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The application also informs users of the many symptoms of COVID-19, how to protect yourself, how and when to Isolate and how we as a people can reduce the spread.  Should a user feel interested in discovering the latest news on COVID related sources they may opt to use the news feature which displays the top headlines within a selected country, which can be changed via the settings option.  While the social distancing feature of our application involves using Bluetooth Low Energy to detect nearby phones and warn a user that they have been in close contact with another person over a period of 15 minutes in a 24 hour cycle.  This document will describe the application and its features in more detail and also bring to light the challenges we faced in creating our application, and furthermore how we overcame these said challenges.  **1.2 Glossary**  ***BLE*** - Bluetooth Low Energy  ***Retrofit*** - Rest client library for android that makes it easy to consume/parson JSON  ***XML*** - Extensible Markup Language  ***JSON*** - JavaScript Object Notation, Data interchange format  ***Google firebase*** - Firebase is a mobile and web application development platform  ***Android studio*** - Android Studio is the official integrated development environment for Google's Android operating system  ***Newsapi.org*** *-* A website that gathers worldwide news and allows developers to create News API’s to display current news, old news or topical news based on what the developer has requested through his application  ***Coronalmao.ninja*** - A website that displays JSON data of live COVID-19 case data  **2. System Architecture** The system architecture hasn’t changed much from the functional specifications apart from a clearer approach to our architecture as we have now built the application, which involves the use of third party API’s (NewsAPI.org, Coronalmao.ninja and Firebase.google.com)  Figure 1 - System Architecture   **3. High-Level Design** Figure 1 - Context Diagram    Figure 2 - Activity Diagram    Figure 3 - Data flow diagram  Figure 4.1 - Registration Sequence Diagram    Figure 4.2 - News API Sequence Diagram   **4. Problems and Resolution** ***4.1:***  *Problem*: Learning and developing with Android Studio and how projects are built.  *Resolution*: Began by following numerous introductions to Android Studio via YouTube and a course on Udemy, followed by implementing some basic Applications to perform simple tasks. Once we completed and went through a lot of tutorial content, we became familiar with Android studio and also learned how to read and fix common errors thrown when first beginning with the IDE, the best practice is learning from a difficult bug and stack overflow if you’re lucky. ***4.2:****Problem***:** Figuring out how to build the correct requests to interact with the News API. Initially we were not adding the correct parameters to our authorization request and struggled to understand why we were not getting a bearer token in response to our requests.*Solution***:** Read all of the relevant API documentations in the News Api docs, watched several YouTube videos on building a News REST API, and went through many stack overflow questions which led us to use retrofit and multiple built in libraries to figure out how to handle requests and responses. Figured out which required parameters were missing from the initial request (It required creating a variable of the API Key at run time that would generate within the BuildConfig) and resolved the issue.***4.3:*** *Problem*: We were nearing the end of the project without implementing some of the planned features.  *Solution*: We had to abandon the ability for users to create a health check in, which would allow users to notify others that they tested positive for COVID-19. Also abandoned the feature for users to view location history / contact history, as there was a major bug in regard to this which would take up time for other more important features and documentation. ***4.4:*** *Problem*: Implementing a NavBar for activities, to coincide with the rest of the application  *Solution*: A big obstacle involved in developing the app was coming up with a functional NavBar that would display for both fragments and Activities, it was decided in the end to opt towards creating a fragment of the activity, which would allow for proper navigation rather than displaying a back button on an activity page which would return the user to the dashboard. However, some libraries did not display proper documentation on implementing them in a fragment and so that also raised a issue. **5. Development Cycle**In the development process of our android application, we used Android studio, this is a free and reliable platform for android app development, and it is used by the vast majority of developers in the industry. For our server and database, we used Google Firebase, Firebase comes with a great number of tools such as a database, storage, authentication and analytics. It is also free and stable as it is provided by google. The firebase services that we used authentication to allow users to create accounts and login to our app and a database to store user temporary data.Our final implementation of the project is very similar to the original idea set out in the functional specification at the beginning of this development cycle. All the main features that we set out to do such as social distancing feature, covid case tracker, news tracker and a clean UI have been successfully implemented and are working as intended.Some features however had to be left out of the final app due to us running out of time. For example, we intended to allow users to make a health check in which would allow them to notify others if they tested positive for COVID-19, we also opted to get rid of the GPS function of the social distancing feature as we felt that for the time it took to create a fully functional application using GPS it would not give the same accuracy or results as using Bluetooth.If given more time and if we continue work on this application in our spare time these features would be implemented and the app will be exactly as we set out in the functional specification, if not even more improved with a more fluid UI, and a more competent Social distancing feature.**6. Installation Guide** **6.1 Requirements**  You will need the following to install and use our application:   * Android Phone - With a device capable of running android 5.0 and above. * Latest version of Android Studio * Internet Connection * Java 8+   **6.2 How to install**   * Download our GitLab repo at <https://gitlab.computing.dcu.ie/joycem32/2021-ca326-jmichael-projectmanager> * Save the repo to a folder of your choice * Make sure developer mode is enabled on your Android device and USB Debugging is enabled, to enable developer mode you must tap the Build Number of your phone in your “About Phone” section of your phone settings at least 7 times. * Open the project in Android studio and plug in your Android phone to the computer/laptop via a USB cable. * Click the run button, which looks like a green play button in the top right corner of the Android studio project and select your android phone as the target device, if you connect your phone it should default to your physical device, otherwise you also have the option of running the app within one of the many emulators that android studio offers. * The app will automatically install, and you can then run the app, if it doesn’t open automatically.   Obviously, should this application go to market it could be installed via the Google play store, or even quite possibly through a website via an APK. |