

Project

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1 INTRODUCTION

Robinhood is one of the renowned investment apps to invest in stock and crypto markets. The app targets young and novice investors with the free trading feature. This project would attempt to redesign the user interface of the Robinhood android mobile app to improve the usability of the app.

The Robinhood Android app can be installed from the play store from the link https://play.google.com/store/apps/details?id=com.robinhood.android&hl=en_US on any android mobile phone. Once the App is installed, the user has to register if he is not a member already. For registering, the user needs to provide his name and social security details and in most cases, the registration is approved instantly. In some cases, the approval might take a couple of days. Once the approval is received, users can perform the below functions in the Robinhood using the available interfaces in the android app.

1. **Individual Stock Page:** The interface provides detailed stats for individual stocks. The interface can be reached from any of the above three functionalities. It is also an interface to trade on that particular stock.
2. **Browse:** The interface is used to look up the individual stocks based on symbol or name.
3. **Custom Lists:** The interface allows users to create custom lists of stocks and crypto. This functionality can be used as a custom watch-list for interesting stocks and crypto.
4. **Pre-defined Lists:** Multiple pre-defined lists are available for users to browse. The lists are created based on industry grouping(tech, Finance,etc.) or themes(Green stocks, International, etc.) or performance-based(Top movers, most popular, etc.)
5. **Portfolio:** Interface to provide details about invested stocks and their performance
6. **Messages:** Interface for displaying the notifications

2 INITIAL NEEDFINDING

The project would use **reading existing product reviews** as the need-finding approach for the redesign of the "Robinhood" app.

2.1 Approach Description

The needfinding approach would analyze the app reviews to find out the issues in the current interface as well as missing features in the app. Since the project is limited to only the android app, only the product reviews from the google play store reviews(https://play.google.com/store/apps/details?id=com.robinhood.android&hl=en_US&showAllReviews=true) will be considered for need-finding. From the user perspective, the need-finding exercise will focus on understanding who the users are, their demographics, their expertise with the app as well as the stock market, and their exact needs on using the "Robinhood" app. From the app perspective, the exercise would try to understand what are the features mostly used, what are the bottlenecks, missing functionalities, difficulty in using existing functionality, and the intuitiveness of the app.

2.2 Approach Plan and Execution

The challenge in this need-finding approach is, the reviews not only will focus on the application interface but also on the general Robinhood platform issues like credit limit, buying power, speed of trade execution, etc. Hence apart from filtering the reviews from the play store, the text content will be thoroughly analyzed to focus only on the reviews on the interface usability and features. The reviews will be sorted by recency and the first 50 reviews on the app usability and features will be taken for the need-finding exercise.

Below are some of the sample reviews from the users highlighting some design issues and missing features in the Robinhood app.

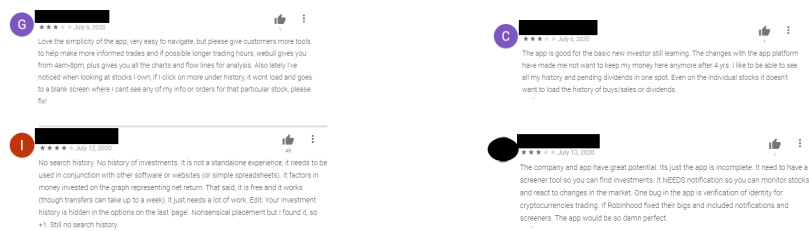


Figure 1—Reviews from Robinhood users.Source: Google Play-store

2.3 Needfinding Conclusions

Some of the key findings and conclusions from the need-finding exercise are summarized below.

Users:

- Most of the Robinhood users are new to stock market investing and they like the simplicity of the app. There is a small segment of expert users who like the commission-free stock trade feature of Robinhood.
- Many of the users are young and "Robinhood" is the first investment app they use. Most of them find the app very intuitive and easy to use for core activities like Buying and Selling the stocks.

Goals and Needs:

- Although most new users trade stocks based on external information, some of them prefer to have some options to explore the market to choose stocks.
- Expert users like to perform detailed technical analysis using the available charts and metrics, compare stocks and trade. However, they find these options are mostly missing compared to traditional investment portals.

Tasks and Sub Tasks:

- The new users mostly perform basic tasks like searching the stocks through browse options and trading the individual stocks.
- Expert users think that the available options to track the market and find the interesting stocks are not satisfactory. They prefer to have stocks listed based on multiple selection criteria based on current market trends and conditions.

Others:

- Some of these expert users also feel that the chart options in the app were very basic and looking for more dynamic charts.
- The important features like portfolio and transaction history are hidden in the "Menu" option in the "User" page rather than the home screen. Also, there is no search history available to quickly look into recently searched stocks or crypto.

Based on the above findings and conclusions from need-finding exercise below 4 critical needs are prioritized for the redesign activity of the project.

2.4 Identified Needs

- Home page would be redesigned to have three new icons in the bottom ribbon (Portfolio, Market Movers, Compare), which are detailed in the next points. User and Notification icons would be moved to the top left of the page to accommodate new icons.
- Portfolio and Transaction History features are currently hidden in the "Menu" option of the user page. It would be removed from there and a new page with portfolio and History would be created. It can be accessed from the bottom ribbon.
- A new page named "Market Movers" will be created to enable novice users to find the stocks of interest based on trends and current market performance. This can also be accessed from the bottom ribbon.
- Another new page named "Compare" will be created to enable expert users to compare different stocks based on multiple technical metrics and charts. This can also be accessed from the bottom ribbon.

From the above list, the first two items (Home page and Portfolio page) will be a change to existing interfaces whereas the next two items (Market Movers and Compare) will be a new feature to complement the existing interfaces.

3 HEURISTIC EVALUATION

The detailed heuristic evaluation is carried out on the existing interfaces. Below six aspects, three positive and three negative, are discussed using design principles and HCI concepts.

- Positive Aspects
 - Simplicity
 - Gulf of evaluation
 - Learning Curve
- Negative Aspects
 - Flexibility
 - Discoverability
 - Expert Blindspot

Each of these six design principles is explained in the below sections highlighting what works well, what doesn't work well, and why it works well or why it doesn't work.

3.1 Positive Aspect - Simplicity

What works:

The whole app is very simple, clutter-free, and intuitive. The buy or sell transaction can be executed in a couple of seconds. For performing most of the activities in the app, the user does not need any prior knowledge.

why it works:

The home page of the app is completely clutter-free, with only the basic options needed. The critical Buy/Sell task in Robinhood is straight forward and it expects only the most necessary details like quantity and stop limit for the Market and Conditional orders. This design helps novice users and does not need any additional stock market knowledge to trade a stock. These design aspects make the app very simple to use even for the new users.

3.2 Positive Aspect - Gulf of Evaluation

What works:

The task of Buying and Selling the stocks is most critical aspect of the investment app and a lot depends on the result of these actions. Robinhood App has a very short Gulf of Evaluation for the critical task of buying and selling of the stocks.

why it works:

Robinhood provides immediate feedback on Buy or Sell action in the form of notifications. The feedback is clear and precise with details of the trade like the exact amount of purchase. The app also follows the principle of "perceptibility" indicating the status of the system during trading using the clear push notifications, especially when the conditional orders are executed. Apart from the temporary push notification, a permanent notification is also sent to the messages interface once the transaction is complete. These features make the gulf of execution for the Robinhood app very short.

3.3 Positive Aspect - Learning Curve

What works:

Robinhood has a very rapid learning curve. Even novice users can become proficient with the app with very little experience.

why it works:

The Robinhood app is designed with the principle of simplicity and unnecessary clutters are removed. The options provided for the main tasks are very intuitive. By using most of the existing Android OS conventions for the tasks, even the new users start with some level of expertise. Even the advance options like day trading and conditional order are very simple with clear instructions. Every feature in the Robinhood app contains a single sentence description under the section explaining the basics about that feature. These simple instructions make the learning curve of Robinhood very rapid.

3.4 Negative Aspect - Flexibility

What Doesn't work:

The app is mostly designed with novice users as a target. However, due to the free trading options, many of the existing users are also using the app. The detailed analysis and research options are not available for these expert users.

Why it Doesn't work:

The experienced stock market traders would prefer to carry out multiple technical analysis before buying or selling the stocks. Although Robinhood has basic statistics about the stock in the individual stock page it still lags advanced charts and advanced technical parameters about the stock which would help the expert users. Although there is a paid subscription model called "Robinhood Gold", targeting the professional investors, there is a segment of customers who are not professional investors but have a fair knowledge on technical analysis, who would expect at least the basic research options like various technical charts in the base Robinhood app.

3.5 Negative Aspect - Discoverability

What Doesn't work:

Some of the important features like User portfolio and transaction history are not readily discoverable for the users. These features are nowhere to find on the home page and hidden in "Menu" which is hidden in the user page to find these frequently used options.

Why it Doesn't work:

The home page has the highlighted buttons for features like notifications whereas the most frequently used features like portfolio and transaction history are missing on the home page. As a user, to view my portfolio I had to look into all of the options under the "Menu", which itself is hidden in the "User" page. User has to find the "Menu" options in the user page and then navigate each option to find the portfolio and transaction history. Even inside the "Menu", names did not help. As a user of other investment apps and portals I was looking for a keyword 'Portfolio' and 'History', whereas Robinhood has a very generic name such as 'Investments'. All these make the discoverability of the app very poor.

3.6 Negative Aspect - Expert Blindspot

What Doesn't work:

Although most of the features follow the principle of simplicity, some features like charts have a visible expert blindspot. The charts are non-intuitive for novice users and it is complex to understand these charts.

Why it Doesn't work:

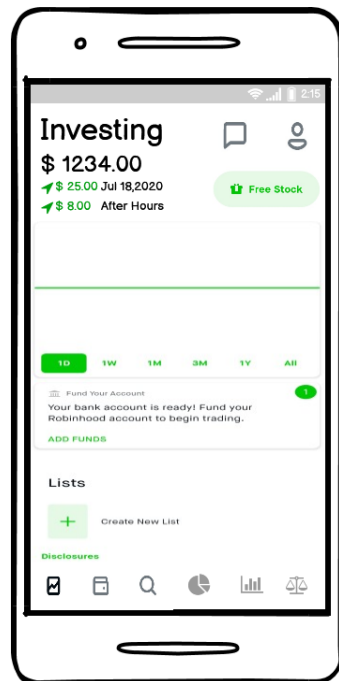
Most of the charts in the Robinhood app lack the clear axis and the scale. Even the master chart on the home page indicating the performance of the portfolio over different periods is missing the axis. While most of the other features have a short description under the feature, the charts don't have any description under them. The technical charts on the individual stock page also don't have any axis making the scale of the chart very confusing. The basic chart options are used by both the novice users as well as expert users, but the design is overlooked due to expert blindspot making it very non-intuitive for the novice users.

4 INTERFACE REDESIGN

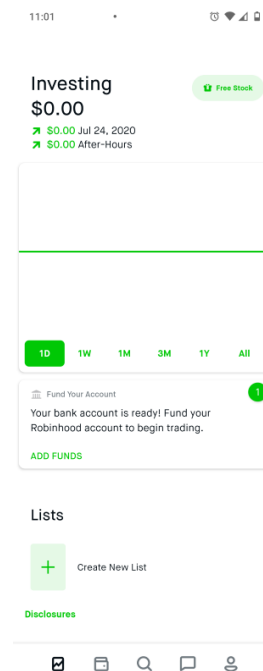
4.1 Redesign - Home Page

Below changes were made to the home page interface.

- Messages and User icons are moved from the bottom ribbon to the top right of the app.
- Portfolio icon(4th from left) is added in the bottom Ribbon for Portfolio page(Details in Section 4.2)
- Market icon(5th from left) is added in the bottom Ribbon for Portfolio page(Details in Section 4.3)
- Compare icon(6th from left) is added in the bottom Ribbon for Portfolio page(Details in Section 4.4)



Re-
designed
Home
Page



Current
home
page

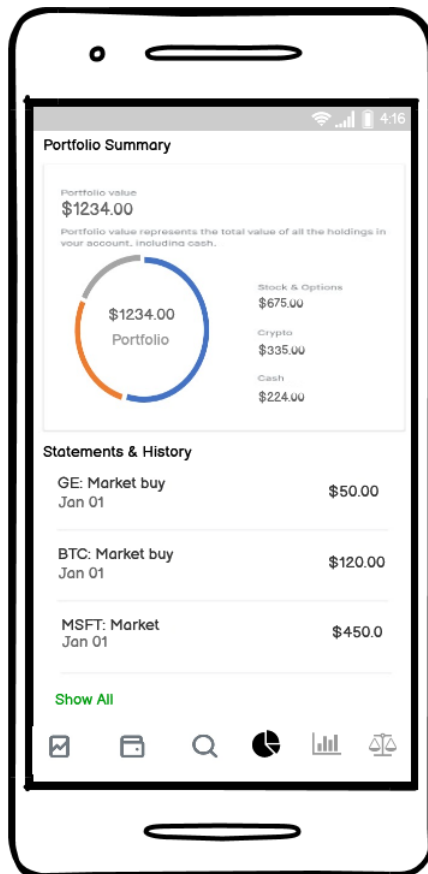
Figure 2—Home Page Redesign,Images Source: Robin-hood,Wireframe Design: Balsamiq

4.2 Redesign - Portfolio and History Page

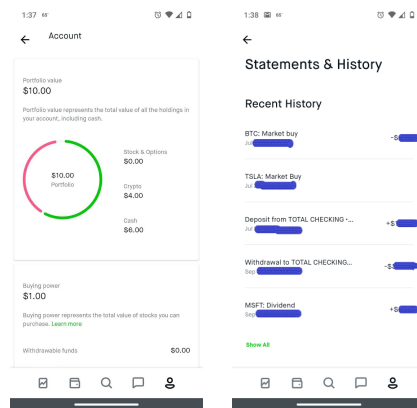
In the current design Portfolio and Transaction history is available as different pages in the "Menu" option of user page(as shown in right figure)

In the redesigned interface, a new page is created for Portfolio and Transaction history and can be accessed from the bottom ribbon(as shown in left figure)

The old portfolio and history pages are removed from the User Page.



Re-
designed
Portfolio
and
History
Page



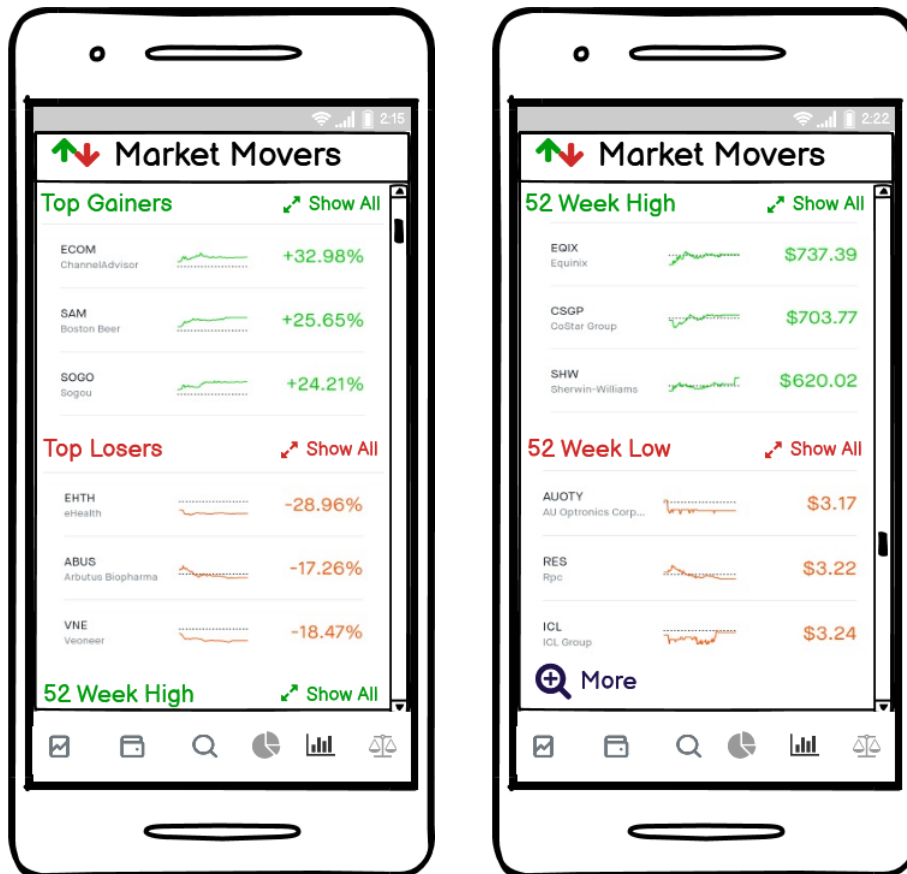
Current
design
with two
different
pages

Figure 3—Portfolio Page Redesign, Images Source: Robinhood, Wireframe Design: Balsamiq

4.3 New Feature Design - Market Movers Page

A new page name "Market Movers" is designed as below which can be accessed from the bottom ribbon.

The below prototypes show top and bottom section of same "Market Movers" page with a slider.



Market
Movers
Page -
Top

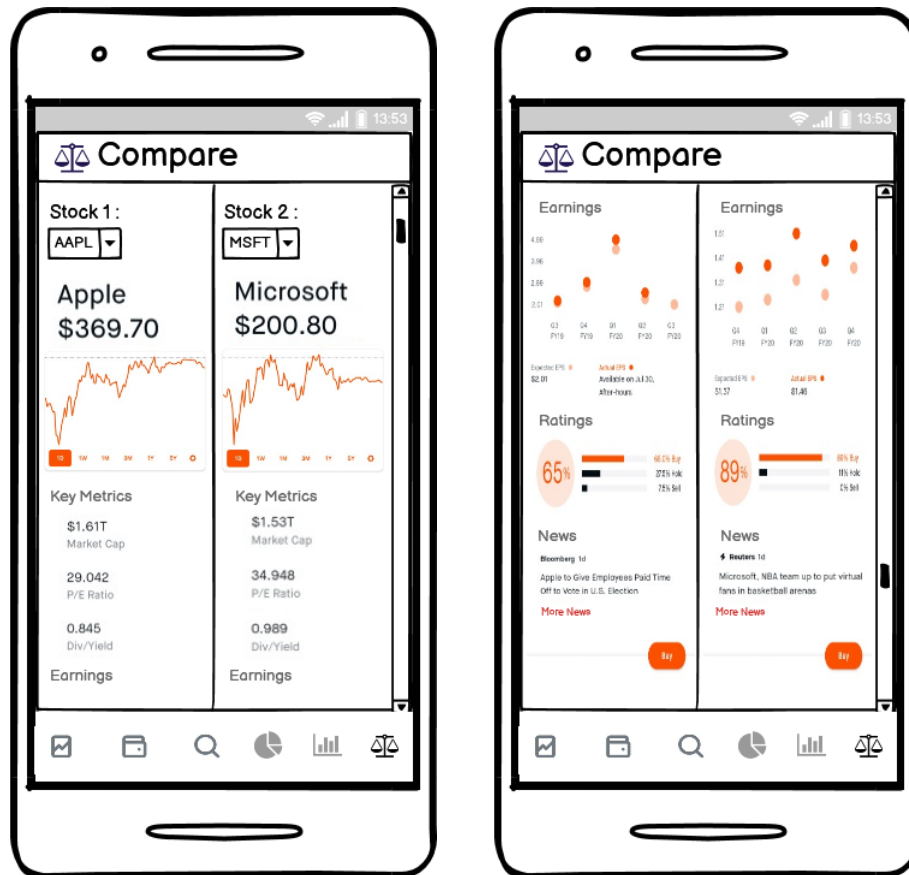
Market
Movers
Page -
Bottom

Figure 4—Market Movers Page Design, Images Source: Robinhood, Wireframe Design: Balsamiq

4.4 New Feature Design - Compare Page

A new page name "Compare" is designed as below which can be accessed from the bottom ribbon.

The below prototypes show top and bottom section of same "Compare" page with a slider.



Com-
pare
Page -
Top

Com-
pare
Page -
Bottom

Figure 5—Compare Page Design,Images Source: Robin-hood,Wireframe Design: Balsamiq

5 INTERFACE JUSTIFICATION

Each of the redesign in the previous section is justified using design principles below.

5.1 Redesign - Home Page and Portfolio Page

5.1.1 *Need*

One of the main criticism discussed in the heuristic evaluation section is the discoverability of portfolio and history options. It is also one of the primary need identified from the need finding exercises. These options are currently hidden under the "Menu" in the user page.

5.1.2 *Change*

In the redesign a new page is created for portfolio and Transaction History by merging the existing portfolio and history pages. The new page would provide a single window to look into all the investments of the user, both current and historic investments. Also a "Portfolio" icon is created in home page to launch it from the bottom ribbon.

5.1.3 *Principles*

Below are the principles related to the redesign of home and portfolio pages.

Discoverability

The main objective of this redesign is to improve the discoverability of critical features like portfolio and transaction history. Creating a single page and providing an icon to launch it from the bottom ribbon solves the discoverability issue identified in the heuristic evaluation

Simplicity

Although three new icons are added to the home page, they are added in such a way that it does not increase the clutter on the home page. The discoverability of the app is improved without impacting the simplicity principle, which is one of the key positive aspects of the Robinhood app.

Structure

Both Portfolio and Investment history are very closely related as they provide a view about the investments of the users. Hence merging portfolio and transaction history into a single page emphasizes the design principle of structure. This helps the user to track all their transactions in a single place.

Consistency

The user and notifications icons are moved to the top right of the page. This is consistent with numerous other android apps thereby emphasizing the design principle of consistency. This would make using these features very intuitive for Android users.

Learning Curve

The rapid learning curve is one of the important positive aspects of the Robinhood App. Simplifying the Portfolio and History into a single page with a clear description further accelerates the learning curve.

5.2 New Feature - Market Movers Page

5.2.1 Need

A critical need identified from the needfinding exercise is the lack of ability for users to explore multiple stocks based on the market trend. A limited predefined lists and the browse option to look for individual stocks also does not help this cause. In heuristic evaluation, the same is discussed as a lack of flexibility for a different segment of users to explore the market and choose the stocks based on the market trend.

5.2.2 Change

The new interface created for "Market Movers" has the trending stocks grouped under multiple market criteria like Top Gainers, Top Losers, 52 Week High, 52 Week Low, etc. These criteria enable users to explore these stocks. From this page, users can navigate to individual stock pages from where they could either trade on the stocks or add them to the watchlist.

5.2.3 Principles

Below are the principles related to the creation of the "Market Movers" interface.

Flexibility

The new feature caters to the need of users who would like to explore the stocks based on the market trend. This complements the existing feature of browse and pre-defined lists. Hence the redesign provides flexibility for various segments of the users as per their preference

Consistency

Designing all the positive trends like "Top Gainers" and "52 Week High" in green color and the negative trends like "Top Losers" and "52 Week Low" in red color is consistent with general usage emphasizing consistency principle. Although this is a very minor aspect, it improves usability.

5.3 New Feature - Compare Page

5.3.1 Need

Another important need identified in the needfinding is to provide the ability for users to compare different stocks based on multiple metrics and charts to make an informed decision.

5.3.2 Change

The new interface created for "Compare" provides a direct ability for users to select two different stocks and compare them on multiple metrics, charts, earnings, and recommendations. The interface simplifies the complex elements in the individual stock pages to provide a simple view to compare stocks and trade them.

5.3.3 Principles

Below are the principles related to the creation of the "Compare" interface.

Ease and Comfort

Having the key metrics and charts side by side for the compared stocks greatly reduces the user's effort to visit the individual stock pages and remember the metrics for effective comparison. The new view reduces customer's mental fatigue in comparing the stocks thereby emphasizing the principles of ease and comfort.

6 EVALUATION PLAN

6.1 Evaluation Type

The prototype designed for improving the Robinhood app will be evaluated using the qualitative evaluation. The qualitative evaluation is chosen due to the below reasons.

1. The current prototype is of medium-fidelity and it is not suitable for empirical evaluation at this point
2. There are a couple of new features added, "Market Movers" and "Compare" which will be difficult to evaluate against the existing interface empirically.

6.2 Evaluation Method

A "survey" method is chosen for the qualitative evaluation of the Robinhood prototype. The main reason for choosing the survey method is to reach as many diverse users as possible which would provide clear feedback and multiple perspectives about the prototype. The survey would include the wireframe prototype and the questionnaire about the prototype. The survey questions will be designed to evaluate the usability, ease, learning curve, intuitiveness, and other qualitative aspects of the prototype of the app.

6.3 Participant Recruiting

The participants would be recruited with care to make sure they belong to varied demographics and expertise in the stock market. The survey would be conducted asynchronously using the "Peer Survey", "Google forms", "Survey Monkey" and many other similar platforms to make sure of diverse participation. The survey will not be recorded as it is done asynchronously and only the responses of the survey will be collected from the participants.

6.4 Evaluation Script

The detailed survey script that will be used to evaluate the Robinhood prototype is given below.

- What is your age?
- How would you rate yourself on the stock market knowledge?
- How frequently have you used the "Robinhood" App?
- Do you use any other Investment app apart from "Robinhood"?

- In the given home page prototype, are you able to identify the function of each icon based on the icon symbol used?
- Is having user and notification icons on top of the page more intuitive than having them in the bottom ribbon?
- Do you find the home page clutter-free?
- Is the portfolio page prototype looks intuitive?
- Do you think having Portfolio and transaction history on the same page help you as a user?
- Do you think having the "Market Movers" page helps you explore the stocks trending in the market?
- Is the sections given in "Market Movers" sufficient?
- Which of the given section in "Market Movers" do you think would be most useful?
- Is there any section you think missing in the "Market Movers" page that would be helpful to explore the market?
- Do these sections provide a view into whats happening currently with the market?
- Is the information given in the "Compare" page sufficient for comparing two stocks?
- If not, which additional information do you expect on the compare page?
- Is the charts in the "Compare" page more intuitive than the charts found in the individual stock page of the existing interface?
- Do you find the overall prototype intuitive to use?
- Which feature in the given prototype is most useful?
- Do you have any suggestions to improve the prototype?

6.5 Evaluation Bias

The primary bias anticipated in the survey is observer bias. The survey questions might have been phrased to hear the answer I want to hear. The observer bias is mitigated by getting the survey scripts reviewed by friends and family members. Another possible bias could be participant bias, where the participants might belong to the same demographics, especially the age group or the same expertise level. This will be avoided by surveying multiple platforms to reach a variety of users.