DadChat

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Abstract

This project is meant to help single fathers improve their day-to-day lives by improving accessibility to needed resources who will not discriminate against them, increase the opportunity for them to meet other single fathers in their area, and let other single fathers know about their experiences with resources that other single fathers may be looking for. It will accomplish these goals by allowing them to search for locations and services near them or somewhere they may be traveling. Once they identify a resource, which they may choose to use, they will gain access to reviews and ratings made by other single fathers who used the same resources. This will let them know if they should expect to be treated with some bias or be treated as any other parent would be treated. They would also be able to create events which they could advertise to other single fathers in their area, which would allow them to meet other single fathers and socialize their children. This web application is put together using Java Spring Boot, HTML, CSS, and PHP. The Google Map API is configured to only pull reviews for locations from the applications database and not public reviews. The messaging feature allows users to establish connections with other users and create chats for events that they create. This web application will help to resolve four areas of concerns identified in the research for this web application. Those concern themes are health, perceived bias, lack of peer connection and stress relief. This web application will help an increasing demographic which has gotten little assistance, even though it suffers from worse mental and physical health than any other parenting group. This improvement will, in turn, benefit the children of single fathers.

Introduction

Project Summary

This project will be a tool directed towards single fathers. The goal is to establish a web app which can be used to identify and locate resources that are cooperative with single fathers. The fathers will be able to then rate these resources so that other single fathers are able to determine if they are resources that they want to utilize. Some examples include but are not limited to: lawyers, doctors, childcare and play groups.

Problem Statement

The 2020 United States census states that there are approximately 2.1 million households headed by single fathers (US Census Bureau, 2020). In 1983, that number was only about 700,000 households (Greif, 1985). When doing research for this project, the only research about single fathers that was available discussed their health. Single fathers have the worse mental and physical health of all the parenting groups (The Lance Public Health, 2018) (DeGarmo et al., 2008) (Janzen et al., 2006). They also have the highest mortality rate (Chiu et al., 2018). While this research was very thorough, none of it provided any solutions to help them. It did cover preventative health measures, which may not help a single father who is already having problems (Janzen et al., 2006) or they simply recommended further research (Chiu et al., 2018) (The Lancet Public Health, 2018). Research by Andrew Burgdorf and Annu Prabhakar stated that single fathers felt like they did not have anyone to help them, they felt like they were being biased against in society as well as the court systems and they did not have anyone that they connect with that knew what they were going through (Burgdorf and Prabhakar, 2021). While this research was starting to discover how technology may be able to help, it did not begin the process of discovering what would help. This project starts that process.

The number of single fathers is increasing from year to year, and a well-designed application may have the potential to help single fathers build a community and support for themselves. Technical solutions for single mothers already exist and most parenting applications are marketed to mothers. Some of the services that those applications provide include the ability to request help from multiple supporters with the press of a button, tracking children's timelines and many other resources. (Prabhakar et al., 2017) (Prabhakar et al., 2018) (Sainz et al., 2020). Some research into how parents use technology describes the differences in the ways that mothers and fathers use technology, specifically social media (Hartwig, 2016) (Ammari and Schoenebeck, 2015). Ammari and Schoenebeck describe father's social media use as utilitarian and a way to research parenting and documenting children's growth. They focused only on how social media was used in relation to parenting (2015). The word social in social media more accurately describes the way that single mothers use social media. For them, it is a tool to meet people and make friends. They feel like those connections help them personally and with parenting (Hartwig, 2016). There are some technology solutions that are geared toward fathers, but we were not able to find any that were specifically for single fathers. This project will attempt to provide a solution for some of the day-to-day stress of that single fathers have and provide a tool to help solve some of those problems.

Solution

This project will be a tool directed towards single fathers. The goal is to establish a web app which can be used to identify and locate resources that are cooperative with single fathers. The fathers will be able to then rate these resources so that other single fathers are able to determine if they are resources that they want to utilize. Some examples include but are not limited to: lawyers, doctors, childcare and play groups. We also want the fathers to be able to create and schedule play dates and other activities in order create opportunities for them to meet other single fathers in their area. This will help improve their moral as well as bring joy to their children, hopefully reducing stress.

There are websites and web apps that have similar functions. Some examples of those are Google, Yelp, Google maps and Facebook. Our application will integrate features from all these services but make them available only to single fathers. This will provide them with information that is most relevant to them without them having to sort through reviews that are not relevant to them. This will allow them to pass on resources that may discriminate against single fathers. The goal is to bring single fathers together for them to have a support community.

Project Source

Andrew Burgdorf developed the plan behind this project. He is doing the initial research for this project for his MSIT Thesis. He is a father and has spent long stretches of time caring for his

children while his spouse travels for work. The project team formed after Andrew and Joe were in a team in a previous semester. Joe took advantage of the Teams channel over the summer and recruited the two additional students.

Discussion

Project Objectives/Goals

The hope is that this solution with provide single fathers a safe location to search for resources that are local to them and are cooperative with single fathers, especially since discrimination against single fathers is an ever-present issue.

Features

- Search for resources by location
- Rate resources
- Set up single father groups to expand social relationships for them and children
- Identify discrimination and avoid those locations
- Directions to the resource
- A successful project would be one that allowed a single father to search for something in their local area, read and post reviews of that resource, set up and schedule play dates that other fathers can view when searching their area.

Project Scope

Our team will develop a functional web application that enables single fathers to locate services, tools, and parent groups to aid in the course of parenting. They will also be able to rate and post reviews of each of the services and tools that they use to help other single fathers in the future. The web application will offer secure login, search, evaluation, and review of the services that they need on a day-to-day basis. They will be able to confidently evaluate the service that they received from companies without worrying about non-single fathers polluting the reviews.

Quick Project Timeline

Table 1: Timeline

Task #	Task Name	Duration	Start Date	End Date
1	Azure Setup	6hr	09/13/2021	09/20/2021
2	Develop Website	40hrs	10/10/2021	10/25/2021
3	Database	40hrs	09/13/2021	09/27/2021
4	Database integration	20hrs	09/27/2021	10/04/2021

5	API integration	40hrs	09/13/2021	10/04/2021
6	Security	40hrs	10/04/2021	10/25/2021
7	Testing	40hr	10/25/2021	11/22/2021
8	Troubleshooting	80hrs	01/10/2022	02/01/2022
9	Refine front end appearance	40hrs	02/01/2022	02/15/2022
10	Penetration testing	20hrs	02/15/2022	02/22/2022
11	Refinement and patching	40hr	02/22/2022	03/07/2022
12	Testing and Presentation	40hrs	03/07/2022	03/12/2022

Technologies Used

For the backend

The application will be hosted on Azure.
The application will be built using Java Spring Boot
The database with be SQL server.
Scripts will be stored on GitHub.
There will be Google API's used to search for resources and maps.
IntelliJ will be used to compile code and ensure that all components work tother prior to uploading to the server.

For the front end

The web page will be built using JavaScript, CSS, and HTML.

Technical Architecture Diagram

Network Map

This diagram displays the hardware and how it interacts with our web application. The user devices (laptop, smart phone, and tablet) access the web application through their browsers through the internet. The application is hosted on Azure Cloud and is protected by a firewall, which should keep malicious attacks from getting through. There will be three servers hosted with Azure services. The users will access the web server which will access the application and database servers to provide services to the user. The web application will use OAuth or Auth0 as an authentication service. It will also use the Google Maps API for several of the services provided through the application.

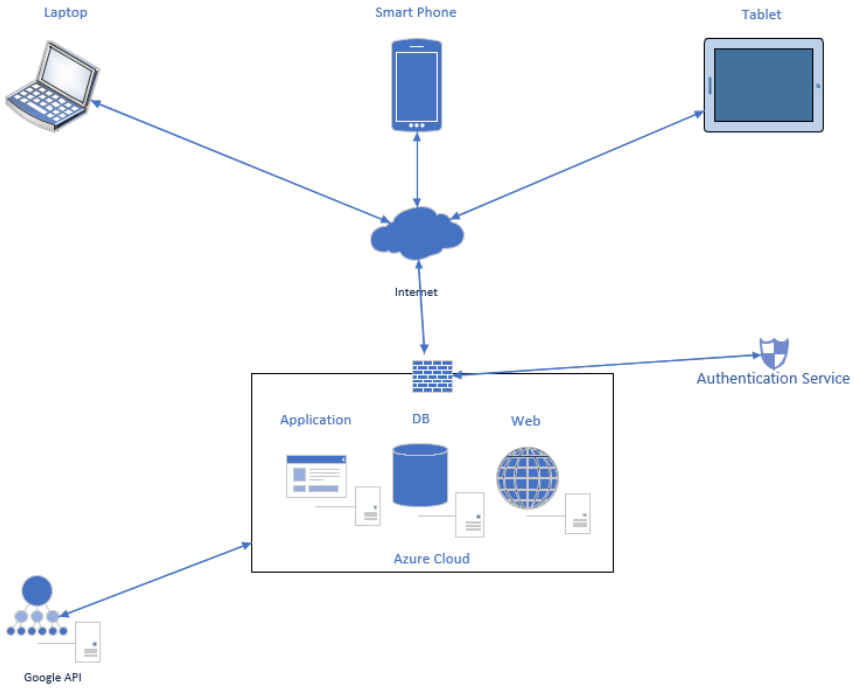

Figure 1: Network Map

Service Map

The service map illustrates the use cases and how the different portions of the application interact with each other. It starts with the different tasks that the user will try to complete and how the application will interact with the authentication services, Google API, and the Database. With messaging, there will be interaction with other users who will read and reply to messages.

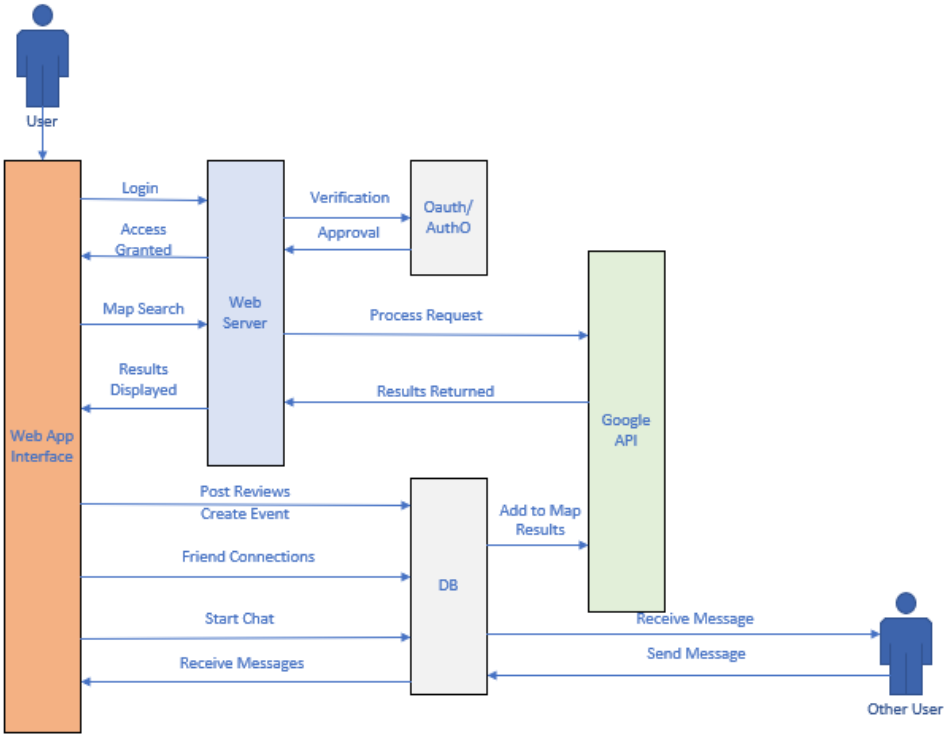

Figure 2: Service Map

User Personas

Table 2: User Personas

User Persona 1	
	Title The single full-time father
	Name Sean Matthew
	Age 28
	Gender Male
Behavior	• Sean is a hard-working electrician who was able to get his training through a union and has not pursued higher

	education. His wife had two children and fell into severe post-partem depression after her second child. To cope she turned to drugs and alcohol. She grew to resent Sean and her children. She did eventually leave and left her children with Sean. Sean struggled with taking over the parenting responsibilities, making sure the children know that they are loved and working full-time. He has been able to get into a routine, but always feels like there is too much to do and not enough time to do it. He can put his children in after-school care but does not receive much support from any other family or friends.
Pain	• divorced from drug addict/abusive spouse • has 2 elementary age kids • works full-time as an electrician
Needs & Goals	• Wants kids to have good quality of life • Want to be seen as a good parent • Wants kids to know that they are loved
User Persona 2	
	Title The single part-time father Name Adam Stephenson Age 32 Gender Male
Behavior	• Adam completed his bachelor's degree in computer science and has gotten a high paying job working with a software startup company. The company required long hours and often required work on the weekends. His wife grew tired of him always being at work and eventually started becoming interested in another co-worker of hers. To pursue the new relationship, she took the children and

	kicked Adam out of their house. She also filed for divorce. Because of Adam's unreliable hours, she retained primary custody of the children. Adam hired an attorney to try to fight for 50/50 custody and reduced child support, but his attorney informed him that he should be happy with the terms that he received because it could be much worse. He and his ex-wife do not get along, but they attempt to appear to get along when around the children. He has only gotten a two-bedroom apartment, so he does not want to spend much time there when he has time with his children. He wants to be able to find things to do outside of the house in his area. He also wants to go back to court to try to establish different, more favorable for him, child support requirements, but had such a terrible experience with his last attorney that he has no idea where to start.
Pain	• Divorced • Has 3 children ages 8, 13, and 14 • did not get custody of kids, but gets them every other weekend • Works full-time as IT specialist
Needs & Goals	• Wants to keep things as amicable with ex as possible • Wants kids to think of both parents highly • Wants to be able to take care of kids whenever he does have them.

Use Cases

Provide a separate table for each use case considered for your project in this section. Make sure to introduce the section to the reader.

Table 3: Use Case 1

Name	Login
ID	DA_001

Description	User logs into their personal account
Actors	Single father
Organization Benefits	Confirms that only single fathers are contributing to the site
Frequency of use	Every time a user uses the app
Triggers	When user selects login
Preconditions	User open webpage on their web browser
Post-conditions	User is logged into web app and able to use features
Main Course	1. User has opened web browser and navigated to DadChat website 2. User selects “Login” option in upper right corner of screen 3. User is taken to login screen 4. User enter unique username and password 5. User hits enter on keyboard or uses mouse click continue button 6. User is taken back to home screen and can use features
Alternate Course	2a1. User does not have account, so they choose “Sign Up” option 2b1. See Sign up use case (DA_002) 2c1. Return to login screen 2a2. User does not attempt to login before using features 2b2. User is taken to login screen with error that says “Please sign in before using.” 2c2. Return to step 3. 4a1. User enters incorrect username 4b1. Login screen is refreshed and user to shown an error which states “Incorrect username or password, please try again or create an account.” 4c1. Return to step 4 4a2. User enters incorrect password 4b2. Login screen is refreshed and user to shown an error which states “Incorrect username or password, please try again or create an account.” 4c2. Return to step 4
Exceptions	EX1. Web page is not able to communicate with use DB ▪ Display error to user “We are currently experiencing some technical errors, please try again soon.” ▪ Send email to development team alerting them to the lack of communication with DB.

Table 4: User Case 2

Name	Create Account
ID	DA_002
Description	User creates new account
Actors	Single father
Organization Benefits	Accounts allow team to monitor activity and identify troublemakers and allows users to post reviews
Frequency of use	Anytime a new user wants to access web app
Triggers	When a new user visits our site and wants to access its features
Preconditions	User navigates to our site on their web browser
Post-conditions	User has an account that they can log into
Main Course	1. User opens web browser and navigates to our website 2. User left clicks on “Sign up” option 3. User is navigated to sign up page 4. User fills in required login information 5. User left clicks in check box that certifies that they are a single father 6. User reads terms and conditions 7. User left clicks in check box that certifies that they have read terms and conditions 8. User left clicks on “Continue” button. 9. User is taken to the login page
Alternate Course	4a. User does not fill in required fields 4b. Page does nothing. 4c. User is presented with an error which states “Please fill in the required fields.” 4d. Return to step 4 5a. User does not select check box indicating that they are a single father. 5b. Page does nothing. 5c. User is presented with an error which states “Only single father may use this site. You must certify that you are a single father. If you are not, you cannot create an account.” 5d. Return to step 4 7a. User does not select check box to certify that they have read the terms and conditions 7b. Page does nothing. 7c. User is presented with an error which states “Please read the Terms and Conditions, and indicate that you have done so.”

	7d. Return to step 4 8a. User attempts to use a username that is already in use 8b. Page does nothing 8c. User is shown an error which states “This username is already in use, please choose another username.” 8d. Return to step 4. 8a. User attempts to use an email that is already in use 8b. Page does nothing 8c. User is shown an error which states “There is already an account that uses this email. Please go to the Login page and login.”
Exceptions	EX1. Web page is not able to communicate with use DB ▪ Display error to user “We are currently experiencing some technical errors, please try again soon.” ▪ Send email to development team alerting them to the lack of communication with DB.

Table 5: Use Case 3

Name	Search for resources
ID	DA_003
Description	User uses search feature to locate resource in their area
Actors	Single father
Organization Benefits	This is the primary purpose of this web app
Frequency of use	Anytime a user want to locate a resource in their area
Triggers	User enters term in search bar and presses enter
Preconditions	DA_002, DA_001
Post-conditions	User is presented with search results
Main Course	1. User has navigated to site and logged in 2. User selects “Search” from menu options 3. The search page is presented to the user 4. User enters resource that they are searching for in “Search” bar 5. User enter City and State or ZIP code in “Location” bar 6. User selects whether he is looking for a location or an event 7. User presses enter key or left clicks on “Continue” button

	8. User is presented with search results.
Alternate Course	7a. User did not fill in a search field 7b. The screen does not change 7c. The user is presented an error that says “Please enter your search criteria. 7d. Return to step 4 7a. User did not fill in location field 7b. The screen does not change 7c. The user is presented with an error that says “We need to know where you want to search.” 7d. Return to step 5. 7a. User did not select location or event from dropdown 7b. The screen does not change 7c. The user is presented with an error that says “Are you searching for a location or event? Please select from the dropdown.” 7d. Return to step 6
Exceptions	Ex1. App does not interface with the Google API 1. Display error to user “We are currently experiencing some technical errors, please try again soon.” 2. Send email to development team alerting them to the lack of communication with API. Ex2. App does not interface with Google map API 1. Display error to user “We are currently experiencing some technical errors, please try again soon.” But continue to display search results. 2. Send email to development team alerting them to the lack of communication with API.

Table 6: Use Case 4

Name	Create Event
ID	DA_004
Description	User wants to create a social event
Actors	Single father creator, single father who wants to attend
Organization Benefits	Single fathers want to be able to attend social events with the children or with each other
Frequency of use	Whenever user wants to create event
Triggers	User logs into website and chooses to create a new event

Preconditions	DA_002, DA_001
Post-conditions	User creates event for other single fathers to find and attend

Main Course	1. User selects “Create Event” from menu
	2. User is taken to the correct page
	3. User fills in all required blocks to create an event including
	  1. Name
	  2. Description
	  3. Location
	  4. Children's Age Range
	  5. Dropdown for Public or Private Event
	  6. Enter email addresses to send invitations
	4. User selects “Create” button
	5. User is taken to a final screen that says “Your event has been created”

Alternate Course	3ea. User chooses Public event 3eb. There is no requirement to enter email addresses 3fa. User chooses Private event 3fb. User tries to continue without entering email addresses 3fc. User will be presented with an error that says “For a private event you must enter email addresses to send invitations.”
Exceptions	EX1. Web page is not able to communicate with use DB ▪ Display error to user “We are currently experiencing some technical errors, please try again soon.” ▪ Send email to development team alerting them to the lack of communication with DB.

Table 7: Use Case 5

Name	User wants to review other single fathers reviews of resources
ID	DA_005
Description	User has located a resource and wants more information about how they work with single fathers
Actors	Single fathers
Organization Benefits	Single fathers will be able to save time and energy by avoiding resources which do not serve the best interest of single fathers
Frequency of use	Whenever a single father is looking for a resource

Triggers	User has completed their search and views the “View Reviews” hyperlink under a resource that they are interested in
Preconditions	DA_003
Post-conditions	User can review other single fathers reviews
Main Course	1. User has completed search 2. User selects hyperlink “View Reviews” associated with resource of interest. 3. User is taken to a page of reviews
Alternate Course	2a. There are no reviews posted 2b. There is no hyperlink, but instead there is a line that says “0 Reviews”
Exceptions	EX1. Web page is not able to communicate with use DB ▪ Display error to user “We are currently experiencing some technical errors, please try again soon.” ▪ Send email to development team alerting them to the lack of communication with DB.

Table 8: Use Case 6

Name	Create Review
ID	DA_006
Description	User wants to create a review of a resource that they have used
Actors	Single fathers
Organization Benefits	Reviews will allow other single fathers which resources should and should not be used.
Frequency of use	After a single fathers uses a resource
Triggers	Single father chooses to leave a review
Preconditions	DA_003
Post-conditions	Review has been left
Main Course	1. User completes search and identifies the resource that they have used 2. User selects hyperlink that says “Post Review” 3. Users are taken to the page for posting a review 4. User chooses how many stars they would give the resource 5. User write a description justifying their rating. 6. User selects “Post” when completed

Alternate Course	4a. User does not select the number of stars to award 4b. The page does not change 4c. The user is presented with an error that states “You must provide a star rating.” 4d. Return to step 4 5a. User does not enter a description 5b. Users can post a review without a description 5c. Continue to step 6
Exceptions	EX1. Web page is not able to communicate with use DB ▪ Display error to user “We are currently experiencing some technical errors, please try again soon.” ▪ Send email to development team alerting them to the lack of communication with DB.

Use Case Diagram

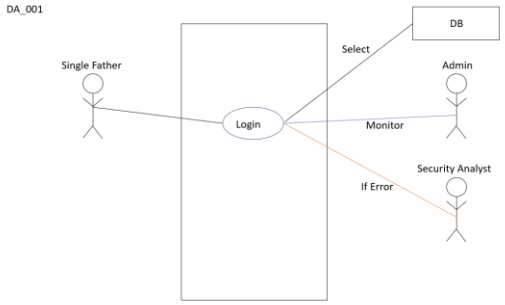

Figure 3: Use Case 1 Diagram

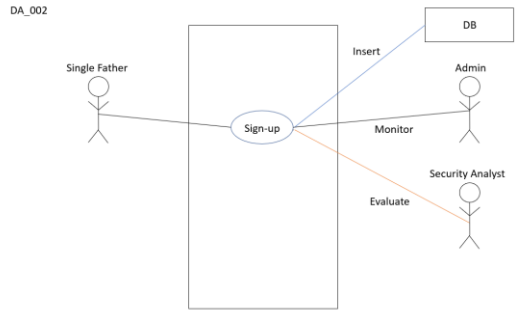

Figure 4: Use Case 2 Diagram

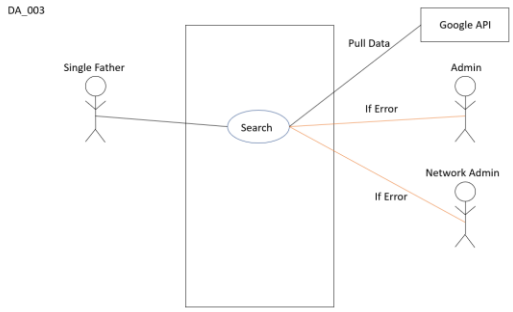

Figure 5: Use Case 3 Diagram

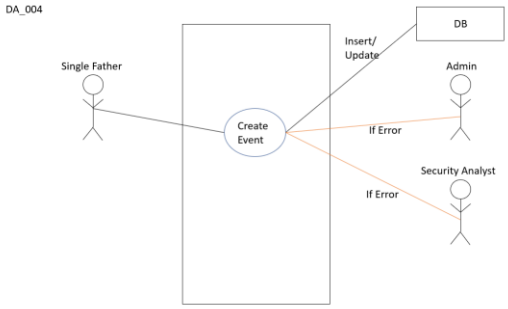

Figure 6: Use Case 4 Diagram

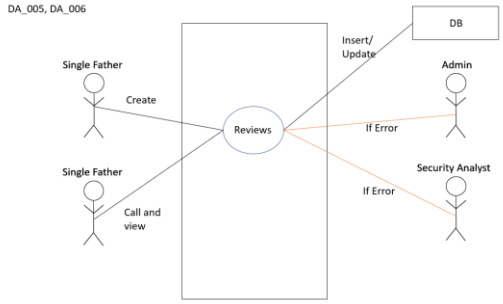

Figure 7: Use Case 5 Diagram

Testing Plan

Overview

This section will go over the development team's plan for testing. The team will test the software to ensure that everything works together as well as security testing to ensure that the website is protected. As the project gets to a point where it is mostly functional, user testing will start, and user recommendations will be taken into consideration when wrapping up the project.

Methodology

Testing will be conducted with the completion of each unit of code or piece of the program. This testing will be continuous and ongoing. Once unit testing is completed on each piece of the program, the team will be made aware of progress. Unit testing will be completed by the software developers

Once each piece of the program is compiled with the other pieces, testing will be conducted to ensure that all pieces of the program are working together. This compilation testing will be conducted by another team member who is not a software developer. Testing by non-developers is to ensure that it will more closely resemble user testing, while still having enough familiarity with the software to attempt to break the program.

Once most of the compilations are complete the cybersecurity team members will conduct penetration testing. This includes but is not limited to injection testing, DDOS testing and other forms of security testing.

Once the development team is confident that their program is well built and secure, they will recruit users from the target demographic and conduct user testing. This will allow the developers to receive feedback on the program as well as test how well put together the program is.

Users will be required to run through the features of the program from creating a user account through testing all the features. Users will be presented with the we application and be asked to explore the webpage on their own. As the development team observes the users' exploration the team member will note any errors that occur. If the user misses any features, the team member will direct them to the features that were missed so that every aspect of the program is reviewed. The user conducting the testing will then be asked to fill out a survey (Appendix A.). The results of all the surveys will be compiled and the recommendations will be compiled, and the development team will prioritize them to determine which will be improved and in which order.

Scope

All use cases will be tested. DA_001 and DA_002 will be tested at all phases of development. During security testing, this is when injection testing and password encryption will be tested.

DA_003, DA_004, DA_005 and DA_006 are the most important use cases of this program. Testing in these use cases will be constant. The integration and unit testing on these use cases will be the most intensive. The developers will focus on ensuring that these use cases work using admin accounts and the rest of the team will test these use cases using standard user accounts. The security testing will ensure that the standard accounts do not have access to any administrative privileges and that they cannot be elevated with admin intervention.

User testing will be categorized by use case as the recommendations are compiled. The developers will prioritize these recommendations in the same way that they do with their own testing.

Objectives

a. All major features need to be accounted for and tested prior to integration

b. All major features need to work together seamlessly
c. All use cases must account for all the user roles
d. All bugs need to be resolved before IT Expo
e. All features of the program must be as secure as possible, making the website as protected against attacks as possible
f. User testing should identify any unseen flaws in the plan or software to steps should be taken to rectify them when possible.
g. User testing will identify which features meet the needs of the single fathers and which could be improved or altered.

Test Logs and Procedures

A test log will be kept on GitHub and will primarily be used when testing outside of unit testing. Notes will be made to identify where the program breaks and which errors are received. When notes are added, there will be a corresponding post made in the group chat to notify all developers where the errors are and opens the group to a discussion for repairing the errors. When the corrections have been made and tested, notes will be made on GitHub on the original testing note and it will notify every one of the underlying error and the corrections taken to repair the program.

11/04/2021 – Testing on map function
11/10/2021 – Testing of HTML/Java integration
11/16/2021 – Messaging function testing
11/19/2021 – Front/back end connection testing
02/15/2022 – User testing

User testing will be logged separately. They will have dates, user number and any relevant recommendations recorded in the table below.

Testing Review

11/04/2021 –
Tester – Pete Pandey
Pete was able to test that the Google maps API was functioning properly. He determined that there were some problems pulling up reviews and did not see an easy way for him to post a review if he would like. This was brought to David's attention, and he is now addressing it.

11/10/2021
Tester – Andrew Burgdorf
Andrew was testing the HTML code that was put together to ensure that all the links were working, and the pages were loading correctly. He determined that they all were, but that the work "placeholder" was showing up in many of the input boxes throughout the pages. This will be addressed at a future time.

11/16/2021
Tester – Pete Pandey
Pete was testing the messaging function within the application. It functioned properly outside of the application. When ran inside of the application the messaging function did not run. It did load, but was not able to send messages. There was no reaction inside of the page. Developers were notified and are already working on converting the PHP to Java.

11/19/2021
Tester – Joe Pomeroy
Joe was testing to see if the new HTML was working within the program. The HTML was functioning with the CSS correctly when ran from the shared compiler. This was only true when the code was run outside of the application. When ran inside of the application, the code failed. This is likely because of some part of the Java programming. When the developers have a chance, he will meet with them to attempt to identify where the error is occurring and what needs to be done to correct it.

User testing:
Table 9: User Testing

Date	User #	Use Case	Error	Recommended Corrections	Reason for Error	Priority for Correction
2022/02/11	1	DA_003	User ZIP Code	Auto fill user ZIP code on map feature	User preference	3
2022/02/14	2	DA_003	Alphanumeric ZIP Code	Prevent users from entering any characters other than numbers for ZIP	Programming allowed for users to enter any character in ZIP code	1
2022/02/20	3	DA_001	Unable to login	Logging in feature broken	Unstable connection to database prevented user data from being stored when creating new account	1
2022/02/25	4		Chat feature not functioning	Finish chat feature	User testing began before chat feature had been completed	1
2022/03/10	5	DA_006	Not all resources have reviews	Notify users that there is no information from other single fathers about the interested resource	No information is provided if users have not made reviews yet	2

Testing Conclusions

There were several lessons learned during the course of our user testing. We learned that a lot of effort needs to be focused on ensuring that users are not able to enter whatever data they want when we are looking for specific information. For example, the first users were able to enter any alpha numeric characters when they were providing their ZIP code. We had to change our requirements to ensure that they only provided 5 numeric digits.

We learned that the users liked the events page and the opportunities that it provided. They would have liked and RSVP function, so that the event creator could know how many people to expect. They also thought that a chat attached to each event, for planning purposes, would have been an innovative idea.

Stylization was another topic that the users brought up. They wanted to see the pages filled with more images and information. They recommended providing pieces of information about each feature somewhere on the pages.

Change Management Plan

A change request can come from any of the developers on the team. It will most likely come from user testing. The team advisor can also request or recommend changes to the development plan. From this point forward a change can be any alteration to the current project including any additions.

Change requests will be assessed by the development team to determine if the change is 1) within the scope of the project, 2) feasible with the teams current skill level, 3) able to completed by the project deadline and 4) more important than other parts of the project. If the team determines that the change should go forward, it will be assigned to a team member in the next scrum iteration. If the team determines that it is a good change, but not necessary, they will keep the change request and determine if it can be implemented at a future time. If not, it will be implemented before the website is made public.

All changes will be categorized as 1) Necessary, 2) Important, 3) Nice to have, 4) Optional and 5) Not necessary. The importance of the change requests are from 1 (highest) to 5 (lowest). Any change requests ranked 3 – 4 will be set aside and decisions will be made about them if most of the project is completed. A change request with the rank of 5 will only be done before the project is made available to the public (go-live). Requests with a rank of 1 - 2 will added to the next scrum iteration. All change requests will require the team to vote to determine the ranking assigned to it unless it is directed by the academic supervisor. If it is directed by the academic advisor, it will automatically receive a ranking of 1. If any change request is too far outside of any team members abilities, it will automatically be given a rating of 5.

Pros of changes mean that the program will work better for the target demographic. It could also make the website run more effectively. Cons are related to the time required to implement

changes. If the request come closer to the end of the project, it could mean that it would not get completed in time, which could result in a worse product.

Budget

The budget breaks down into 3 primary categories labor, software, and hardware.

Software

The software requirements include the software development product, IntelliJ professional edition for $650 per user. OAuth, which is the authentication tool used, costs an annual fee of $2880. An estimated $250 annually to host our application on Azure was an additional cost that was included in software. The cost to host on Azure would increase as additional storage was required once the application started gaining users.

Hardware

This application will be hosted on the cloud so the only hardware requirement is for the development of this application is the 5 laptops used by the developers. For simplicity, we calculated the costs of 5 Lenovo X1 Carbon Gen 9 laptops which have been upgraded to have the processing power required for development, testing, and monitoring.

Labor

This is where the cost for development could change drastically. The team has 1 networking professional, 2 software developers and 2 cybersecurity specialists. Depending on the salary of each position, the expected cost of labor could see significant increase. The number of hours required could also increase depending on the experience level of the team. The external labor costs were for a UX (User Experience) designer consultant. This cost could be made internal and eliminated if the UX designer was part of the development team and replaced one of the cybersecurity consultants.

Estimated Cost Rough Order of Magnitude:						
				Ongoing Annual		
	Rate Per/Hr	**Work Effort (Hours)**	**1 X Costs**	**Rate Per/Hr**	**Work Effort (Hours)**	**1 X Support Cost**
Labor - IT	20	1200	$ 24,000.00	20	120	$ 2,400.00
Labor - External	100	10	$ 1,000.00	0	0	$ -
Software - External			$7,500			$7,500
Hardware - External			$17,500			$3,500
Misc.						
TOTAL			$ 50,000.00			$ 13,400.00

Figure 8: Budget

Problems Encountered and Analysis of Problems Solved

The largest problem that our group encountered was with the tool that we used to share, compile and push code to and from our repository. We used IntelliJ for this purpose and the difficulty was that several users were unable to get IntelliJ to interact with Postgres, which is what we used for our database. This failure to interact caused the application to be unable to run. The problem was resolved when one of the students uninstalled and reinstalled both IntelliJ and Postgres and identified that the default port that Postgres was accessed through was different than the one that the program was pointed to. After this, all corrections were made and all the users then able to run the program.

The second problem was attempting to find a messaging application API that would work for our application. There were many options available, all of them had a price, and the students were not willing to pay out of pocket for it. The solution was to find an example of a messaging application written in PHP. This led to another problem where one of the software developers had to convert the code from PHP to Java to integrate it in the application.

Changing program features from one language to another was a difficulty that was encountered. The chat feature was originally built using PHP, but it did not integrate well with the rest of the program, which had been built using Java. Converting PHP to Java was not as simple a process as the team had originally anticipated.

One of the first problems that had to be resolved was with project management. The project manager attempted to maintain a hands-off approach, which led to some students not contributing to the project because they were unable to think of any contributions that they could make. After one of the students who had contributed a significant amount pointed out that there were other students who were barely contributing, the project manager reassessed the approach that he needed to take. After he decided on another approach, he made the other students outline the work that they were going to do each week and assigned additional work if they were not contributing enough. This made the objectives for each sprint more clear to the students and ensured that each student was contributing to the assignment.

Conclusion

The lessons learned so far include the ability to integrate Google APIs into a web application, the integration of HTML and CSS designed by one group of individuals into the backend of an application designed by another group of individuals and the difficulties of non-software developers to assist software developers. It helped to demonstrate why many corporate teams will work separately, establish standard operating procedures, or have significantly fewer specialist who are not software developers on teams.

Another lesson learned was the importance of a solid project management plan and project manager to implement it. If developers are left on their own with the expectation that everyone will do their own part in time, often the workload will not be balanced, or parts of the project will not get done.

The non-software developers enhanced their HTML and CSS skills. The software developers enhanced their skills with APIs. They also learned to work with PostgreSQL. One of them learned a lot about Spring Boot.

The plan, moving forward, is to complete the process of connecting the front and back ends of the web application so that they work seamlessly. We will redesign the messaging widget, create event chats, and configure the friend's connections. We will then begin to integrate security measures and testing. We will also get the web application to work while being hosted on Azure. As the application is tightened up and tested to ensure that it is secure and will not break, there are additional features which will be added to the web application. We may also investigate integrating google or Facebook logins to enhance account creation and verification.

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Appendix A:

Create an account and login:

1. Were you able to create an account and use it to login?
2. How was the process of creating an account?
3. Is it a process that you would use again?
4. Are there any recommendations that you would make to improve the process?

Search for resources:

5. Were you able to search for a resource that you think a single father would need?
6. Were you able to search in different zip codes?
7. Were you able to view the reviews for the resources that you searched for?
8. What did you like about the search feature?
9. What changes would you recommend to improve this feature?

Create an event:

10. Were you able to create an event?
11. Were you able to view the even that you created in the search page?
12. What did you like about this feature?
13. What changes would you recommend to the Create Event feature?

Chat:

14. Were you able start a chat conversation?
15. Were you able to send and receive messages?
16. What did you like about the chat feature?
17. What changes would you recommend to the chat feature?

Overall:

18. If you were a single father, do you think that this is a webapp that you would use?
19. Do you have any improvement recommendations?
20. Are there any features that you thought were especially useful?
21. What did you think of the overall layout?
22. What did you think of the stylization?