Project Proposal:
The Paramount Investments League

Team 1:

David Patrzeba
Eric Jacob
Evan Arbeitman
Christopher Mancuso
David Karivalis
Jesse Ziegler

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Hyperlinks:

Webapp Link
Project Repository
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Functional Requirements	30 Points	0%	0%	0%	0%	0%	0%
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Domain Analysis	25 Points	0%	0%	0%	0%	0%	0%
Plan of Work	5 Points	0%	0%	0%	0%	0%	0%

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1 Customer Statement of Requirements

1.1 Problem Statement

Perhaps nothing portrays capitalism better than the Stock Market. The ability for individuals and collectives to gain equity in international corporations, trade that equity, and perhaps even gain a profit, has piqued the imagination of a nation for well over a century. One could even say that owning stock is part and parcel of The American Dream.

However, there is a barrier that separates this dream from reality for many would-be investors: an understanding of the market. The stock market has myriad intricate ways of bundling and exchanging instruments, most of which will be beyond the ken of an economic novice. An economist may be interested in the differences between Mutual Funds and Exchange-Traded Funds; a banker may have the judgment to decide between a Stop Order and a Market Order. These financial techniques offer greater flexibility and control over investments to experienced investors and scientists, who are masters of the field. The beginner does not care to be bothered by these techniques, as they can turn a straightforward process into an overwhelming headache.

With Capital Games we are interested in developing a learning platform for these students - a stock market simulation program.

Capital Games is marketed at two primary classes of user; students and novice investors, each of whom have different needs. Students require a social aspect to their experience - shared simulation instances with global rules and social features. Novice investors require performance metrics and research tools. Both require interactive tutorials, visualization tools, and email updates, in addition to the core requirement of being able to execute various types of trades.

At its simplest, Capital Games is about exchanging stocks and managing investments. This is done through the respective menus for each Research, Trading, and Managing Portfolios. Research allows investors to analyze relevant financial metrics of publically traded corporations. Trading allows investors to place market, stop, and limit orders for their various portfolios. Managing Portfolios allows investors to view their investments and performance metrics for each of their simulations. In all menus, data can be visualized and interactively examined, in addition to being tabulated. This unprecedented level of accessibility will ease accessibility to market trend analysis.

Portfolios and trades only exist in the context of leagues, or market simulation instances. Each league has with its own rules, administrators, and varying privacy levels. Investors can participate in both public leagues, which anyone can join but offer less social interactivity, and private leagues, which require private email or Facebook invitations but which have expanded social features. Leagues are social because they include Trade Streams of executed trades from league members, Investor Profiles containing trade history and portfolio performance of investors, and a Comments Board. Additionally, each league will have a scoreboard for its members portfolio performances. Top investors will have their names and net worth displayed prominently on league

pages.

As a site with social content, it is also important to have the ability to moderate and review submissions by users. This is provided by having two classes of moderators, League Managers and Site Administrators. League Managers are, by default, the users who create a given league, and can ban, invite, and promote users within their leagues, as well as being able to delete comments and create league-wide announcements. League Managers, by default, are also participating in a given league. Site Administrators can delete leagues, ban users and delete comments, add front page announcements, view reports about abusive users, and view other various statistics about users, trades, and leagues. As mentioned previously, even tighter social network integration is a long-term goal.

With the continuing influx of mobile browsing and computing devices to the personal computing market, it is increasingly important to have a single unified interface for users. This is accomplished through the use of Responsive Design, in which a single web page automatically and intelligently reflows itself to accomodate devices of any screen size. This revolutionizes the trading experience – users don't want to use a dozen odd applications and browsers to access their favorite sites, they want to just click-and-go. These changes are made possible by improvements in mobile browsers, which now universally support Javascript. Therefore one site really will be enough for all users.

As alluded to previously, a strong emphasis of this platform is the use of interactive portfolio graphs. Previous systems have failed to speak directly to users because they presented static images that were impossible to manipulate or interact with. This is a core design feature of Capital Games. We employ the newest, most state-of-the-art graphing tools to allow a user to see any and every stock and portfolio over an indefinite time span with the finest degree of granularity.

Another way of enhancing user experience is by letting users opt to receive daily or weekly email updates about their portfolio performance. This is a feature set that all financial investors have access to and therefore is something that novice investors who use our platform should not be denied. Previous learning platforms have failed to develop a respectable e-mail service – their demos barely covered assets, and certainly didn't mention trends. We will provide the first fully functional e-mail system.

These features, together with other core capabilities such as email updates and interactive tutorials, provide the most cutting-edge and modern platform for both individual and collaborative efforts to conduct financial simulations.

1.2 Glossary of Terms

Margin – Borrowed capital used to execute trades, i.e. "buy on margin". Although leveraging margin is possible for normal buy and sell orders, they are critical to short orders, in which the entire stock is sold without actually being owned. [**?**] Margin can refer to both the act of purchasing a stock on credit, and to the percentage of a stock's equity value required to be held in capital against the risk of the stock decreasing in value. [**?**]

League – an instance of a market simulation with a predefined rule-set and containing many *investors*. All leagues are created by a *League Manager* There are two types of leagues:

- **Public** – Any Investor can join this type of League

- **Private** – A private league can only be seen by its members and administrators. A User does not join this league, rather they are placed into it by a League Manager.

Order – An *investor* must place an order for the purchase or sale of a *stock*.

- **Stop Order** – A type of order used to protect gains or limit losses. Stop loss orders are activated if a stock drops below the stop price and buy stop orders are activated if a stock rises above the stop price. [**?**] When activated, a Stop Order becomes a *Market Order*.

- **Limit Order** – A type of order used to prevent trades from occurring except at indicated prices. Buy limit orders will only be executed at or below the indicated price, and sell limit orders will be executed at or above the indicated price. Limit orders are not guaranteed to ever be executed and expire after a specified duration. [**?**]

- **Market Order** – An order to be executed as soon as possible at current market prices.[**?**]

  - **Short Order** – A type of transaction in which an Investor symbolically borrows a certain number of stocks (using their existing Margin) and sells them at market price, expecting the stock value to decrease and to make a profit when exiting the position. Exiting is called a *cover*. [**?**]

  - **Cover Order** – A type of transaction in which an Investor purchases stocks to *cover* the symbolic loan of stocks created by a *short order*. [**?**]

Portfolio – A detailed account of the *stocks* associated with an *investor* in a given league. Portfolios are unique.

Stock – A type of asset that represents equity in a company.

- **Ask Price** – The price at which a trader is willing to sell a stock.

- **Bid Price** – The price a trader is willing to pay for a stock.

- **Bid-Ask Spread** – The bid-ask spread describes the difference in price between the bid and the ask. These two prices are marginally different, but always with the ask being the more expensive of the two. It represents the friction inherent in trading a stock. [**?**]

- **Ticker Symbol** – an abbreviation used to uniquely identify publicly traded shares of a particular stock on a particular stock market.

- **Symbol List** – a list of a market/several market's ticker symbols.

User Roles – Each user with an account can have one or more of the following roles:

- **Investor** – A instance of the User, who commits capital expecting to see it grow in value. Users Instances are referred to as *investors*.

- **League Manager** – A League Manager is an *investor*. A user does not necessarily have this role for every league they are in. Only ones in which they created the League or were given a League Manager role from another League Manager of that League. League Managers control settings of leagues.

- **Site Administrator** – This is the most powerful role. A Site Administrator is a user with elevated privileges, to ban users and delete offensive comments.

- **Suspended** – A user with this role is currently pending losing their Suspended Role, or granted a *Banned* role. While suspended an *Investor* cannot do anything with their Account other then login and view the duration of their suspension, The reasoning behind their ban, and an appeal form if the situation permits.

- **Banned** – A banned user can never be unbanned, this occurs after a rejected suspension appeal.

2 System Requirements

2.1 User Stories

Identifier	User Story	Weight
ST-1	As a user, I can register an account so that I may participate in Capital Games.	10 pts
ST-2	As a user, I can join or create leagues so that I may compete with others in a simulated stock market environment based on real-time stock data.	10 pts
ST-3	As a user, I can search for companies both by company name and stock symbol so I may scout companies I would like to invest in.	6 pts
ST-4	As a user, I can browse a companies profile and view the performance data over a configurable span of time so that I may determine whether or not I want to invest in them.	6 pts
ST-5	As a user, I can buy or sell stocks within a fantasy league I am a member of so I may build my fantasy league portfolio.	10 pts
ST-6	As a user, I can manage my portfolio within a league to track my investments.	8 pts
ST-7	As a user, I can visually track my finances via graphs and charts so I may more easily manage my portfolio.	4 pts
ST-8	As a user new to the stock market, I will have access to tutorials that teach about the stock market via a specially created novice fantasy league.	6 pts
ST-9	As a user, I can see the performance of stocks I invested in via a stock-ticker like marquee so I may have a quick overview of my day-to-day performance.	3 pts

ST-10	As a user, I can see an activity stream of recently executed trades by other users in my leagues so I am always up to date.	5 pts
ST-11	As a user, I can see the performance of other users' portfolios so I may observe the investment habits of others.	2 pts
ST-12	As a user, I can view a list of all members in each of my leagues so I know how many others I am competing with.	1 pt
ST-13	As a user, I can view a portfolio leaderboard so I may have a summary of relative performance between users in my league.	1 pt
ST-14	As a user, I can submit abuse reports on users so I may continue having a positive fantasy league experience. See section ?? for details.	5 pts
ST-15	As a user, I can message other users so I may interact with people I am playing within and out of my league.	4 pts
ST-16	As a user, I can post, edit, or delete comments to league pages so I may communicate with leagues en masse.	2 pts
ST-17	As a user, I can opt to receive periodic e-mail notifications of my stock performance or trades so I may be kept up to date even when not actively viewing the site.	3 pts
ST-18	As a user, I can additionally link my account with Facebook so I may share my fantasy league experience with friends.	1 pt
ST-19	As a user, I can recover or change my password so I may always have access to my own account.	5 pts
ST-20	As a user, I can access my profile and settings on a dashboard on the top of every page within the site.	8 pts
ST-21	As a user, I may opt to create a league and become a league manager so I may have my own personal league.	10 pts
ST-22	As a league manager, I can add league rules, a league name, and a league logo to personalize my league.	8 pts
ST-23	As a league manager, I may manage players within the league so I may invite players I want to join, ban players that are being abusive, and assign other league managers.	8 pts

ST-24	As a league manager, I can moderate and delete comments in the league page.	5 pts
ST-25	As a league manager, I can create league announcements.	4 pts
ST-26	As a site administrator, I can view reports of and delete leagues that are abusive in nature.	2 pts
ST-27	As a site administrator, I can delete abusive/offensive comments and ban users or IP addresses so the website remains a clean, positive stock market fantasy league experience.	6 pts
ST-28	As a site administrator, I may post front page news or announcements.	3 pts
ST-29	As a site administrator, I may have access to a user count, number of active leagues, total leagues, quantity of daily transactions, the most/least popular stocks, and newly created or banned users so I may have reliable site statistics.	9 pts

Notes

For representations of use cases that relate to visual requirements, see: **??**.

ST-18: "Experience" refers to things such as stock purchases, current capital, position within the league, etc.

For other details on the specifications of these user stories, refer to **??**.

2.2   Nonfunctional Requirements

Functional

Additional features for security could be enabled through the use of various third-party plugins. There exists several packages for the purpose of authentication and authorization of applications. Key authentication features to are the the ability to encrypt and store passwords, provide recovery options for users that have forgotten their password and store a cookie to validate the session. Other plugins may provide authorization features. These will allow for a user to perform different actions based on their position. For example, a user will be able to comment and delete their own comment, but an admin will be able to comment and delete all comments on the league they are an admin of.

Usability

A key point in the design of this application is ease of use and appeal to the users. Through the use of CSS and Bootstrap, we will be able to make the theme of our application consistant and pleasing. With CSS, we will create a universal header and navigation bar that each page will build off of. Javascript will provide for responsiveness and it will be the key framework for which we build our interactive tutorials upon. The interactive tutorials are meant for inexperienced users in

the topic of stocks to learn the fundamentals of the game. Any user that finds themselves lost later on can always view these tutorials again or browse through any specific topic.

Reliability

In order to ensure that there is no confusion to the user in the case of the internet or server failure, all transactions end with a final confirmation, and no changes to the account are made until after this confirmation. A user that leaves the application and returns later will still be logged in. Server failures should be dealt with by the application's host.

Performance

The performance of the site is mostly maintained by an appropriate technology stack consisting of a web framework, database, web server, and assets server. Performance management tools are built into the server for maintenance by application developers (not necessarily site administrators).

Supportability

Various measures and plugins exist for supportability. Between a combination of plugins enabling test-driven and behavior-driven development, supporting and modifying should be relatively painless. The project should be highly portable in the sense that a user will be able to access the website on all major browsers and mobile devices, and have a specilized appearance for both. For maintainability, there is the option of a user to be a site admin. These users can view details about the entire site, such as activity and user feedback. There also exists an internationalization framework for translating to provide multi-language support.