interviews are: Accurate screening, Capture verbal and non-verbal ques, Keep focus, Capture emotions and behaviours. Some disadvantages are: Cost, Quality of data by interviewer, Manual data entry, Limit sample size.

**What sort of data do you store on the customers?**

We don't store any data on the customers currently.

**Do you have an idea of what data you would have to store on the customers?**

Yes, we will need to store their name, gender, address, age, email, phone number and when they became a customer so that we can do loyalty discounts.

**What data do you currently store on your staff?**

We store their name, age address, gender, email, phone number and when they joined. We also store their role in the current paper based system.

**What will the counter staff need to do in the system?**

They will have to be able to create customer accounts for people ordering over the phone. They also need to be able to associate a customer with an order without having to get the customer to login as this would waste time. This is for when a customer is ordering at the counter. The counter staff should also be able to see the customer's saved orders for when they want to order them in store.

The counter staff need to see updates on the order and all of the items in it and they need to be notified when the order is ready. I think it would be good if the counter staff could see how long it takes for each item so that if a customer asked, they could answer accurately.

**What will the kitchen staff need to do in the system?**

They will need to have a view of orders coming in and orders being worked on and what stage they are at. The kitchen staff must be able to notify the counter staff or delivery driver and the customer depending on what type it is (delivery, collection, in store) when the full order is ready. The kitchen staff must be able to do this on the system. The system should also be able to predict when the restaurant will be busiest and roughly how much of each item will be purchased.

The kitchen staff should be able to see how much of each ingredient is in store and a predicted date of when each ingredient needs to be reordered. They should also be able to see graphs that show which items take the most/least to prepare.

**What will the customer need to do in the system?**

The customer will need to be able to create and edit their own accounts. They will need to be able to order when the restaurant is open and when it is closed they should have the option to pre order. If a menu option is unable to be ordered, this should appear on the menu with a reason why (ingredients, staff problem, not out yet, etc) and the customer should not be able to order these items.

The customer should be able to view how long it takes to make items and how long the delivery will take. However the admin should have the option of hiding the time from some items if they want to.

The customer should also be able to view all of their previous orders and select some of their favourites to save, to make ordering easier next time. The customers should be able to easily access any discount offers we implement in the future.

The customer should be able to login using a barcode from the store. This will allow the counter staff to easily associate an order with a customer.

**What will the drivers need to do in the system?**

The drivers will need to be notified of when an order is ready to be delivered. They should also receive all of information on the customer that they would need to contact them just in case and also all the information of the order so that the driver can make sure that they have everything.

The driver should also have the customers' addresses overlaid on a map to make it easier and quicker to plan a route.

**What will the admin staff need to do in the system?**

They will need to be able to change and edit the menu, ingredient list and supplier list. They need to be able to view all data easily and quickly. Whenever a new member of staff is making their account there must be a way for the admin staff to confirm this account is real before it can do anything in the system.

The admin should be able to hide how long it takes to prepare some items or deliver from the customer. The staff should still see it, so they can improve it.

The admin should be able to see a heatmap of customers' addresses for delivers, collections, eating in store and total. This will allow the admin to target ads in certain areas. The admin would also be able to have a heatmap to see if a certain topping is more popular in one area or another.

The admin staff would also like to see if the difference in delivery speeds between drivers and if there is a difference in how long items take to prepare if there is a different kitchen staff present. They would also like to see graphed output of which menu items/toppings/dips/drinks are most popular and among different age groups/gender/location.

The admin staff will also need the system to automatically send out SMS and email messages to the customers and staff. These could be offers to the customers or just a general work message to the

staff. Customers should also receive a discount offer for their birthday. They should receive the offer about a week before their birthday with reminders as they get closer.

The admin staff should have the option to save all of the graphs to a PDF file to be easily viewed later or shared with people outside of the system or do not have acess, e.g the admin could make a graph of data that other staff could not access so the admin can use the system to save the graph as a PDF and use the system to email the staff.

The admin should also have a way to personalise the system. For example we would like to be able to put up images of our products on our menu and website. We want to be able to do this ourselves.

The admin staff would also like to be able to save shift times for the week on the system. Every member of staff should be able to view their shift

# Observations

Some advantages to using observations for fact finding are: Observation can help round out research by offering a real-world aspect to a hypothesis. It offers a better description of consumer behaviour and is less hypothetical than other methods. Also observation provides a more reliable measurement of actual user behaviour, rather than self-report metrics.

Some disadvantages to using observations for fact finding are: Observation research can include a high degree of researcher bias. Because the observer is human, subconscious opinions on demographics can affect the analysis. Also, observation research doesn't always return an accurate demographic sample. It's much smaller and relies heavily on chance. Researchers are sometimes left at the mercy of whomever came into a store that day, whether or not it lines up with desired consumer profiles. And finally, observation only tells one part of the story. Attitudes and opinions cannot be clearly expressed only through actions, so it may not be the clearest picture possible.

The first step in ordering a pizza is the customer phoning the restaurant or visiting in store. A member of the counter staff will take the order. They also take down all of the required customer details on the same page. Different customers' details are required depending on if it is a delivery or collection, for example the address isn't required for a collection.

The counter staff then copies out the food order and send it to the kitchen. If it is a delivery the customer's details are copied out for when the driver needs it. The counter staff records the food order not by a primary key code, but just by the name and size. This sometimes leads to confusion in the kitchen and can make it hard to find the recipe, as they have to search serially. This shows that the kitchen staff need to be able to quickly access information about the food, requiring a completely different view set up.

For a collection when the food is ready, the counter staff call out the customer's name. While observing I realised this process could be simplified by having my system send the customer a notification when their order is ready. The system will know when it is ready by the kitchen staff updating the system.

For a delivery the driver must go and get the food from the kitchen and the customer's details from the counter staff's copy. This wastes time, lowering the temperature of the food. This process is also very susceptible to errors as there is no coherent labelling system for different boxes.

In the kitchen the staff do not rack how much of each ingredient that they are using. They just wait until it runs out.

# Limitations of Current System

## Customer

- Cannot order online, must order through the phone or in store
- Cannot save favourite orders
- Cannot see any details on previous orders
- Does not receive recommendations in the checkout
- Customer's details are not securely stored
- Customer's details must be taken down every time they order, unnecessary
- Do not have an accurate time estimate for their order or delivery
- Cannot track driver

## Counter Staff

- Must write out data multiple times, causing data redundancy which results in a loss of data integrity
- Inefficient waste of time
- Data Duplication occurs regularly, resulting in a loss of data integrity
- Any data processing is done manually, leading to many processing errors

## Kitchen

- Cannot easily track ingredient supply
- Any data processing is done manually, leading to many processing errors

## Manager

- Cannot easily track which items are selling the most
- Cannot track which are their best customers
- No way too track trends, e.g if a certain menu item is more popular at a certain time or day of the week
- Has no access to customer's details, making it impossible to send out offers
- Very little to no validation on any inputs to their current system as it is paper based.
- Any data processing is done manually, leading to many processing errors
- Paper based data is unsecure and could be physically stolen, leading to problems with the law GDPR
- Paper based system has no back up, meaning all the data could be lost
- Paper based system has no access levels
- More data duplication with the paper based system
- Less flexibility with the paper based system
- The data in the paper based system cannot be exported, e.g to a csv file
- The data in the paper based system cannot be used for high level data processing
- The paper based system has less security

Some more limitations of the current system are: maintainability, for example since the data is paper based currently,  the records are hard to update, leading to a loss of data integrity.

Another limitation is the issues with backing data up, problems deleting data since it is currently a paper based system so it is extremely tedious & time consuming to create paper based back ups, whereas if they were using a digital system, they could use an algorithm to do so. Another disadvantage is the issues with manual processing such as calculations and the lack of use of algorithms for this, the readability of outputs, user friendliness of any interface all of which would be improved greatly by using a digital system.

Another disadvantage is the lack of security/data protection in the paper based system. This is because is someone has physical access to the data, then they access it as it is a paper based system. In my system there will be different access levels, which will protect data & functionality from being able to be seen/used from unauthorised users. My system will also have password authorisation to enforce the access levels, and all high valued data such as passwords will be securely encrypted, all of which cannot be implemented in a paper based system, like the one that is currently in use.

# Explanation of Methods to be Used

This section shall explain:

- programming tools used
- discussion of interface
- data structures used
- file handling
- validation
- local or global variables used
- use of data types

I shall be using python. Python is an interpreted high-level programming language for general-purpose programming. Python has great compatibility with different GUI and database modules and Databases meaning it will be well suited for a project like mine. I shall be using a GUI over a CLI. I shall be using a GUI because it provides a better user experience compared with CLI, especially for new or inexperienced users.

I will be programming my solution using OOP. Because I am using SQLite it is essential that I am programming in OOP to ensure that my code can be minimised and efficiently. Using OOP will allow me to evolve my project as it becomes developed and build on pre-existing features if I chose to. Extensive use of classes and heritance means my program can continually be developed on and will be extremely reusable & efficient.

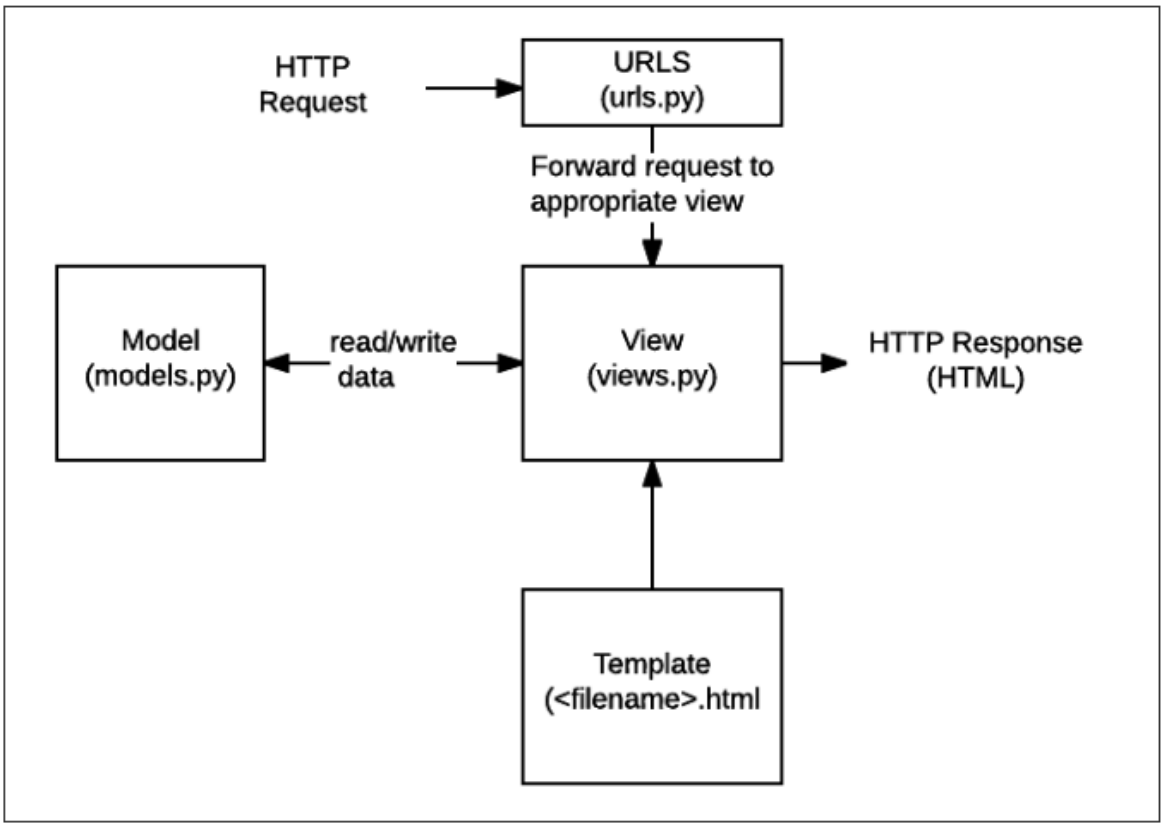
I will also use Django web framework so that my project can be accessed online. Django is a free and open-source web framework, written in Python, which follows the model-view-template architectural pattern. It is maintained by the Django Software Foundation, an independent organization established as a 501 non-profit.

I will need to validate all of the user and staff input. To ensure this I will use a wide range of validation techniques such as presence checks, range checks, type checks, format checks, length checks and look up checks, I will also heavily rely on dropdown menus with pre-existing options as a way for the users in insert data.

Since my program revolves around the storing and processing of data, it is important to use suitable data structures. All of the data will be stored in tables using SQL database therefore the data stored in my program will be normalised and distributed throughout these tables. I shall not be using any text files in my system. There is no specific reason for this, I just do not see the need to do so.

There are four different types of file handling: serial, sequential, indexed sequential and random (direct access). For serial access records are stored in chronological order, as new items are appended to the end of the file when added. For sequential file access, records are stored in order of a key sequence. Sequential files offer more efficient processing than serial access files. They can be used on a direct access storage device such as a hard disk. For indexed sequential file access, records are accessed either sequentially (in the order they were entered) or randomly (with an index). Each index defines a different ordering of the records. An employee database may have several indexes, based on the information being sought. For example, a name index may order employees alphabetically by last name, while a department index may order employees by their department. A key is specified in each index. For an alphabetical index of employee names, the last name field would be the key. For random file access, random access files are also known as direct, hash, or relative file. Records are stored according to their disk address or relative position within the file. A hashing algorithm can be used to determine the address at which records are to be stored. When I access my data, which will be stored in a SQL database, I shall be using direct (random) access.

Throughout my python code I will be using lists, tuples, variables (strings, integers, Boolean) and dictionaries. I shall be using local variables. This is because I plan to write reusable code that can be developed upon and evolved. Global variables will add complications to my code which I can avoid by using efficient class methods and passing in variables. I shall not use any global variables, only local variables or class attributes. Since I am approaching this project with object oriented programming, I will make use of class heritance and transferring attributes between classes.




- **URLs:** While it is possible to process requests from every single URL via a single function, it is much more maintainable to write a separate view function to handle each resource. A URL mapper is used to redirect HTTP requests to the appropriate view based on the request URL. The URL mapper can also match particular patterns of strings or digits that appear in an URL, and pass these to a view function as data.
- **View:** A view is a request handler function, which receives HTTP requests and returns HTTP responses. Views access the data needed to satisfy requests via *models*, and delegate the formatting of the response to *templates*.
- **Models:** Models are Python objects that define the structure of an application's data, and provide mechanisms to manage (add, modify, delete) and query records in the database.
- **Templates:** A template is a text file defining the structure or layout of a file (such as an HTML page), with placeholders used to represent actual content. A *view* can dynamically create an HTML page using an HTML template, populating it with data from a *model*. A template can be used to define the structure of any type of file; it doesn't have to be HTML!

# Objectives & Success Criteria

## Customer

| Number | Objective/ Success Criteria | Priority |
|---|---|---|
| 1. | Must be able to create, edit and delete their account | High |
| 2. | Must be able to save their previous orders so that they can quickly re order them in the future | High |
| 3. | Must be able to view the menu | High |
| 4. | Must be able to edit the quantities of each item before the order is saved | High |
| 5. | If an item is not available, the customer must not be able to order it | High |
| 6. | Must be told if an item is not able to be ordered and why | Low |
| 7. | Must be able to quickly login using a barcode printed by the store | Medium |
| 8. | Must have the option of adding extra items such as dips while in the checkout | Medium |
| 9. | They should by recommended other products | High |
| 10. | Must be able to order online, not just in the store | High |
| 11. | Must be able to see the status of their order as it is being prepared | High |
| 12. | Must be able to track their delivery driver | Medium |
| 13. | Must have an accurate estimation of how long it will take to order and deliver | Medium |
| 14. | If the restaurant is closed, the customers should not be able to order and should instead be given the option of pre-ordering for when the restaurant is open again | Medium |
| 15. | The customer should have the option of viewing all of their previous orders | High |
| 16. | The customer should be able to see a leader board of the most popular items in each category | Low |
| 17. | The customer should be able to easily see the opening, delivery, collection and closing hours of the restaurant | Medium |
| 18. | Must be able to easily access any discount offers from the restaurant, e.g.: receive email or SMS offers | High |
| 19. | Must be notified on progress on their order and when it is ready | High |
| 20. | If it is a collection they should receive a notification to collect their order | High |
| 21. | If it is a delivery they should receive a notification that it is now being delivered and then they should be able to track their driver | High |
| 22. | Must be able to view all the products at once or view them by category | High |
| 23. | Must be able to search for a specific product | High |
| 24. | Must be able to access a product detail page for each product | High |
| 25. | Must be able to add multiple products of varying quantities to the cart | High |
| 26. | Must have a cart | High |
| 27. | Must be recommended other products on the product detail page that other customer's have bought with the product currently being viewed | High |
| 28. | Must be recommended other products on the cart detail page based off what products the customer is ordering | High |
| 29. | Must be able to remove items from the cart | High |
| 30. | Must be able to edit the quantities of items in the cart | High |
| 31. | Must be able to go to the product detail page of a product from the cart | Medium |
| 32. | Must be able to continue shopping after looking at the cart | High |
| 33. | Must be able to go to the checkout after looking at the cart | High |

| | | |
|---|---|---|
| 34. | As all times the customer must have easy access to the dashboard, shop and cart | High |
| 35. | Must be able to view a summary of their order in the checkout | Low |
| 36. | Must be able to chose the type of order | High |
| 37. | Must be able to create orders | High |
| 38. | Must be taken to an order confirmation page after creating the order | High |
| 39. | Must see relative details at the confirmation page | High |
| 40. | Must be able to view a receipt in a pdf file | High |
| 41. | Must receive an email confirming their order | High |
| 42. | Must be able to login & logout | High |
| 43. | Must be able to view their details | Medium |
| 44. | Must be able to reset their password | Medium |

Counter Staff

| Number | Objective/ Success Criteria | Priority |
|---|---|---|
| 45. | They must need permission from an admin account to activate their account | High |
| 46. | They should be able to create, edit and delete customer accounts for people over the phone | Medium |
| 47. | They should be able to create, edit and delete customer accounts for people over the phone | Medium |
| 48. | They should also be able to view the customer's saved orders | Medium |
| 49. | They should be able to see the status of the customer's order | High |
| 50. | They should be notified on its progress and when it is ready | High |
| 51. | They should be able to see how long each item takes and how long the customer's order should take | Medium |
| 52. | Any orders that they take should be associated with their account | High |
| 53. | They should be able to view their shift times | Low |
| 54. | They should receive an SMS message or email reminding them about their shift times the day before | Low |
| 55. | Should be able to view all of the orders, live order and previous orders | High |
| 56. | Should be able to view a pdf receipt of each order | High |
| 57. | Must be able to update the status of each order | High |
| 58. | Must be able to delete an order | High |
| 59. | Must be able to go to an order detail page for each order | High |
| 60. | Must be able to search & rank all orders | High |
| 61. | Must be able to view all the order items in an order | High |
| 62. | Must be able to update the status of each order item | High |
| 63. | Must be able to remove an order item | High |
| 64. | Must be able to view a pdf ticket for each order item | High |
| 65. | Must be able to relevant customer information in the order detail page | High |
| 66. | Must be able to view all customers | High |
| 67. | Must be able to search & rank customers | High |
| 68. | Must be able to delete customers | High |
| 69. | Must be able to go to a customer detail page for each customer | High |

| | | |
|---|---|---|
| 70. | Must be able to see all of the customer's information on this page and all of their orders | High |
| 71. | All of the data must be able to be viewed as a pdf file or csv file | High |
| 72. | Some high level data processing on the customer must be shown here | High |
| 73. | Form the customer detail page the staff should be able to go to that order detail page | High |
| 74. | Must be able to view their details | Medium |
| 75. | Must be able to reset their password | Medium |

Kitchen Staff

| Number | Objective/Success Criteria | Priority |
|---|---|---|
| 76. | They must need permission from an admin account to activate their account | High |
| 77. | They must be able to view how much of each ingredient that they have left | Medium |
| 78. | They must be able to update the status for the order part that they are responsible for. They should not be able to affect the status of the whole order, as the whole order is only ready when all of the order parts are | High |
| 79. | They should be able to view & print out the stickers for the boxes. They should not be able to access the data, the system should access it and create the sticker. The sticker should include:<br>OrderID, Box number/ number of boxes, type(in store, delivery or collection), relevant timestamps, CustomerName, subtotal and TotalCost.<br>The stickers will be pdfs | High |
| 80. | They should be able to change the quantities of each ingredient. This is to keep the system accurate. Whenever an order is placed the system will automatically subtract the quantity of ingredient used but, if there is an accident, the kitchen staff may need to update it | High |
| 81. | When the kitchen staff finish an order, they must update the system which will notify the counter staff, driver or customer | High |
| 82. | The system should analyse all of the previous orders and the time and day, and from that be able to roughly predict to the kitchen staff how much of each item they will have to make. This allows the system to be more accurate when tracking how much of each ingredient the restaurant needs for the next day or week | Medium |
| 83. | They should be able to view their shift times | Medium |
| 84. | They should receive an SMS message or email reminding them about their shift times the day before | Medium |
| 85. | Must be able to view their details | Medium |
| 86. | Must be able to reset their password | Medium |
| 87. | Must be able to view all order items | High |
| 88. | Must be able to search and rank these order items | High |

Driver

| Number | Objective/Success Criteria | Priority |
|---|---|---|
| 89. | They must need permission from an admin account to activate their account | High |

| | | |
|---|---|---|
| 90. | They must receive a notification whenever an order is ready for them to deliver | Medium |
| 91. | They should be able to view all of the contact information on the customer whom they are delivering to. They should only have access while they are delivering | High |
| 92. | They should be able to view the entire order and all of the order part, to make sure that they have everything. They should only have access while they are delivering | High |
| 93. | When the driver begins the delivery they should put in the time into the system and again when they finish, so that the delivery times can be tracked. If the driver starts driving without inputting the time, thy should get a notification to do so. If they do not then an error message should be saved instead | Medium |
| 94. | The driver should see a map on the system with an overlay of the customer's addresses | Medium |
| 95. | They should be able to view their shift times | Low |
| 96. | They should receive an SMS message or email reminding them about their shift times the day before | Low |
| 97. | Must be able to view their details | Medium |
| 98. | Must be able to reset their password | Medium |
| 99. | Must be able to view a pdf file of the order receipt | High |

Manager

| Number | Objective/Success Criteria | Priority |
|---|---|---|
| 100. | The manager must be able to enable or disable accounts | High |
| 101. | Whenever a member of staff is creating an account they must have their account enabled by the manager before they can do anything, while the customer's account should be automatically enabled | High |
| 102. | The manager must be able to edit the opening, delivery, pick up and closing times for each day | Low |
| 103. | The manager should be able to hide items on the menu from the customer if they do not want that item to be ordered but do not want the hassle of deleting the record temporarily | Medium |
| 104. | The manager should have the option of hiding how long it takes to prepare items or how long it takes to deliver, from the customer. However, the staff should still see it so that they can improve to the target | Low |
| 105. | The manager should set the target times for preparing food in the menu table and delivery times in the delivery zone table. Not everything in the menu table will be visible by the customer | Medium |
| 106. | The admin should be able to create delivery zones that have different delivery prices, e.g.: within x miles of the restaurant is costs £y | Medium |
| 107. | The admin should also be able to view a heatmap of the local area, that is overlaid with customers' addresses. This should give the admin the option to show the intensity of the heatmap based off just number of customers, number of orders or the total cost of the orders. The admin should also be able to view just collections, deliveries, instore, all or any combination they wish to view | Medium |
| 108. | The admin should also be able to see how long it takes to prepare each item on average and how long it takes it deliver on average | Medium |

| | | |
|---|---|---|
| 109. | The admin should be able to set the target times for each delivery zone | Low |
| 110. | The admin should be able to set the target times for preparing each item | Low |
| 111. | The admin should also be able to create a custom SMS or email message that would be sent out to any or a combination customers, drivers, kitchen staff or counter staff. The admin should also have the option of sending out SMS messages or emails to people of just a specific attribute, e.g: customers over a certain age or drivers who are working at a certain time | Medium |
| 112. | The admin should be able to save next weeks shifts in the system | Low |
| 113. | The admin should receive a report at the end of every day and week showing the total sales instore, delivery and collection for that week. They should also see how much revenue they generated and how many new customers joined | Medium |
| 114. | For each graph or report that the admin can create/view, they should be able to save it as a PDF, and then use the system to email it out to any members of staff or customers that they may want to | High |
| 115. | The manager must be able to view all the employees | High |
| 116. | The manager must be able to delete employees in this page | High |
| 117. | The manager must be able to change access levels in this page for each employee | High |
| 118. | The manager must be able to search/rank the employees in the page | High |
| 119. | The manager must be able to view all the categories in a view categories page | High |
| 120. | The manager must be able to delete categories in this page | High |
| 121. | The manager must be able to search/rank categories in this page | High |
| 122. | The manager must be able to add a new category in this page | High |
| 123. | The manager must be able to view all products in a view products page | High |
| 124. | The manager must be able to hide products in this page | High |
| 125. | The manager must be able to delete products in this page | High |
| 126. | The manager must be able to search/ rank products in this page | High |
| 127. | The manager must be able to add a new product in this page | High |
| 128. | The manager must also have access to all of the other staff's apps | High |