

Mind Coders

Build An Options Chain Tool

Introduction

The term option refers to a financial instrument that is based on the value of underlying securities such as stocks. An options contract offers the buyer the opportunity to buy or sell:

- Depending on the type of contract they hold.
- The underlying asset.

Objective:

To create an options chain tool that calculates Implied Volatility (IV) in real-time using market data.



Options chain tool overview

Market data stream

Provided over TCP/IP with market data structure.

Goal

Process data, calculate IV, and display options chain as a webpage.

Features

- Differentiate "in the money" and "out of money" options.
- Selection of underlying and different expiries.

Working of the options chain tool

- **Market Data Stream Server Setup:** Participants set up a market data stream server using Java. The server generates and sends market data for four major indices to connected clients over TCP/IP.
- **Client Connection:** Clients connect to the server by sending a single packet with a single byte, indicating their readiness to process responses.
- **Options Chain Tool Interface:** The web-based Options Chain Tool interface is displayed to users. It allows them to select the underlying asset and different expiration dates for options.

Working of the options chain tool

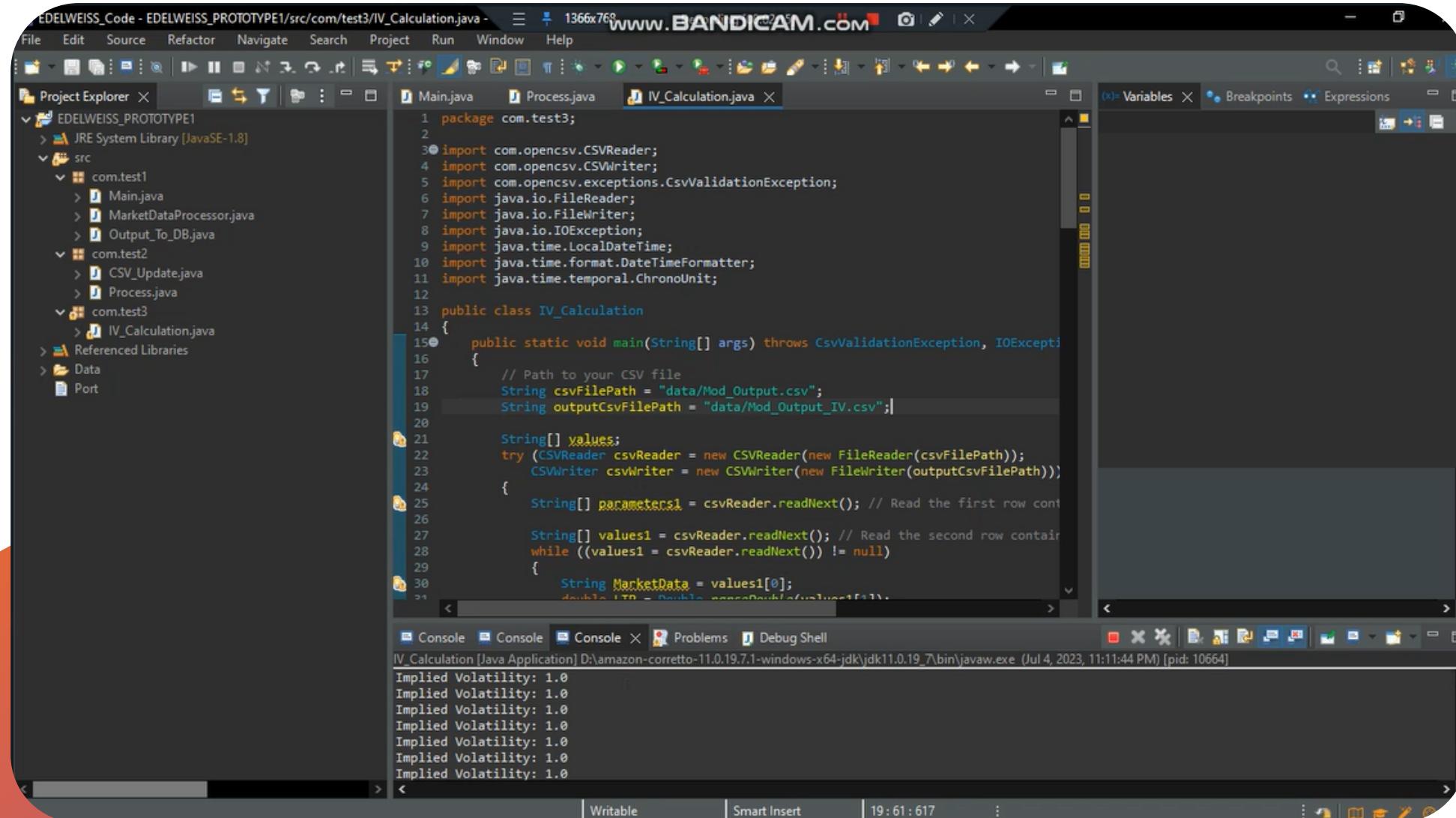
- **Real-Time Data Processing:** As market data changes, the application processes the data in real-time. It updates the options chain interface without requiring a page reload, providing users with the latest options data.
- **Implied Volatility (IV) Calculation:** The application calculates the Implied Volatility for options using the Black Scholes Formula, which considers the options price, risk-free interest rate (assumed as 5%), and time to maturity (TTM). TTM is based on the assumed expiry time at 15:30 IST on the expiry day.
- **Options Differentiation:** The tool highlights "in the money" and "out of money" options differently, helping users identify profitable options based on their strike prices relative to the underlying asset's price.



Implied Volatility (IV) Calculation

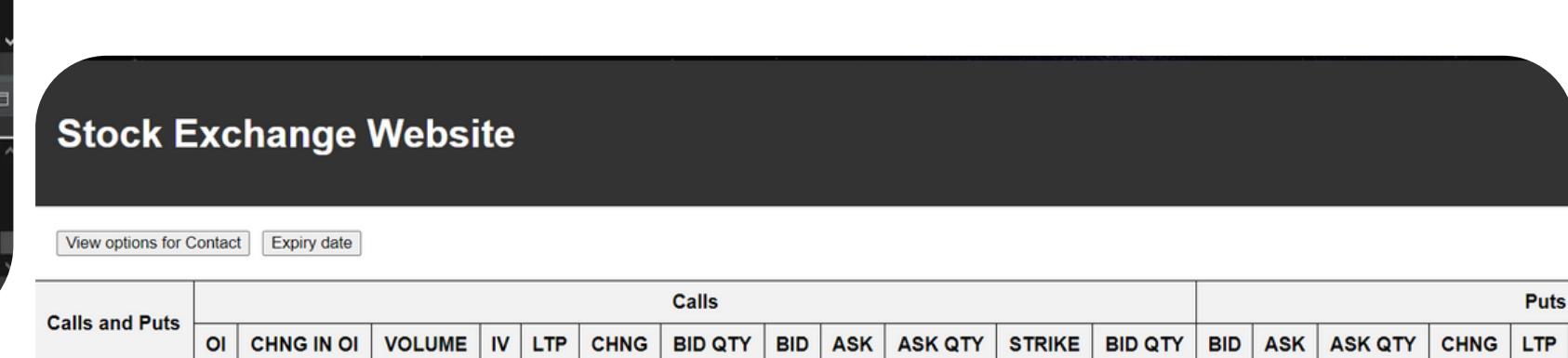
- **Black Scholes Formula:** Used for calculating IV from options price.
- **Risk-Free Interest Rate:** Assumed as 5%.
- **Time To Maturity (TTM):** Assumed to be at 15:30 IST on expiry day.
- **Impact on IV after contract expiry.**

Options chain tool interface



The screenshot shows an IDE interface with the following details:

- Title Bar:** EDELWEISS_Code - EDELWEISS_PROTOTYPE1/src/com/test3/IV_Calculation.java
- Menu Bar:** File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, Help
- Toolbar:** Standard Java development toolbar.
- Project Explorer:** Shows the project structure: EDELWEISS_PROTOTYPE1, JRE System Library [JavaSE-1.8], src, com.test1, com.test2, com.test3, and Referenced Libraries.
- Code Editor:** The IV_Calculation.java file is open, showing Java code for reading CSV files and calculating implied volatility.
- Console:** Displays the output of the application running in the console.
- Bottom Status Bar:** Shows Writable, Smart Insert, and the current time (19:61:617).



The screenshot shows a web-based stock exchange interface with the following elements:

- Header:** Stock Exchange Website
- Buttons:** View options for Contact, Expiry date
- Table Headers:** Calls and Puts, Calls, Puts
- Table Data:** A grid showing market data for Calls and Puts across various parameters: OI, CHNG IN OI, VOLUME, IV, LTP, CHNG, BID QTY, BID, ASK, ASK QTY, STRIKE, BID QTY, BID, ASK, ASK QTY, CHNG, and LTP.

Conclusion

In conclusion, the "Build an Options Chain Tool" project has successfully achieved its objectives of developing a web-based application that processes real-time market data and calculates Implied Volatility (IV) for options. The project has resulted in a powerful and user-friendly Options Chain Tool that provides traders with valuable insights and data to make informed trading decisions.

Key highlights and achievements of the project include:

- **Real-time data processing**
- **Implied volatility calculation**
- **Options chain display**
- **Seamless user experience**
- **Practical usefulness**