

PRINTINGQUEUE ANDROID MOBILE APPLICATION

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Abstract - Printing a piece of paper hardly takes a minute and for that single minute, people generally wait in long never-ending queues at the printer stations for their turn to get a printout. The majority of these people include students and employees from professional fields trying to make it out of the rush hour as soon as possible. Though there are printing stations available in colleges especially for students, they exhibit the same rush hour since all of the students tend to get their printouts at the same time, generally before or after the college hours or in between, during breaks, resulting in taking up huge amount of time out of the students' precious time. "PrintingQueue", a mobile application developed in an attempt to eliminate the never-ending queue hogging up daily schedules for a job that could be done in a minute. The application allows the users to register/login, to upload their PDF files on the go, guided by the simple UI in the app, further leading to storage of the file at the server-side (the printing station) database which is developed using Google Firebase tool provided in Android Studio. As soon as the file is uploaded, and the user pays the necessary amount via online banking before hand, the entire details of the user is stored in the database at the server side, the administration of printing queue, enabling the end-users to collect their files once they receive the acknowledgement that the file has been printed from the printing station.

Key Words: Android Studio, Java, Gradle, Real-time Database, Google Firebase, User-Interface, Printing station, Queue.

1. INTRODUCTION

It is hard to relax even after the students have finished their work typing for hours, and arranging all of the content into a final document because even a harder task lies ahead, which is trying to get a hard copy of that final document. Though it sounds like a 2-minute task, the amount of time being spent trying to get to that 2-minute turn is hysterical owing to chaotic queues at the printing place. In a developing country like India, printers are owned one in ninth household, leading the students to printing stations available in their locality or in their respective colleges, whenever necessary. As a result, many students rely on their local services thus resulting in hefty queues waiting to get their turn, wasting their precious time often. It is really important for a student to spend most of their time staying focused and working on themselves to get better each day but simple tasks such as getting a printout is hogging up a major

amount of time in their daily schedules, having an effective impact on the efficiency of work done by the student on that particular day.

1.1 Basic Concepts

The mobile application developed is based on Java Programming Language and is developed using Android Studio IDE, along with the tools it comprises of including Firebase, Realtime database, Debugging Emulator and Android AVD which is a virtual device used for testing and building the application.

"PrintingQueue", a mobile application developed in an attempt to eliminate the never-ending queue hogging up daily schedules for a job that could be done in a minute. The application allows the users to register/login, to upload their PDF files on the go, guided by the simple UI in the app, further leading to storage of the file at the server-side (the printing station) database which is developed using Firebase tool provided in Android Studio. As soon as the file is uploaded, the employee at the printing station prints it out and keep it aside, labeled with a token which is generated while the file was being uploaded, for the user to pick it up, thus eliminating the annoying queue and having an effective impact on the student's productivity throughout the day.

1.2 Site visited

The problem space we have visited to come up with the motivation to work further is the library in the college premises of VR Siddhartha Engineering College, Vijayawada. We have observed that there are major rush hours during on the days of important due dates, at times where the entire college, irrespective of branch or year is given a break such as the lunch break and even the times before the first college hour and right after the ending of college hours. Everyone reaches out to the same place, being a part of the rush our eventually. Thus, we strive to make an effort in bringing a change in the way students lead their lives in and around the college through the mobile application we have developed, "PrintingQueue". In addition to the college, we have visited the printing stations near and around and literally observed the same routine every single time and thought to ourselves that we should be a part of the change that has to happen.

2. LITERATURE REVIEW

The current societal issue is ever raising problem which is not addressed yet. So far we did our analysis based on google and other technical domains and also searched for some whitepapers, International Journals whether the problem had been addressed or not. And finally we came to know that there is no area or no person addressing this issue many people have been facing their day to day lives. As to stay positive and move forward, we have further decided to do the project in a sincere and committed approach.

So far some android applications portray similar functionalities but are no way close to our mobile application nor to the problem are we trying to solve.

2.1 Xerox Workplace App

This is an android application present in play store. But the Xerox machine should be connected to a network from where the printing can be done. This won't even make a sense for the students.

In other words, Literature says that the issue, we are dealing with, has not addressed yet. Also there are mobile applications that allow the home users to access their printers via Internet. But this is not the case in students' scenario, because the issue is entirely different from what those mobile applications provide.

3. PROPOSED SYSTEM

The 'PrintingQueue' application is implemented using Android Studio IDE, Java SDK 10 as the software and the hardware used are Android mobile device.

The 'PrintingQueue' application is developed for the end-users to send files to the nearby printing station along with making payments and sending the file that needs to be printed. Another application that was developed in parallel is the 'PQAdmin' Android mobile application which keeps track of the user details i.e., the token number and associated e-mail address. This application is maintained by the printing station administrators and they are responsible for sending the necessary acknowledgments including the entire cost involved, the problem that is raised (if any problem arises), and the job completion. Such acknowledgments allow the user to apprehend how far the necessary task of getting their files printed has come so that they could plan accordingly when to pick up the hard copies.

This mobile application developed in an attempt to eliminate the never-ending queue hogging up daily schedules for a job that could be done in a minute. The application allows the users to register/login, to send their PDF files on the go which is sent in accordance to the unique token number generated, to the nearest printing station that

could be located on the Google Maps which was integrated to the application as a part of development as well. These tasks are achieved guided by the simple UI in the app, further leading to storage of the file at the server-side (the printing station) database which is developed using Google Firebase tool integrated to Android Studio. As soon as the file is uploaded, the user is returned with the number of pages and the cost of the entire printout that is charged by the particular printing station, from the 'PQAdmin' application which was sent by the administrators. The user is then redirected to pay the amount to the particular printing station through the activity provided in the application. The payment is transferred to the admin at the printing station or the owner via Google Pay, which was integrated to the application while being developed. The administrator or employee is now responsible to check the database created in Google Firebase in real-time for new requests. The database stores the unique token number along with for the user e-mail address and the number of copies the user has requested. The employee now prints the PDF file as many as required and the printed pages are kept aside labeled by the unique token number associated. At the same time, an acknowledgement confirming that the job is done is sent to the end user through the PQAdmin application. An acknowledgement may also be sent in case an error has occurred to notify the end-user before end and plan accordingly. Now the end-user could pick up their files on the go without having to wait to get it printed and pay for the print outs, thus eliminating the annoying queue and having an effective impact on the student's productivity throughout the day.

The entire source code for both the applications has been pushed into the github repositories,

[1]<https://github.com/himap2569/PrintingQueue--Android-Mobile-Application>

[2]<https://github.com/himap2569/PQAdmin--Android-Mobile-Application>

4. METHODOLOGY

At the client side, the app consists of several activities consisting of the simple but significant user-interface design. At the server side, the administrator is able to access the database the application consists of.

AT CLIENT SIDE:

The mobile application "PrintingQueue" consists of several activities including

- Homepage: A brief description about the application and has a reference to the login and registration pages.
- Registration Activity: If the user has not registered till date, the user could go to the register page and enter their credentials to establish their authentication in the

application, which is stored in the firebase database to which the app is connected to.

- Login Activity: Once the user is registered, the user becomes authorized to login and thus the user is prompted to login entering valid credentials. If the credentials are valid, the user is prompted to the main page.
- Main Activity: The user generates a token number, which the user has to enter in the given space along with specifying the number of copies needed and once it's done, the user is guided to their email linked to the application where the file is uploaded and sent.
- Map Activity: The user could look up the closest shops near them and select the shop in that shop in the drop down.
- Payment Activity: Payment is a must to enable trust for the owner and hence payment is integrated with the app through GPay. The owner ID is already set by default and the user has to make the payment through the app after receiving the billing amount through their account and the billing is interpreted by the token number they send it with.

AT SERVER SIDE:

The server here is the administrator, in terms of real world, the owner of the printing station. The administrator has all the access to the database connected to the application via the firebase tool where the user's registered credentials are maintained along with the files the users are uploading. Once the administrator has been notified about the file upload, the administrator can take a printout of the file, label it with the respective token number and cost, and put it aside. Once the user arrives and proves their authentication by specifying a valid token number, the user can take their printout after the billing is done.

This is achieved through a server side application as well; The PQAdmin app consists of the following:

- Main Activity: The admin gets all the details of a particular token once it is typed. Acknowledgements such as sending payment, Job done or any slipup incase it occurs, is immediately notified to the user. Once the job done acknowledgement is received, the user could pick up the printouts any time soon after.

5. IMPLEMENTATION

The implementation of the mobile applications, 'PrintingQueue' and 'PQAdmin' can be demonstrated as follows.



Fig -1: The homepage activity for PrintinQueue Application

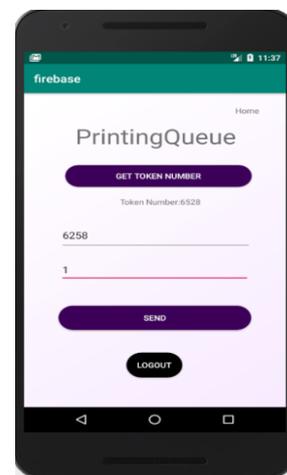


Fig-2: Activity page to send the PDF file

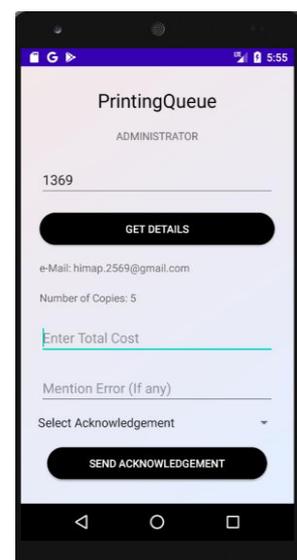


Fig-3: The PQAdmin application homepage

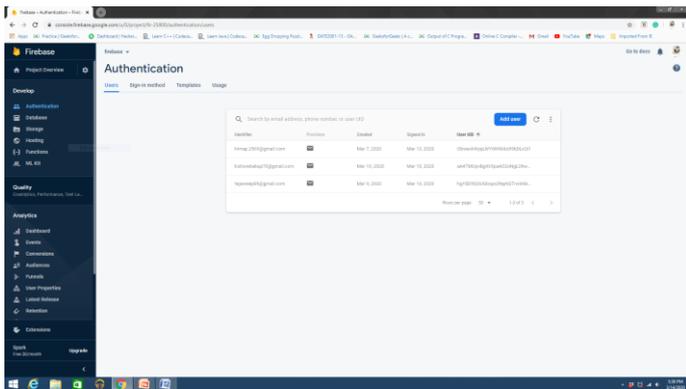


Fig-4: Database of registered users stored in Google Firebase

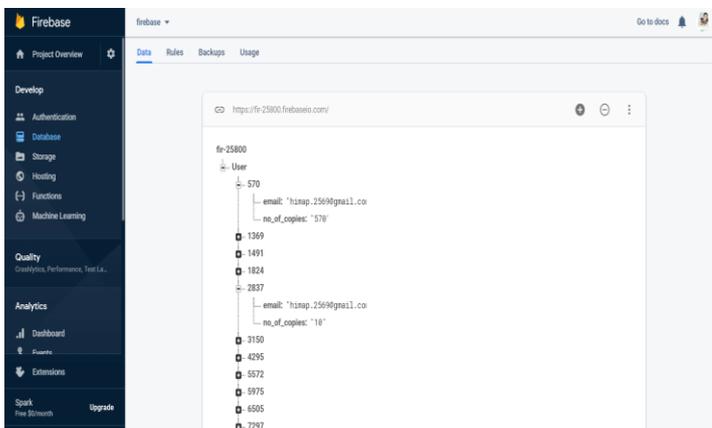


Fig-5: Database of User Token Number and E-mail stored in Google Firebase

The entire implementation can be found in the following Github repositories,

[1]<https://github.com/himap2569/PrintingQueue--Android-Mobile-Application>

[2]<https://github.com/himap2569/PQAdmin--Android-Mobile-Application>

6. APPLICATIONS

The developed mobile application, “PrintingQueue”, could be a part of a incredible to such a simple problem, waiting in queues to get a printout. The applications include:

- [1] Students of the college could install the application and never have to wait for their turn to get a printout.
- [2] Many colleges could download their version of the application to serve better for their respective students as well.
- [3] In addition to colleges, students, even the printing stations could be the administrators of their version of the app, so that people close by could upload their respective files and not have to stand in large

queues, draining their energies, disturbing their daily routines.

7. CONCLUSIONS

We studied and presented a novel approach for helping the society by providing a means to save their valuable time and serve a method for digitizing a physical queue. It is exhausting to stand in long never-ending lines to get a job done, especially when the job could be done in a minute or two. Thus, “PrintingQueue”, as the name describes acts the queue for the user thus presenting a loophole for the user to not wait in a queue. To conclude, the entire idea of our project, “The Printing Queue” is a method to not having to wait in energy-draining lines to print a file. This application is to be developed using Android Studio with attractive, yet professional work ethic UI to serve its purpose and play its part. The thought revolves around digitizing the lines so that they don’t exist and you are always at the top of the line. The entire activity is monitored and necessary acknowledgements are sent to the users through another app, PQAdmin specifically designed for the shop owner. This mobile application can be deployed in students’ mobiles and can be used whenever necessary as an academic-related application and can be used in any similar institution or organization. The application is implemented using Android Studio IDE, Java SDK 10 as the software and the hardware used are Android mobile device. The application is proven to be helpful through the client satisfaction report as well and hence we are immensely proud to provide a means to solve a problem faced by many throughout countless years.

8. ACKNOWLEDGEMENT

The entire project was worked on as a motive to solve an on-going problem persisting in the society so as to help people lead their lives in a hassle-free manner. This project was developed under the guidance of Smt. K. S Vijaya Lakshmi Associate professor, CSE MTech, Ph.D. and has been accepted as the group project under EPICS, a program to develop real-time solutions to the problems in the society as part of the academic curriculum by the Head of the Department (CSE).

REFERENCES

BOOKS

- [1] Neil Smyth, Android Studio Development Essentials - Android 7 Edition: Learn to Develop Android 7 Apps with Android Studio 2.2 1st Edition, 2016
- [2] Mr. Victor A. Kaiser-Pendergrast, Elementary Android App Development 1st Edition, 2013
- [3] Gerardus Blokdyk, Firebase The Ultimate Step-By-Step Guide Paperback – July 24, 2018
- [4] Mike James, Android Programming in Kotlin: Starting With An App 1st Edition

JOURNALS

- [1] Hana R. Esmaeel, International Journal of Advanced Research in Computer Science and Software Engineering, Apply Android Studio (SDK) Tools, 2015
- [2] Chunnu Khawas, Pritam Shah, Application of Firebase in Android App Development-A Study, 2018
- [3] Divya Sharma, Hiren Dand, Firebase as BaaS for College Android Application, 2019

WEB RESOURCES

- [1] <https://www.androidhive.info/2016/10/android-working-with-firebase-realtime-database/>
- [2] <https://firebase.google.com/>
- [3] <https://developer.android.com/reference/android/graphics/drawable/GradientDrawable>
- [4] <https://www.geeksforgeeks.org/firebase-realtime-database-with-operations-in-android-with-examples/>