# National College of Ireland

BSc(Honours) in Computing (Part time)

Software Development

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# PocketStats

# Technical Report

# Contents

October 2020 I put a lot of time into searching for a project idea. Any idea that I came up with I always wrote it down on my phone but when it came down to decision day, I wasn't sure the ideas I had were technical enough. In the end I decided to create an android app for a basketball manger to be able to track statistics of their players and be able to view the data easily. I also created a project pitch video stating what I intended to do in my project and submitted it to be reviewed. In the month of October I was also assigned my supervisor and I am looking forward to working with

Searching for a project idea was a lot harder than I thought it was going to be. I came up with many ideas but had to think to myself would they be technical enough and I finally came up with the idea of a basketball statistics team app.

# Executive Summary

In this report we are going to look at the technical aspects of my application. We will look at why I chose the application in the first place, what technologies I am going to use, What I want the application to look like, the aims of my application and lastly the different use cases regard to my project. As of now, I do not have any further results or conclusions but what I have gathered from this report is that I have a plan now in place to switch up the gears with my application and complete more functionality to it.

## 1.0    Introduction

### 1.1. Background

Why did you undertake this project?

The Idea of this app came to me over a conversation with my dad who is a basketball coach. One Friday evening we were speaking about basketball stats and how they can help players and coaches to see how players are doing on a certain aspect of their game. I then decided that it was a possibility that I could create such an App plus some extra features to what we spoke about. Coming up to the project pitch I still was not sure I could make it technical enough. but with some research I have been able to put together a plan of what I want to create. One of the main reasons for the App I am creating is that there isn't such a App out there at the moment so I believe there is a gap in the market for it.

### 1.2. Aims

What does the project aim to achieve?

The aim of my project is to create an App whereby a Coach can collect stats during a game and evaluate them when the game has completed. The stats collected after each game will be available to each player to see how they have performed on the court. I have 2 main aims for this project, and it is to help both the Coach and Players using the stats in each game. The coach is going to be able to see the team stats as a whole and see on different graphs how the team is performing. From the overall stats the coach will be provided with some drills with regards to where stats are good to make the most of where the team performs well. The other aim I have is on the player side of the App. The player side will be able to see all their stats from previous games and from all the stats of previous games the player will be provided extra training to improve where they are falling down on the stats table.

### 1.3. Technology

What technology will you use to achieve what you have set out to do and how will you use it?

Looking at the different technologies in my project the main one I am going to be using is Android Studio. Android studio is the official IDE for android development. At the moment my App will only be available on android. Another technology I am going to be using is Google Firebase. Firebase is a mobile platform that offers help regarding app

development. I am going to be using firebase for the purpose of authentication. This will include a sign in and sign up features I will also use firebase storage or MYSQL as my overall database. This will distinguish between Coach and Player within the app and will personalise the user experience.

## 2.0   System

### 2.1. Requirements

All requirements should be verifiable. For example, experienced controllers shall be able to use all the system functions after a total of two hours training. After this training, the average number of errors made by experienced users shall not exceed two per day.

#### 2.1.1.  Functional Requirements

This section lists the functional requirements in **ranked order**. Functional requirements describe the possible effects of a software system, in other words, *what* the system must accomplish. Other kinds of requirements (such as interface requirements, performance requirements, or reliability requirements) describe *how* the system accomplishes its functional requirements. Each functional requirement should be specified in a format like the following:
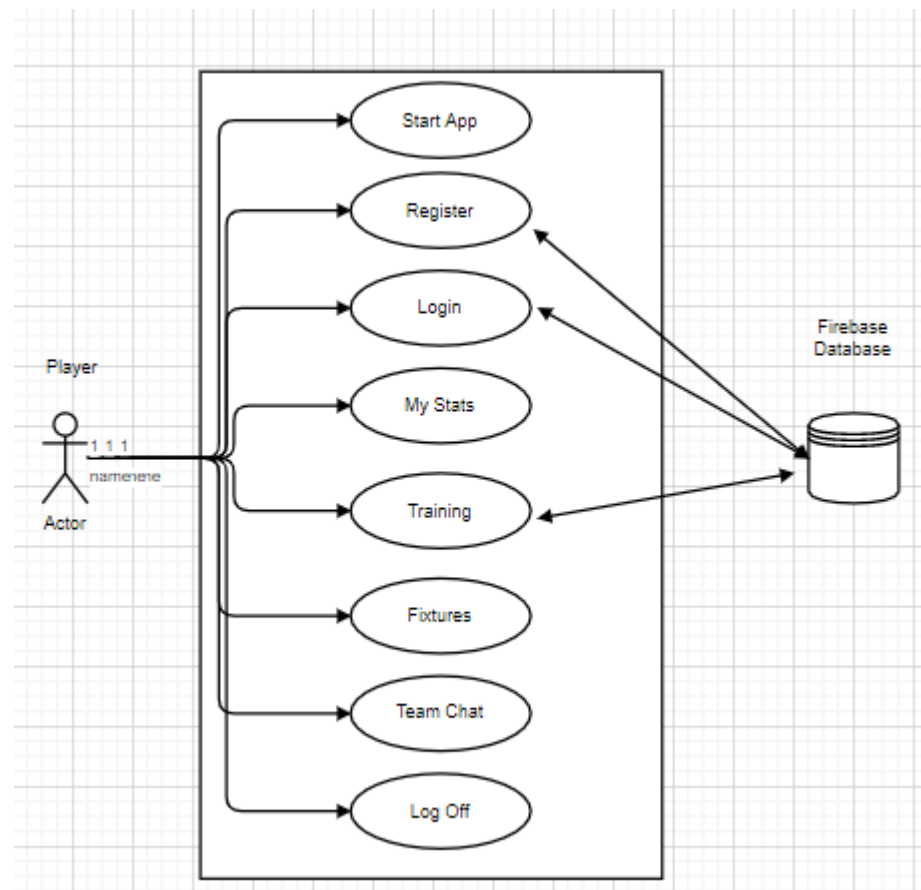
Start application : Initial launching of the application.
Authentication : Login and register of new users .
Game Stats : Collection of new stats during a game and Stats from previous games.
Training assistance : Provide training to Coaches and players with regards to statistics.
Game Planning : Team chat and Fixtures available.

##### 2.1.1.1.    Use Case Diagram
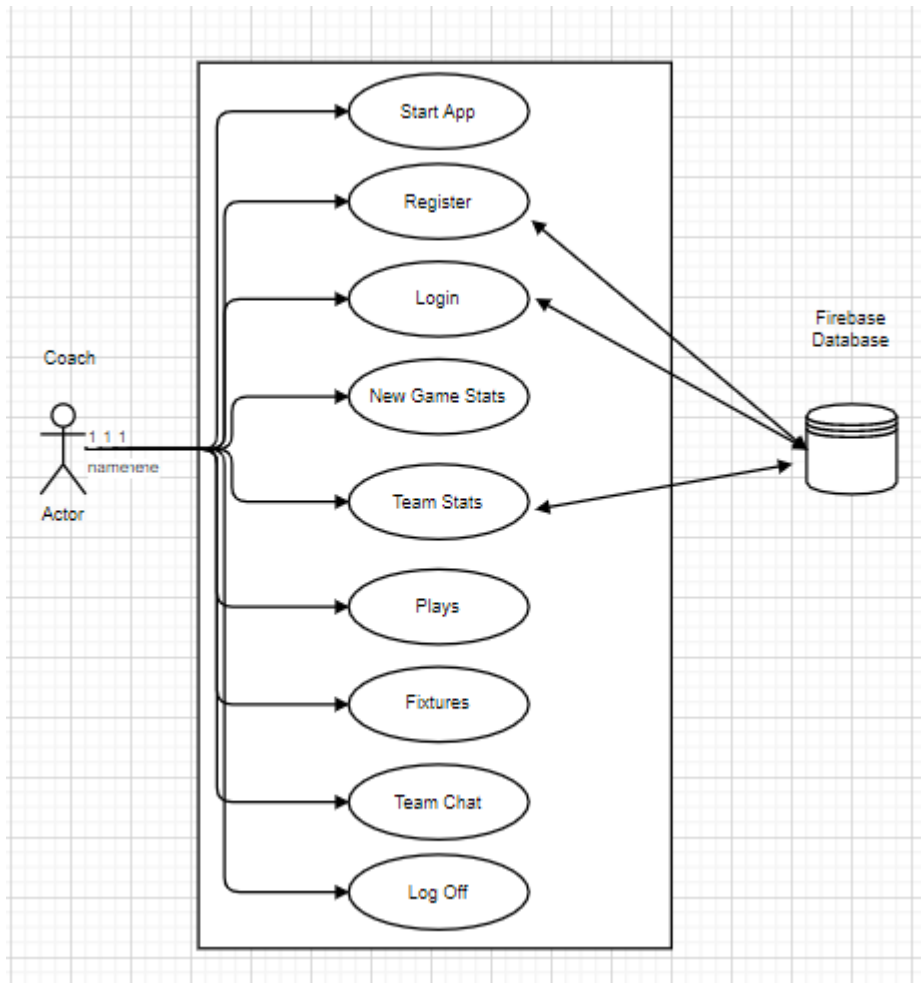
## 2.1.1.2.  Requirement 1 Starting up the Application

## 2.1.1.3.  Description & Priority

The first Use case in my priority List is Starting the Application. This shows us if the user does not have an Android device the Application will not be able to work. As application is only built for Android users

## 2.1.1.4.  Use Case

Each requirement should be uniquely identified with a sequence number or a meaningful tag of some kind.

**Scope**

The scope of this use case is to show that the user will be able launch the application if the right device is being used.

**Description**

This use case describes the process to show that only users with an Android device will be able to use the application.

**Use Case Diagram**
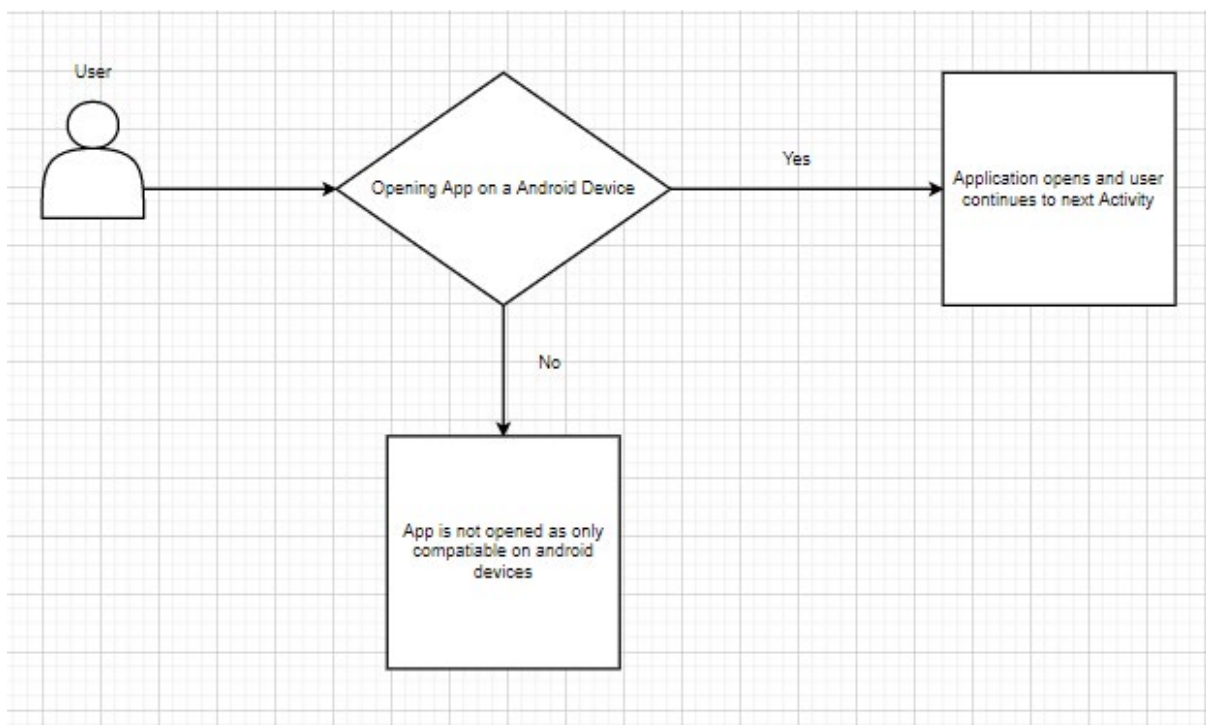


**Flow Description**

The User opens the application on a android device and if user is using a android device well then they can carry on and continue to the next activity. Whereby if the user does not have an android the application will not be able to open as it is not compatible with other devices.

**Precondition**

The application runs on a android Operating system and has been downloaded from the app store and installed on a android device.

**Activation**

This use case starts when an User initially clicks to open the application when it is in a idle state.

**Main flow**

1. The User clicks on the application logo on their android device.
2. The system then launches the application.
3. The User then can use the Application

**Alternate flow**

A1 : Alternative
1. The user clicks on the application
2. The user is unable to launch the application as there device is not compatible.

**Exceptional flow**

E1 : Crash
3. The system has frozen and application wont start
4. The user cant complete action as battery has ran out on there device.

**Termination**

This use case is terminated when the application has loaded on the device.

**Post condition**

The system goes into a wait state when the user is brought to the main activity of the application.

## 2.1.1.5.    Requirement 2 Authentication of the Application

## 2.1.1.6.    Description & Priority

This is the second priority of my application. This use case shows us that when the application has been loaded up the user will then have to sign into there account or register a new account.

## 2.1.1.7.    Use Case

**Scope**

The scope of this use case is to show a user being logged into their account or registering a new account

**Description**

This use case describes the process of logging into the user account and registering a new account.

**Use Case Diagram**
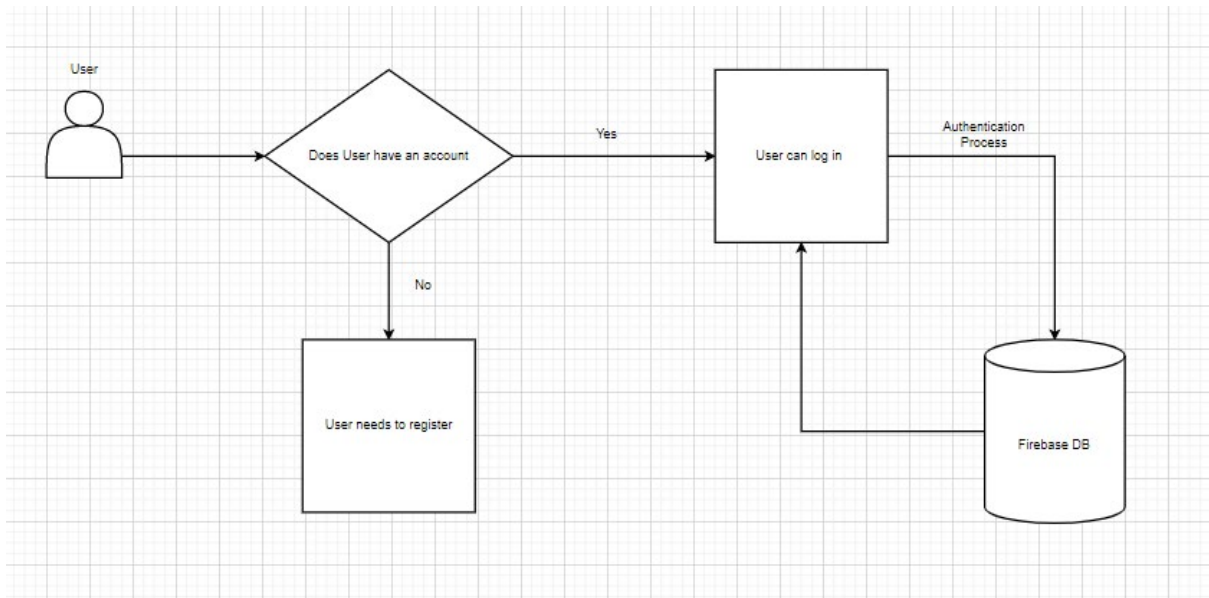


**Flow Description**

**Precondition**

The Application is ready and waiting to see if the user is logged in or registering for a new account

**Activation**

This use case starts when a User has started up the application

**Main flow**

4. The user signs into there account
5. The system checks firebase to confirm the valid sign in
6. The user has been able to log in successfully.

**Alternate flow**

A1 : Alternative
5. The user logs in but has no account registered
6. The system tells user not a valid login creates new account

**Exceptional flow**

E1 : Crash
7. The system has frozen on loading up the application
8. The user can not log in or register

**Termination**

This use case is terminated when a user has successfully logged in or registered for a new account.

**Post condition**

After successfully registering for a account the user will be able to log in.

## 2.1.1.8.   Requirement 3 Game Stats

## 2.1.1.9.   Description & Priority

This use case is next on our priority list. The user will be able to view the overall team stats as a whole or add new stats to the overall stats table. This application is using firebase database to hold the data gathered.

## 2.1.1.10.  Use Case

**Scope**

The scope of this use case is to view team stats as a whole or to be able to add new stats to the team stats.

**Description**

This use case shows how the user can add new stats to the overall stats table or to be able to view the overall stats table.

**Use Case Diagram**
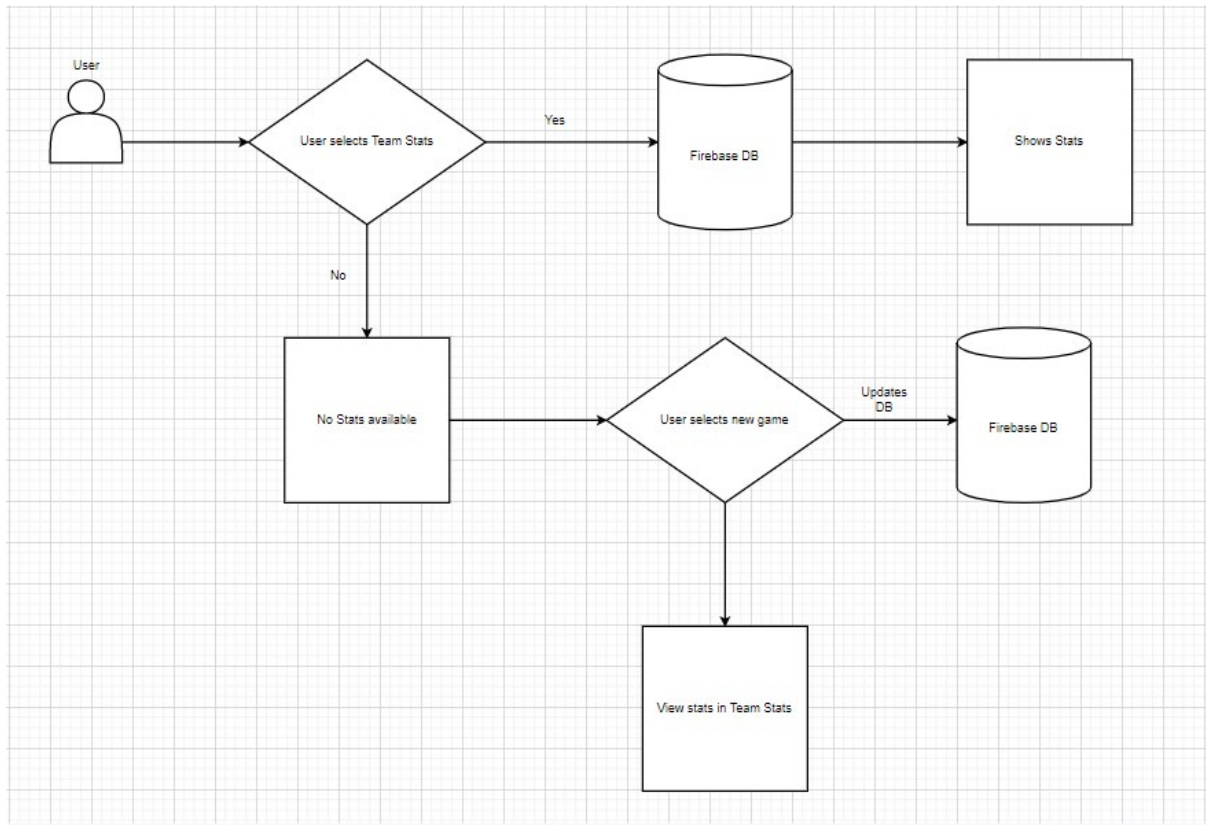


**Flow Description**

**Precondition**

The user has successfully logged in as a coach.

**Activation**

This use case starts when a user clicks view team stats.

**Main flow**

7. The user clicks on Team stats to see all the stats from the team.
8. The system then goes to the Database to retirve the data requested
9. The User can then view all the team stats.

**Alternate flow**

A1 : <title of A1>
9. The user clicks on team stats
10. The system shows no stats available
11. The user then selects new game.
12. The system then saves stats to DB
13. The user can then view Stats in Team stats.

**Exceptional flow**

E1 : Crash
14. The system has not registered any clicks
15. The user is unable to make a selection

**Termination**

This use case is terminated when the user has been able to view team stats.

**Post condition**

The system goes into a wait state

## 2.1.2. Data Requirements

## 2.1.3. User Requirements

Some of the user requirements are as follows:

- A user should have a android device to be able to use the App.
- A user should have internet connection to install application from the app store.
- A user will need to be registered to gain access to the app using an email and password.
- A registered user will be able to log in with their credentials

## 2.1.4. Environmental Requirements

Some of the Environmental requirements are as follows.

- An android device is needed to run this application
- Internet will also be a factor as it is needed to get the application initially.
- Firebase console: To manage accounts of registered users

## 2.1.5. Usability Requirements

Some of the usability requirements are as follows:

I have designed the application to be well navigated and easy to get around. It will be easy to use and catered for all levels of experience with android apps. I have designed a App whereby the use of colours will be vital in certain aspects of my application . for example with the use of buttons in my new game stats part of the application.

## 2.2. Design & Architecture

I have fully designed my application in Android studio, and I have been testing the application on my personal mobile device which is an android OS. I will be using Firebase code to implement

some of the firebase features, such as Firebase authentication. I will use this to allow users to register a account and be able to sign into there account. I have all access to the firebase console where you can see updates when a new user has been registered to the application. I will also use a database to store all the data I will be collecting in my new game stats.
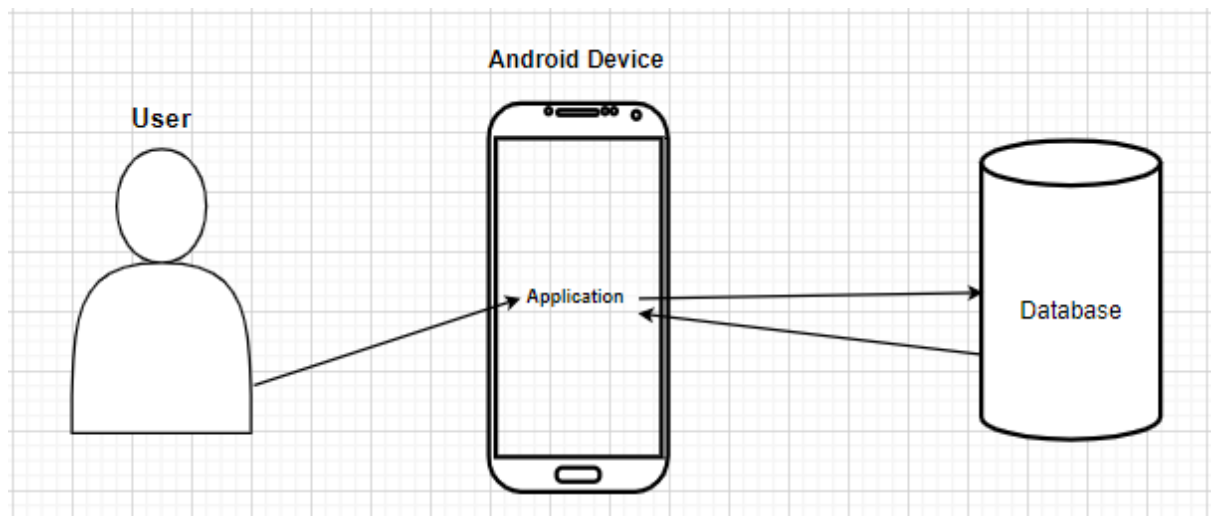


## 2.3. Implementation

In this section I will explain in detail how each of the following functions were implemented in pocketStats. I will also provide a screenshot of my code showing each function.
The functions I will look at are as follows:

### 2.3.1. Firebase

Firebase has been used in previous projects I have worked on in my past 4 years in college. I believe this is a great technology to use as it provides some key features for my application. Firebase allows me to set up Authentication through Android Studio using a Firebase Assistant. This assistant helps me get my Authentication function Working. I can add custom functionality to the firebase login to enhance authentication of users. I can do this by saving additional user details in Firebases addon called Firestore.

### 2.3.2. Login

Using the firebase login saved me a lot of time creating a UI and validations regarding my authentication. In the login screen it consists of 2 text fields email and password and then three buttons Login, Register and a forgot password option.  There is a check to make sure all fields are used to confirm login and a check to make sure details are correct. As you can see in the code Toast messages are used to show messages to the user.

```
public void onSuccess(AuthResult authResult) {
    Toast.makeText( context: LoginActivity.this, text: "Login Success", Toast.LENGTH_SHORT).show();
    checkUserType(authResult.getUser().getUid());

    //Intent intent = new Intent(LoginActivity.this, Coach_Home.class);
    //startActivity(intent);


}
}).addOnFailureListener(new OnFailureListener() {
    @Override
    public void onFailure(@NonNull Exception e) {
        Toast.makeText( context: LoginActivity.this, text: "Authentication has failed", Toast.LENGTH_SHORT).show();
        //hideDialog();
    }
});
```

### 2.3.3. Register

In My Register activity again, I am using Firebase Authentication to register new users. It consists of 4 fields that I am taking in. Name, Email, Password and Confirm Password. I then Have A register button and a Login button. Should a user click Register, it registers the new user then a Toast message appears to confirm that the user is registered and then in my firebase console we can see the new user has been set up with a Unique ID.

| Identifier | Providers | Created | Signed In | User UID ↑ |
|---|---|---|---|---|
| katem@gmail.com | ✉ | May 14, 2021 | May 14, 2021 | 8CHTkMQVfTMp0Ubv7ZyOrsrZGc... |

Again, I have some checks to make sure all fields have data in them to make sure you can't register a new user with empty fields. Another feature in my register activity is my new user registration details are saved to Firestore and in Firestore we can determine if user is a player or a coach. We can see below how the data is put into the Firestore using a document reference.

```
DocumentReference docR = fStore.collection( collectionPath: "User").document(fbUser.getUid());
Map<String, Object> userInfo = new HashMap<>();
userInfo.put("name", name.getText().toString());
userInfo.put("email", email.getText().toString());
userInfo.put("uId", fbUser.getUid());
```

### 2.3.4. Coach Console
On my coaches console the coach that is logged in is able to access various functions in pocketStats. Some of these functions are not available in player's console. I will look at each of the functions in detail and see how they were implemented. The functions available for the coach are as Follows.

- New Game
- Team Stats
- Add\List\ Upload Fixtures.
- Training Drills

- Upload Stats

## 2.3.4.1. New Game

In the New game Activity, the coach is able to track all the players stats live during a game. My new game activity is split into 3 different sections. Firstly, I will look at the players buttons. I have 5 player buttons on the screen, and I have 7 players on my team so in order for the coach to change the 5 players on the court at the start. I have given the coach the ability to click the Subs button and from there the coach can select the 5 players they want on the court and this then updates the text on the buttons to the players that have been selected. The Subs button I mentioned is an Alert Dialog builder this allowed me to have a pop-up screen when Subs was clicked, and coach picks the team. In the below screenshot we can see how the alert dialog builder was created .

```java
private void showTeamSelection() {
    AlertDialog.Builder builder = new AlertDialog.Builder( context: Coach_NewGame.this);
    builder.setTitle("Select Starting 5 Players")
        .setMultiChoiceItems(squad, checkedItems: null, new DialogInterface.OnMultiChoiceClickListener() {
            @Override
            public void onClick(DialogInterface dialog, int which, boolean isChecked) {
                Log.d( tag: "myTag", msg: "show");
                if (isChecked) {
                    startingPlayer[which] = true;
                } else{
                    startingPlayer[which] = false;
                }

            }
        })
```

Then when the coach has selected the 5 players to be on the court and clicks on enter. The text on the buttons in the game will change to players selected . This can be seen below.

```java
Button button = (Button) findViewById(getResources().getIdentifier( name: "btn_Player" + String.valueOf(i), defType: "id", defPackage: "com.shane.pocketstats"));
button.setText(squad[a].toString());
```

I then have a text field in the middle of my screen which I have the result of the player and action buttons being selected . This allows the coach to show what stats have been entered into the game. I have my action buttons working after the click of a player and a selection of the action button this allows the coach to add an action to the relevant player. For Example SarahM + 3pt which then means SarahM scored 3 points and this is then added to the game. Finally I have a save button which saves all the stats gathered during the game into the database and we will see how they are displayed later in the report.

## 2.3.4.2. Team Stats

In this section I have 7 different card views one to represent each player. I have but an OnClick method into each card view so I am able to click a player and it will bring me to the stats for that player. When a card view is clicked it displays all stats for that player in a recycler view layout. I have both the recycler View for the stats of previous games and also have a recycler view header to allow the coach to see what each of the stats refer to.

As seen below we can see the lines of code whereby I am getting my stats from by reading from my stats Database.

```
//intialize stats DB and get stats for the player signed in
    Stats_DB statsDB = Stats_DB.getDbInstance(this.getApplicationContext());
    List<DB_Entity_Stats> stats = statsDB.stats_DAO().getPlayer(player.toLowerCase());
```

I have created a Stats DAO file this is where I am calling my Query to get all Stats as the below screenshot you can see it. Also in the DAO file I have a query to get all stats where name equals player required.

```
@Query("SELECT * FROM stats WHERE LOWER(name) = :playerName")
List<DB_Entity_Stats> getPlayer(String playerName);
```

As seen below this is where I am getting the stats depending what player card was clicked.for example if SarahM was clicked the query gets SarahM's stats for all previous games.

Lastly I have created a DB Entity Stats file and in this file is where I have created my table called Stats and I have all the relevant fields of the data being saved in my database. As seen below in the screenshot we can see an example of how the table is being created . In this file I am declaring all my getters and setters for each row in my table Stats.

```
@Entity(tableName = "Stats")
public class DB_Entity_Stats {

    @PrimaryKey(autoGenerate = true)
    private int id;

    @ColumnInfo(name = "game")
    private String game;

    @ColumnInfo(name = "name")
    private String name;
```

### 2.3.4.3. Fixtures

In this section in the coaches console a coach is able to insert all the fixtures for the upcoming season. In the screenshot below you are able to see how I have implemented the upload to the fixture Database and As you can see on success of the fixtures being uploaded a toast message is created Stating the fixtures have been saved.

```java
public void saveFixtures(String et_Date, String et_Venue, String et_Opponent, String et_Time){

    Room_DB fixDB = Room_DB.getDbInstance(this.getApplicationContext());

    DB_Entity_Fixtures entry = new DB_Entity_Fixtures();
    entry.setDate(et_Date);
    entry.setVenue(et_Venue);
    entry.setTime(et_Time);
    entry.setOpponent(et_Opponent);
    fixDB.fixtures_DAO().insertEntry(entry);

    Toast toast = Toast.makeText(getApplicationContext(), text: "Fixture Saved" ,Toast.LENGTH_SHORT);
    toast.show();
```

In this insertion I am taking in the Date , Time, Opponent and Venue of the fixture. Along with the Fixture Database I have a fixture DAO file that allows me to Query the data in the DB to show all the records in the database. I have created the Fixtures table using a fixture DB Entity file. I have also inserted a recycler view into this activity to allow the coach to see each fixture that has been inserted to the database.

### 2.3.4.4. Training

In this section the coach is able to upload all relevant training drills to the application. The activity has two input fields to take in a type of URL and a URL. The type is referring to 3pt or 2pts and the URL will link a video depending on the area of the type. The coach will then be able to add the URLs and Type to a Database . After creating an Entity file that was the initial creation of the Table called Training. The Training DAO file was used to query the data and show all URLs and Types. I have used a recycler view to display the data to the coach and this allows the coach to see all relevant types that the team need to improve on and then the links are there for assistance in their coaching.

### 2.3.5. Player Console

### 2.3.5.1. My Stats

In this section of my application I have all the stats available to see depending on the user signed in. As you can see in the screenshot below how I am displaying the stats of whichever player has logged in. For example if SarahM is signed in, it will only display the stats that are relevant to SarahM.

```java
Stats_DB statsDB = Stats_DB.getDbInstance(this.getApplicationContext());
List<DB_Entity_Stats> stats = statsDB.stats_DAO().getPlayer(player.toLowerCase());
```

To display the Stats I am using a recycler view. This recycler view this allows me to display all the stats horizontally and they match up exactly with the above recycler view. I am getting these stats from all the stats saved in the Stats Database.

### 2.3.5.2. Fixtures

Fixtures In this section I am giving the player the ability to view all fixtures for the upcoming season. As in the coaches console the coach is able to create new fixtures. But the player is only able to scroll through all the fixtures provided for the season ahead. The Fixtures are displayed in a recycler view (which I have reused form the coaches fixture View) with each record having a new card. So this makes the recycler view look good when displaying many different fixtures it makes them unique. Below you can see how I am getting and displaying the fixtures that have been inserted into the database by the coach.

```java
Room_DB fixDB = Room_DB.getDbInstance(this.getApplicationContext());
List<DB_Entity_Fixtures> fixtures = fixDB.fixtures_DAO().getAll();
```

### 2.3.5.3. Training

Lastly in this final function the player will be able to see all relevant training inserted by the coach. If a coach sees that a player in doing good in a certain aspect of their game. The Coach will then tell the player to take a look at the training in regard to a certain skill type and this will allow the player to improve their game. The Training is very well displayed using a recycler view and it is clearly visible as to what type each URL refers too.

## 2.4. Graphical User Interface (GUI)

Provide screenshots of key screens and explain what can be seen in each one.

**Splash Screen**

This is my splash screen I have designed for my application which appears for a second as the application is loading up.
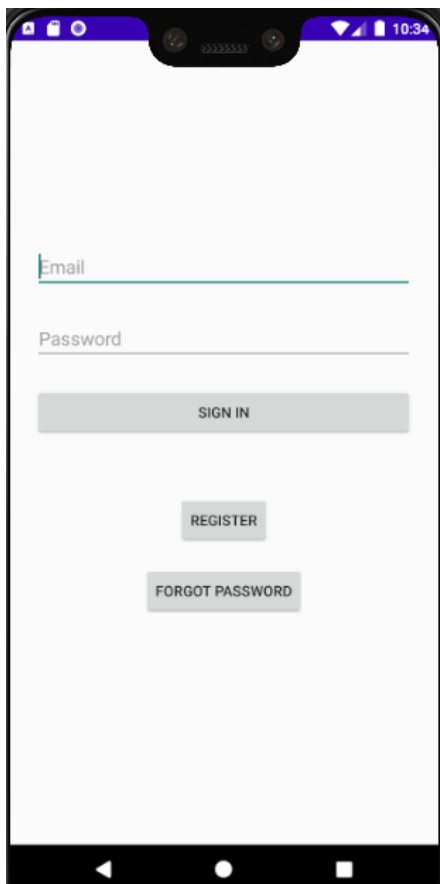


**Login Screen**

This is my login screen. In this activity I have two different edit txt fields to take in the users password and email. Then on click of the sign in button it checks to make sure user is registered and checks is email and password is correct.
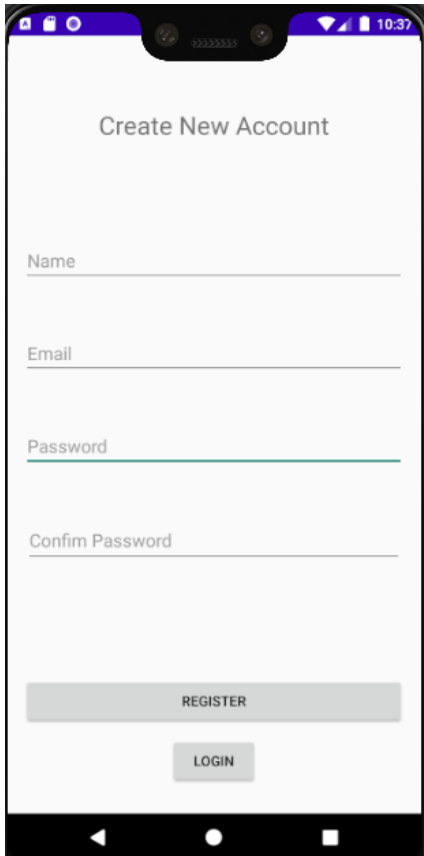
**Register Screen**

This is my Register Activity this is where a user can register for a new account. I have 4 text fields that take in the information on the user and a button register to do the checks that makes sure all fields are full and then takes you to the respective activity.
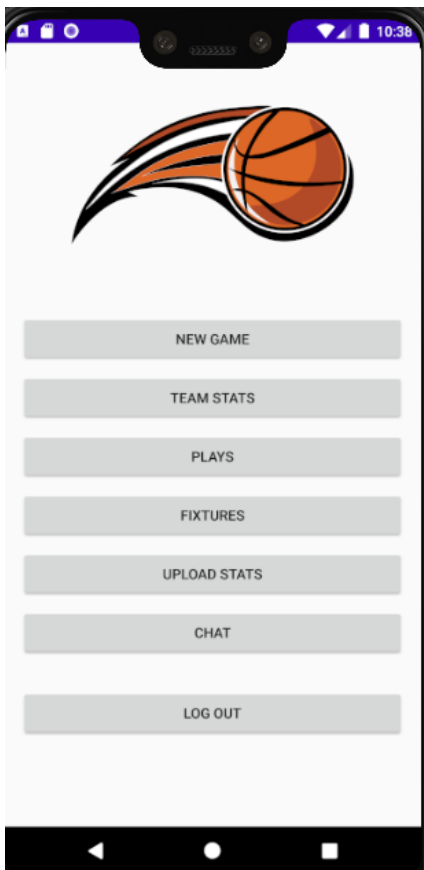


**Coaches Console : Home page**

This my home page for my coaches console with all the relevant buttons to direct you to the relevant activity needed.
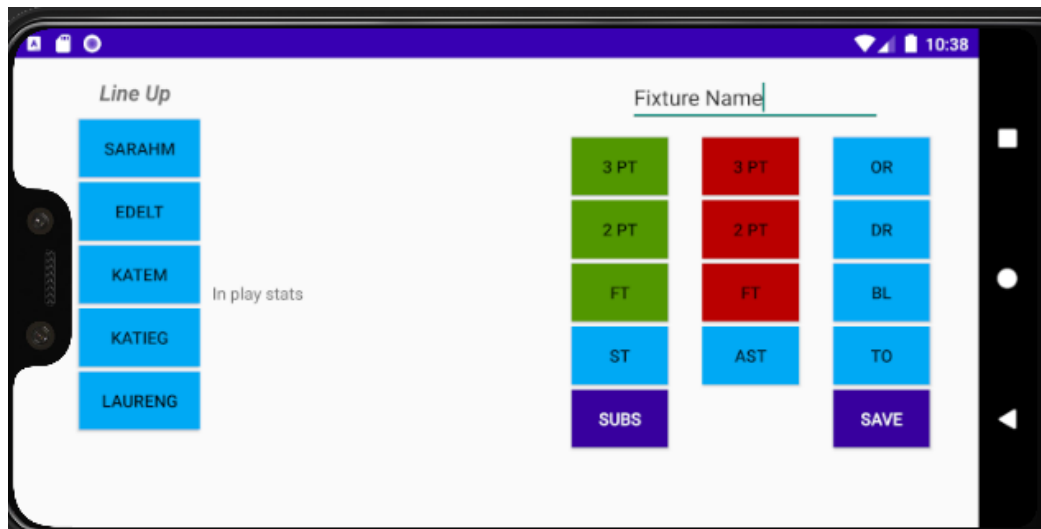
**Coaches Console: New Game Activity**

This in my live in game stats page that allows the coach to take stats live in the game. On the left are the player buttons, the right are the action buttons and in the centre is a text field to display the data to the coach to show what has been entered into the game.
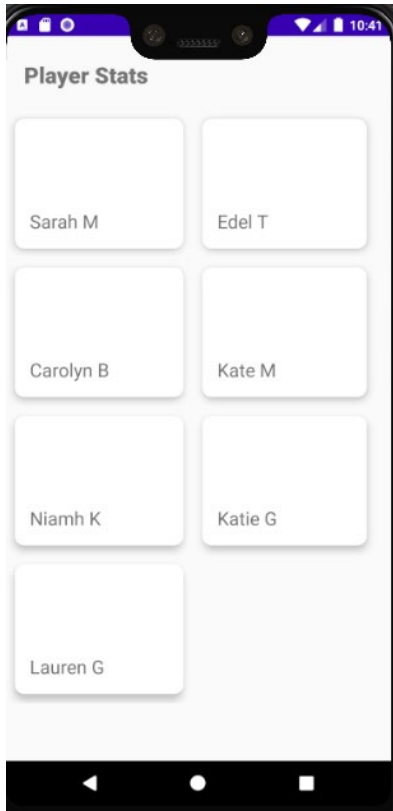
**Coaches Console: Player Stats Activity**

This is my player stats page where a coach can click any of the card view boxes to display all the stats for the player that has been selected.



**Coaches console : Player individual stats view**

This page is where the coach is able to see all the stats for the player selected as we can see the two recycler views used to display the stats and to put a header on the stats displayed.
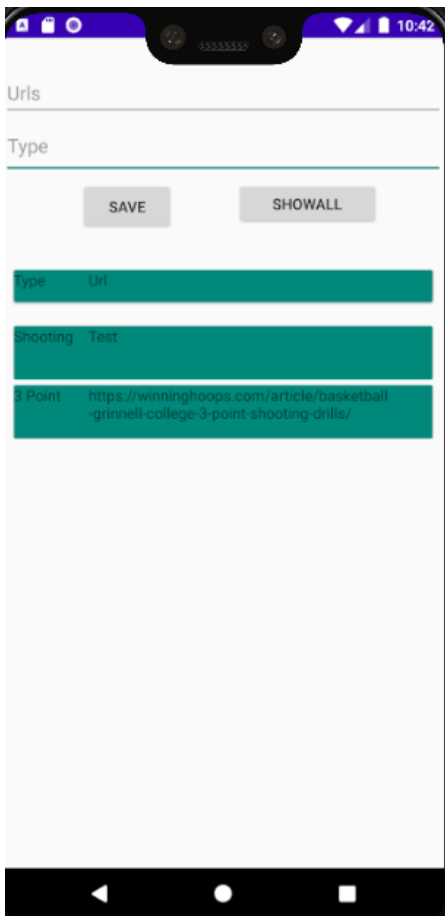
**Coaches console: New Training Drills**

This page is the coaches training drills whereby the coach can insert URLs and their type into a database.
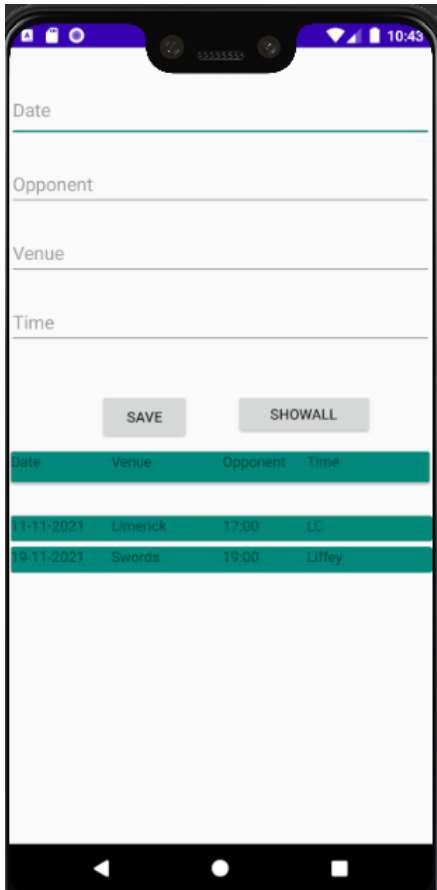
**Coches console: Fixtures**

Here we can see the Fixtures page in the coach's console. This is where the coach can insert the new fixtures into the table.
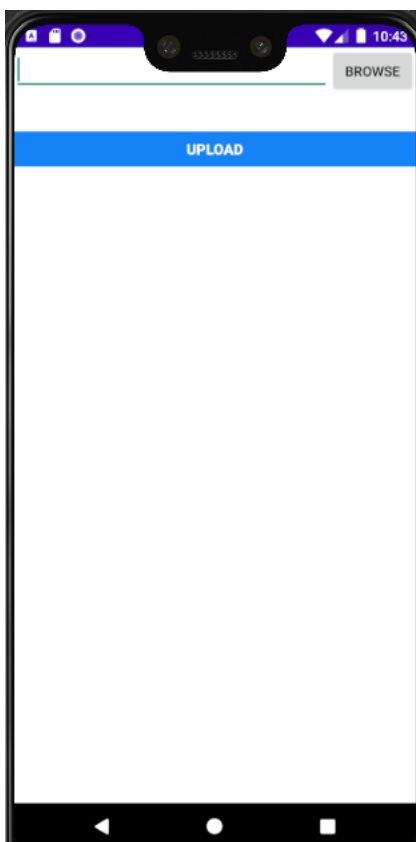


**Coaches console: Upload player Stats**

Here we have the coaches upload stats page. This is where the coach will be able to upload stats from an external source.
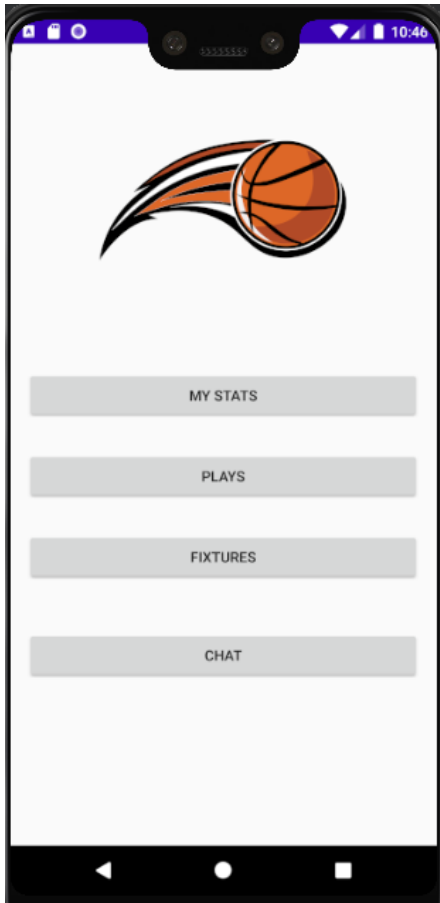
**Players console: Player Home Screen**

This is the homepage of the players console with all the buttons to the available activities.



| FG | 3Pts | 2Pts | FT | Off Reb | Def Reb | Tot Reb | TurnOver | Steals | Blocks | Assists | Pts |
|----|------|------|----|---------|---------|---------|----------|--------|--------|---------|-----|
| 2/7 | 1/4 | 1/3 | 0/0 | 1 | 5 | 1/5 | 0 | 7 | 1 | 10 | 5 |
| 4/8 | 3/5 | 1/3 | 1/2 | 1 | 4 | 1/4 | 3 | 6 | 0 | 2 | 10 |
| 9/16 | 7/11 | 2/5 | 3/7 | 1 | 4 | 1/4 | 3 | 7 | 0 | 7 | 23 |

**Players console: Player Individual Stats**
Here we can see the player consoles activity where the player can see all there stats from all there previous games.
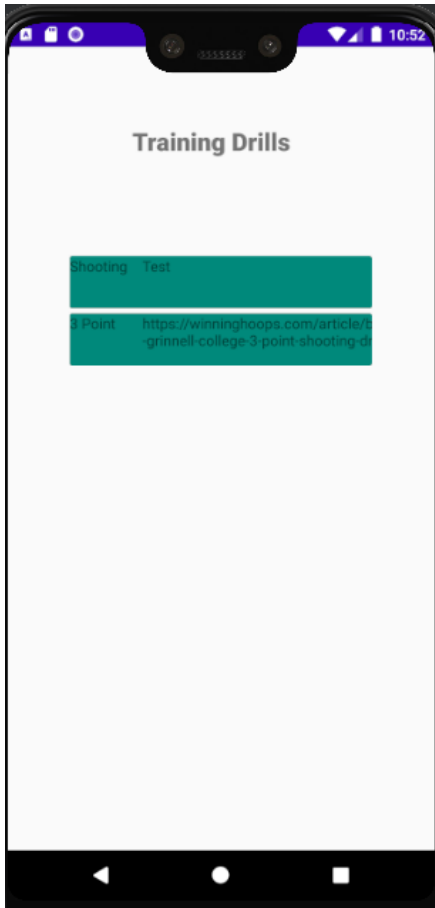
**Players Console: Training Drills**

Here we have the training drills provided by the Coach for the player t look at to improve their skills.



**Player Console: Upcoming Fixtures**

Here we can see that the players will be able to view all the fixtures for the upcoming games in the season.

## 2.5. Testing

Throughout my project I have performed testing to validate some of the methods used in my application. I have used validation to make sure that when a user is registering for a new account. The application goes and checks to make sure all the fields are filled for the user to proceed with their registration. In success of the user registering a new account I have a message that displays stating whether the user has been registered or that they are missing something in one of the fields that are entered. I have also included the validation to check whether the user signing in is a Coach or a player. Depending on the user signing in the appreciate console will appear for the user. The Player console will have some features that the player console will not have.

### 2.5.1. Usability Testing

For this section I tested the Application on three separate users. Each of all are above the age of 20 and all with a keen interest in sport. I first spoke to the user who was going to test the coaches console and asked the user to use the app as they pleased. After that I spoke to the user who was going to test the player side of the application. I told this user to explore the features and I am looking forward to the feedback from both users.

Both Users registered for a new account and were not shown how to navigate through the application and both users are seeing this app for the first time. As both users are beginning the test halfway through the test. The user testing the player console stated that there were all empty fields as no data was appearing. Instantly I remembered I would have to test the coach console and then the player. So, I completed the test with the User testing the coach app and a got another user in to test the player app who again has never seen the application before. But this time in the player test data would be in the application as the coach would have added data.

Feedback from Coach Console:

- Registration was easy and not required to much information.
- I like you can add new fixtures to your application.
- I would like if you could upload stats from an external source.
- Homepage is simple design.
- Easy navigation by using the back button on the device and ages aren't too cluttered.

Feedback from Player Console:

User 2 (no data in application test abandoned)

- Easy Registration process
- Nice layout of the home screen
- All activities are blank.
- Test abandoned.

User 3

- Easy to go through registration.
- Very well laid out design for the display of fixtures.
- I would like for the screen for be landscape for the individual stats page as it would be easy to read.
- I would also like a header on top of the stats to show what each number refers too.

## 2.5.2. Actions

Firstly, on the Coaches console a comment received from user 1 was that it would be nice to get stats from an external source. For example, if a coach received the application after previously keeping stats on his local computer if there was a way to upload those previous stats onto the application it would be great. So, I included a feature that allows a coach to upload Stats from an external source.

Secondly in the Players console I have received some feedback regarding the stats as they are displaying in a vertical display. So, I have changed the layout file to allow the application to automatically change the display to a landscape view and this allows the player to have a clear look at all the player stats.

Lastly in the Players console I received a comment about inserting a header to help determine what each individual record was referring too. So, I designed a recycler view to display all the field names of the records in the database.

## 2.6. Evaluation

I evaluated the app with continuous testing of the components from end to end as they were completed. As follows :

After completing the Registration of a user function I tested it to make sure a new user was created in the Firebase console.

After completion of the log in function a check was done to make sure the email and password were authenticated and also a check was done to make sure all the fields were filled in.

After completion of the new game Activity I tested to make sure the player buttons and action buttons all displayed their data in the text field on the screen . And tested to make sure that the data was being entered into the database.

After completion of the Fixtures Activity and Training Activity  I carried out some tests to make sure that the Fixtures were getting entered into the table and also being able to view the data on the screen. In the players console the same test was carried out to check that the right data was being displayed.

After completion of the Upload Stats Activity I completed a test to check to make sure that the stats from the external source was being uploaded and by the player being able to view all the stats in the database.

After completion of the Individual Stats Activity I done some tests to make sure that the player that had signed into the app was receiving the right stats on their screen.

## 3.0    Conclusions

Describe the advantages/disadvantages, strengths and limitations of the project.

Pocket stats was developed with the purpose of developing an android application for a basketball team to use.

**Advantages**

- This app allows a coach to record and view Stats, Fixtures and preferred Training drills that the team will use all in one place.
- It also allows the ability to upload stats from an external source.

**Disadvantages**

- In the apps current state, it is for a single team usage. This will be rectified in future development with settings to build different teams.

In conclusion this application is very useful for a team both player and coaches

Overall I have really enjoyed developing this application. In the development of the app I included both functional and non functional requirements . As each requirement plays a key role in my application. Coaches and players will be able to find all functionality that they require in the one place rather then having separate apps. In the design of the app I kept in mind the sizes of different devices. All the end to end testing that was done in final stages of development proved to be successful and useful from a certified coaches point of view.

## 4.0    Further Development or Research

With additional time and resources, which direction would this project take?

When it comes to future developments the first thing, I will look at implementing is the chat feature. I had set out on implementing this feature before the deadline but unfortunately, I was unable to complete the implementation of this feature.

Another feature I would include in the feature is to make a couple of changes to application to make it more accessible for a coach to register a team and then the coach inserts their team names into the application instead of what I have currently hard coded into the application.  I will also look at creating a timer and giving the coach be able to control the time of the game as well as keeping stats. This would also be on the lines of taking player minutes to see how long each player is playing.

I plan to implement the above and then put the application up onto the app store available for download. As I do not have the features completed at the moment in the only reason my application isn't on the app store just yet. I really look forward to working on this application in the future.

## 5.0    References

Googles Android Developer Website - https://developer.android.com/

Firebase - https://firebase.google.com/?authuser=0

## 6.0    Appendices

This section should contain information that is supplementary to the main body of the report.

### 6.1. Project Proposal

# National College of Ireland

## Project Proposal

## Pocket Stats

# 07/11/2020

BSc(Honours) in Computing (Part time)

Software Development

2020/2021

Shane McGreevy

X17100917

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## Contents

# 7.0    Objectives

Coach Side of the App:

Being able to successfully sign into the Coach side of the app.

Able to View all stats as a whole team

Being able to analyse the stats.

Be able to see which players are performing or underperforming.

Being able to advise on plays based on stats of previous games. Eg if most points scored are 3 points then advise 3-point plays.

Being able to populate coach's data from stats from an another device.

**Player side of the app**

Able to sign into the player side.

View previous stats from other games.

Being able to view team stats as a whole.

Provide training aspects to where the player has fallen in the stats from previous games.

**Both player and Coach side of the app.**

Implement a chat between players and managers.

Ability to show fixtures for all upcoming games and have option to download these fixtures to your personal devices calendar.


# 8.0    Background

The idea of this app came to my mind as I have a keen interest in basketball. I thought it would be great to create an app related to the game. At first, I had in mind just a specific android app for just taking stats of games but I felt I could use this idea and expand on it greatly.

After looking at several apps in the app store there were many apps with just a basketball stats taker. None of them incorporated my ideas .

To dive into my idea and where my idea came from. Firstly, I will look at the coach side of the app. As mentioned above I am going to create an android app to track basketball stats. A coach of a team will be able to take stats during a game and then be able to view them afterwards for analysis. Another feature that I thought of that I didn't discover in any other apps was when a team are scoring more than 10 3 points in a single game, I am going to

implement something to provide the coach/manager with some 3 point plays for the coaches to try in training and make use of the good 3 point shooters in the team. Also, on the coaches side of the app it will include viewing the stats as a whole in different graphs and data displayed in different forms.

On the player side of the app I am going to build an interface whereby a player logs into their team and all their stats from previous games are made available. The player will only be able to view there stats and I would like in to include some videos specific to when a player is playing poorly and their stats drop in a certain area I would like to provide some training drills automatically to that specific player to help them improve in the areas where the stats have been bad. In my research of other apps in this area I did not discover any app that had such features as my app I am going to build.

The reason for doing this app is because I feel there is potentially a gap in the market for such a app and I believe basketball teams could make use of my app as it will become helpful to coaches of teams. As I am very interested in basketball as a sport, I believe that an app like this would be very useful to teams all around world.

The target audience for my application would be basketball sports teams and clubs. I believe I could promote this application and It may take up a place in the android market.

## 9.0   Technical Approach

My application is going to built in android studio and will be available to 2 different screen sizes. The coach side of the app will be designed for use on an android tablet while the player side will be designed for a mobile device.  The language in which I am going to build this application is Java and I am going to include Firebase to handle the authentication side of the app.

Another technical aspect of my app is I am going to link a database to my application whereby the user can store previous games and results where stats have been collected. Also, I am going to include a chat within the app so all players and managers can access this chat feature. Another feature I am going to provide is when a player or manager can view the fixtures for the season ahead and give them the option to download them to their personal device.

As an end user of this app I would expect the app to be able to provide accurate stats during a game and an easy readable design of the stats after the game. Another feature I would expect as an end user is to be able to navigate easily between the app. To have a drop-down menu to help navigate around the app.


## 10.0  Special Resources Required

For the coaches side of the app there will require an android tablet to input the stats during a game. After which a mobile device will be required to view and analyse stats by both coaches and players.

# 11.0 Project Plan

| Task Name | Duration | Start | Finish | % Complete |
|---|---|---|---|---|
| Planning | 22 d | 10/19/20 | 11/17/20 | |
| Project Proposal | 11 d | 10/25/20 | 11/06/20 | |
| Requirements Spec | 7 d | 11/09/20 | 11/17/20 | |
| Journals Semester 1 | 37 d | 11/12/20 | 01/01/21 | |
| November Journal | 14 d | 11/12/20 | 12/01/20 | |
| December Journal | 24 d | 12/01/20 | 01/01/21 | |
| Prototype and Midpoint | 64 d | 11/17/20 | 02/12/21 | |
| Mid point presentation | 1 d | 12/01/20 | 12/01/20 | |
| Manager prototype | 18 d | 11/17/20 | 12/10/20 | |
| Player prototype | 21 d | 01/17/21 | 02/12/21 | |
| Journals Semester 2 | 96 d | 01/03/21 | 04/30/21 | |
| January Journal | 22 d | 01/03/21 | 02/01/21 | |
| Febuary Journal | 21 d | 02/01/21 | 03/01/21 | |
| March Journal | 24 d | 03/01/21 | 04/01/21 | |
| April Journal | 22 d | 04/01/21 | 04/30/21 | |
| Development | 104 d | 12/01/20 | 04/23/21 | |
| Continuous development | 99 d | 12/01/20 | 04/16/21 | |
| Application testing | 61 d | 01/17/21 | 04/09/21 | |
| Final | 16 d | 04/24/21 | 05/14/21 | |
| Final product and documentation | 11 d | 04/24/21 | 05/07/21 | |
| Final video presentation | 6 d | 05/09/21 | 05/14/21 | |

In the above Gantt chart you can see the tasks and their dates on when deadlines are due. The lines that are in bold colour in the Gantt chart are the heading for each task and you can see how long a task takes. The light blue lines in the graph are the length of each individual task.

# 12.0 Technical Details

As mentioned above I am going to be using android studio and using java programming a language.

Firstly I will plan on designing the UI of the application including both user and coach side of the app.
After I have the UI designed I will begin with the coaches side of the app, get the stats working correctly and information going to the right location. When I get the coaches stats working along with how the stats are being displayed. I am going to put some functionality behind the player side of the app to display data from the stats collected to a specific player.

When the Coaches stats are working correctly, and the stats are being made visible to the players. I will then implement the recommendations to both players and coaches.

The chat feature will also be implemented into my app whereby players and coaches will be able to chat amongst themselves about training and matches and other basketball team related chats. Along with the chat feature I am going to implement a fixture list for the year, and it will give users the option to download the fixtures onto the user's personal calendar on their device. So, the user will never miss a game or training again.

# 13.0 Evaluation

For the evaluation of this project I plan on doing the testing of the software by going to the local basketball club to test out the application. All players have numbers on their kit. So names will not be used only squad numbers

# Reflective Journal

Student name: **Shane McGreevy – X17100917**

Programme: **BSc (Hons) in Computing Evening – Software Development – BSHCSDE4**

Month: **October 2020**

## My Achievements

### October 2020

I put a lot of time into searching for a project idea. Any idea that I came up with I always wrote it down on my phone but when it came down to decision day, I wasn't sure the ideas I had were technical enough. In the end I decided to create an android app for a basketball manger to be able to track statistics of their players and be able to view the data easily.
I also created a project pitch video stating what I intended to do in my project and submitted it to be reviewed.
In the month of October I was also assigned my supervisor and I am looking forward to working with them.

## My Reflection

Searching for a project idea was a lot harder than I thought it was going to be. I came up with many ideas but had to think to myself would they be technical enough and I finally came up with the idea of a basketball statistics team app.

When it came to my project pitch video I have never done something like this before and I felt nervous in doing this but I feel I done a good job with the end product.

I have been assigned my supervisor for my project and I will now just wait for my project to be approved or denied.

## My Next Actions

In the next month I am going to complete my project proposal and start with the actual project itself. I am also looking forward to speaking to my supervisor about my project to get their views and point out where I can improve in certain areas.

# Reflective Journal

Student Name: **Shane McGreevy – X17100917**

Programme: **BSC (Hons) in Computing Evening – Software Development – BSHCSDE4**

Month: **November 2020**

## My Achievements

November has been a truly busy month with all other subjects with many other CA's due in the previous month. I was able to complete other CA's within the given time frame and all submitted on time. I also had a meeting with my supervisor which was good to gather his feedback on my project ideas. In the past month I have drawn out some potential ideas of how I would like my Application to look like. In the last couple of weeks of the month I was able to give my app some time as I got some CA's submitted. Another achievement within the month of November was receiving a good score in my strategic management module in which I was happy enough with.

## My Reflection

Looking back on the month of November it has well and truly been a crazy month. It was a very busy month containing many CA submissions and deadlines. I have been working on all my modules, but I am trying to juggle them with regards to the deadline date as some Ca's need to be completed earlier than others. This has led to some late nights within the last month. Another reflection on the last month was I received my grade for a pestle essay in strategic management and this was the first of a kind assignment since beginning of 3$^{rd}$ year. It has been a very long time since I have done an essay and proper referencing and I believe the grade I was given I am happy how it went. One thing that I felt hard was knowing you were coming to the end of one CA and knowing the amount of work still left to do in other CAS that was difficult. But I fell I am managing well.

## My Next Actions

My next actions are to start working on my software project and start implementing the drawing I have made and create a working UI for my presentation in December. I am also going to finish off 2 other CA's I have in the early stages of December to be able to fully focus on the Software project. I will also arrange a meeting with my supervisor in the early stages of December and show him some of the progress I have made in my App.

# Reflective Journal

Student Name: **Shane McGreevy – X17100917**

Programme: **BSC (Hons) in Computing Evening – Software Development – BSHCSDE4**

Month: **December 2020**

## My Achievements
November has again been a busy month with deadlines and progress with my project. I completed another android application for another module, and I have been planning for my TABA Assessments. All My Cas have been submitted on time once again and my most difficult found module data application development has been completed. It was one of the most challenging modules to date. I have made some progress in my software project with more progress to be made in the coming weeks. I also had my midpoint presentation video to do in December. In this presentation I showed my progress to date.

## My Reflection
Looking back on the month of December it has been crazy with Assignments, Covid and Christmas. But I was still able to stay on top of all my deadlines. I was able to complete the module I found most difficult and I am happy at the effort I have put into the module. I would have like to put in more time into my software project, but I plan in using the time off in January to get it into a good place.

## My Next Actions
My next actions for the month of January are to firstly complete my two TABA assessments. Then I will dive into my software project and get it up to where it needs to be at this stage. Make up for the lost amount of time over the past couple of months.  They are my aims for a good start to 2021 and plan to keep the progress going over the next number of months.

# Reflective Journal

Student Name: **Shane McGreevy – X17100917**

Programme: **BSC (Hons) in Computing Evening – Software Development – BSHCSDE4**

Month: **November 2020**

## My Achievements

January has been a quiet yet very busy month. To begin with I successfully completed my TABA assessment at the start of January that were quite different to the usual end of semester exams, but I really preferred that format of assessment. I then gave myself a week break just to ease the mind. I than dived int my software project getting a good chunk of work done in it. I no have a functionally working Authentication using Firebase. I have my application linked up to a room database storing the fixtures of the games ahead. Finally, the last achievement was receiving a good grade in my midpoint and I am truly very happy with that result.

## My Reflection

Looking back on the month of January it was at more relaxed than the previous semester. Just knowing that I had my TABA assessments in the beginning of the month. Followed some time to get a good chunk of my software project completed. We have also started 3 new modules in the month of January and so far, they have been very interesting. One which is Cloud Application Development. I really do like this module and feel it will be very interesting as the semester goes on. In terms of my software project, I am happy with my progress with it and have a clear plan of what needs to be done and when it needs to be done. I have set myself targets over the coming weeks so I can get as much of the project completed as early as I possibly can.

Looking at the other modules I have started this semester with more projects and Assignments. I have already completed CA1 of Usability design, so I am happy how I am dividing my time. In relation to course work and project work.

## My Next Actions

My Next actions for the month of February have been set in terms of goals. I have set then to different dates in the month of February to keep hitting my targets and getting the work done. Firstly, I am going to finish of my group project for Usability Design. I am then going to get a good start to my Cloud Application Development Project. I plan on meeting my supervisor to show them the progress I have made on my project and speak about the midpoint result. In terms of my software project, I am aiming to have my Coaches console completed come the end of February leaving an additional 2 features in the player console to complete. I am really looking forward to getting more into my software project as the

feeling you get when you hit your goals and you see the application coming together. It really makes you feel proud about your work.

# Reflective Journal

Student Name: **Shane McGreevy – X17100917**

Programme: **BSC (Hons) in Computing Evening – Software Development – BSHCSDE4**

Month: **February 2021**

## My Achievements

February has been a busy month when it comes to the workload of semester 2. I have almost completed my Usability Design project 2 weeks earlier than the submission deadline. I have also made really good progress in my ruby on rails project. Also, when I look at the progress on my software project, I now have a working authentication page followed by a Fixtures page that allows you to see the list of features stored in the database. So, the database is connected successfully and it is also displaying the data from it in my app. I have the data displaying in a recycler view, so it gives a good look to the page of the app. I also met with my supervisor to discuss my progress on the software project and we set some targets for the next month ahead.

## My Reflection

Looking back on the month of February it was planned to be a very productive month but to be honest I have made progress in other modules but not as much progress I would have liked in my software project. As I have gotten a good chunk of work done in other projects this will then allow me to spend more time on the software project and start to really progress this one. February has been a very fast month and with learning the new modules have been interesting and always when it comes to setting up new software on my laptop it never goes smoothly. But now that I am up and running and have everything set up, I will be able to progress in all my projects and get them all finished before the deadline ahead. When looking back at the targets set with my supervisor not all of them were hit but I am not to far off completing the targets that were set. It was just about time management between all the subjects.

## My Next Actions

My next actions are to complete my projects as early as I can which gives me plenty of time to focus on the software project and make some good progress on it. The software project has some similar features so once they are completed it will be easy to make some good progress on the app. I will also arrange a meeting with my supervisor to set some new

targets and to take any comments he has for me on board. The next couple of weeks will be busy but I am ready for what the next couple of weeks have ahead.

# Reflective Journal

Student name: **Shane McGreevy – X17100917**

Programme: **BSc (Hons) in Computing Evening – Software Development – BSHCSDE4**

Month: **March 2021**

## My Achievements

### March 2021

Through out the month of march it has been a very busy month. With the end of the semester in sight I still had 3 projects remaining to complete as well as the final year project. Firstly, looking at Usability Design me and my classmate completed our project before the deadline and this allowed us to dedicate more time to our other two modules with projects still due. Secondly Distributed systems was due also in the month of March. This project was very challenging at times but got to the end of the line with a good effort and a working application. Lastly Looking back on the month of March Cloud Application Development Project is due in early April and as I have already a good chunk of it done, I plan to complete it before the deadline and get it submitted early. Another achievement in the month of March I created my Project showcase profile and was told that my profile was ready to be published to the showcase website in May.

## My Reflection

Looking back at our module Usability Design it has really improved my knowledge of usability design and I will be able to bring this knowledge into any further projects that I will be working on. It will also help me out in the real world working on different projects. The Module of Distributed Systems was very challenging at times, but I am happy and feel that I put in a good effort at creating a working application in ruby on the rails. I really enjoyed learning this language and once I got the hang of it was enjoyable to use. But like any new language in the beginning, it is always tricky to grasp. The work I have put into my Cloud Application Development project I feel has put me in a good place to complete the project in the coming days as I have a good chunk of the work already done. Unfortunately, not as much of my Software project was completed as I would have liked but As I have the whole of April to finish it off this will allow me to complete all features and documentation required.

## My Next Actions

In the next month I am going to first complete my Cloud Application project as this will be the last submission of my semester 2 modules then I will be able to give 100% attention to my Software project. I will then begin to see progress day by day and have the project and documentation completed before the project is due.

# Reflective Journal

Student name: **Shane McGreevy – X17100917**

Programme: **BSc (Hons) in Computing Evening – Software Development – BSHCSDE4**

Month: **April 2021**

## My Achievements

### April 2021

April has been a very busy month with a lot of achievements also included in the month. Firstly, I completed my project in Cloud Application development and learned a lot in ruby on rails development. Secondly I hit many of my goals in relation to the my software project so overall I was happy how the month went.

## My Reflection

Looking back at the previous month which was one of ups and downs It started of a great month with the progress I was making in my final module project. Then I was coming to end of the Distributed systems project and the NCI Systems got hit with an IT attack. Which halted the project for a couple of days. I used these days to do some research for certain features I was going to include in my Software Project. Overall, in the month of April it was successful bar the few days of the IT issue but I made them days count by doing some other work.

## My Next Actions

My Next actions for the remaining couple of weeks are finalise my project code and to finish of my Technical report. I don't have to much more work to do in my software project, but I am happy how progress has been going. I will also meet with my supervisor for one final time before the final submission.