Google Summer of Code 2022

Project Idea: Submitty Progressive Web App (PWA)

Personal Information

Name : Madhur Jain

Email: 21112002mj@gmail.com

University: Indian Institute of Technology, Bhilai

Major: Computer Science Engineering (Bachelor of Technology)

GitHub: [immortalcodes](#)

Location: Sonipat, Haryana, India (Pin Code:131101)

Time Zone: IST(UTC + 5:30)

Organization: Submitty

Synopsis:

About Me:

I am an undergraduate student in my second year, at Indian Institute of Technology, Bhilai, pursuing a Bachelor of Technology in Computer Science. I always had a keen interest in development and programming which led me to learn and explore fanatic world of developers. Previously I have worked on several [projects](#) and had participated in various domains that could deliver great opportunities for learning and innovation. I have explored Graphic Designing , UI/UX building, space exploration etc. I have a keen interest in public communication and love building good relationships with people I meet at different stages of my life.I have been part of several management activities with in my college and helped in growth of several clubs and societies in the college.I have a dream of bridging the gap between society and technology through innovation .I feel opensource is a great step in this direction and I am fascinated that I could contribute to something that will impact the lives of millions who will use the open source applications .

Technical Background:

Languages:

PYTHON   C   HTML   CSS   JAVASCRIPT   SQL   BASH

Softwares & Tools:

DOCKER   GIT   GITHUB   FIGMA   ADOBE_XD

Miscellaneous:
FLASK   MYSQL   LEX   YACC   MARKDOWN   LATEX   BEAMER   JEKYLL
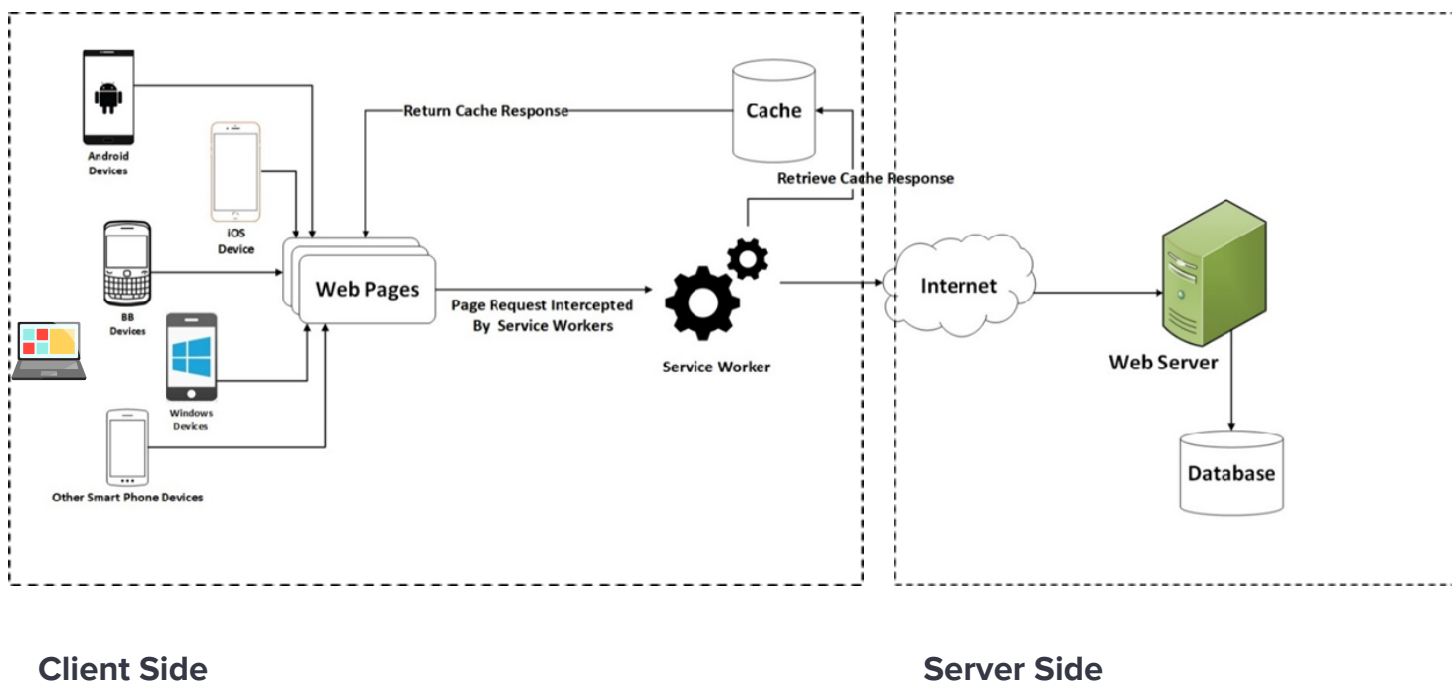
Why choose Submitty?

Being a college student I came across several softwares and platforms that my instructors and TAs have used in order to manage the course and in each software (Canvas, Piazza etc) many times I felt that some improvements in them could make things a lot more optimal and easy for both students and professors. I used the Submitty application and I found it quite awesome and thought about how, I could do to make the application even better with the past experience I had with other applications. Teaching has been one of the most novel profession and being able to assist it , is itself a work of great value.

Understanding of the Project:

With today's dynamic technology , people interact more with their phones and tablets and in order to adapt with this change , PWAs offer a great solution with their ability to leverage the resource of a website and provide a cross platform experience on any device with almost all features a mobile app has to offer , like push notifications etc. One of essential prerequisites for PWAs is good integration of the web app in various resolutions. Submitty already has good support for most of it's web features on mobiles and tablets and I would like to carry the work forward in the assimilation of more of its features and webpages in variety of display resolutions. With this done we can experiment and analyze various platforms in order to successfully implement the creation and maintenance of PWA for submitty , this will include exploring a platform that provides best support for all feature on variety of devices in the most optimal way.

After we are done with selection , work on essential components like Manifest, Service worker , Caching and fetching of the assets, Optimal UI/UX for installation and other features could we worked upon. Then the work on some errors and compatibility issues could be done. Atlast the proper documentation for all the work including the usage , installation etc could be done.

Approximate Diagram of how PWA will be implemented:

Client Side   **Server Side**

Deliverables:

1. Work on Current pages for optimisation for all screen resolutions.
   a. Updating and working on different panels of various dashboards that doesn't display contents in desired manner when on different devices.
   b. Discussing and implementing extra features that could ease the implementation of web app on different resolutions.
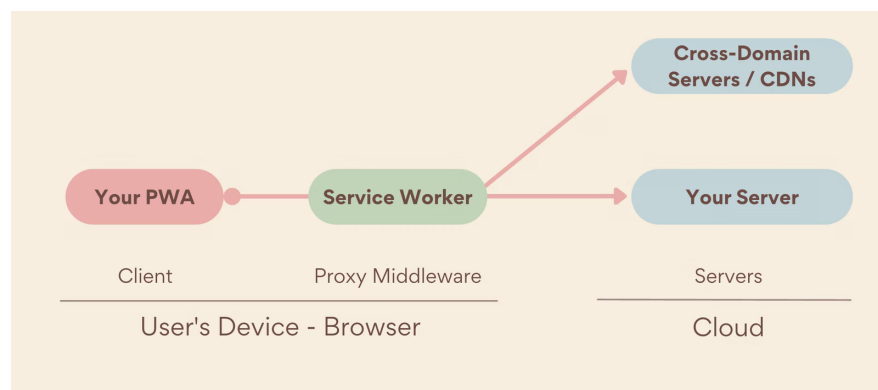
      Eg. like a special scrollbar at places where whole content might not possibly fit due to more size horizontally etc.

   c. Improving the existing pages and fixing the errors I encounter in the process.

      Eg. fixing the bugs related to implementation of dark mode.
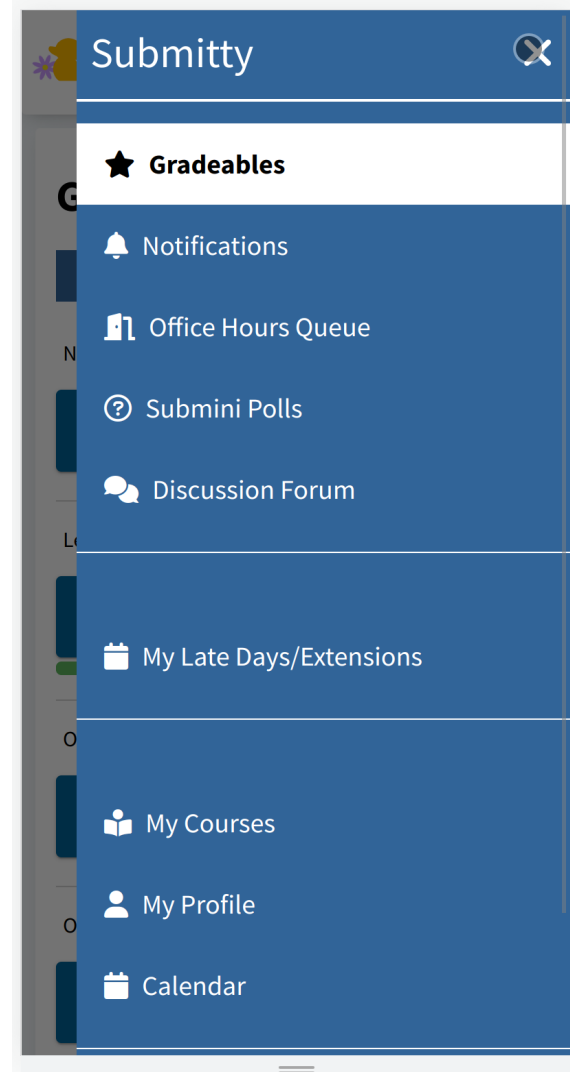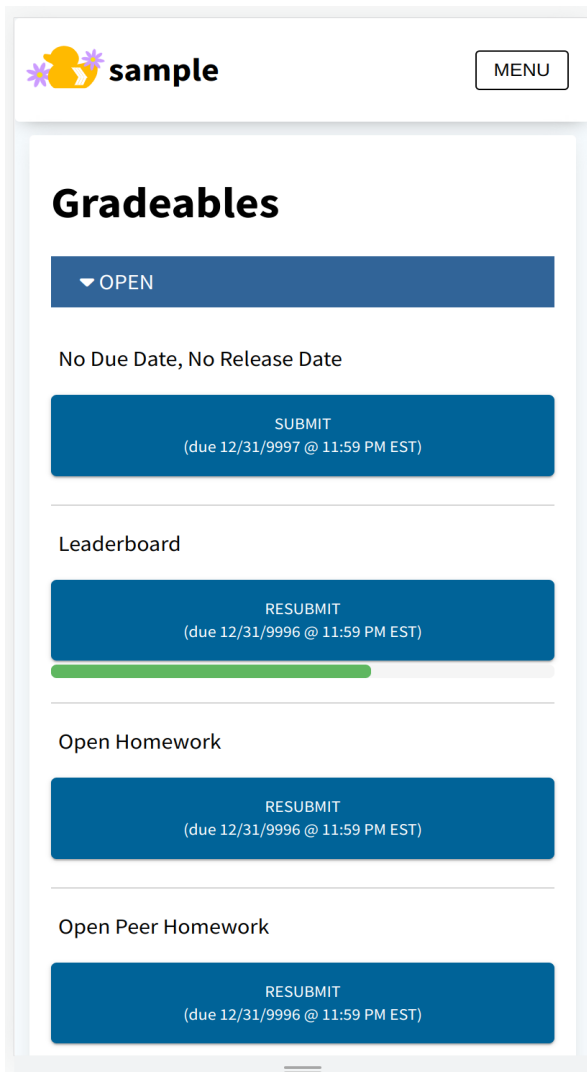
2. Implementation of appropriate PWA Platform:
   a. Selection of appropriate PWA platform based upon:-
      ● Server-side rendering (SSR) or Client-side rendering (CSR)
      ● Features offered by various frameworks.
      ● Compatibility and complexity with respect to our codebase.
      ● Capacity , size and requirements of user base.
      ● Future prospects of the application and support for the platform.
   b. Starting with a basic structure to test and apply our main functionalities.
      ● This would include working on manifest file .
      ● Also a basic implementation of the app shell will be done.
   c. Working on Proper styling and user interface of application shell.
      ● Includes working on application shell.
      ● Managing and creating assets and UI elements.
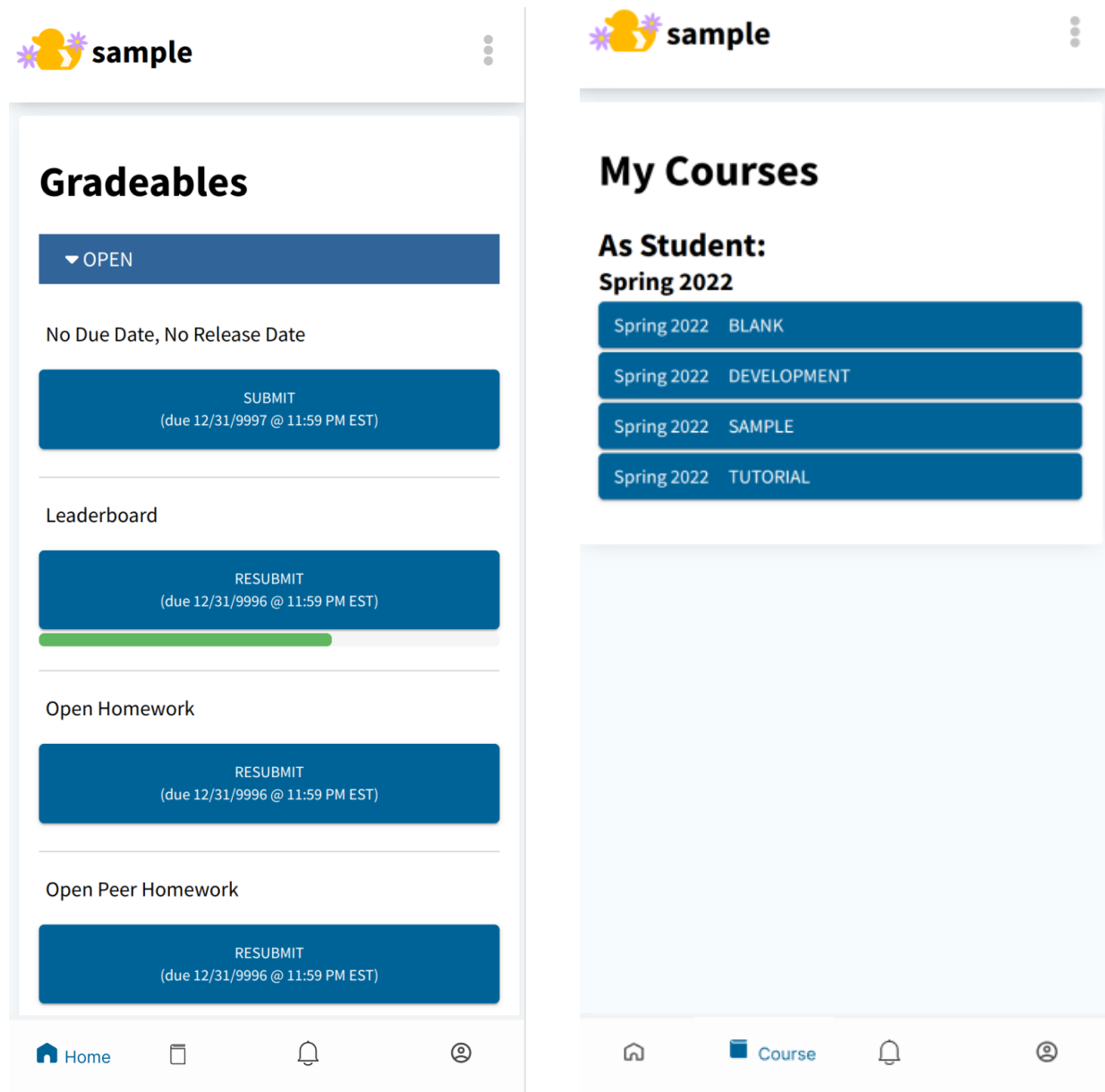   ● Integration with rest of the application.
   d. Work on Service Worker

- Selection of appropriate libraries(like workbox etc) for service worker .
- Deciding upon the how the resources will be loaded(from network/cache) and thread be worked upon to provide best experience.
- Registration of the service worker with the app.
- Implementation of offline features offered by the service worker.
- Debugging and optimization.

e. Implementation of Assets and Caches:
- Setting up all the assets required for the PWA.
- Deciding upon appropriate caching strategy.
- Implementing what resources to cache , cache updation period etc.
- Integration with web app and service worker.

f. Working on the final application
- While all steps above are listed in a individual manner they will require a constant integration with each other.
- Final optimisations and improving user experience.
- Testing the application with appropriate test cases.

3. Documentation for PWA:
   a. Documentation for installation.
   b. Appropriate guidelines and comments for future developers.
   c. Summarizing the work done.

4. Creating well structured reports for work and contribution done.

Current User-Interface of the Submittty on mobile platforms:

sample

MENU

Gradeables

▼ OPEN

No Due Date, No Release Date

SUBMIT
(due 12/31/9997 @ 11:59 PM EST)

Leaderboard

RESUBMIT
(due 12/31/9996 @ 11:59 PM EST)

Open Homework

RESUBMIT
(due 12/31/9996 @ 11:59 PM EST)

Open Peer Homework

RESUBMIT
(due 12/31/9996 @ 11:59 PM EST)

Submitty ✕

⭐ **Gradeables**

🔔 Notifications

🏢 Office Hours Queue

❔ Submini Polls

💬 Discussion Forum

📅 My Late Days/Extensions

📖 My Courses

👤 My Profile

📅 Calendar

A sample User-Interface with the integration of PWA services:

My Work Plan:

I have no prior commitments to my institution or some other internship or any project during the summers (We have institute holidays during summers.) , hence I can devote maximum effort and time to the project.

On a daily basis I can devote 6-8 hours to the project and hence can maintain 45+ hours on a weekly basis.

Till May 20 (Before Announcement of Accepted Students):	
Objectives	- Get to know the whole code base in a better way. - Ask questions and discuss about parts I am not able to understand. - Include PHP in my skill set since most of the code base is written in it. - Go through whole documentation. - Do a extensive study about the PWAs and currently operating PWAs like twitter etc. - Try to solve more bugs.
Challenges	- Understanding code written in different frameworks. - Managing my time with the exams/assignments before summer break starts.
Comments	I have already done the setup and went through previous commits and work done by other contributors.
May 20 – Jun 12 (Community bonding period): 24 Days	
Objectives	- I will get to know more about the org, its mentors, other contributors and will read more about previous commits and contributions to repo. - Discuss and finalize the planned features and designs with my mentors and other contributors. - Becoming clear with final implementations that need to be done, and the approach that I will follow.
Challenges	It might be difficult to finalize some approaches at such an early stage.
Comments	I will also include some suggestions from the previous year contributors.
Weekly Schedule	
June 13 -June 19	
Objectives	- Start working on optimization of the existing pages in discussion with mentors. - Enhancement of UI for different resolutions.
Challenges	Covering the corner cases.
Comments	Pre -liminary work before implementation of PWA. Should be easy
June 20 -June 26	
Objectives	Creation of Manifest file

	• Defining and discussing the properties for same • Management of assets to be used in Manifest file
Challenges	• Working on different assets and deciding property values.
Comments	Manifest file will help us to set the base app interface for the PWA
June 27 -July 3	
Objectives	• Starting work on service worker.(sw.js) • Registering sw.js in app file. • Starting work with library to manage service worker.
Challenges	• Promises for sw.js will be difficult to implement
Comments	• I would require some time to understand promises and other important functionalities of library used. • Contribution might be less as much time will be devoted to learning concepts.
July 4 -July 10	
Objectives	• Implementing promises. • Offline support addition • Adding cache store, fetch and update policies.
Challenges	• Deciding upon how application will behave when offline • Limitation on size of precache/cache.
Comments	This will be a very prominent week with a lot of work and hence would require regular long discussions with mentors.
July 11 -July 17	
Objectives	• Adding https security to the network protocols • Working on optimizations suggest by PWA report by lighthouse. • Finalizing and completing sw.js • Adding installation support.
Challenges	• Integrating with whole submitty codebase will be a difficult task,.
Comments	Submitty is mostly in php and online resource more often deal with applications in react/angular , so I might face difficulties to get the required resources online.
July 23 -July 29	
Objectives	• Final work on cache (fetch,update) • Testing the service worker.

	• Adding some UX features for better interface as an app. • Working on overall optimization and integration.
Challenges	• Testing it for all features will be quite difficult.
Comments	At this point , good amount of our task will be accomplished.
July 30 -September 5	
Objectives	• Finalizing the whole application • Documenting the installation procedure and some parts of crucial code. • Optimization and improvisation
Challenges	• Some minor changes in lot of files to ensure smooth working.
Comments	Hoping to complete all tasks and deliverables before this week.
September 6 -September 12	
Objectives	• Buffer time for any leftovers • Discussion with mentors on future aspects
Challenges	
Comments	A great learning and contribution session with a lot of guidance from mentors is coming to end.
September 13 -	
Objectives	Make reports for all the work done

Future Aspects:

As they say their is no exit to the opensource once you start contributing, I will continue to contribute to Submitty (no matter if it's not through GSOC) and other open source projects.

I plan to work and bring upon my own organization aimed at digitalization and prosperity of the society with goals that are sustainable and innovations reachable to all sections of society.

Coursework and experience.

Here is the list of **coursework** that might be significant for my contributions.

Or visit

(https://docs.google.com/document/d/13lB1pFUTjntwpt7WbemRLPneCnNX3xSBtkgMLpfmfJQ/edit?usp=sharing)

PROJECTS:

Health-e : This project aims to predict the possibility of common diseases associated with old age in humans through a very user-friendly survey.**(Python,Flask,HTML,CSS)**

UI for DesignX :UI for website of DesignX club. **(HTML,CSS)**

Share & Care: This project works with a PostgreSQL online database and provides with a dashboard to view and upload stuff students with in a hostel would like to share/sell to their fellow mates .**(HTML,CSS,Flask,Python,PostgreSQL)**

Branch Website: Worked as a collaborator on the Branch website for the discipline of Data Science & Artificial Intelligence.**(HTML,CSS,JAVASCRIPT,React)**

Minimal Shell: Made a simple shell using C and some basic commands of Bash.

l-blog- A personal static site for portfolio and blogs, made using jekyll.(**HTML,JEKYLL,MARKDOWN,JAVASCRIPT**)

EXPERIENCE:

Management Team(Council of Student Affairs)-

Management team is a crucial part of students body at IIT Bhilai which manages all the major events at the institution.

DesignX -Content Head -

DesignX is the Digital design club at IIT Bhilai.

Sports Council-Badminton Coordinator .

Center for Career and Placement Services-(Publicity Team Member) -

As a member of publicity team I help in designing of brochures and other useful templates for the cell.

SES- Core Member (Astronomy Division) -

SES is a society for space fanatics at IIT Bhilai.

Student Mentor (2025 Batch) -I am mentor of a group of 8 students that took admission in Batch-2025. I helped them to get familiar with the working of the institution

Why me?

I have a lot of experience of using various learning management platforms and have constantly analyzed and wondered about their working (one of reasons why I feel familiar to submitty), which makes me capable to understand and work upon submitty in a efficient manner. I have been practicing UI/UX and graphic designing for almost 2 years hence I have a critical eye for visuals , alignments & placements , colors and design ideology , since the project works upon the UI/UX for the various platforms, I am the perfect candidate to intercept the overall experience. I possess relevant skills and knowledge of different programming languages like python, HTML,CSS, JAVASCRIPT etc that are required for the project and since I have learnt all these skills on my own I can guarantee you that I could learn and execute any tech that might be required in the journey.

Since, I have addressed most of the upcoming challenges- I am confident in myself, my skills and above all, my enthusiasm. If given a chance I will leave no stone unturned to excel this project within the given period.

Link to my resume:

References:

- https://developer.chrome.com/blog/getting-started-pwa/
- https://www.freecodecamp.org/news/build-a-pwa-from-scratch-with-html-css-and-javascript/
- https://web.dev/progressive-web-apps/
- https://developer.mozilla.org/en-US/docs/Web/Progressive_web_apps/Installable_PWAs
- https://medium.com/samsung-internet-dev/pwa-series-hands-on-create-your-first-pwa-step-by-step-5bb7a6605349
- https://github.com/g105b/pwa
- https://www.cloudways.com/blog/progressive-web-apps/
- https://vaadin.com/learn/tutorials/learn-pwa/turn-website-into-a-pwa
- https://developers.google.com/web/ilt/pwa/introduction-to-progressive-web-app-architectures
- https://www.smashingmagazine.com/2020/12/progressive-web-apps/
- https://www.iflexion.com/blog/progressive-web-app-framework
- https://livebook.manning.com/book/progressive-web-apps/

There were a lot of other resources I couldn't list which include several tutorials from many developers on open platforms.