# Requirements

## Application Phase 1

Initially I want my application to have basic features:

1. Complete database creation.
2. Data Vendor Integrations.
3. Complete Options Screen.
4. Complete all pages of Admin Screens. Can leave out Manage Watchlists page for now.

## Application Phase 2

1. Screening implementation completed with basic technical analysis and chart patterns.
2. Backtesting implementation completed with basic backtesting and chart patterns.

# Application TimeLine:

PHASE 1

Completion Date Range : 15th June – 30th June 2018

PHASE 2

Completion Date Range : 1st Dec – 15th Dec 2018

# Application Architecture:

## High Level Design

**Web Service API Layer**

(Data Vendor Specific)

**Data Vendor**

Zerodha / Global DataFeeds / Alpha Vantage

**Data Storage Logic**

Logic to query from API Layer on periodic basis(Data Vendor Specific)

Logic to store the data in the database(Data Vendor Independent)

**Database**

My Sql Database with Hourly and Daily Candle information.

Database design needs to be generic , independent of the Data Vendor.

**Strategy Implementation**

Separate logic for separate strategies.

**Notification**

Email / Text Notifications

**Strategy Result Analysis**

Separate logic for testing each strategy and recording the results in database

# Data Vendors:

|  |  |  |
| --- | --- | --- |
| **Name** | **Cost** | **Comments** |
| ***Zerodha*** | 2K to 4K per month |  |
| ***Globaldatafeeds*** | 5K per month for 50 symbols across all exchanges. |  |
| ***Quandl*** | Free but with one day’s delay or Paid with approximately 3K cost. |  |
| ***AlphaVantage*** | Free EOD and other time frames but not very reliable data. |  |
| ***NSE Bhav Copy*** | Free EOD data in csv format for all EQ | Can start with this set of free data.  Need to check how soon it is available on nse website. |

## Alphavantage:

**API KEY:** 5ARB0R48XFE3NC7A

**DAILY TIMEFRAME:**

https://www.alphavantage.co/query?function=TIME\_SERIES\_DAILY&symbol=NSE:SBIN&apikey=5ARB0R48XFE3NC7A

**DAILY TIMEFRAME FULL:**

https://www.alphavantage.co/query?function=TIME\_SERIES\_DAILY&symbol=NSE:SBIN&apikey=5ARB0R48XFE3NC7A&outputsize=full

**INTRADAY 15 MIN TIMEFRAME:**

<https://www.alphavantage.co/query?function=TIME_SERIES_INTRADAY&symbol=SBIN&interval=15min&apikey=5ARB0R48XFE3NC7A>

## Quandl:

* Free to use for EOD data.
* Data gets updated after market close after 7 pm.
* Reliable data source for EOD data.

**API Key:**  UXsVDnMsYhtX\_qVmVVLR

**Account Details :** [kulbir0663@gmail.com](mailto:kulbir0663@gmail.com)

Kulbir@0663

URL: <https://www.quandl.com/api/v3/datasets/NSE/VEDL.json?api_key=UXsVDnMsYhtX_qVmVVLR>

## NSE:

**Symbol Wise Data:**

<https://www.nseindia.com/live_market/dynaContent/live_watch/get_quote/getHistoricalData.jsp?symbol=VEDL&series=EQ&fromDate=19-02-2018&toDate=01-03-2018>

**Bhavcopy for all symbols for a particular day:**

<https://www.nseindia.com/content/historical/EQUITIES/2018/FEB/cm26FEB2018bhav.csv.zip>

# Database Design:

**DATABASE**

**WATCHLIST TABLES** These tables will contain different watchlists .

**Example :** WATCHLIST\_F&O , WATCHLIST\_LIQUID\_OPT Each watchlist will contain a set of symbols to be tracked.

IONS

**DATA TABLES** These tables will contain raw data directly fromsome

**Example :** DATA\_NSE\_DAILY\_F&O , DATA\_QUANDL data source example NSE, Quandl etc.

\_HOURLY\_ LIQUID\_OPTIONS Table should contain only last N records( for eg: 3 Years)

**LOG TABLES** Tables to contain information about the data, it should

**Example :** LOG\_DATA\_NSE\_DAILY\_F&O, LOG contain count of total records, missing records, incorrect

\_ CALCULATIONS\_DAILY\_F&O Table to contain only 1 entry per symbol, only most recent.

**CALCULATIONS TABLES**  These tables will contain list of all calculations for a

**Example :** CALCULATIONS\_DAILY\_F&O particular watchlist for a particular timeframe.

**MARKET\_HOLIDAYS , MARKET\_WORKING\_DAYS** These tables to contain list of holidays & working days

## Watchlist Tables:

* These tables will contain various watchlists.
* Some of the watchlists that will be maintained are : F&O, Liquid Options, Nifty\_500, Nifty\_50.
* These are the list of tables with various columns.

1. WATCHLIST\_LIQUID\_OPTIONS:

|  |  |
| --- | --- |
| **Column Name** | **Column Description** |
| Sl No. | Auto\_Increment, Primary Key |
| symbol | Varchar(256), Primary Key |
| company\_name | Varchar(256) |

## Data Tables:

* These tables will contain raw data from various data sources.
* For now, these tables to contain data of past 2 years.
* How to ensure that data of before 2 years gets automatically removed ?

1. data\_quandl\_daily\_liquid\_options:

|  |  |
| --- | --- |
| **Column Name** | **Column Description** |
| recorddate | date, Primary Key |
| symbol | varchar(256), Primary Key |
| open | decimal(8,4) |
| high | decimal(8,4) |
| low | decimal(8,4) |
| close | decimal(8,4) |
| volume | bigint(20) |

## Log Tables:

* These tables will contain the log of data and the log of calculations.
* These tables will only contain one entry per symbol.
* How to ensure that previous records get automatically removed ?

1. log\_data\_quandl\_daily\_liquid\_options:

|  |  |
| --- | --- |
| **Column Name** | **Column Description** |
| recorddate | date, Primary Key |
| symbol | varchar(256), Primary Key |
| expected\_records | bigint(20) |
| actual\_records | bigint(20) |
| missing\_record\_count | bigint(20) |
| missing\_records | List |

1. log\_calculations\_daily\_liquid\_options:

|  |  |
| --- | --- |
| **Column Name** | **Column Description** |
| recorddate | date, Primary Key |
| symbol | varchar(256), Primary Key |
| theoretical\_record\_count | bigint(20) |
| actual\_record\_count | bigint(20) |
| missing\_record\_count | bigint(20) |
| missing\_records | List |

## Calculation Tables:

* These tables will contain the calculations for the symbols from a particular watchlist for a particular timeframe.
* These tables will only contain upto 100 entries per symbol.
* How to ensure that records older than past 100 records get automatically removed ?

1. calculations\_daily\_liquid\_options :

| **Column Name** | **Column Description** |
| --- | --- |
| symbolPrimary | varchar(256) |
| recorddatePrimary | date |
| open | decimal(8,4) |
| high | decimal(8,4) |
| low | decimal(8,4) |
| close | decimal(8,4) |
| prevclose | decimal(8,4) |
| volume | bigint(20) |
| candle\_body | decimal(8,4) |
| candle\_height | decimal(8,4) |
| candle\_type | varchar(256) |
| change\_value | decimal(8,4) |
| change\_percent | decimal(8,4) |
| volavg50 | bigint(20) |
| ma20 | decimal(8,4) |
| ma50 | decimal(8,4) |
| avg\_candle\_body\_50 | decimal(8,4) |
| avg\_candle\_height\_50 | decimal(8,4) |

## Holiday Tables:

* These tables will contain the list of holidays or working days for a particular market.
* Holidays table will be updated and based on that Working Days table will be calculated

1. holidays\_nse:

|  |  |
| --- | --- |
| **Column Name** | **Column Description** |
| market | Varchar(256), Primary Key, Default=NSE |
| holiday\_date | varchar(256), Primary Key |

1. working\_days\_nse:

|  |  |
| --- | --- |
| **Column Name** | **Column Description** |
| market | Varchar(256), Primary Key, Default=NSE |
| holiday\_date | varchar(256), Primary Key |

# Screens:

## Admin Screens:

### Manage Database:

**Update Data Form:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl No.** | **Field Name** | **Field Type** | **Field Values** |
| 1 | Data Source | Dropdown | NSE, Quandl, Alphavantage, Zerodha , etc… |
| 2 | Watchlist | Dropdown | Liquid\_Options, F&O,Nifty\_500 |
| 3 | Timeframe | Dropdown | Daily, Hourly, 15 minutes, 5 minutes etc.. |
| 4 | Update Type | Radio | Full Update or Partial Update(if Partial , then show start date and end date), if Full , then update for last 2 years. |
| 5 | Start Date | Dropdown |  |
| 6 | End Date | Dropdown |  |

Once form is submitted, the user is shown a scrollable popup on same page with live logs. Live Logs will not be stored in database.

**Update Calculations Form:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl No.** | **Field Name** | **Field Type** | **Field Values** |
| 1 | Watchlist | Dropdown | Liquid\_Options, F&O,Nifty\_500 |
| 2 | Start Date | Dropdown |  |
| 3 | End Date | Dropdown | Start Date – End Date should not be more than a month |

Once form is submitted, the user is shown a scrollable popup on same page with live logs. Live Logs will not be stored in database.

**Jobs:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl No.** | **Field Name** | **Field Type** | **Field Values** |
| 1 | Job Name | Dropdown |  |
| 2 | Job Frequency | Dropdown | Daily, Hourly, etc.. |
| 3 | Job Time | Time Selector | 10:00 pm, 1:00 am etc.. |

Once form is submitted, the user is shown a scrollable popup on same page with live logs. Live Logs will not be stored in database.

### Database Logs:

**Generate Logs Form:**

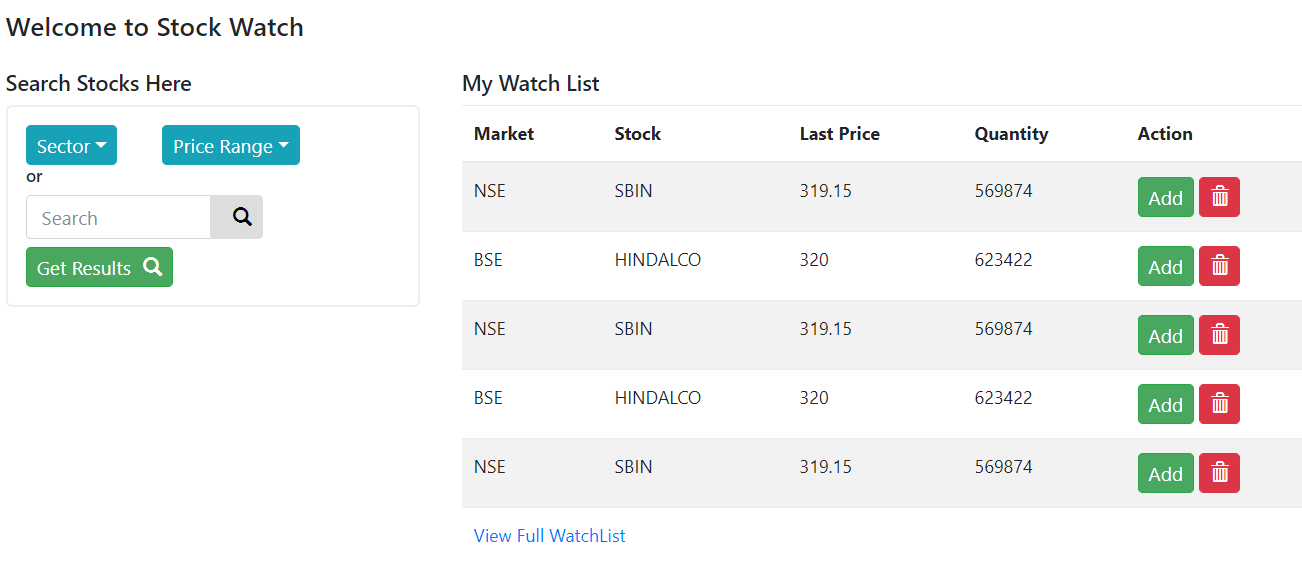
|  |  |  |  |
| --- | --- | --- | --- |
| **Sl No.** | **Field Name** | **Field Type** | **Field Values** |
| 1 | Log Type | Dropdown | Data Log, Calculations Log |
| 2 | Log Table | Dopdown | QUANDL DAIL F&O, NSE DAILY LIQUID OPTIONS |
| 2 | Log Duration | Radio | Full Log or Partial Log |
| 3 | Start Date | Dropdown |  |
| 4 | End Date | Dropdown | Start Date – End Date should not be more than a month |

**Logs Output:**

This needs to be a paginated table with the option to sort by Record Date or by Symbol.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl No** | **Record Date** | **Symbol** | **Expected Record(s)** | **Actual Record(s)** | **Missing Record Count** | **Missing Record(s)** |
|  |  |  |  |  |  |  |

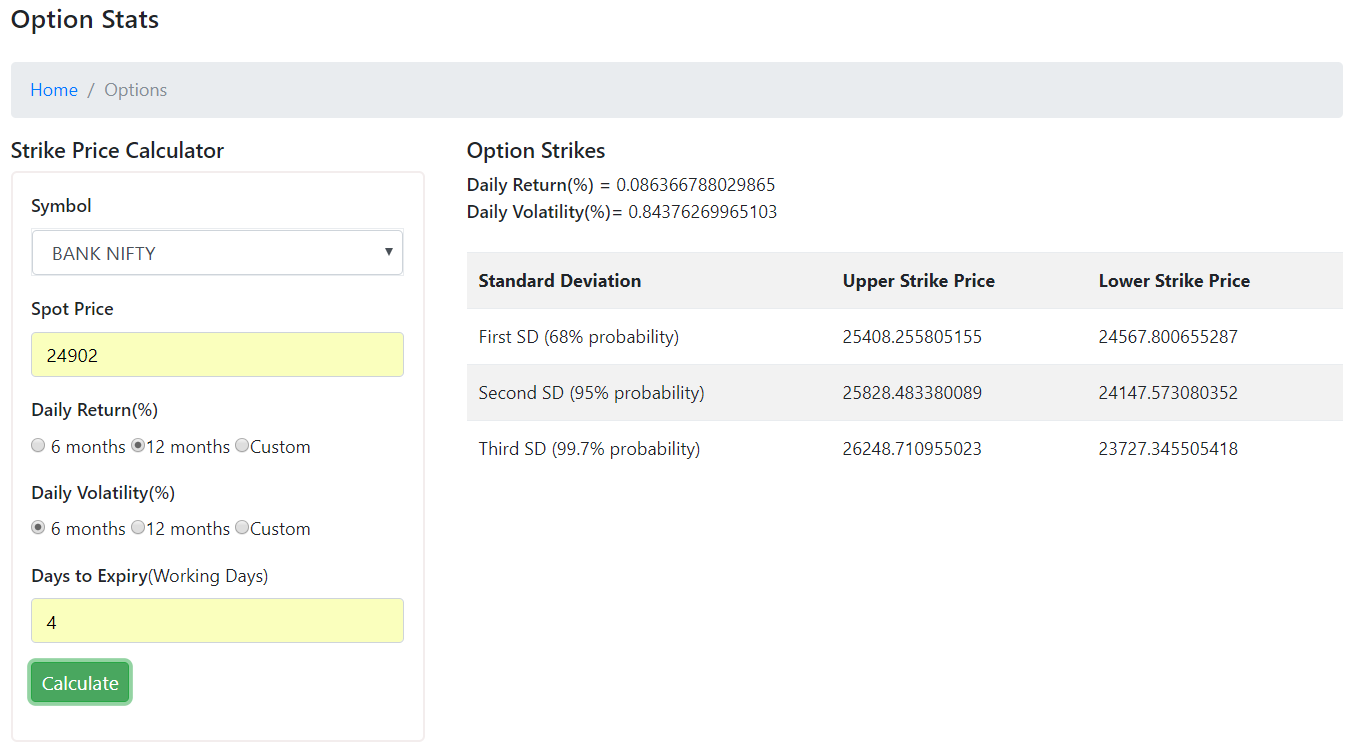
### Manage Watchlists:



## Options Screen:

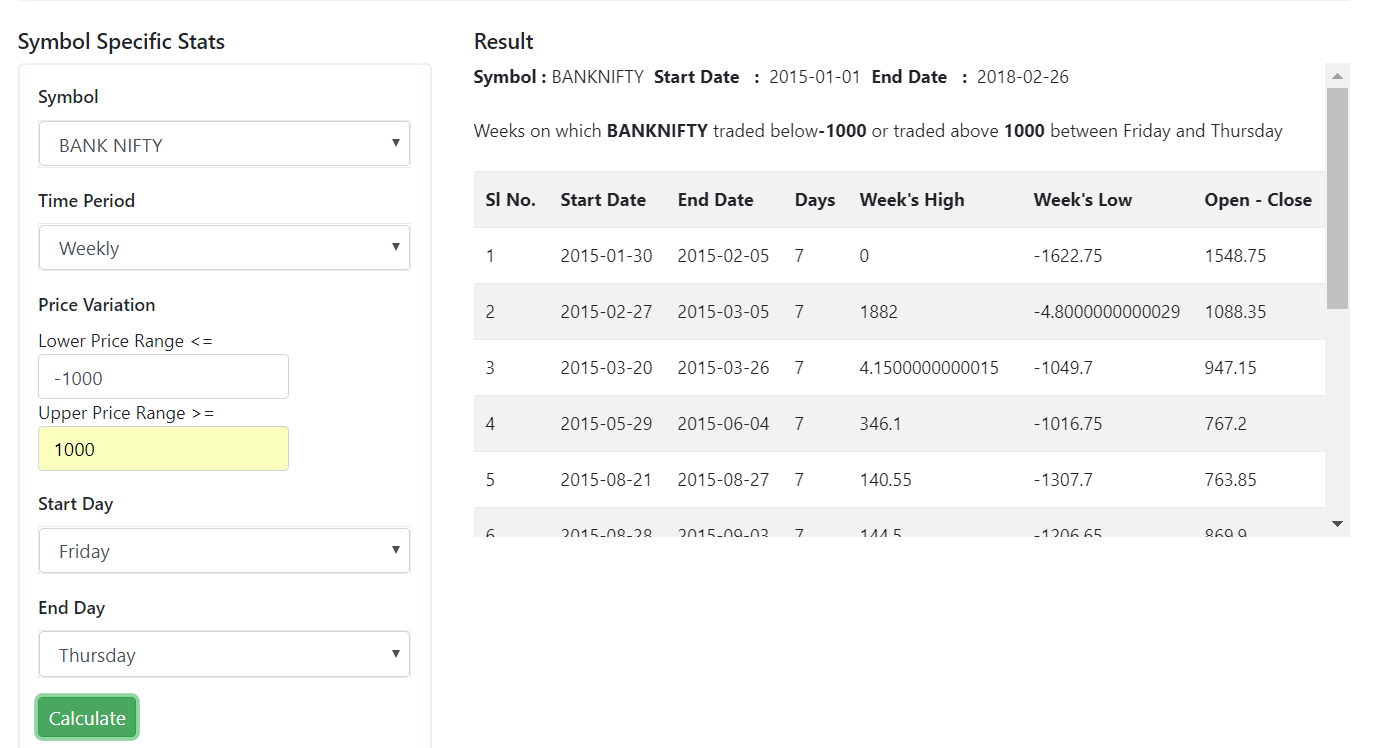
### Strike Price Calculator:

* This screen is to calculate the appropriate Strike Prices of an Option based on Standard Deviation

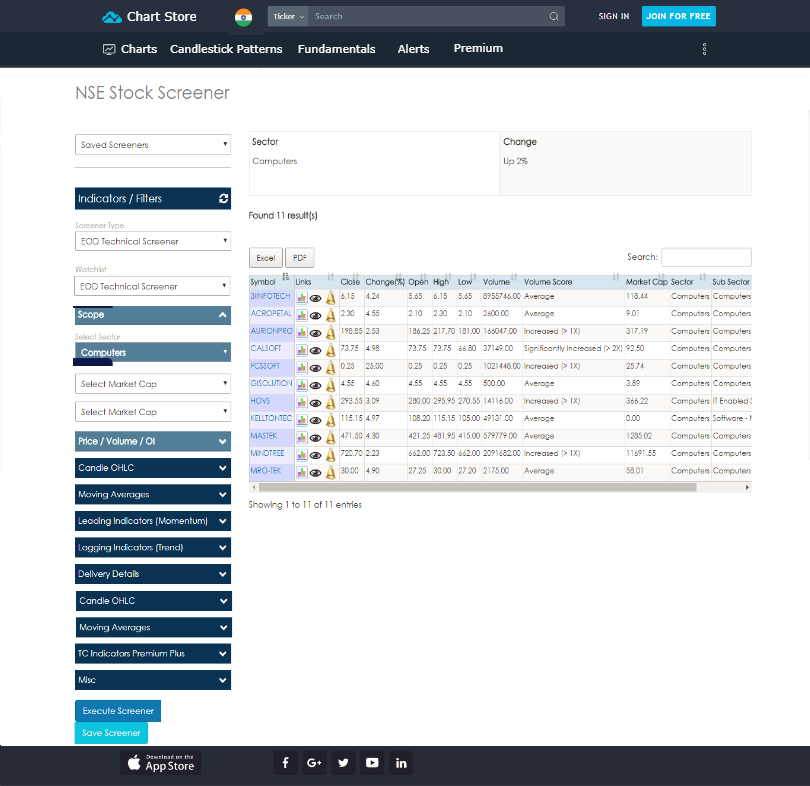


### Symbol Specific Stats:

* This screen is for finding the range of a Symbol for a month or for a week.



## Stocks Screening:



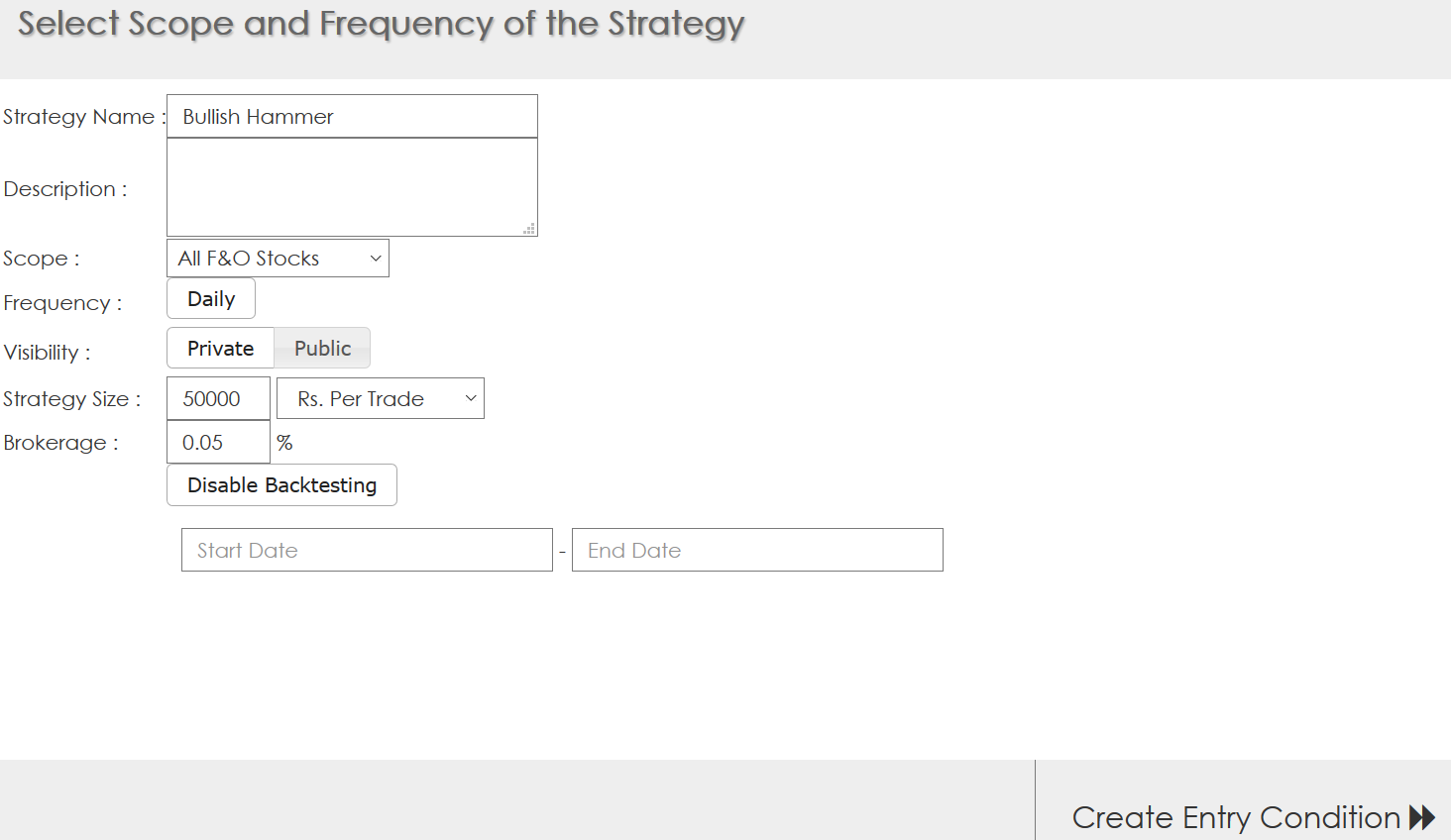
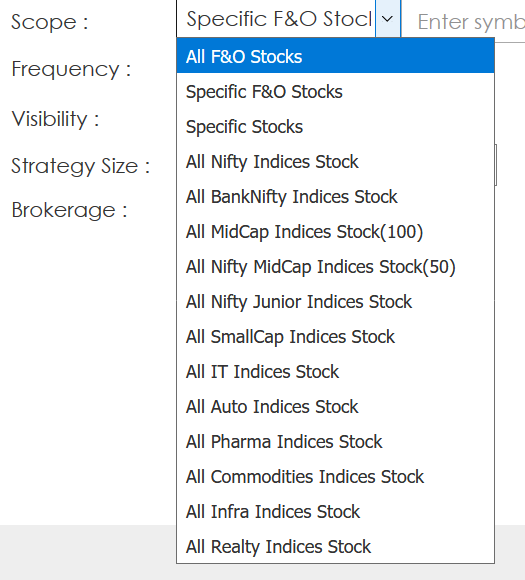
**Screener Dropdowns:**

|  |  |  |
| --- | --- | --- |
|  |  |  |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | | |

## Backtesting:

**Screen 1:** Scope of the Strategy

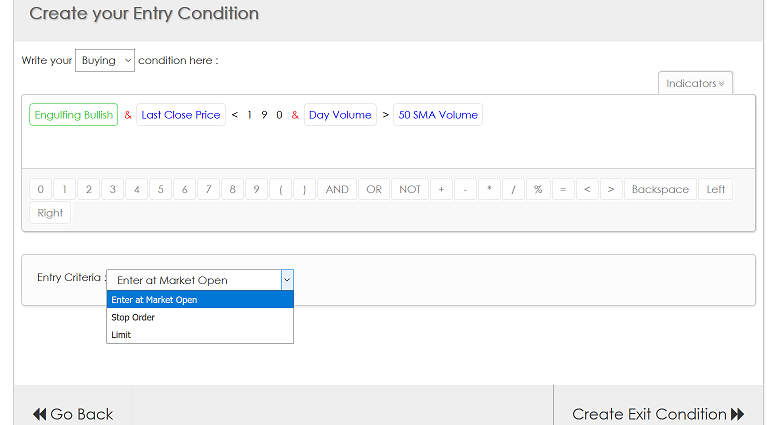
 

**Strategy Name & Details:** Hardcoded from Backend, **Scope :** Only one stock or index at a time.

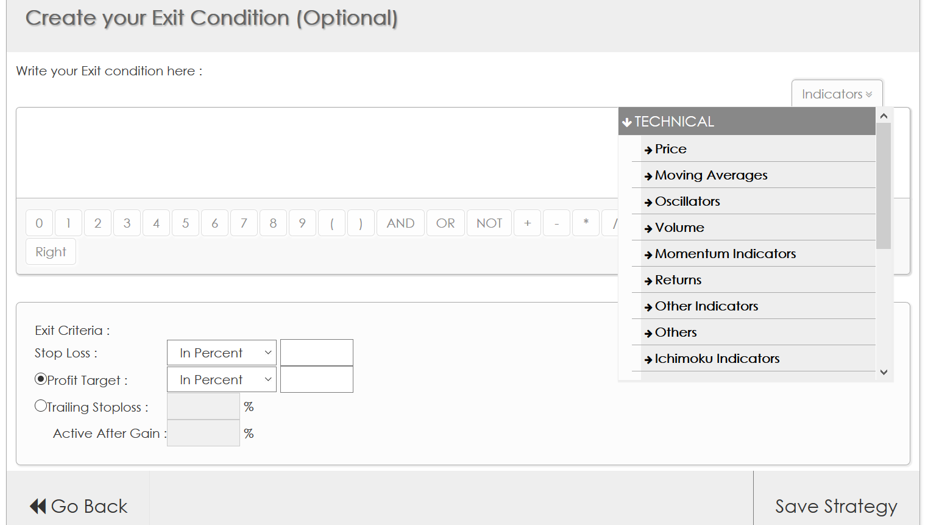
**Frequency :** Daily, **Strategy Size:** Input Box

**Time Period :** 1 Year, 2 Years, 3 Years, 4 Years, 5 Years

**Screen 2:** Entry Conditions : Buying or Selling , etc…



**Screen 3:** Exit Conditions : Stop Loss etc…



**Screen 4 :** Output

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Strategy Name** | **Scope** | **Occurrence Date** | **Entry** | **Exit** | **Quantity** | **Profit & Loss** |
| Double Bottom | HDFC | 5th Feb | 1250 | 1300 | 1500 | 75000 |
| Double Bottom | HDFC | 16th Feb | 1260 | 1000 | 1500 | -90000 |
| Double Bottom | HDFC | 16th Feb | 1260 | 1000 | 1500 | -90000 |

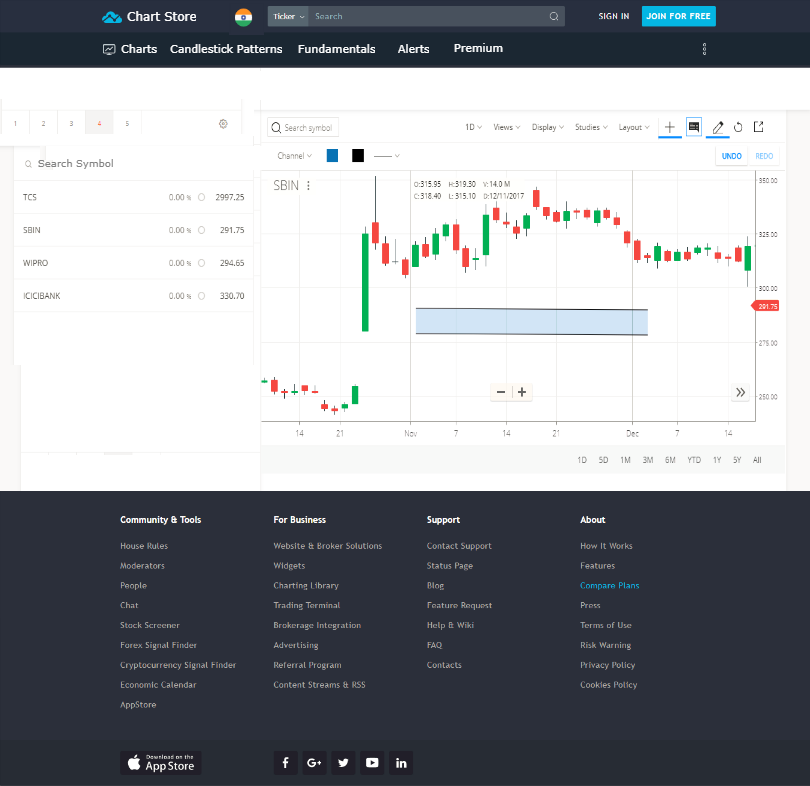
**Time Frame :**

**Total No. of Trades:**

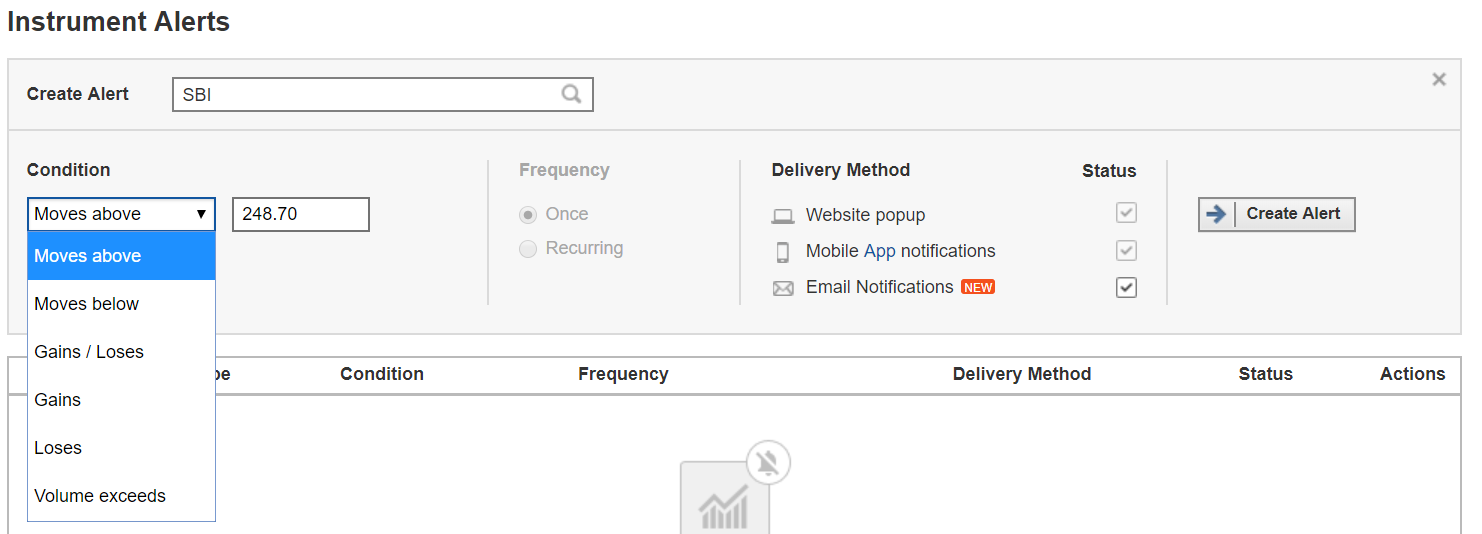
**Total Profit / Loss:**

**Maximum Drawdown:**

## Charting



## Alerts



## Algorithmic Trading:

Ability to integrate with any Broker to perform algorithmic trading.

Top of Form

Top of Form

Bottom of Form

# Initial Setup:

## GIT

git init

git add README.md

git add filename

git commit -m "first commit"

git remote add origin https://github.com/play-area/stock-watch.git

git push --set-upstream origin master

username : [kulbir2408@gmail.com](mailto:kulbir2408@gmail.com)

password : ks9556462141

## ECLIPSE SETUP:

1. Add an apache server to Eclipse:
2. Import Project as Maven project into eclipse.
3. Navigate to Project’s Home Directory where pom.xml file is kept in command prompt and run the mvn clean install command.
4. Add the following settings to Eclipse for a Maven Dependencies.
5. You need to add the "Maven Dependency" in the Deployment Assembly

* right click on your project and choose properties.
* click on Deployment Assembly.
* click add
* click on "Java Build Path Entries"
* select Maven Dependencies"
* click Finish.
* Rebuild and deploy again

# NSE BHAV COPY:

## URL:

<https://www.nseindia.com/content/historical/EQUITIES/2018/JAN/cm05JAN2018bhav.csv.zip>

## File Structure :

The file is a CSV file containing information about all symbols in NSE for a particular day:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SYMBOL** | **SERIES** | **OPEN** | | **HIGH** | **LOW** | **CLOSE** | **LAST** | **PREVCLOSE** | **TOTTRDQTY** | **TOTTRDVAL** | **TIMESTAMP** | **TOTALTRADES** | **ISIN** |
| 3MINDIA | EQ | 19440 | 19600.05 | | 19255.35 | 19367.5 | 19350 | 19449.8 | 867 | 16855986.45 | 05-Jan-18 | 407 | INE470A01017 | |

# KITE CONNECT API:

Unless stated otherwise, every request requires the following arameters.

#### api\_key

Every request before and after authentication requires the api\_key

#### access\_token

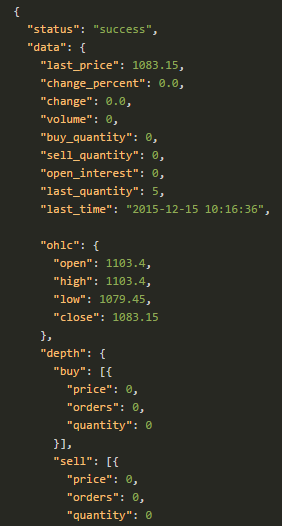
Every request after authentication requires th eaccess\_token along with api\_key

## LIVE QUOTES :

### Request:

"https://api.kite.trade/instruments/NSE/INFY?api\_key=xxx&access\_token=yyy

### Response:



## HISTORICAL QUOTES :

### Request:

https://api.kite.trade/instruments/historical/5633/minute?from=2015-12-28&to=2016-01-01&api\_key=xxx&access\_token=yyy

| **parameter** |  |
| --- | --- |
| :instrument\_token | Identifier for the instrument whose historical records you want to fetch. This is obtained with the[instrument list](https://kite.trade/docs/connect/v1/#retrieving-full-instrument-list) API. |
| :interval | The candle record interval. Possible values are:  · minute · day · 3minute · 5minute · 10minute · 15minute · 30minute · 60minute |

### Response:

The response is an array of records, where each record in turn is an array of the following values — [timestamp, open, high, low, close, volume].

