Question 1:

In terms of stakeholders to be interviewed, the best choice would be users with different operating systems and different browsers. These would have to be interviewed in order to reach the full domain of tests. Not only that but it would be beneficial to have many users in order to have a clear understanding of the different ways the product would be used. Another set to be interviewed would be the programmers themselves. They would be interviewed to see if the job can be done properly and so they can understand the risks. Internet providers would have to be another stake holder because the fridge must have a connection to the net, so they must be interviewed in order to see how that connection would work. The local power plant would have to be interviewed in order to see how much power can be drawn by the fridge and what restrictions are given. Lastly, HP would be interviewed as they produce the machines the development is being done on.

Question 2:

Users:

The purpose of this interview is to see how often a user uses the fridge, as well as what kind of operating system/browser they use and if they are willing to share data gathered by the product. They would also have to be asked how many recipes they plan to store and how much food they typically keep in their fridge. This is asked in order to make sure the product can accommodate for the households usual upkeep. They also need to be interviewed to get a glimpse of how well versed they are in using modern technology.

Programmers:

The purpose of this interview would be to identify the ability of certain programmers to work as a team. The level of commitment would also need to be gathered to avoid the possibility of a loss of personnel. They should all have knowledge in at least one object oriented programming language, preferably java. If they disclose they do not know java they need to be trained.

Internet Providers:

They need to be interviewed as stake holders because they need to keep the connections to the product secure. They also need to work out the details in terms of payments such as if the product will be a part of internet bills or be a separate bill entirely. They also must be aware of the needed speed for the product to work.

Power Plant:

Similarly to internet providers, they need to be interviewed for the logistics of payments for the power the product draws. They must also be aware that it may draw additional power due to its need to have a constant internet connection. Once they are aware they can accommodate for it.

HP:

HP would need to be interviewed due to the fact that the software development is being done on their machines. The information needed from them would simply be if their machines can handle the operations the company needs to use.

Question 3:

Users:

* Do you have a fridge at home?
* How often do you store food in that fridge?
* How often do you use recipes?
* How much experience do you have with technology?
* What operating system and browser do you use?
* Are you willing to share data with us to keep the product as best as it can be?
* How beneficial is it for you to have all your recipes in one place?

Programmers:

* What types of languages have you programmed in?
* What languages have you used?
* What other projects have you worked on in the past?
* Are you committed to this project?
* If you were to leave this project, or fall ill, would you still be able to regularly update the system?
* How often are you available to work?

Internet Providers:

* What is the speed of the internet connection you are willing to provide for us?
* Are you okay with adding an extra load to your internet traffic on the connection that you are providing?
* Can the connection you are providing be considered stable and without fluctuations?
* How will the users be paying for the connection on our product?
* Can your connection hold our databases?

Power Plant:

* How much power can be set aside for the use of our product per house hold?
* Can you accommodate for the increase in power usage from a normal fridge?

HP:

* How much data can your machines store?
* Are your machines stable enough to keep our back up files safe?
* Will the tools we need be on your machines?

Question 4:

Users:

* Are there any extra features you wish to be a part of the CyberFridge?
* Was there a time when our fridge made it harder for you to prepare a meal, if so describe it?

Programmers:

* Is there any way you can think to make this more efficient?

Internet Providers:

* Has there been situations where there were detrimental effects on the users home internet connection?
* How have you dealt with large businesses using the CyberFridge?

Power Plant:

* Has our product ever caused an over-use in power in a particular house hold?

HP:

* What would you advise to keep the data we store safe?

Question 5:

Functional Requirements:

* If CARA fails, the CyberFridge should not fail
* If CARA fails, the fridge should still function as a normal fridge
* There is a manual reset button for when the product doesn’t work
* If recipe exists in favorites already, do not add
* Door must always be able to open
* While door is open nothing is being updated, only update when door closes
* Light needs to turn on upon door opening
* Temperature must be managed internally and only when door closed
* Door must stay closed unless opened by user
* Display the food items currently in the inventory of the fridge when door is closed
* Do not display food items in fridge while door is open
* Categorize the food inventory in a way the user specified
* Return information about a food item upon users request
* Every time there is an addition to the inventory the fridge updates item count
* Every time there is a removal from the inventory the fridge updates item count
* The fridge will keep a database consisting of all recipes the user has inputted
* Recipes can be removed, added or listed upon request
* There must be a running internet connection
* Provide the user with recipes available to be made with current inventory
* Provide user with missing food items needed to make a given recipe
* Keep track of most used recipes
* Provide suggested recipes set by user criteria

Question 6:

Non-functional Requirements:

Look and feel:

* The fridge should look like a normal fridge apart from the added display
* Display must be well lit at all times

Usability:

* Fridge should be usable for a person aged 8 – 70 in able condition.

Performance:

* It has enough speed if the recipes load in under 30 seconds
* Maximum response time of half a second before showing the user that recipe requests were received
* Power must be regulated and all cabling insulated properly as a safety critical system
* It must also keep an appropriate temperature to a degree of variance
* The product will be usable 24/7
* It must accommodate the same number of food items as a normal fridge

Operational:

* The product will be used in homes, by home owners
* All interactions with the fridge will be done through the browser

Maintainability and Portability:

* All updates to the software and all reports are saved and backed up by each employee on a weekly basis
* The software works on Google Chrome, Explorer, Firefox and Safari

Cultural and Political:

* The software will provide no offensive imagery to any culture

Requirements Taxonomies:

* The fridge should display NO CONNECTION when not connected to the internet and it is searching for recipes

Question 7:

Positive Scenario 1:

1. User opens the fridge door
2. Light turns on
3. User takes carrots out of the fridge
4. User puts milk in the fridge
5. User closes the door
6. Fridge updates, now there is –carrots +milk but the number of items in the fridge remains the same

Positive Scenario 2:

1. User opens browser application
2. Searches for apple pie recipe
3. Software returns recipe
4. User adds it to favorites
5. User closes application
6. User opens application
7. User opens favorites
8. User selects apple pie recipe

Negative Scenario:

1. User opens the fridge door
2. Light turns on
3. User takes carrots out
4. User closes door
5. Fridge updates, now there is –apples and – 1 number of items in fridge
6. User opens application and looks for apple pie recipe
7. Application returns not enough apples but there is enough apples in the fridge

Abnormal Scenario:

1. User opens application while apple pie is already in favorites
2. User adds apple pie to favorites again
3. Application updates, 2 of the same apple pie recipes now exist in the system
4. User opens apple pie recipe, only one opens and is still usable
5. User closes application

Question 8:

Requirements:

* A user deletes an existing recipe from the system
* A user updates an existing recipe already in the system

Under normal circumstances, these two scenarios will play out completely fine. If they were to happen at the same time on the other hand, the result would be undefined. To solve this issue the system would give one action priority over the other and cancel the latter operation. The best way to handle this is to let it update, then cancel the deletion from happening, because if the user wants to delete it they can afterwards.

Question 9:

Two risks that could be identified in the situation could be electrocution from fault wiring or loss of all data due to a weak connection.

Electrocution:

|  |  |  |  |
| --- | --- | --- | --- |
| Consequences | Likely | Possible | Unlikely |
| Loss of Life | Catastrophic | Catastrophic | Severe |
| Serious Injuries | Catastrophic | Severe | High |
| Fridge Damaged | High | Moderate | Low |
| Company Reputation Damaged | High | Moderate | Low |
| Fire | Severe | Severe | High |

Loss of all data:

|  |  |  |  |
| --- | --- | --- | --- |
| Consequences | Likely | Possible | Unlikely |
| Company Reputation Damaged | High | Moderate | Low |
| Fridge Sent for Repair | High | Moderate | Low |
| User Needs to Re Enter All Data | Moderate | Moderate | Low |

Electrocution Fault Tree:

Look on next page.

Electrocution

AND

User Touching Fridge

OR

User Overloads Outlet

User Breaks Fridge

Fridge Melts Wiring

User Breaks Wiring

Improper Wiring

OR

Assumption

Error

Requirement

Error

Specification

Error

Implementation

Error

Question 10:

Risk Consequence Table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Objectives | Risks -> |  |  |  |  |  |
|  | User gets electrocuted by the fridge (likelihood: 0.1) | All data from fridge is wiped (likelihood:  0.2) | Fridge sets on fire (likelihood: 0.1) | Temperature in fridge makes the food go bad (likelihood 0.3) | Moldy food makes it more likely that other food gets moldy (likelihood 0.6) | **Loss Obj.** |
| Users are safe when using the fridge (weight: 0.6) | 1 | 0.1 | 0.8 | 0.7 | 0.7 | **0.498** |
| User gets recipe from fridge (weight: 0.5) | 0.8 | 1 | 1 | 0.2 | 0.1 | **0.25** |
| Fridge updates number of items in inventory correctly (weight 0.5) | 0.2 | 1 | 0.2 | 0 | 0 | **0.12** |
| Fridge keeps food safe at the right temperature  (weight 0.7) | 0.1 | 0 | 0.5 | 1 | 0.8 | **0.588** |
| Fridge fetches data in a reasonable time frame (weight 0.1) | 0 | 1 | 0.2 | 0 | 0 | **0.022** |
| **Risk Criticality** | **0.117** | **0.232** | **0.145** | **0.366** | **0.618** |  |

Risk Countermeasure Table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Countermeasures | Risks -> |  |  |  |  |  |
|  | User gets electrocuted by the fridge (likelihood: 0.1) | All data from fridge is wiped (likelihood:  0.2) | Fridge sets on fire (likelihood: 0.1) | Temperature in fridge makes the food go bad (likelihood 0.3) | Moldy food makes it more likely that other food gets moldy (likelihood 0.6) | **Overall Effect of Counter-measure** |
| Heavily insulated wiring | 0.9 | 0 | 0.8 | 0 | 0 | **0.2213** |
| Tangle Proof Cords | 0.9 | 0 | 0.9 | 0 | 0 | **0.2358** |
| Maintenance of internal thermometer | 0 | 0 | 0.1 | 1 | 0.2 | **0.5041** |
| Maintenance of software code | 0 | 0.8 | 0 | 0.2 | 0 | **0.2588** |
| Continuous back up process for all data in fridge | 0 | 1 | 0 | 0 | 0 | **0.232** |
| **Combined Risk Reduction** | **0.99** | **1** | **0.982** | **1** | **0.2** |  |

The greatest risk criticality comes from moldy food being left in the fridge. The most effective counter measure is constant maintenance of the internal thermometer. This information is useful because it gives the company an understanding of what has the greatest risk, and what can be done to fix it.