Interamerican University of Puerto Rico

Aguadilla Campus

Final Project COMP 3400

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Y00339371 COMP3400

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Prof. Edgardo Vargas Moya

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Introduction

With the recent class and development of this project, it has been interesting to work with the whole software development phase that we have discussed in class. The Pothole Tracking and Repair system was a very intriguing due to the fact that it has a very specific process used to collect all of the data then place it in its storage database. Its something that can be used now a days in Puerto Rico. Although enforcing it through a law would be the first step in applying this kind of design in a municipality for testing purposes. In this scenario, the main data is collected for the citizen including their name, address and phone number. This is done through the main app or page once opened and registered using a User ID and Password. The citizen then fills out the cost of the damage, address where it happened, location of the pothole, size and estimated cost of damages. The system then stores the address in a small database where its then sorted and district determined. The system prioritizes the repair of the pothole due to its size then proceeds to assign an ID to the Pothole, repair crew and the number of people in that crew. The number of equipment needed to work on the repair is also determined due to the size and amount of work hours needed. This is then all stored in a Work Order database. Once this has all been processed a Damage File is created and displayed on the system so that the internal employees can have the exact repair cost. This is a fun and interested project that I may take as a challenge to develop and present it to our local county and see if they do like the idea.

Logbook:

Date	Attendance	Tasks	Hours (Central Standard Time)
11/4/19	**Raul Gonzalez**	**Started looking for information regarding Flow Chart systems.**	**12PM CST**
11/6/19	**Raul Gonzalez**	**Started Flow Chart Design**	**11AM CST**
11/6/19	**Raul Gonzalez**	**Finished Flow Chart**	**1:40PM CST**
11/7/19	**Raul Gonzalez**	**Started researching info on ERD design**	**1:05AM CST**
11/7/19	**Raul Gonzalez**	**Finished ERD**	**12PM CST**
11/7/19	**Raul Gonzalez**	**Started DFD**	**12:30PM CST**
11/7/19	**Raul Gonzalez**	**Finished DFD**	**8:20PM CST**
11/7/19	**Raul Gonzalez**	**Started Data Dictionary**	**10:05PM CST**
11/7/19	**Raul Gonzalez**	**Finished Data Dictionary**	**10:45PM CST**
11/8/19	**Raul Gonzalez**	**Answered final Questions**	**1PM-4:33PM CST**
11/8/19	**Raul Gonzalez**	**Introduction, Reference and Conclusion**	**4:45PM-5:08 PM CST**

		Started and Finished	
11/9/19	**Raul Gonzalez**	**Timeline Started and Finished**	**10:00AM-11:50AM CST**
11/10/19	**Raul Gonzalez**	**Completed Interface**	**10PM-11:30PM CST**

Timeline:

MY TIMELINE

DEFINING REQUIREMENTS

Once we've captured the analysis and information from the client on the PHTRS, we document and define the...

November 10, 2019

CODING

We proceed to code the application after the design has been approved by the customer. Coding this type of...

November 29, 2019

DEPLOYMENT

Once we test the project to its full potential and fix any possible issues and defects, its then ready to be deployed...

January 6, 2020

November 9, 2019

PLANNING AND REQUIREMENT

In this step, the developers will get in touch with the senior member of the team that will provide the ideas and...

November 15, 2019

DESIGN

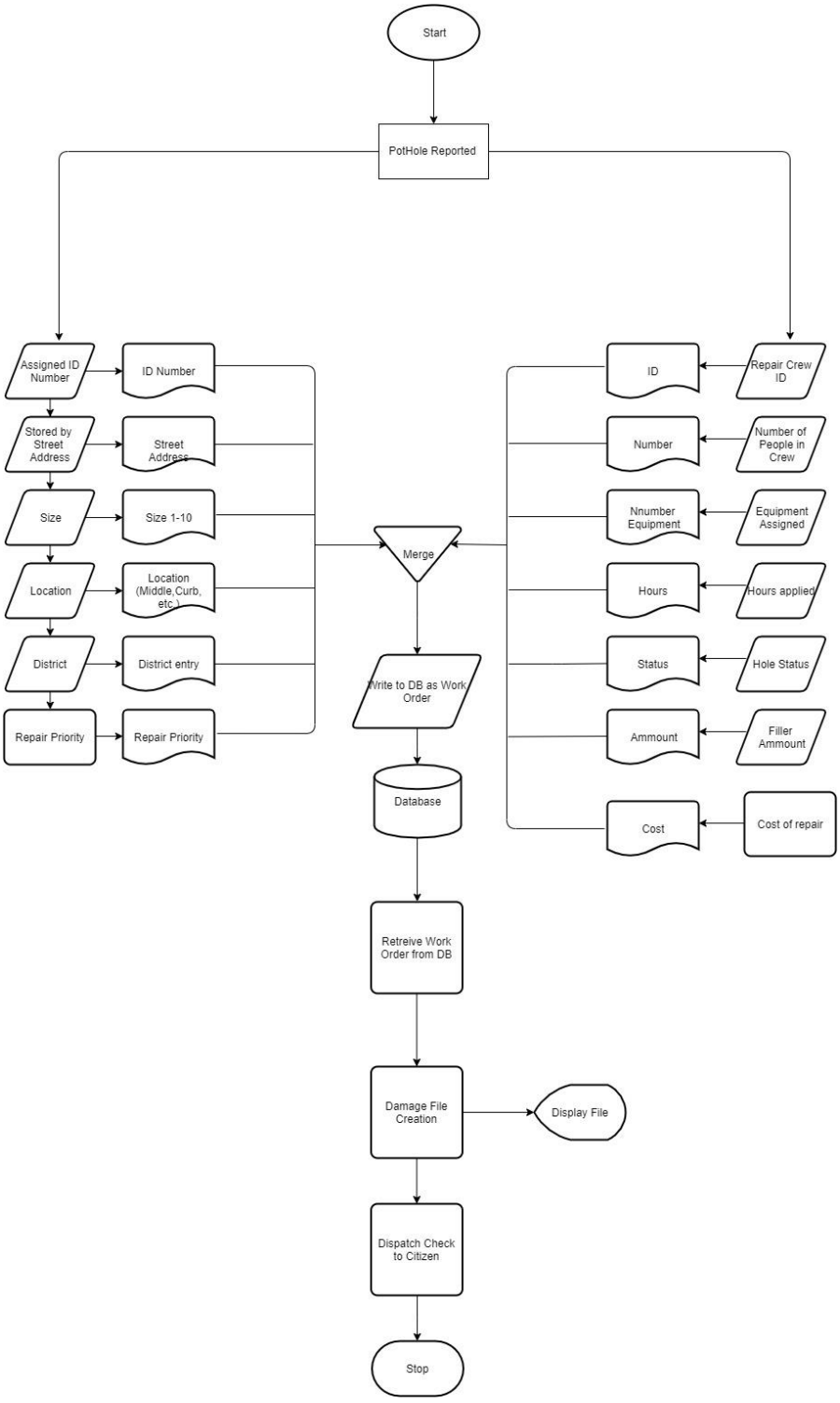
Once we've gotten a clear approval of the County in order to process and design the PHTRS, we then continue...

December 29, 2019

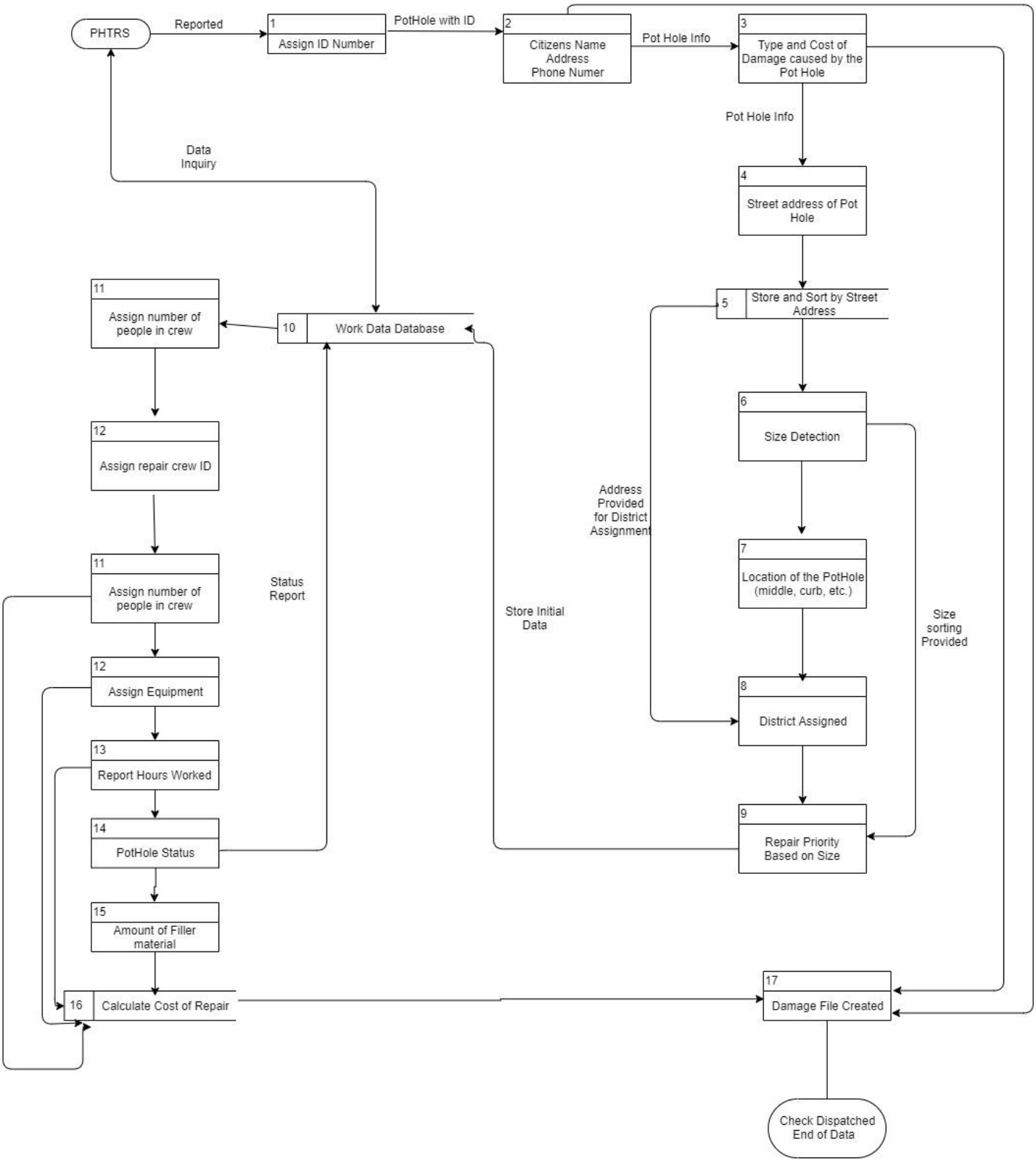
TESTING

In this phase, we proceed to test the application internally. This will allow us to report, track and fix the application...

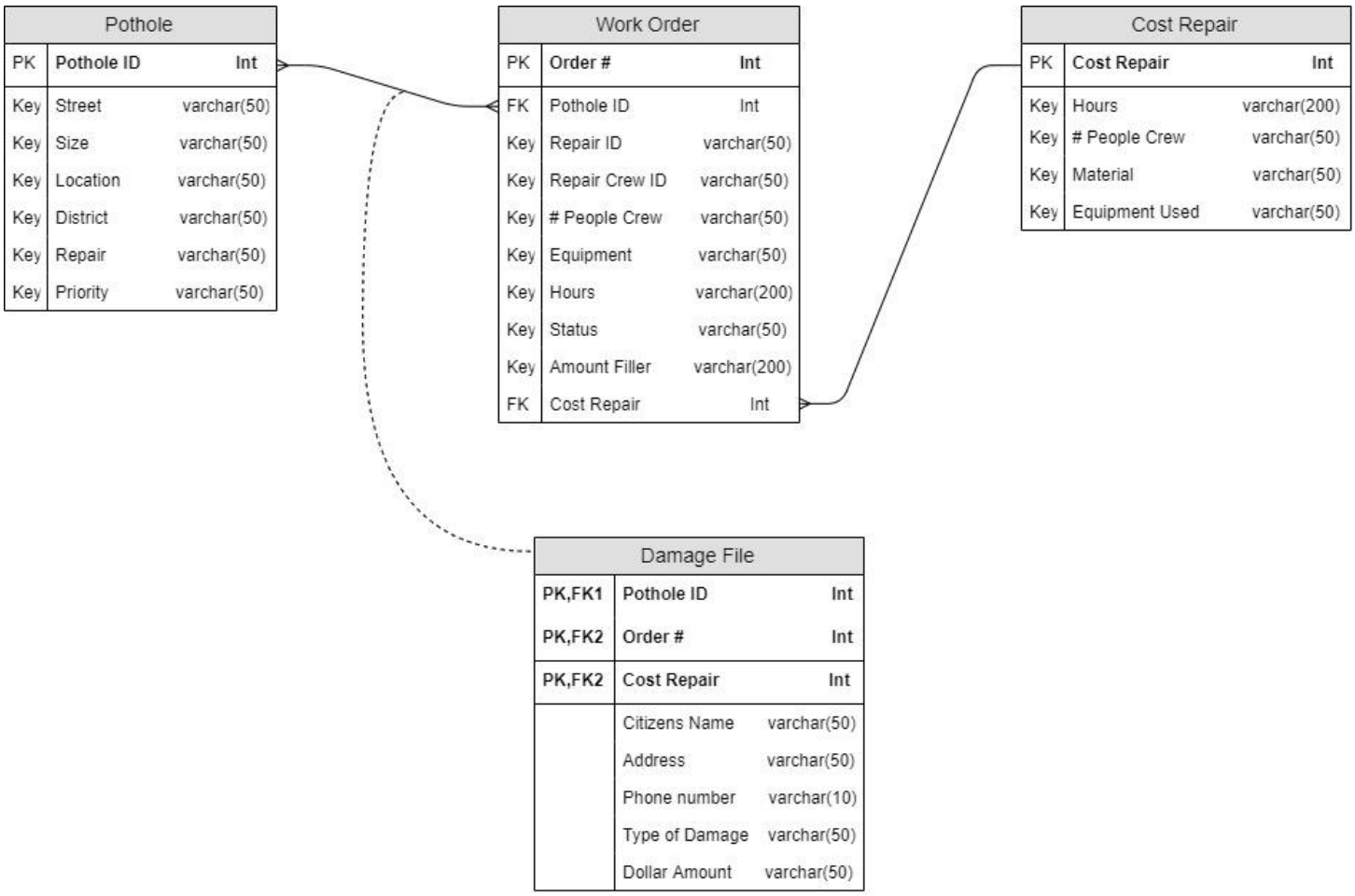
Flow Chart:


Start
PotHole Reported
Assigned ID Number
ID Number
Stored by Street Address
Street Address
Size
Size 1-10
Location
Location (Middle,Curb, etc.)
District
District entry
Repair Priority
Repair Priority
Merge
Write to DB as Work Order
Database
Retreive Work Order from DB
Damage File Creation
Display File
Dispatch Check to Citizen
Stop
ID
Repair Crew ID
Number
Number of People in Crew
Nnumber Equipment
Equipment Assigned
Hours
Hours applied
Status
Hole Status
Ammount
Filler Ammount
Cost
Cost of repair

Data Flow Diagram



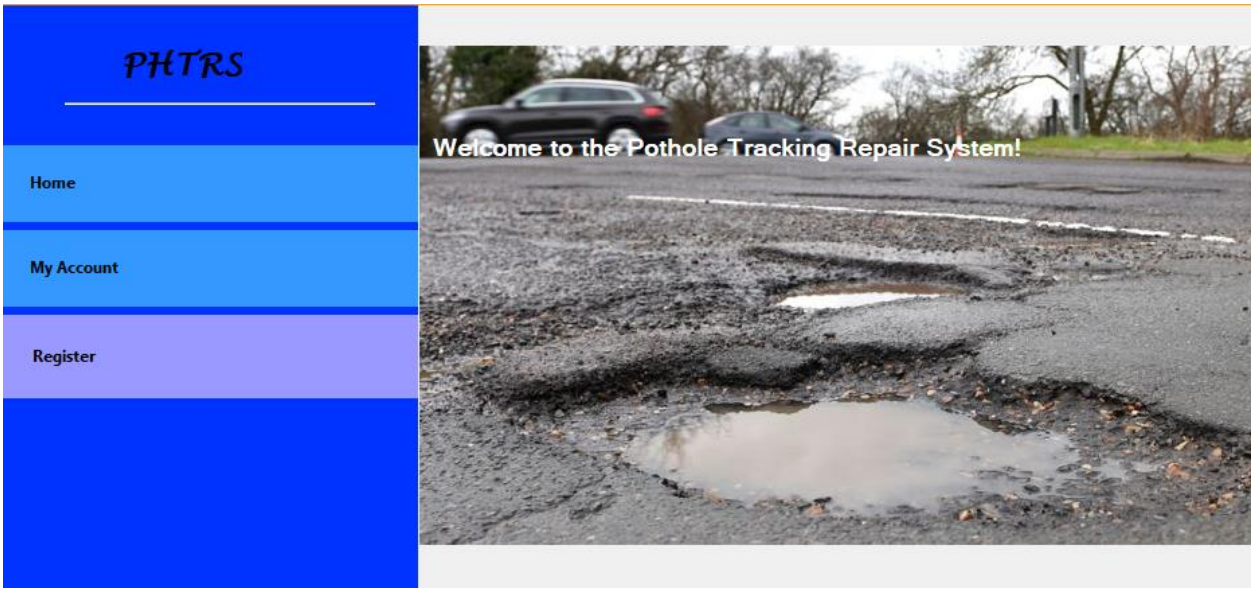
Entity Relationship Diagram

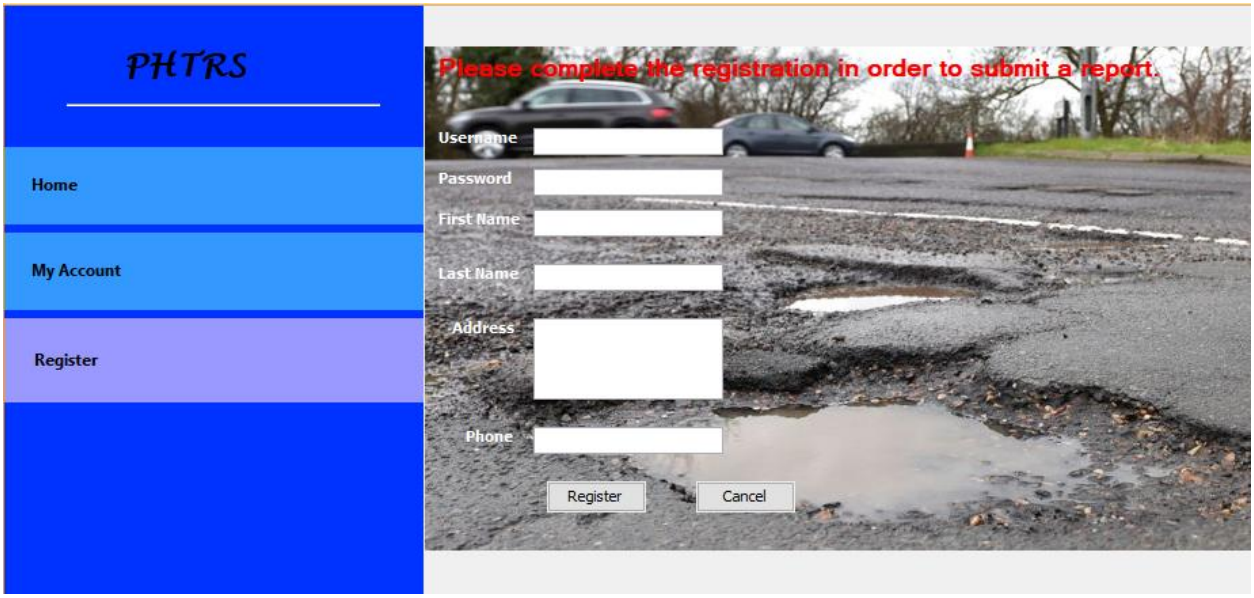


Data Dictionary

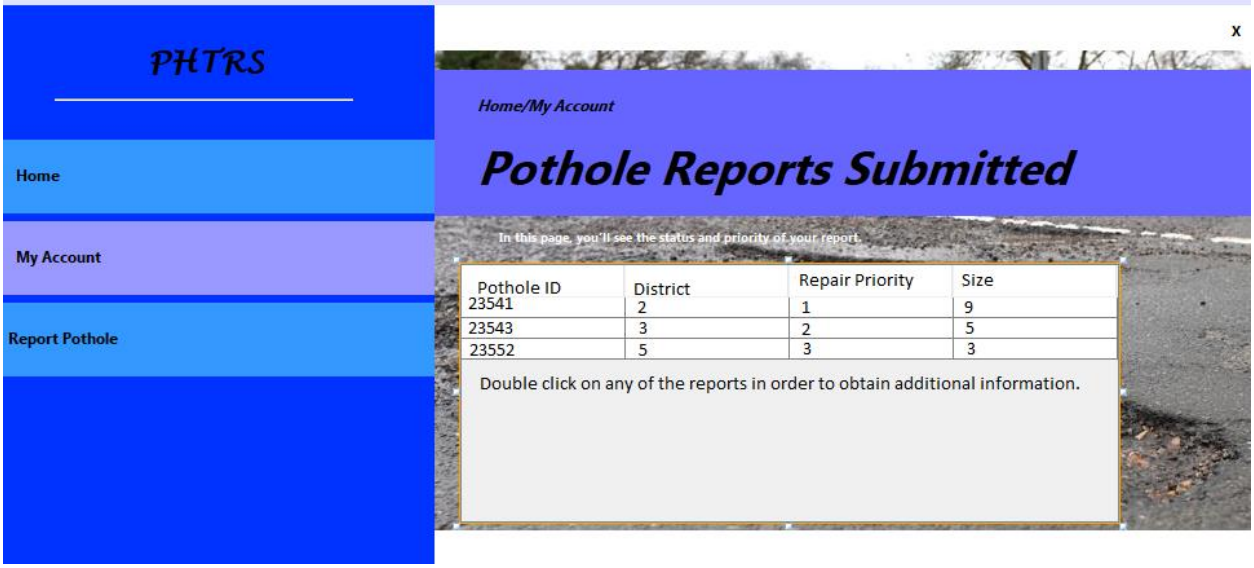
	A	B	C	D	E	F	G	H	I
1	**Column**	**Data Type**	**References**	**Source**	**Required**	**Sensitive**	**Values**	**Description**	
2	loginID	varchar(50)	Login Page					User name created when registering.	
3	Password	varchar(50)	Login Page			Yes		Password created when registering.	
4	PotholeID	Int			Yes			PotHole ID created once the pothole has been reported.	
5	OrderNum	Int			Yes			Order number is created once all of the information including the ID number for the pothole, size, location, district and address has been stored in the work order database.	
6	First_Name	varchar(50)	Damage File		Yes	Yes		First name of the citizen reporting the damage.	
7	Last_Name	varchar(50)	Damage File		Yes	Yes		Last name of the citizen reporting the damage.	
8	AddressCIT	varchar(50)	Damage File		Yes	Yes		Address of the citizen reporting the damage.	
9	PhoneNum	varchar(10)	Damage File		Yes	Yes		Phone Number of the citizen reporting the damage.	
10	AddressPH	varchar(50)	Work Order		Yes			Address of the Pot Hole.	
11	typeDMG	varchar(50)	Damage File		Yes		$	Type of Damage that the Pot Hole did.	
12	costDMG	NUMERIC	Damage File		Yes		$	Cost of the Damage that the Pot Hole created.	
13	Size	varchar(50)	Work Order		Yes		1-10	Size of the Pot Hole.	
14	location	varchar(50)	Work Order		Yes			Location of the Pot Hole (Middle, Curb, sides, etc.)	
15	District	varchar(50)			Yes			District of the Pot Hole (Determined by the Address of the Pothole)	
16	Priority	varchar(50)			Yes			Priority of the Pot Hole (Determined by the size of the Pothole)	
17	numCrew	Int	Work Order		Yes			Number of crew members assigned to the pothole repair.	
18	crewID	int	Work Order		Yes			ID assigned to the crew members working on the repair.	
19	numEquip	Int	Work Order		Yes			Number of equipment needed to work on the repair.	
20	repairHours	NUMERIC	Work Order		Yes			Repair hours needed to work on the pothole repair.	
21	StatusPH	varchar(50)	Work Order		Yes			Status of the Pot Hole.	
22	FillerAmnt	NUMERIC	Work Order		Yes			Amount of filler needed to repair the pothole.	
23	costRepair	Int	Work Order		Yes		$	Repair cost of the Pothole.	

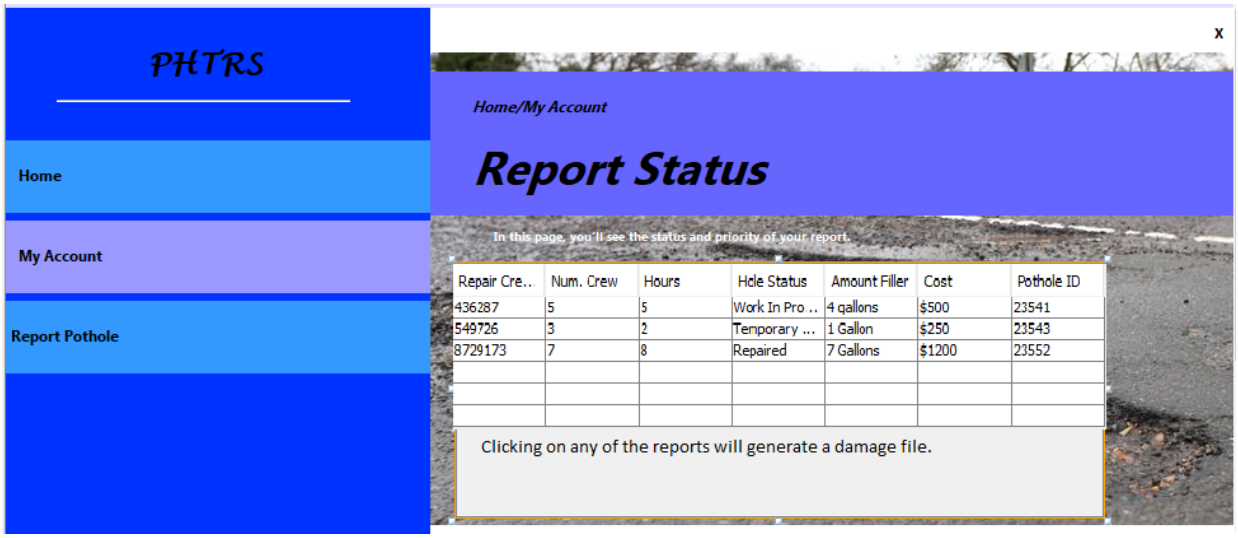
Interface

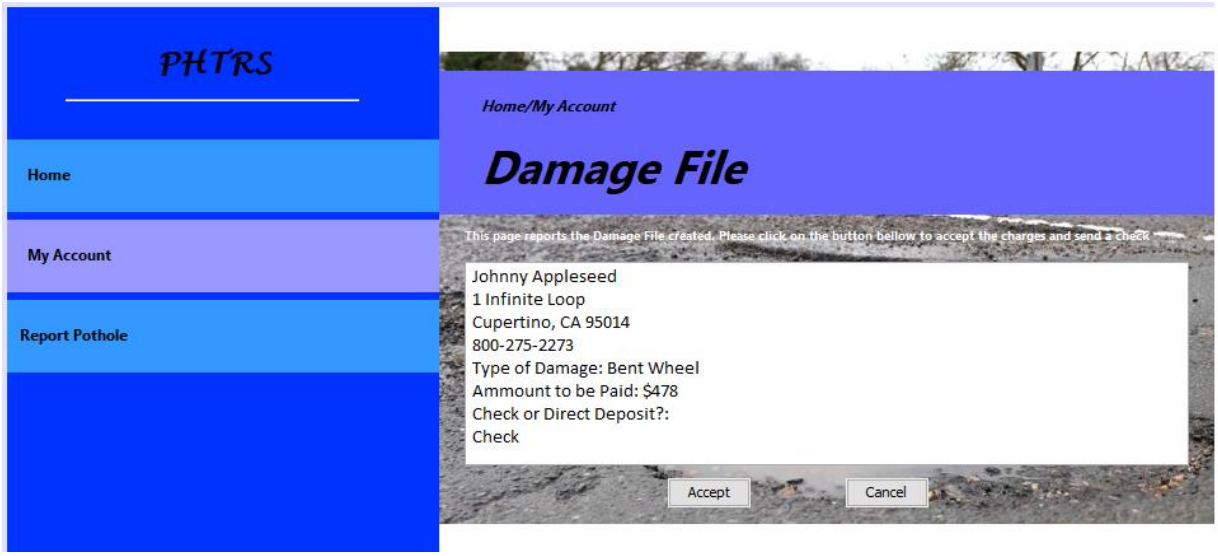

PHTRS
Home
My Account
Register
Welcome to the Pothole Tracking Repair System!


PHTRS
Home
My Account
Register
Please complete the registration in order to submit a report.
Username
Password
First Name
Last Name
Address
Phone
Register
Cancel


PHTRS
Home
My Account
Report Pothole
x
Home/Report Pothole
Report Pothole
Please fill out all of the spaces in order to report the pothole. You need to be e registered user in order to create the report in our page.
Location:
(Middle, Curb, etc.)
Size:
(1-10)
Picture:
Browse:
Street Address
Create Report


PHTRS
Home
My Account
Report Pothole
x
Home/My Account
Pothole Reports Submitted
In this page, you'll see the status and priority of your report.
Pothole ID
District
Repair Priority
Size
23541
2
1
9
23543
3
2
5
23552
5
3
3
Double click on any of the reports in order to obtain additional information.


PHTRS
Home
My Account
Report Pothole
x
Home/My Account
Report Status
In this page, you'll see the status and priority of your report.
Repair Cre..
Num. Crew
Hours
Hole Status
Amount Filler
Cost
Pothole ID
436287
5
5
Work In Pro ..
4 gallons
$500
23541
549726
3
2
Tenporary ...
1 Gallon
$250
23543
8729173
7
8
Repaired
7 Gallons
$1200
23552
Clicking on any of the reports will generate a damage file.


PHTRS
Home
My Account
Report Pothole
Home/My Account
Damage File
This page reports the Damage File created. Please click on the button bellow to accept the charges and send a check
Johnny Appleseed
1 Infinite Loop
Cupertino, CA 95014
800-275-2273
Type of Damage: Bent Wheel
Ammount to be Paid: $478
Check or Direct Deposit?:
Check
Accept
Cancel

Questions

- What kind of software development model would you use in the design phase?
  - For this kind of project, I would go with the Iterative development model, due to the fact that we wouldn't need the full list of requirements before the project is started. We could always start with simple requirements to the now functional part which can be extended later on. It will also allow us to make new versions of the product which in this case is the PHTRS every cycle along the development. Each and every iteration will include the development of several components of this project and after that the component is added to the fully functional development at a later time.
- What are three types of risks that may occur in this system?
  - One of the risks that I do see in this system is the sudden growth in requirements. Sure it may be able to handle a vast majority of entries within the Pothole database but if lets say, a county expands you'll have more customers reporting in, or if the maintenance wasn't done right you would have to include additional features in the software to ensure that all work is done properly. Productivity issues could be seen as another risk, due to the fact that a complex project like this can be challenging to some employees and as a result they end up losing significant time completing the project. There has to be a realistic schedule in order to fully complete this project. Finally, I believe that "Gold Plating" as it's called, could cause another issue now a days where everything has to be "pretty" for the customer. Wasting time in unnecessary features, looks and all kinds of graphical animations may just take hours away from the initial project.
- What programming language or languages (C, C++, Java, Visual Basic, etc.) would you use in the coding phase?
  - Personally, I would use Java to develop this project due to the fact that its been used for a long time now and its widely available to be used as a completed program on any kind of operating system. This does facilitate the development as it would also require a less complex structure of programming versus any of the older languages.

There's also a wide range of software developers that use Java which would also help driving costs down.

- What are the minimum requirements in terms of software required by this new application?
    - Software wise its always important to have the latest up to date software in order to prevent flaws that could interfere with the project or application that's being developed. As a minimum requirement for the PHTRS, I would prefer that the client use Windows 8.1, Internet Explorer, and Java Version 8. Why Internet Explorer instead of Chrome or Firefox? Due to its RAM usage, Chrome's security design and recent update has led to its increased usage of RAM which could be troublesome if the customer has limited amounts of. Windows 8.1 still receives security updates till this date so it would work as a minimum requirement. As for Java, version 8 should be the minimum which is currently the highest version. This is important due to security flaws that older Java runtime could have. Now for a Mac, if the application is Java based, the same Java version would apply. Safari as a minimum requirement for the browser as the same issues apply on the Mac side for those other browsers. With the application being developed in a 32bit environment (easier and more cost effective), Apple's latest OS wouldn't be supported as they've cut support on all 32bit applications. If the budget and team works fine, a 64bit alternative could be developed to run on both computers. With both using the same CPU architecture this shouldn't be a challenge.
- What are the minimum requirements in terms of hardware required by this new application?
    - Hardware wise as opposed to software, is something that could be way more flexible since hardware now a days tend to stay valid and supported for years to come even though newer kind is released. As a minimum requirement of the developed application mentioned earlier, a PC with an Intel i3 based processor or newer would be recommended. RAM requirement could work with 4GB DDR3+ since Internet Explorer and Windows 8 are optimized. Hard Drive should have at least 20GB due to the main OS requirements. No dedicated GPU's needed since the CPU processor will provide us with enough graphical power. If the application will also run on Mac's, as

a minimum requirement a Mac with a i3 Intel Processor or newer, no PowerPC support, RAM requirement would be the same as a PC, 4GB or more. Same with the HDD/SSD and GPU.

- What would be your estimated costs for the project for each of its stages of development and for each of its components?
    - Project costs throughout the stages of development should stay at a reasonable level if I were the one managing and overseeing the development. Specially within the beginning stages of the project, there wouldn't need to be a immense amount of funding towards the project as it would still be in development (development of the application in terms of a pure base line) Once the full project development has been completed and we see that the customer is satisfied with the final product, then it would be wise to invest more in the looks and feel of the product in order to complete a final and polished product. Sure, we could polish some steps when showing the process to the client that way they do get impressed with it, however this would consume additional resources and hours. For the requirement gathering and analysis there's minimal cost if any or no cost at all as this is just the research and inquiry of the details of the project so this phase is pretty straight forward. The design is one of the other steps in the cycle where the costs start rising, with he design you do need a team that would be in charge of taking the information from the analysis done earlier and from the client and developing the mockup of the project. An estimated cost in this phase could be of about $800 US dollars. This was calculated using an estimated hourly cost of $100/hr for a basic developer as it could take about 8 hours to design. Once designed, the Coding is then started. Coding a project of this magnitude could cost (based on the hourly charged mentioned earlier) up to $10,000-$20,000 if we only hire one single software developer, consider the cost doubling or even tripling if we would decide to speed up the process so about $45,000. Testing can be done quick and effective. Id say about 8 hours so another $800 for a single developer. The deployment of the project has no cost as it would be the client and users using and testing the application. Maintenance can be done by just one software developer or the IT department of the client so cost would be minimum as well, maybe 5 hours a month. Driving the final costs of the whole project, on a estimate of $50,000.

Conclusion

I understand that my project should be selected as it was carefully analyzed and drawn out to be as easy as possible for a software development team to observe and attempt to design it. The concept used wasn't that crowded and can be followed at any pace or SDLC models. The low requirements for the project also helps to name my work as the chosen one. I obtained a ton of experience working on this project, from creating the designs, to reading about other projects and software development. The work done on this project will help me in future jobs and future software developments. One of the reasons I decided to work on this by myself not only because I like to do my work in time and not depend on others but because I want to ensure I learn about the whole process regarding software engineering, development and all of the steps needed to design a project from the start. I believe I'm ready from now on to tackle on a project of this magnitude thanks to my Professor and class given, something that I found challenging but in reality, it was just a fear of starting to work on this. Once started I did not stop and was able to finish this within a weeks' time. This does tell me that ill be able to work on developing or designing software in my future jobs if taken seriously.

References:

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