CmpE 451
Fall 2019
Milestone 2

Group 4
Bahadır Hocamoğlu
Baturalp Yörük
Cemal Aytekin
Elif Çalışkan
Ege Başural
Emre Demircioğlu
Gürkan Demir
Levent Baş
Muhammed Bera Kaya
Taha Eyup Korkmaz

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1 Executive Summary

1.1 Project Introduction

Our project Arken's aim is to establish an environment that users can socialize with each other, get information about any trading equipment, read articles and find out about economic events and also share their ideas about economic events and articles. There are three types of users in this project: Guest user-not registered-, Basic user and Trader.

Guest users can get information about any trading equipment, event or article. They can search users, trading equipment, events or articles. Basic users can make comments, chase events, create portfolios, rate articles, manually enter investments, make predictions about any trading equipment and follow users in addition to guest user's abilities. Their prediction rate for any equipment can be seen by other users. A user's profile can be private. Traders can make investments onsite with the IBAN number that they provide. Every user has profit/loss section and it shows the user's profit based on user's transactions with respect to the chosen trading equipment. Users can make annotations about events, trading equipment, articles etc.

Events have significance levels which represents their importance. Also events can have numeric values about the related trading equipment. Events can be filtered based on their significance level or country that it belongs. Articles can be rated, commented and shared by users.

Trading equipment should have functionalities such as: the previous close, percentage change with the percentage close, amount change with the previous close, day's range and moving averages.

The system provides semantic search and makes recommendations about articles or trading equipment based on their user history.

1.2 Work Done So Far

We have already designed our mockups, class diagram, sequence diagrams and use case diagram in the previous course, CmpE352. We also have analyzed the requirements then, so we only had to review and update them wherever we see necessary. We've also revised the requirements according to the our customer's feedback on our milestone 1 report.

We've implemented some basics of our project; login/signup functionalities, listing events and trading equipment, on the first milestone. We had to reschedule some work about trading equipment into the second milestone. Besides that, our project plan for the first milestone were followed successfully.

We planned the follow system, searching, comment, trading equipment follow and prediction, user portfolio and profile features for the second milestone. Almost all of those features have been implemented as planned, with user portfolio missing on our frontend and some other small features on articles such as rate and edit an article are missing on mobile application. All the missing features and rest of the project is rescheduled for the final milestone. While im-

plementing the planned features for milestone 2, we followed our requirements such private profiles and follow request confirmations. Besides the implemented features, we changed our mobile application's overall design such as coloring and menu tabs. In addition, we designed a project logo for our project so as to evolve our project to a professional application. We are sure that the final product will be ready upon the final milestone presentation and our customer will be satisfied with our product.

1.3 Planned Changes

Based on the feedback of customer in the second milestone, we are planning to:

1. Increase comment text size,
2. Add the population of users who made trading equipment prediction,
3. Delete the pending request of user,
4. Revise the concepts of currency and parity for following trading equipment,
5. The time when predictions are calculated should be selected for international purposes,
6. Frontend placeholder profile picture should not define any race or gender.

Also based on the comparison to other groups, we can discuss:

1. Making comments editable,
2. Rating articles,
3. Adding notification when someone follows

Besides the rescheduling of some of the features for the final milestone mentioned above, there aren't much to change in the project plan.

2 List and status of deliverables

Deliverable	**Status**
Trading Equipment	Done
Comment	Partially Done
Search	Partially Done
Article	Partially Done
User Profile	Done
User follow	Done
Trading Equipment Follow	Done
Trading Equipment Prediction	Done

Table 1: List and status of the deliverable in Mobile

Deliverable	Status
Trading Equipment	Done
Comment	Done
Search	Partially Done
Article	Done
User Profile	Done
User follow	Done
Trading Equipment Follow	Done
Trading Equipment Prediction	Done
Deployment	Done

Table 2: List and status of the deliverable in Backend

Deliverable	Status
Trading Equipment	Done
Comment	Partially Done
Search	Partially Done
Article	Done
User Profile	Done
User follow	Done
Trading Equipment Follow	Done
Trading Equipment Prediction	Done
Deployment	Done

Table 3: List and status of the deliverable in Frontend

3 Evaluation of the status of deliverables and its impact on project

Trading Equipment: In milestone 1, this part was partially implemented. In this milestone, we made the trading equipment in list clickable and in the following page, we show the graphic with previous values of that parity based on the selected period. Frontend and mobile teams finished implementing trading equipment page. In this context, user have a chance to observe previous values of specific trading equipments with respect to another currency(EUR or USD), and reads comment related with that parity.

Comment: For any event or trading equipment, a registered user can read comments, make a comment and delete his/her own comment. A guest user can just read the written comments. We plan on making the name above the comment clickable so that user can see the profile of the writer. Frontend and mobile teams finished implementing this functionality for trading equipment and events. But we will add comments in articles too. In this context, other users have a chance to observe other users' ideas related to that parity or specific

event.

Search: A user can search users, articles, events and trading equipment. Our backend team implemented an endpoint for it which takes a text as an input and returns all corresponding results for that four parts at the same time. As mobile and frontend, we are showing them to users after separating those results to make it more readable. We have not implemented the search part for articles since we hadn't have them as a whole before milestone, but we can implement it now since we have it. For now, fuzzy search is implemented, but in the future semantic search will be implemented using 3rd party API.

Article: Article is text written by user about trading equipments, parities etc. A registered user can share his own ideas about them, by writing an article. Other registered users can read and rate that article. Guest user can only read article, they can not make comment or rate specific article. In this context, users have a chance to observe other individual's thought about specific equipment, or parity.

User Profile: User profile is a page where all fields about that user is placed. In user profile, user can see following, followers, followed trading equipment parities, articles, portfolios, prediction rates etc. User profile can be either public or private. So, in order to see contents of private user profile there must exists a follow relation.

User Follow: Registered user can follow other users in order to trace their articles, followers, followings, portfolios etc. As we said above, user profile can be either public or private, which means for a private profile in order to access user's portfolios, following trading equipments etc follow request must be sent, and owner of that profile must accept it. But for public profiles, other users can see fields of that user no matter there exists a follow relation or not.

Trading Equipment Follow: User can follow trading equipment in both mobile and frontend. Also, user can see her followed trading equipment at her profile page in frontend but not in mobile for now. In this context, user have a chance to trace parities' values easily.

Trading Equipment Prediction: In profile page, users have a field named prediction success rate. Registered users can predict parities next day's values about whether it increases or decreases. According to next day's value, system checks whether user's prediction is true or not. In this context, higher success rate means that user has good knowledge about economics.

4 Summary of coding work done

Member Name	**Work Done**
Bahadır Hocamoğlu	Implemented searching functionality for users, trading equipments, events and articles. Added HTTPS options for our API and website. Added request body validations to some of the already-implemented endpoints. Added middleware-level validations for some of the models. Implemented some utility middlewares to our tool set.
Baturalp Yörük	After I got more familiar with Android after the tasks that I have done for Milestone 1, I contributed more to the Milestone 2. I implemented the event filter functionality which takes country and importance as parameters, via using the corresponding endpoint. After implementing it, I changed its design after the feedback from my teammates to make it more compatible with the rest of the page. Finally, I implemented the search functionalities for events and trading equipment using our semantic search endpoint, which lists the results according to user's input dynamically. Those results for events and trading equipment are shown on different parts of viewPager.

Cemal Aytekin	Organized our 'utils' and 'index' file for a better initialization performance. Implemented prediction system in order to make registered user to make a prediction on a specific trading equipment as its value will either increase or decrease. Also implemented a function to calculate registered users' general prediction rate in order to show it on their profile pages. Implemented article feature in order to make registered user to share their ideas and thoughts about finance in text format or rate other users' articles. Implemented edit profile endpoint in order to make registered user to edit some of their personal information. Finally implemented portfolio system in order to make registered user to create portfolios and share them on their profile page. Also provided users to add trading equipment into their portfolios.
Elif Çalışkan	Implemented comment functionality as a fragment and added the layouts to events and trading equipment. Added delete comment functionality. Created general search layout with viewpager and linked them with navigation graph. Added user search functionality and made the results clickable. After reaching the profile pages, I checked if the user is public or private along with the following information. I added follow button to profile page and added related API requests. I created a dialog fragment for pending users and added accept or reject functionalities. Also if the user is public or a followed user, the follower/ following lists can be seen as dialog fragment.
Ege Başural	Created trading equipment page and constructed trading equipment chart. Added follow feature for trading equipment. Modified layout of profile page and made some minor changes about user follow logic. Added responsive lists that directs to related pages to profile page. Constructed redirection to article creation page from profile page. Managed redirection of home page to economic events page, because home page isn't initialized yet.

Emre Demircioğlu	Implemented trading equipment detail page. Added trading equipment follow and prediction functionalities along with their confirmation pop-ups. Implemented trading equipment graph. This graph has price indicator, that shows up on click, and a scaling bar below to change time range. Implemented my articles page for a user to see his/her articles and view specific article page that redirects from my articles page. Also connected it to create article dialog. Changed trading equipment detail and article detail pages to scroll view to make them user friendly. I helped Baturalp to solve filter event functionality bugs and Elif to solve search fragment navigation bugs.
Gürkan Demir	Implemented comment endpoints, in order to make registered user to comment on specific a trading equipment or specific event. Implemented endpoints for follow system. In this context, user can follow, unfollow, request to follow, accept follow request or reject follow request. Enlarged information that is supplied in profile endpoint, also change the profile endpoint response according to follow system. In this context, user can see everything about himself in his profile page. Moreover user can see some attributes like articles, followers etc according to follow system. Beside of those, added body validators for some post and patch methods in order to response in more adequate way. Reviewed other team member's codes in articles, predictions and took necessary actions. Also, fixed bugs in some endpoints.
Levent Baş	I created the initial version of Profile page in which the logged in user's basic information is shown. I created the welcoming page to show potential users what Arkenstone is all about. I created the write article feature using Retrofit to use backend endpoint related to article creation. I created a logo with different colors to be used on both mobile and frontend. I re-designed our whole mobile application using the logo I designed and a new color palette and theme. I updated our README page to include our logo and badges to show the current progress of our project alongside with the deployment steps to run the application both on mobile and on web.

Muhammed Bera Kaya	I added filtering and sorting features to "Events" page.I created the page where details of an event are shown.I added links to details pages from the "Events" page. I created the "article details page" where an article is displayed.Then,I added the article rating feature (for logged-in users) to this page.Besides, I adjusted this page so that a logged-in user can edit the article if it is his/her own article.I also created the page where a logged-in user can create a new article.I created the "Comments" component which would be used in "event details", "article details" and "Trading equipment" pages.In this component, the user can read comments, send comments(if he/she is logged in), and delete his/her own comments.I added these components to "event details" and "trading equipment" pages.I added "prediction" feature to "Trading Equipment" page.
Taha Eyup Korkmaz	After getting familiar with the JavaScript, I added the new routers for other users' profiles and our profile separately and added follow/unfollow buttons using the endpoints. We had a cookie problem but Ege solved. After finishing the follow/unfollow and show them to users according to their following status and public profile status; Ege also kinda changed the layout of the profile page later too. I also added the user action, router of the follow unfollow actions and added a search bar to the header that also replaced by a different one later.

Table 4: Summary of work done by each team member

5 Requirements

5.1 Glossary

- **Application:** The whole project as seen by guests, members and users.
- **Article:** Text written by user about trading equipment.
- **Basic User:** Signed up user who can't perform investments inside the application, can be chosen during sign up.
- **Comment:** A body of text, image or links shared in response to an article.

- **Database:** An organized collection of data.
- **Day's Range:** The range in which a trading equipment traded. For example, a day's range that reads "48.50-51.25" means that the lowest price the trading equipment reached that day was $48.50/share and the highest price was $51.25.
- **Event:** Events about economy that occurred and posted inside the application, will have a numeric result.
- **Followed User:** A user who accepted other users following request.
- **Following User:** A user who's following request has been accepted by other user.
- **Guest:** Unregistered person.
- **Moving Average:** A succession of averages derived from successive segments (typically of constant size and overlapping) of a series of values.
- **Profile Page:** A page where user can see information about user and additionally change the information if it's their own profile page.
- **Prediction Rate:** A rate showed on user's profile page, calculated by their past predictions.
- **Previous Close:** What the price of a trading equipment was when the market closed on the previous trading day.
- **Semantic Search:** A prediction system to improve search accuracy by understanding the searcher's intent and the contextual meaning of terms as they appear in the searchable dataspace.
- **Significance Level:** A rating system that describes the importance of an event.
- **System:** The whole project, including design and functionalities.
- **Trading Equipment:** Indices, stocks, ETFs, commodities, currencies, funds, bonds and cryptocurrencies.
- **Trading User:** Signed up user who can make investments inside the application, can be chosen during sign up.
- **User:** Registered basic user or trading user.

5.2 Functional Requirements

5.2.1 User Requirements

5.2.1.1 Guests

- **5.2.1.1.1** Guests shall be able to search economic events, articles and trading equipment.
- **5.2.1.1.2** Guests shall view the price of trading equipment.
- **5.2.1.1.3** Guests shall read comments about trading equipment.
- **5.2.1.1.4 Registration**
  - **5.2.1.1.4.1** User shall be able to choose between basic user and trading user.
  - **5.2.1.1.4.2** Basic user shall provide name, surname, email and password.
  - **5.2.1.1.4.3** Trading user shall additionally provide IBAN and TC identification number.
  - **5.2.1.1.4.4** User shall provide location with Google Maps.
  - **5.2.1.1.4.5** User shall validate account via e-mail.
  - **5.2.1.1.4.6** Users shall be able to register via their Google accounts.

5.2.1.2 Registered Users

5.2.1.2.1 Login

- **5.2.1.2.1.1** User shall login via email and password provided upon registration.
- **5.2.1.2.1.2** User shall login via Google account.
- **5.2.1.2.1.3** User shall be able to reset password if they forget it, by clicking "Forget password?" button. An email containing the link for resetting password is sent. User resets its password by using the link that can be used only once.
- **5.2.1.2.1.4** Users shall be able to logout.

5.2.1.2.2 User Follow System

- **5.2.1.2.2.1** User shall be able to follow other users.
- **5.2.1.2.2.2** User shall be able to send following request to other users who have private profile.
- **5.2.1.2.2.3** Users shall be able to accept or reject following requests.
- **5.2.1.2.2.4** User shall be able to be followed by another user upon accepting their follow request.

5.2.1.2.3 Trading Equipment

- **5.2.1.2.3.1** User shall be able to follow trading equipment.
- **5.2.1.2.3.2** User shall be able to set alerts for certain levels and certain percentage change of trading equipment.
- **5.2.1.2.3.3** User shall be able to comment on trading equipment.
- **5.2.1.2.3.4** Trading user shall be able to invest in trading equipment.
- **5.2.1.2.3.5** User shall be able to make prediction on trading equipment details page.

5.2.1.2.4 Profile

- **5.2.1.2.4.1** User shall have a profile page.
- **5.2.1.2.4.2** Profile page shall have the general prediction rate of the user.
- **5.2.1.2.4.3** User shall be able to choose to be public user or private user.
- **5.2.1.2.4.4** Private users profile page content other than prediction rate shall be seen only by following users.
- **5.2.1.2.4.5** Public users profile page content including name, surname, location, articles and portfolios shall be able to be seen by all other users.
- **5.2.1.2.4.6** Users shall see and edit their personal information including name, surname, location, IBAN, TC identification number and password in profile page.
- **5.2.1.2.4.7** Users shall view their old actions including portfolios and articles on their profile page.
- **5.2.1.2.4.8** Users shall be able to reach their own followers and followings list in their profile page.

5.2.1.2.5 Articles

- **5.2.1.2.5.1** User shall be able to share ideas only in text based about trading equipment as articles.
- **5.2.1.2.5.2** User shall be able to comment on articles.
- **5.2.1.2.5.3** User shall be able to rate articles, from 1(worst) to 5(best).

5.2.1.2.6 Portfolio

- **5.2.1.2.6.1** User shall have at least one portfolio.
- **5.2.1.2.6.2** User shall be able to have different portfolios.
- **5.2.1.2.6.3** User shall be able to rename portfolio.
- **5.2.1.2.6.4** Users shall be able to add trading equipment to portfolio.
- **5.2.1.2.6.5** Users shall be able to remove trading equipment from portfolio.
- **5.2.1.2.6.6** User shall be able to share portfolio in profile page.
- **5.2.1.2.6.7** Other users shall be able to follow other public user's portfolio.
- **5.2.1.2.6.8** Users shall be able to create their portfolios.
- **5.2.1.2.6.9** Users shall be able to delete their portfolios.

5.2.1.2.7 My Investments Page

- **5.2.1.2.7.1** Trading users shall have "My Investments" page.
- **5.2.1.2.7.2** Trading users shall be able to invest on trading equipment in "My Investments" page.
- **5.2.1.2.7.3** Trading users shall be able to create a buy order for a trading equipment for a specified rate in "My Investments" page.
- **5.2.1.2.7.4** Trading users shall be able to set stop/loss limits on trading equipment in "My Investments".

5.2.1.2.8 Profit/Loss Section

- **5.2.1.2.8.1** Users shall have a profit/loss section.
- **5.2.1.2.8.2** Profit/loss section shall be private to each user.
- **5.2.1.2.8.3** User shall be able to see profit/loss in terms of currency chosen by user.
- **5.2.1.2.8.4** Users shall be able to manually enter investments to see calculated profit/loss.
- **5.2.1.2.8.5** Profit/loss section should include investments made in the platform by a trading user when calculating profit/loss.

5.2.1.2.9 Events

- **5.2.1.2.9.1** Users shall be able to see events fetched from third parties.
- **5.2.1.2.9.2** Users shall be able to comment on events.
- **5.2.1.2.9.3** Users shall be able to filter events by its currency, significance level.
- **5.2.1.2.9.4** Users shall be able to set an alarm to a specific event

5.2.2 System Requirements

5.2.2.1 Trading Equipment

- **5.2.2.1.1** System shall provide following functionalities for a trading equipment:
  - **5.2.2.1.1.1** Previous close
  - **5.2.2.1.1.2** Percentage change compared to the previous close
  - **5.2.2.1.1.3** Amount change compared to the previous close
  - **5.2.2.1.1.4** Day's range
  - **5.2.2.1.1.5** Moving averages

5.2.2.2 Recommendation & Notification

- **5.2.2.2.1** System shall recommend users, portfolios, articles and trading equipment to users based on their history of search, trading equipment interactions and follows in the system.
- **5.2.2.2.2** System shall provide a notification mechanism which lets traders to get notified (or alerted) about certain levels of trading equipment.
- **5.2.2.2.3** System shall provide a notification settings interface that lets traders set their notifications about certain levels of trading equipment and success of their buy/sell orders.
- **5.2.2.2.4** System shall notify trading users according to a transaction that is made because of the stop/loss limit.

5.2.2.3 Search

- **5.2.2.3.1** System shall provide searching for users, trading equipment, articles, and economic events.
- **5.2.2.3.2** System shall support semantic search.
- **5.2.2.3.3** System shall sort events in search results by their significance level.
- **5.2.2.3.4** System shall also sort users according to their general prediction success rate.

5.2.2.4 Events

- **5.2.2.4.1** System shall have events page which contains economic events.
- **5.2.2.4.2** System shall be able to provide different significance levels for events. The assignment of significance levels might be done by an external API.
- **5.2.2.4.3** Events shall have numerical results.

5.2.2.5 User Authentication

- **5.2.2.5.1** An email verification link shall be sent to the users' email address for verification. After clicking the link, users' email address shall be verified.

5.3 Nonfunctional Requirements

5.3.1 Security and Reliability

- **5.3.1.1** User data shall be processed according to 'Law on the Protection of Personal Data (KVKK)'.
- **5.3.1.2** User's password shall be stored with encryption in the database.
- **5.3.1.3** User shall get notification emails when changing their password.
- **5.3.1.4** Weekly backups of every table in the database shall be taken in order to ensure data is safe and sound.
- **5.3.1.5** In case of server failure or any other need, the system shall be restored with the latest backup. Also, the data of the financial transactions that occurred after the time that backup is taken shall be recollected from the financial institutions involved.

5.3.2 Performance

- **5.3.2.1** The system should be able to respond to requests within 3 seconds.
- **5.3.2.2** At least 150 requests per second should be responded.
- **5.3.2.3** The system shall be able to serve at least 100000 members.

5.3.3 Availability

- **5.3.3.1** The system shall be accessible on both native Android and web platforms, including Google Chrome v60, Mozilla Firefox v57 and Microsoft Edge v18.
- **5.3.3.2** The system shall support English language.

- **5.3.3.3** The system should be available 99% of the time.
- **5.3.3.4** In the case of failure, the system should recover in at most 30 minutes.
- **5.3.3.5** The system shall support Turkish characters.

5.3.4 Annotations

- **5.3.4.1** The annotations shall be designed according to W3C web annotation data model.
- **5.3.4.2** The annotations shall be tested by the test team to ensure that they work correctly.

5.3.5 Database

- **5.3.5.1** User data shall be held in a secure database.
- **5.3.5.2** Database hierarchy shall be well-constructed so that it shall be efficient and protect the user's privacy.
- **5.3.5.3** All changes shall be logged in a database.

6 API Documentation

The domain of our API is api.dev.arkenstone.ml.

Latest version of our API documentation prepared using Postman can be found here, and in our repository.

7 Project Plan

Team	**Members**
Backend	Bahadır Hocamoğlu, Cemal Aytekin, Gürkan Demir
Frontend	Ege Başural, Muhammed Bera Kaya, Taha Korkmaz
Mobile	Baturalp Yörük, Elif Çalışkan, Emre Demircioğlu, Levent Baş

Table 5: Members of Each Subgroup in Our Team

Task	**Time Reserved**	**Start**	**Due Date**	**Assigned to**
Login-signup @backend	5 days	30/09/2019	04/10/2019	Backend team
Homepage & events @backend	5 days	07/10/2019	11/10/2019	Backend team
Viewing trading equipments @backend	5 days	14/10/2019	18/10/2019	Backend team
Login-signup @frontend	5 days	30/09/2019	04/10/2019	Frontend team
Homepage & events @frontend	5 days	07/10/2019	11/10/2019	Frontend team
Viewing trading equipments @frontend	5 days	14/10/2019	18/10/2019	Frontend team
Login-signup @mobile	5 days	30/09/2019	04/10/2019	Mobile team
Homepage & events @mobile	5 days	07/10/2019	11/10/2019	Mobile team
Viewing trading equipments @mobile	5 days	14/10/2019	18/10/2019	Mobile team
Deployment	1 day	21/10/2019	–	Bahadır Hocamoğlu

Table 6: Milestone 1

Task	**Time Reserved**	**Start**	**Due Date**	**Assigned to**
Search-comment-prediction @backend	10 days	23/10/2019	05/11/2019	Backend team
User profile @backend	5 days	06/11/2019	12/11/2019	Backend team
Portfolio @backend	5 days	13/11/2019	19/11/2019	Backend team
Follow system @backend	4 days	20/11/2019	25/11/2019	Backend team
Search-comment-prediction @frontend	10 days	23/10/2019	05/11/2019	Frontend team
User profile @frontend	5 days	06/11/2019	12/11/2019	Frontend team
Portfolio @frontend	5 days	13/11/2019	19/11/2019	Frontend team
Follow system @frontend	4 days	20/11/2019	25/11/2019	Frontend team
Search-comment-prediction @mobile	10 days	23/10/2019	05/11/2019	Mobile team
User profile @mobile	5 days	06/11/2019	12/11/2019	Mobile team
Portfolio @mobile	5 days	13/11/2019	19/11/2019	Mobile team
Follow system @mobile	4 days	20/11/2019	25/11/2019	Mobile team

Table 7: Milestone 2

Task	Time Reserved	Start	Due Date	Assigned to
Investment & profit loss @backend	5 days	27/11/2019	03/12/2019	Backend team
Notification & recommendation systems @backend	5 days	04/12/2019	10/12/2019	Backend team
Annotation @backend	5 days	11/12/2019	17/12/2019	Backend team
Investment & profit loss @frontend	5 days	27/11/2019	03/12/2019	Frontend team
Notification & recommendation systems @frontend	5 days	04/12/2019	10/12/2019	Frontend team
Annotation @frontend	5 days	11/12/2019	17/12/2019	Frontend team
Investment & profit loss @mobile	5 days	27/11/2019	03/12/2019	Mobile team
Notification & recommendation systems @mobile	5 days	04/12/2019	10/12/2019	Mobile team
Annotation @mobile	5 days	11/12/2019	17/12/2019	Mobile team

Table 8: Final Milestone

8 User Scenarios

A user persona is a fictional representation of your ideal customer. A persona is generally based on this user research and incorporates the needs, goals, and observed behavior patterns of your target audience. We presented 2 user scenarios in the second milestone, that cover all the features that have developed so far.

8.1 Story I: Canan Ayten - A Student of Economics (Frontend)

8.1.1 Demographics:

- Boğaziçi University Economics
- 23 Years old
- Follows financial news occasionally
- Registered to System as a Basic User

8.1.2 Goals:

- She wants to check whether there exists a follow request or not.
- She wants to read articles of one of her followers, and rate it.
- She wants to filter economic events and share her comments.
- She wants to observe historical value of TRY/EUR parity, and make prediction about its future value according to comments and related event.
- She wants to follow TRY/EUR parity to chase its values more quickly.

8.1.3 Scenario:

- As an economics student, Canan wants to find some economic events in Turkey.
- She signs in to our web site. Then she goes to her profile page and check if any follow request exist.
- She sees her friend wants to follow her. She accepts the pending follow request.
- Then she search her friend Kamuran and goes to her profile page. She views the article of the Kamuran.
- She reads one of the article about the future of Turkish currency. Since she likes that article so much, she rates the article. She gives 5 point out of 5.
- Then she goes to events page. Since she wants to view economic events in Turkey, she filters the events by country.
- She clicks one of the economic that she is interested in. She reads the comments on that event. She reads some interesting thoughts about Turkish currency.

- Then she wants to check the TRY. She searches TRY and go to TRY-EUR page immediately. She observes the TRY graphics in detail.
- Since she reads some comments and articles about TRY, she gets an idea about TRY. Therefore she makes a prediction. She votes for down and follow TRY currency as she becomes interested in.
- Since she has made prediction about that parity, she decides to follow in order to reach more quickly to TRY/EUR.

8.2 Story II: Kamuran Pektoprak - Graduate, looking for job (Android)

8.2.1 Demographics:

- Boğaziçi University Economics
- 25 Years old
- Checks trend topics on Twitter from time to time
- Registered to System as a Basic User

8.2.2 Goals:

- He wants to look at ideas and thoughts about TRY currency and share his ideas about it.

8.2.3 Scenario:

- Kamuran is a newly graduated person. He is looking for a job currently. He is interested in Turkish currency.
- He wants to check what other people think about TRY. He logs in to our android app.
- He searches for TRY and goes to TRY-EUR page. He observes the graphics of TRY-EUR parity.
- He writes some comment about the TRY.
- Then he makes a prediction and follow TRY. He votes for down.
- Finally he goes to his profile page and clicks create new article button.
- He writes his thoughts about the TRY value according to Trump's new explanations.
- Then, he shares his article.

9 Evaluation of Tools and Managing the Project

9.1 Mobile

The communication between team members is very active and we are using Slack to communicate. We are keeping track of the works by Github and helping each other via Slack or by having some meetings face-to-face. Furthermore we meet each week, go over what has been done so far and get each other's opinion in order to make our app user friendly and convenient.

9.1.1 Android Studio

Android Studio is very easy to use since it has a preview property in layout and shape resources. Since it has a version control inside, it is more convenient to use Git in Android Studio rather than using terminal or another GUI.

9.1.2 Java/Kotlin

Java is a language which we are all were familiar with, from our freshman year. This fact was important for us to use it. Kotlin has some advantages compared to Java, so we are also using it in our project.

9.1.3 Gradle

Gradle is an important tool for android project. It is actually a build tool that collects all dependencies according to their versions that used in the project. It is very effective to use different android packages in the project.

9.1.4 Navigation - RecyclerView - Retrofit

Navigation is an android tool that helps fragment switching and parameter passing between fragments. Recyclerview is used in the listing pages. It helps customizing row view and data binding. Retrofit is used for API calls and json mapping to data models via callback methods.

9.1.5 AnyChart

AnyChart is a js based chart or graph viewing tool. Used in trading equipment page to show historcal data as line graph. Also used AnyStock chart to make the graph flexible such that it shows price indicator on click and time range can be changed. AnyChart is a little slow on creating the view but it provides very useful functionalities for various kinds of charts.

9.2 Backend

The backend development in our project has been very smooth so far, actually. Our backend team was familiar with the technologies we used, as we used them in the previous course, CmpE352, as well. The backend channel in our Slack

group was very active, always discussing any difficulties they faced and searching for solutions, helping each other by recommending various resources, etc.

9.2.1 NodeJS/ExpressJS

We have used ExpressJS framework in our backend, as it's very easy to learn and extensible, thanks to its minimalistic and unopinionated nature. We have added some small libraries for input sanitation, external API access, sending email, etc. and it was very easy to integrate them into our application.

9.2.2 MongoDB

MongoDB is a NoSQL library, using collections and JSON documents instead of tables and table entries. The documents aren't restricted to follow a certain predefined structure, which is the case for any SQL database, and that helps us develop and modify our database without worrying about data migrations and compatibility issues. We are using MongooseJS ORM library to access our database, which makes it even easier to work with MongoDB, as it provides lots of predefined schema types, validation and middleware options.

9.3 Frontend

The frontend team uses a Slack channel for team communication. The progress and the work done by team members are tracked via GitHub. The Slack channel was used actively in helping other team members and asking for help,since most of the team was not familiar with frontend development and needed help of other team members.

9.3.1 ReactJS

ReactJS is an open-source JavaScript library which is used for building user interfaces specifically for single page applications. ReactJS is chosen as frontend framework by the team, because of previous familiarity and it's ease of learning. It's basic structure of state, props and life cycle methods makes it easier to understand and start developing quickly. Component based system helps developers creating more readable code.

9.3.2 Webstorm

As frontend team, we didn't decide on a IDE to use. However, we are all using WebStorm as our frontend IDE. It is a JavaScript IDE, with git integration and version control functionalities. Main advantages of it includes it's conflict solver, which creates a great advantage in multi member projects.

9.3.3 Redux

Redux is a predictable state container for JavaScript apps, as it's documentation says. It is a framework that can also be connected to React, that makes as able to pass on data and actions between components of React, which is a lot of pain without frameworks like it.

9.3.4 Semantic UI React

We have chosen Semantic UI React between other UI frameworks, because of it's ease of use and simplicity. We didn't need complex working components for our project, so UI framework is mostly used for the design.

9.4 Managing the Project

9.4.1 Code Structure

As a whole team, we were very consistent throughout the project with how we implement new features and how we deal with bugs and issues. We created branches for each feature and assigned enough number of people to implement that feature. After writing out the code locally, we opened a pull request and assigned our team members to review the code we have written regarding the corresponding feature. If all of the assignees approved the pull request, we merged the branch into our development branch (android-dev, backend-dev, frontend-dev).

Whenever a bug was found after a pull request was approved and the corresponding branch was merged, we created another branch to fix the bug and went through the same steps as explained above.

9.4.2 Communication

Group communication was a determining factor for our success in delivering the expected results so far. Backend team, frontend team and mobile team all used necessary communication means to deal with issues and decide how they should be organized as a sub-team to deliver their own part. However, internal communication in sub-teams was not enough, all of the sub-teams were also in contact with other sub-teams and knew what the others were doing so that they were in synch as a whole group. Each sub-team had its own channel in Slack where the group members of related sub-teams were discussing their implementation details and each sub-team was allowed to monitor the communication between members of other sub-teams.