**Software Requirements Specification**

**for**

**Algorithmic Trading System**

**Version 2.0**

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|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| Team Black Bird | 3/16/2023 | Initial Revision | 1.0 |
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1. Introduction

1.1 Purpose

This Software Requirements Specification (SRS) is intended to delineate software requirements for the users Algorithmic Trading System. This SRS is intended to provide guidance to the developers of the system to implement required functionality, as well as the test team to develop appropriate Verification and Validation (V&V) plans and procedures required to demonstrate to the customer that the system was built to this specification.

1.2 Scope

This document specifies the requirements for the following capabilities.

1. Algorithmic Trading System, including user interface and web application support
2. Users’ capabilities

1.3 Definitions

Table 1 Acronyms and Definitions

|  |  |
| --- | --- |
| Acronym | Meaning |
| SRS | Software Requirements Specification |
| V&V | Verification and Validation |
| SaaS | Software As A Service |

1.4 References

1. IEEE Std 830-1998 - IEEE Recommended Practice for Software Requirements Specifications - Revision of IEEE Std 830-1993

1.5 Overview

This document follows the recommended format specified in IEEE Std 830-1998 IEEE Recommended Practice for Software Specifications. For Section 3, the specific template A.5 for organizing information by feature is followed.

2 Overall Description

2.1 Product Perspective

The Algorithmic Trading System is intended as a SaaS product in which users can fine-tune pre-made strategies to execute trades in stock market. This document describes capabilities to provided to the users to use the software as intended.

Figure 1 System Block Diagram provides the major components that comprise the system.

Figure 1 System Block Diagram

Diagram

Description automatically generated

2.2 Product Functions

The following use case diagram depicts the users of the system, and the intended way in which they will interact with the system.

Diagram

Description automatically generated



Figure 2 Algorithmic Trading System Use Cases

2.3 Use Case Descriptions

2.3.1 Subscribe to Strategies

|  |  |
| --- | --- |
| **GENERAL CHARACTERISTICS** | |
| **Intent** | Allow the user to select one or more of the pre-defined strategies. |
| **Scope** | Automated Trading System |
| **Primary Actor** | User |
| **Secondary Actors** | - |
| **Preconditions** | User has logged in |
| Assumptions | There are pre-defined strategies |
| **Trigger** | Successful completion of Use Case redirects the user to a new page where the user can fine-tune strategies |
| **Success Post Condition** | User can fine-tune strategies |
| **Failed Post Condition** | User is not redirected |

 Sunny Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This Scenario begins when the user has completed logging in |
| 1 | The user can select one or more pre-made strategies from the user interface |
| 2 | The user will select one of the listed companies and provide the amount they are willing to use to buy. |
| 3 | The Use case ends when goes to another screen or clicks the “fine-tune strategy” button. |

Rainy Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This scenario begins with a failure to open the menu to select one of the listed companies. |

2.3.2 Fine-tune Strategies

|  |  |
| --- | --- |
| **GENERAL CHARACTERISTICS** | |
| **Intent** | Allow the user to fine-tune the subscribed strategies. |
| **Scope** | Automated Trading System |
| **Primary Actor** | User |
| **Secondary Actors** | - |
| **Preconditions** | User has subscribed to one or more strategies |
| Assumptions | User is logged-in and can fine-tune strategies |
| **Trigger** | Successful completion of Use Case will deploy the strategy |
| **Success Post Condition** | User can deploy the strategy |
| **Failed Post Condition** | User is unable to deploy the strategy |

Sunny Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This Scenario begins when the user has selected one of the companies and the Capital for the trades. |
| 1 | The User is instructed by the User Interface to change parameters depending on the strategy selected within the operating range. |
| 2 | This Use Case ends when the user changes parameters and fine-tunes the strategy |

Rainy Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This scenario begins with a failure to change parameters. |

2.3.3 View Executed Trades

|  |  |
| --- | --- |
| **GENERAL CHARACTERISTICS** | |
| **Intent** | Allow the user to see all the executed trades done by the strategy. |
| **Scope** | Automated Trading System |
| **Primary Actor** | User |
| **Secondary Actors** | - |
| **Preconditions** | There are one or more entry/exit conditions fulfilled by the strategy |
| Assumptions | User can view executed trades |
| **Trigger** | Successful completion of Use Case allows user to see further details of the executed trades |
| **Success Post Condition** | User can view executed trades |
| **Failed Post Condition** | User is unable to view. |

2.3.4 Back test strategies

|  |  |
| --- | --- |
| **GENERAL CHARACTERISTICS** | |
| **Intent** | Allow the user to back test strategies and see their performance on selected stocks. |
| **Scope** | Automated Trading System |
| **Primary Actor** | User |
| **Secondary Actors** | - |
| **Preconditions** | User has subscribed to one or more strategies |
| Assumptions | User is back testing on a currently listed company. |
| **Trigger** | Successful completion of Use Case will enable the user to see the performance of that strategy using the capital and stock provided |
| **Success Post Condition** | User can view performance statistics |
| **Failed Post Condition** | User cannot see performance statistics |

Sunny Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This Scenario begins when the user has subscribed to a strategy |
| 1 | The User clicks on back test option on one of the strategies |
| 2 | The User gets a dialogue box which prompts them to enter the number of stocks to buy along with the capital to be invested and duration of back testing data. |
| 3 | This Use Case ends when the user has back tested a strategy. |

Rainy Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This scenario begins with a failure to back test a strategy |

2.3.5 Terminate all Positions.

|  |  |
| --- | --- |
| **GENERAL CHARACTERISTICS** | |
| **Intent** | Allow the admin to close all positions. |
| **Scope** | Automated Trading System |
| **Primary Actor** | Admin |
| **Secondary Actors** | User |
| **Preconditions** | If there are one or more positions in users account |
| Assumptions | There is a glitch in stock exchange and the users are unable to close their positions. |
| **Trigger** | Successful completion of Use Case will send a notification to the users whose positions are closed and there is a new entry in executed trades. |
| **Success Post Condition** | The user can see a new entry in executed trades along with a remark that it was closed by the admin |
| **Failed Post Condition** | Admin notifies the stock exchange. |

Sunny Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This Scenario begins when there is a glitch in stock exchange |
| 1 | The admin gets an option to stop all trading activities along with selling all the open positions |
| 2 | This Use Case ends when the admin has stopped all trading activities along with selling all the open positions. |

Rainy Day Scenario

|  |  |
| --- | --- |
| Step | Action |
| Start | This scenario begins with a failure to stop trading activities and close all open positions. |

2.4 User Characteristics

This software system is intended for the users who are retail traders and want their trades to be executed automatically based on certain conditions.

2.5 Constraints

These are defined specifically in Section 3.

3 Specific Requirements

3.1 Overview

This system will allow users to execute trades on their behalf. Users will be able to select one or more pre-made strategies and fine-tune the parameters to tailor the strategy around the selected stock. Then, the user can deploy the strategy and based on the entry and exit conditions, the trades will be automatically executed by the strategy. The user can then view the history of executed trades and strategies.

3.2 Interface Requirements

3.2.1 User Interfaces

3.2.1.1 The user interface allows users to log in.

3.2.1.2 A user interface **shall** allow users to select one or more strategies.

3.2.1.3 The user interface will allow the user to fine-tune the subscribed strategy.

3.2.1.4 The user interface allows the user to deploy and un-deploy strategies.

3.2.1.5 The user interface allows the user to view executed trades and strategies.

3.2.2 Software Interfaces

3.2.2.1 The software **shall** support HTTPS protocol.

3.2.2.2 The software **shall** interface with an SQL database for the purpose of storing data.

3.2.2.3 The software **shall** allow TCP connection for interacting with the database.

3.2.3 Communications Interfaces

3.2.3.1 The software **shall** support HTTPS protocol.

3.2.3.2 The software **shall** allow TCP connection for interacting with the database.

3.3 System Features

3.3.1 The system software supports the Use Cases described in Figure 2 Algorithmic Trading System Use Cases.

3.3.1.1 Subscribe to Strategies

3.3.1.1.1 Purpose

This feature allows the user to select one or more of the pre-defined strategies.

3.3.1.1.2 Stimulus/Response Sequence.

Diagram

Description automatically generated

Figure 3 Subscribing to a strategy Activity Diagram

3.3.1.2 Fine-tune Strategy

3.3.1.2.1 Purpose

This feature allows the user to fine-tune the subscribed strategies.

3.3.1.2.2 Purpose

This feature allows the user to sell bought stocks.

3.3.1.3 View executed trades.

3.3.1.3.1 Purpose

This feature allows the user to see all the executed trades done by the strategy.

3.3.1.4 Back test strategies

3.3.1.4.1 Purpose

This feature allows the user to back test strategies and check performance on historical data.

Diagram, schematic

Description automatically generated

Figure 4 Paper Trading strategy

3.3.1.8 Terminate all open positions.

3.3.1.8.1 Purpose

This feature allows the admin to terminate all open positions.

3.4 Class Diagram

Diagram, engineering drawing, schematic

Description automatically generated

Figure 5 Class Diagram

3.5 Sequence Diagrams

3.5.1 Sign Up

Diagram

Description automatically generated

Figure 6 Sequence Diagram – Sign up

3.5.2 Subscribing Strategies

Diagram

Description automatically generated

Figure 6 Sequence Diagram Subscribing Strategies

3.5.3 Backtesting of a saved Strategy

Diagram

Description automatically generated

Figure 7 Backtesting of a saved Strategy

3.6 Performance Requirements

3.6.1 The software shall keep track of executed trades and their prices up to 2 decimal points.

3.6.2 The software shall execute trades with a maximum latency of 1 second.

3.7 Design Constraints

3.7.1 Software processing **shall** allow a spare capacity of 50% for memory, CPU utilization and long-term storage (e.g., disk storage).

3.7.2 The system **shall** be able to support the following languages: English.

3.7.3 The software **shall** be developed and maintained in accordance with industry standard **ISO/IEC 5055:2021**.

3.8 Software System Attributes

3.8.1 The Software **shall** use data encryption across all interfaces.

3.8.2 The software must conform to commercial standard IA controls and STIGS.

3.8.3 The software **shall** allow only authorized users to make configuration changes.

3.9 Other Requirements

N/A