QUEUING THEORY

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Requirements:
Product Description

Queuing Theory is a web-based application that can be used to create a virtual line that adds people to the end and removes them, in order, from the front. Any organization that offers services on a first-come-first-serve or other wait-list basis will find this product useful. They will be able to create a queue using the website, and their customers will be able to enroll in the queue by accessing it. Examples of potential customers are restaurants, doctors' offices—such as Hall Health—and tutoring centers such as the CLUE tutoring center at the University of Washington. More specifically, clients of this product would be able to set up a queue at an website which would then provide them with 2 URLs: one that direct them to an administrative dashboard and another that can be given to their patrons that will direct them to a site where they can enroll in the queue. For the sake of clarity and readability in this document, the person that sets up a queue will be referred to as an "administrator" and a person that might enter into the queue will be referred to as a "user."

There are a couple main problems with the conventional queuing systems at organizations like the ones mentioned above. The first is the large amount of time required of employees or volunteers to manage them. For example, at a popular restaurant, potential patrons often will call in before deciding if they want to eat there to see how long they might have to wait once they arrive. That phone call must be received by someone at the restaurant and if it isn't, the customer may not come at all. Then, once a customer has arrived at the restaurant, an employee must put them in line which takes even more of their time. Many similar time-consuming procedures are present in all the queuing systems of our potential users. The second problem is the angst and frustration that is experienced by the persons waiting in the queue. As described in the example above, they often have to be present and wait for an undetermined amount of time before they are helped, and people are generally impatient. For them, that is essentially lost time in which they could have been doing something productive.

Our software reduces or eliminates both of these problems. Administrators will only need to set up a queue once. Once that has been done, the queue will be managed by our software and the users themselves will be able to place themselves into it. Additionally, the users will be able to see the state of the queue online to decide when will be a good time to visit without having to interrupt any employees at the actual business.

Currently, several alternatives to solving queuing problems exist. For example, No Wait & Tap Guest and are both restaurant queue applications available in the Apple app store and the company Tensator offers more customizable queuing systems. However, most of the restaurant queuing applications are available only as apps which must be installed on smartphones and tablets, and Tensator's products are very robust and require expensive customization; some of their systems even include hardware. Further, there is little agreement between restaurants about which service to use, which means users might have to install a different app for each restaurant they want to visit. Queuing Theory is set apart from these in a number of ways. The first is that it is more universal than the applications that are available only on tablets and smartphones because it will be available on any device capable of browsing the web, and will require no installation. The second is that it will be much more accessible than the hefty systems provided by Tensator because it will have functionality simple enough that it will not require the help of an expert to use or set up. Finally, there is no need for specialized hardware because it is made

for use on already existing devices and can be customized by the client themselves from the website.

The core features of this product:

1. the ability of users to enroll themselves into a queue
2. the ability to display estimated wait time to users
3. the ability to display analytics to the administrator about how users are using their services
4. the ability to save queues across uses so they may be used again without having to set up again

Stretch features of this product:

1. The option for administrators to require users to create a profile with information that the administrator chooses before enqueuing themselves.
2. SMS notification to users that they are near/at the top of the queue
3. CAD capabilities so that administrators can build a floor plan to match their physical space and assign users to objects in the space as they are dequeued.

Queuing Theory has a number of non-functional requirements:
1. performance - the site must load quickly and experience little to no lag
2. dependability - the site must never crash or lose queue information
3. maintainability - the program must be well modulated to facilitate tracking down bugs
4. safety - the site must be invulnerable to attacks in which user data can be harvested

Documentation on how to use Queuing Theory will take the form of a user manual on the website for administrators as their use will be slightly more complex. For users, the website will have an obvious UI, prompts and integrated help text to facilitate use.