CSCI 234 – Software Engineering

Spring 2019

Project Initial User Requirements

Client is the Schaper Sandwich Shop. There is currently one location of this business. The client is considering starting a delivery service in order to keep up with competitors. The client wants to franchise their business. The client also wants to dominate the sandwich business. To do so, it is believed that rather than create a traditional delivery service, it would be better to put the entire sandwich shop in a truck and have the truck drive to customer houses to deliver sandwiches. A sandwich truck will have the entire ability of a brick-and-mortar store.

The client wants to also update their menu. The client has specialty sandwiches that their customers love. They will also determine the best (most desirable) menu based on customer surveys. The menu must contain sandwiches that can be prepared in the limited space of the truck.

The basic operation of a truck will be as follows:

* Customer places an order by phone or online website, which can be customized by the customer.
* Customers can pay with either cash, or card
* A customer can edit or cancel an order after its been submitted
* Customers may also potentially be able to order raw ingredients, the truck potentially acting as a sandwich and deli truck.
* If the truck runs low on gasoline, it will schedule at stop at a gas station.
* The order time of the customer is used to determine the route the truck will follow. This route is updated each time an order is placed. Routes must not cause indefinite postponement of deliveries.
* Each order is placed in a queue of orders such that each order will be ready before the time the truck reaches the delivery destination. Order preparation must be as close as possible to delivery time so as to keep the sandwiches as fresh as possible.
* Orders are made while the truck is driving and given to the preparer at the right time to be as fresh as possible at delivery time.
* The orders are prepared and packaged for delivery.
* When a destination is reached, an employee takes the order to the customer’s door and collects payment.
* If the truck has no orders, it will return to the distribution center and re-supply its stocks
* If the truck runs low of a product, it will schedule a stop at a supply center to restock.
* The truck has a driver, an order taker and deliverer, and an order preparer.
* The truck will operate within a 10 block radius of its distribution center

The client wants a software system that will run the business of the truck. To test the concept of a mobile sandwich shop, the client wants a simulation of the operation of the truck. The software must:

* allow for order entry
* Schedule delivery times and the truck route. There must be an easy way to change the heuristics used to create the routes so that the company can experiment with different strategies.
* Scheduling of order preparation and packaging.
* Keep track of the cash register.
* Customers must be able to keep track of the location of the truck, by street address.
* Represent the neighborhood with 20 North/South streets, collectively named “South” and numbered 0-19, and 20 East/West streets, named “East” and numbered 0-19.
* Be capable of generating random locations/addresses, representing customers’ homes.
* Trucks initial location is the distribution center.
* Display a map of the neighborhood with locations marked, and the route of the truck as orders progress.
* Keep track of address of the order along with the time of the order.
* Priority for each order is given based on the time of the order.
* Earliest order in the neighborhood is 10:00 AM and the latest order is at 7:00 PM
* Compute the distance of the truck’s route as it progresses through the neighborhood and the total distance travelled.
* The client is able to resize the size of the neighborhood to cater to the size of the area he is operating in, in this case going from 10 blocks to 20 blocks.
* The client would like two different routing strategies and a way to compare which is the most effective using units of time. Such as left hand turns only and right hand turns only.
* The client would like to add order types to the address list along with times, at this time orders are just using generic placeholders of random chips one through three, random drinks one through three, and random sandwich type one through three.
* As stated above the client wants to see which routing type is the most effective and a move from one address to another takes one unit of time, a stop at an address takes five units of time, a right hand turn takes two units of time, a left hand turn takes four units of time, and preparing food takes five units of time.
* ----SPRINT FOUR
  + Implement the observer design pattern to automatically and easily update the truck, especially if there are multiple trucks
  + Implement units of time converted to real time assuming truck is going 30mph and houses are 0.03 miles apart
  + Complete other items as described above to complete user story.
* -- SPRINT FIVE FINAL
  + Finish all other backlog items as described above.
  + Generate a random sandwich order using turkey and ham, roll or wrap, mayonnaise, mustard, and cheese, as well as vegetables including lettuce and tomato or a combination of those items.
  + Add things like a bag and sandwich cover which are required on ALL orders.
  + Adding each menu item to a sandwich takes time, meats take 30 seconds, a roll takes 60 seconds, a wrap takes 75 seconds, mayonnaise and mustard take 30 seconds, cheese takes 40 seconds, lettuce takes 20 seconds and tomato takes 35 seconds, a sandwich paper cover takes 75 seconds and bagging each one takes 20 seconds.
  + There is a 10% sales tax added to the order total.
  + Must display total distance travelled as well as print orders out along with the address
  + Truck returns to the distribution center when finished!
  + Must use decorator or factory design patterns.

The client knows that the requirements for this operation are not complete and is relying on the software development company it hires to help flesh out additional details (or even ideas) regarding the mobile sandwich truck.