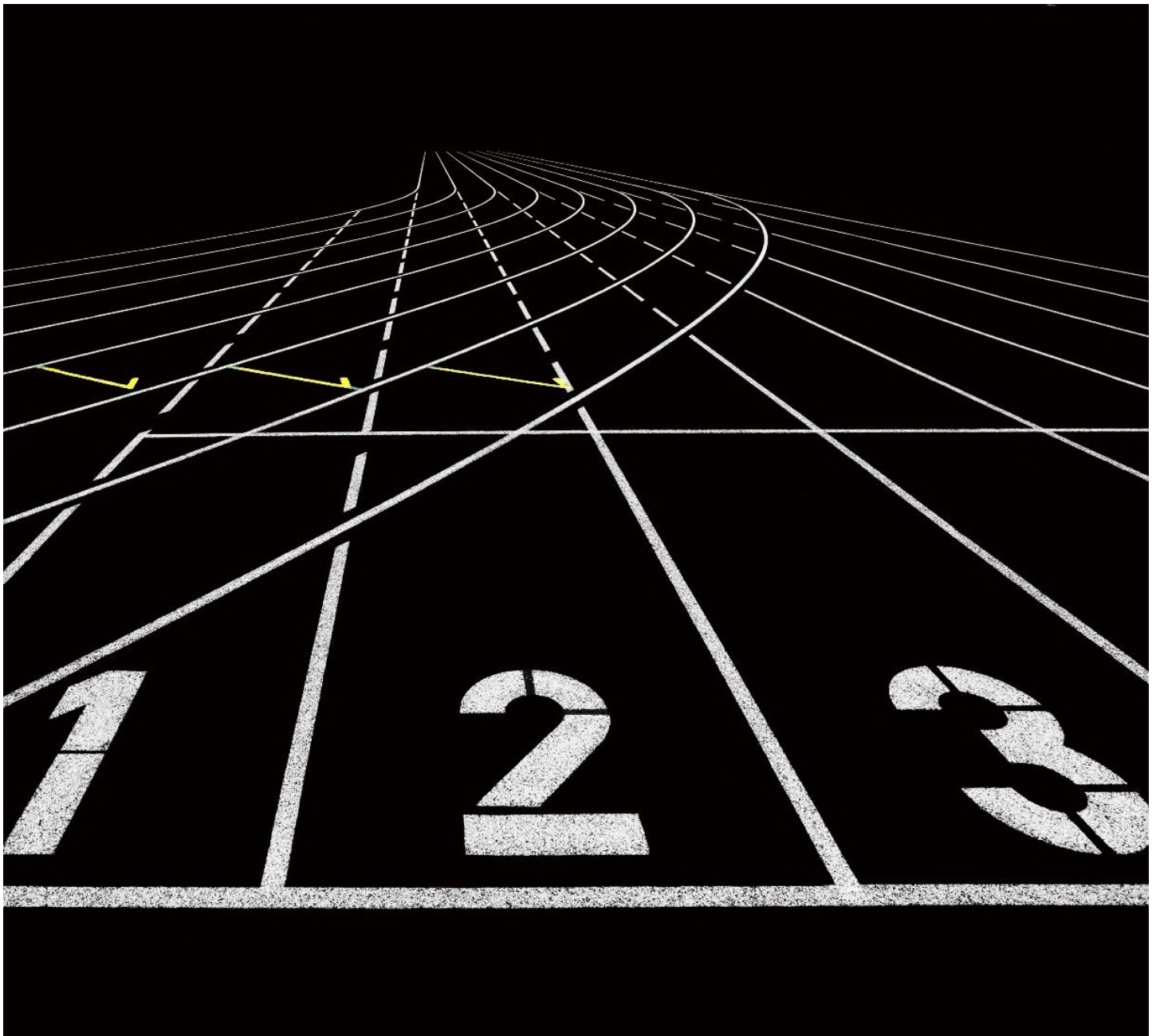


# DYNAMIC VOLATILITY FORECASTING FOR RISK MANAGEMENT AND DERIVATIVES VALUATION

## EWMA AND GARCH (1,1) APPROACHES

MBA 912 – Project 2  
eMasters – Quantitative Finance and Risk Management  
2023-24 Q4

**Amol Sharma**  
**23358004**



## EXECUTIVE SUMMARY

This project investigates the pivotal role of volatility in options valuation and risk management by forecasting the Nifty50 index's volatility using EWMA and GARCH models. These forecasts were utilized to value call and put options on the index, highlighting how volatility influences option pricing. Additionally, the forecasted volatilities were applied to calculate Value at Risk (VaR) for a one-stock portfolio. The findings underscore the importance of accurate volatility estimation in financial modeling, as it significantly affects both options pricing and risk assessment, thereby aiding better-informed investment and risk-related practices.

# INDEX

Executive Summary.....	2
1. Introduction.....	4
Motivation/Relevance of the Study.....	4
Methodology.....	5
2. Literature Survey.....	7
3. Volatility Forecasting Models.....	10
EWMA.....	10
ARCH.....	11
GARCH (1,1).....	12
4. Option Pricing.....	13
Black – Scholes – Merton Model.....	13
Binomial Option Pricing Model.....	14
Monte - Carlo Simulation.....	17
5. Value at Risk (VaR) and Expected Shortfall (ES): Model Building Approach.....	19
6. Implementation with real world data.....	21
Volatility Forecasting.....	21
Description of Data.....	21
Methodology.....	21
Observations.....	23
Option Valuation.....	28
Description of Data.....	28
Methodology.....	28
Observations.....	29
VaR.....	34
One Stock Portfolio.....	34
7. Conclusion and Recommendations.....	35
8. Challenges and Future Work.....	36
9. References.....	37
10. Appendix.....	38

---

# 1. INTRODUCTION

As part of MBA 911 – Project 1, I critically analysed the three widely used option pricing methods: Binomial Trees, Black-Scholes-Merton equations, and Monte Carlo simulation. I aimed to understand their mathematical foundation, assumptions, limitations, implementation using Python, validation, testing, and real-world applications, and performed a comparative analysis. An important learning was the importance of volatility. It is a critical input in all option pricing models. Accurate volatility estimation can significantly improve the precision of option pricing and risk management. Dynamic volatility forecasting models, such as EWMA, ARCH, and GARCH, are powerful tools for capturing and predicting the changing nature of volatility over time. This project aims to delve deeper into these topics, with particular emphasis on the practical implementation of forecasts.

## 1.1 Motivation / Relevance of the Study

### Importance of Volatility Forecasting

Forecasting volatility is a fundamental aspect of contemporary financial theory and application. It holds significant importance in various financial facets, such as managing portfolios, evaluating risks, pricing derivatives, and executing strategic trades. Precise market volatility forecasts empower investors and financial organizations to make knowledgeable choices, efficiently manage potential risks, and boost their profits.

The financial markets have become increasingly volatile and unpredictable, influenced by a myriad of factors such as economic policies, geopolitical events, technological advancements, and market sentiment. The 2008 financial crisis and more recent market shocks, such as those induced by the COVID-19 pandemic, have highlighted the significance of robust risk management practices. These events have underscored the necessity for advanced tools and models that can accurately forecast volatility and help in mitigating potential financial risks.

Traditional methods of measuring and forecasting volatility, such as using historical averages, fail to capture the time-varying nature of financial market volatility. These methods often assume constant volatility over time, which is an unrealistic representation of actual market behaviour. To address these

limitations, more sophisticated econometric models like EWMA, ARCH, and GARCH have been developed. These models account for the dynamic nature of volatility, providing more accurate and reliable forecasts.

### Application in Risk Management

Value at Risk (VaR) is a commonly utilized instrument in risk management, which measures the prospective decrease in a portfolio's value under standard market scenarios within a defined time frame. The correctness of VaR computations is largely reliant on the exactness of the volatility forecasts that underpin them. This study intends to improve the precision of VaR predictions by using sophisticated models for forecasting volatility, thereby refining risk management methodologies.

Options and other derivatives are highly sensitive to volatility. Accurate volatility forecasts are crucial for determining their fair value. Mispricing of derivatives can lead to significant financial losses. This study will apply forecasted volatilities from EWMA, ARCH, and GARCH models to option pricing, ensuring more accurate and reliable valuation of these financial instruments.

Investors use hedging strategies, such as options, to protect their portfolios from adverse market movements. The effectiveness of these strategies depends on the accuracy of volatility estimates. By integrating advanced volatility forecasting models, this study will develop a robust hedging strategy, helping investors mitigate risks and enhance portfolio stability.

The motivation behind this study lies in the critical need for accurate volatility forecasting to manage financial risks effectively. By leveraging advanced econometric models, this study aims to provide a comprehensive framework for volatility prediction, risk assessment, and strategic hedging. The relevance of this study is underscored by the dynamic nature of financial markets and the increasing importance of robust risk management tools in safeguarding investments against uncertainty.

### **1.2 Methodology: -**

- I. Data Collection: Historical price data for the selected stock and options has been gathered from reliable financial databases.
- II. Data Preprocessing: The data has been cleaned and processed to calculate daily returns, which form the basis for volatility modelling.
- III. Volatility Modelling:

- EWMA Model: Volatility is forecasted using an exponentially weighted moving average, emphasizing more recent data.
- GARCH (1,1) Model: It is an extension of ARCH model by incorporating past forecast errors, providing a more comprehensive volatility estimate.
- Forecasted volatility has been validated against historical realized volatility and standard metrics like Mean Absolute Error (MAE), Mean Squared Error (MSE) and Root Mean Squared Error (RMSE)

#### IV. Option Valuation:

- The forecasted volatility is used as an input in option pricing models, such as Black-Scholes, Binomial and Monte Carlo method to determine option values.
- The obtained prices have been compared with market prices and error metrics calculated.
- The implied volatility has been estimated and compared against forecasted volatilities.

#### V. VaR Calculation: Forecasted volatilities have been used to compute VaR at a confidence level, quantifying potential losses for a single stock portfolio.

---

## 2. LITERATURE SURVEY

**Engle (1982)** proposed the ARCH model to capture the phenomenon where periods of high volatility in financial time series data tend to cluster together. This model assumes that the variance of the current error term is a function of the previous periods' squared errors, allowing for conditional heteroscedasticity. The author applied the ARCH model to the time series of United Kingdom inflation rates, demonstrating its effectiveness in modelling the observed volatility clustering. The model provided better estimates of the time-varying variance compared to traditional models, which assume constant variance. Introduction of the ARCH model revolutionized the approach to modelling financial time series data and led to the development of a wide range of volatility models, including the Generalized ARCH (GARCH) model.

**Bollerslev (1986)** significantly advanced econometric modelling by introducing the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model. This model extended Engle's ARCH model by incorporating lagged conditional variances, offering a more flexible and parsimonious framework for modelling financial time series with time-varying volatility. The model was proposed to address the limitations of the ARCH model, which required a large number of parameters to capture volatility clustering adequately. The GARCH model allows the conditional variance to depend not only on past squared errors but also on past conditional variances.

**Engle (2002)** explores the advancements and extensions of Autoregressive Conditional Heteroscedasticity (ARCH) models since its inception, providing a comprehensive overview of the developments in volatility modelling and highlighting new applications and methodologies that have emerged in the field of econometrics.

**Hansen, Lunde, and Nason (2003)** gave an innovative methodology for comparing and selecting among competing volatility models. The authors introduce the Model Confidence Set (MCS) approach, which allows researchers and practitioners to identify a set of superior models without assuming a single best model. The approach is based on constructing confidence sets that contain the true best model with a specified probability, offering a robust framework for model selection. The MCS approach involves two main steps: model ranking and model elimination. Models are initially ranked based on a performance criterion, such as forecast accuracy or goodness-of-fit. A sequential testing procedure is

then applied to eliminate inferior models, resulting in a confidence set of superior models. This procedure accounts for multiple testing issues and controls for the overall error rate.

**Angelidis, Benos and Degiannakis (2004)** investigates the application of Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models for estimating Value at Risk (VaR) in financial markets. The authors explore how different GARCH specifications can enhance the accuracy and reliability of VaR estimates, which are crucial for risk management. The authors use historical data to estimate the parameters of the GARCH models and then generate one-step-ahead forecasts of conditional variance. The performance of the GARCH-based VaR estimates is assessed using back testing procedures, which involve comparing the predicted VaR with actual returns to evaluate the accuracy and reliability of the models.

**Hansen and Lunde (2005)** critically examines the performance of various volatility models in predicting financial market volatility. The study focuses on determining whether any models outperform the standard GARCH(1,1) model, which is widely regarded as a benchmark in volatility forecasting. The authors concluded that, in many cases, the GARCH(1,1) model performs as well as or better than more complex models. While certain models may offer marginal improvements under specific conditions or for particular assets, the GARCH(1,1) model remains highly competitive.

**Natenberg (2015)** is a seminal work in the field of options trading, providing a comprehensive guide to understanding and applying volatility in the pricing and trading of options. The author offers a thorough and practical exploration of volatility and its critical role in options trading. While it provides foundational knowledge and practical strategies for forecasting and trading volatility, it does not delve deeply into advanced econometric models.

**Brooks (2019)** is a comprehensive textbook that provides a detailed introduction to econometric methods and their applications in finance. Among its various topics, the book covers several key models for volatility forecasting like EWMA, ARCH, GARCH, EGARCH, TGARCH, GARCH-M and Stochastic Volatility Models. The author emphasizes the importance of evaluating and comparing different volatility models based on their forecasting performance. The author also discusses various criteria and statistical tests used to assess model accuracy, such as the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and out-of-sample forecasting performance.

**Hull and Basu (2023)** provide comprehensive coverage of derivatives markets, pricing models, and risk management techniques. The author provides a practically focused overview of historical volatility,



implied volatility, EWMA, ARCH and GARCH (1,1) volatility forecasting models. The author also explains the parametric approach to VaR calculation.

### 3. VOLATILITY FORECASTING MODELS

#### EWMA

The Exponentially Weighted Moving Average (EWMA) extends the concept of historical average volatility by giving more weight to recent observations. In EWMA, the most recent data point has the highest impact, and the weights assigned to previous observations decrease exponentially over time. This approach offers two advantages over the simple historical model. First, it acknowledges that recent events have a greater influence on volatility than distant ones. Second, the impact of any single observation diminishes exponentially as newer data points are incorporated. In contrast, the straightforward historical approach may result in sudden volatility changes when past shocks are no longer considered. Even if an unusually large observation persists in a long measurement sample, the forecast could remain artificially high, even during calm market conditions

$$\sigma_t^2 = (1 - \lambda) \sum_{j=0}^{\infty} \lambda^j (r_{t-j} - \bar{r})^2$$

$\sigma_t^2$  is the estimate of the variance for period t, which also becomes the forecast of future volatility for all periods

$\bar{r}$  is the average return estimated over the observations.

$\lambda$  represents the decay factor that dictates the balance of importance between recent and older observations. Although it can be determined, it's often set at 0.94, as suggested by RiskMetrics, a leading risk measurement software provider. It's important to note that both RiskMetrics and many scholarly articles make an assumption of zero average return. This assumption is generally acceptable for daily or more frequent data, and it usually leads to only a minor loss in accuracy due to the small size of the average return. In reality, an infinite series of observations is not available, so the sum in the preceding equation must be cut off at a certain lag. Like exponential smoothing models, the forecast from an EWMA model for any forecast horizon depends on the most recent weighted average estimate.

There are two limitations of EWMA models.

- There are several techniques for calculating EWMA. However, it's crucial to understand that when we substitute the infinite sum in the formula with a finite sum of observed data, the weights

derived from the given expression will total less than one. In situations with limited samples, this difference could have a substantial effect on the calculated EWMA, requiring adjustments.

- Many time series models, such as GARCH, typically predict a volatility that gravitates towards the unconditional variance of the series as the forecast horizon lengthens. This characteristic is advantageous for a volatility forecasting model because volatility series are known to display a 'mean-reverting' pattern. Specifically, if the current level of volatility is high compared to its historical average, it tends to return to that average level. On the other hand, if it's low compared to the historical average, it tends to climb back towards the average. While GARCH models take this feature into account, EWMA models do not.

## ARCH

In the realm of finance, a widely used non-linear model is the 'ARCH' model (which stands for 'autoregressive conditionally heteroscedastic'). The classical linear regression model (CLRM) assumes constant variance of errors i.e. homoscedasticity. However, when it is not constant, we encounter heteroscedasticity. If errors exhibit heteroscedasticity but are mistakenly assumed to be homoscedastic, it can lead to incorrect standard error estimates.

In financial time series, it is unlikely that error variance remains constant over time. Therefore, it's prudent to explore models that do not assume constant variance and instead capture how error variance evolves. One compelling motivation for the ARCH class of models arises from the phenomenon called 'volatility clustering' or 'volatility pooling.' Volatility clustering refers to the tendency for large price changes (in either direction) to follow other large changes, while small changes tend to follow small changes. In simpler terms, the current volatility level is positively correlated with its recent past levels. Volatility often occurs in bursts.

To address this common feature seen in financial asset returns, an effective solution is deploying an ARCH model.

The equation for ARCH (1) is given below, indicating that the conditional variance relies on just one lagged squared error.

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2$$

### GARCH (1,1) Model

The GARCH model, independently developed by Bollerslev (1986) and Taylor (1986), permits the conditional variance to depend on its own lagged values. In its simplest form, the conditional variance equation is as follows:

$$\sigma_t^2 = \alpha_0 + \alpha_1 u_{t-1}^2 + \beta \sigma_{t-1}^2$$

$\sigma_t^2$  represents the conditional variance, serving as a one-period ahead estimate for the variance. It is calculated based on relevant past information. With the GARCH model, the current fitted variance can be interpreted as a weighted combination of a long-term average value (dependent on  $\alpha_0$ ), information about volatility from the previous period ( $\alpha_1 u_{t-1}^2$ ), and the fitted variance from the model in the preceding period ( $\beta \sigma_{t-1}^2$ ).

## 4. OPTION PRICING

### 4.1 Black Scholes Model

Black and Scholes (1973) provided a key insight that a portfolio (called as replicating portfolio) comprising of an underlying asset and a risk-free asset can be constructed in such a way so as to have the same cash flows as a call or put option. Since no arbitrage opportunities are taken as a given, the authors argued that as the replicating portfolio and the put/call option had same cash flows, their price would also have to be the same.

Black Scholes Merton is the most commonly used model to price options. The model utilizes six variables: volatility of stock ( $\sigma$ ), option type – put or call, underlying stock price ( $S_0$ ), option duration (T) and risk-free rate of return (r) and strike price (K).

#### Assumptions

- I. The risk-free rate of interest is constant over time
- II. No riskless arbitrage opportunity available (as in binomial method)
- III. The stock price follows a continuous variable, continuous time stochastic process.
- IV. The stock price has lognormal distribution
- V. Stock doesn't pay any dividends or returns
- VI. Short selling is allowed
- VII. No transaction cost and taxes
- /III. European style of options are considered

The Black Scholes Merton differential is given as

$$\frac{\partial f}{\partial t} + rS \frac{\partial f}{\partial S} + \frac{1}{2} \sigma^2 S^2 \frac{\partial^2 f}{\partial S^2} = rf$$

The differential equation can be solved by taking suitable boundary conditions: -

$$\left. \begin{array}{l} \text{European Call Option } f = \max(S - K, 0) \\ \text{European Put Option } f = \max(K - S, 0) \end{array} \right\} \text{ when } t = T$$

Solving the differential equation, we get

$$c = S_0 N(d_1) - Ke^{-rT} N(d_2)$$

And

$$p = Ke^{-rT} N(-d_2) - S_0 N(-d_1)$$

Where

$$d_1 = \frac{\ln\left(\frac{S_0}{K}\right) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$$

$$d_2 = \frac{\ln\left(\frac{S_0}{K}\right) + (r - \sigma^2/2)T}{\sigma\sqrt{T}} = d_1 - \sigma\sqrt{T}$$

C = European call option price

P = European put option price

K = Strike price

Limitations:-

- I. Since it is implicit that options can only be exercised on expiration date, Black-Scholes-Merton model does not accurately predict American style options
- II. The risk-free rate of return may change over time. Same goes for volatility.
- III. Trading incurs brokerage fees and commission which clashes with no transaction assumption.

## 4.2 Binomial Trees

Binomial Trees are diagrammatical representation of various paths a stock's price can follow over the life of an option.

Assumptions :-

- I. The stock prices are following a random walk with constant volatility
- II. Risk- neutral valuation: Investors are risk averse. This means that

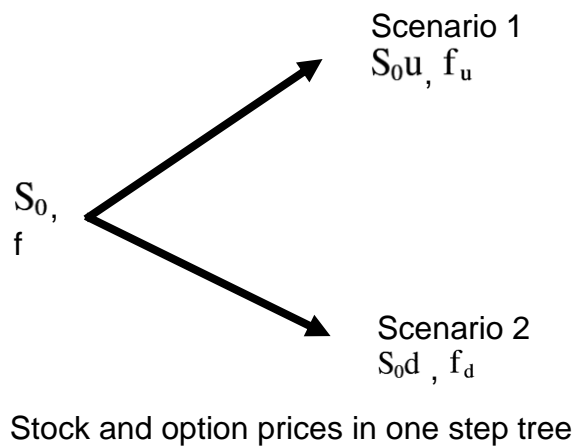
- a. The expectation of return on a stock is the risk-free rate
  - b. The discount rate to calculate present value of portfolio is the risk-free rate
- III. There are no transaction fees and taxes levied.
- IV. The risk-free rate of return does not change over time.

### One-Step Binomial Tree model

Consider

- $S_0$  = Initial Stock Price
- $f$  = Current price of stock option
- $T$  = Life span of option
- $p$  = probability of upward movement of stock
- $1-p$  = probability of downward movement of stock price
- $\Delta$  = No. of shares
- $S_0u$  = Upward price movement of stock where  $u > 1$
- $S_0d$  = Downward price movement of stock where  $d < 1$
- $f_u$  = Option payoff when price is  $S_0u$
- $f_d$  = Option payoff when price is  $S_0d$
- $r$  = risk free rate of return

Consider a portfolio with long position in  $\Delta$  shares and short position in one option.



Portfolio value at scenario 1 =  $S_0u\Delta - f_u$

at scenario 2 =  $S_0d\Delta - f_d$

$$S_0u\Delta - f_u = S_0d\Delta - f_d$$

Since the portfolio is riskless, the two will be equal when

$$\Delta = \frac{f_u - f_d}{S_0u - S_0d} = \text{Hedge Ratio}$$

As there are no arbitrage opportunities, the portfolio must earn risk free rate of return.

Now,

$$PV_{\text{Portfolio}} = FV_{\text{portfolio}}e^{-rT}$$

$$S_0\Delta - f = (S_0u\Delta - f_u)e^{-rT}$$

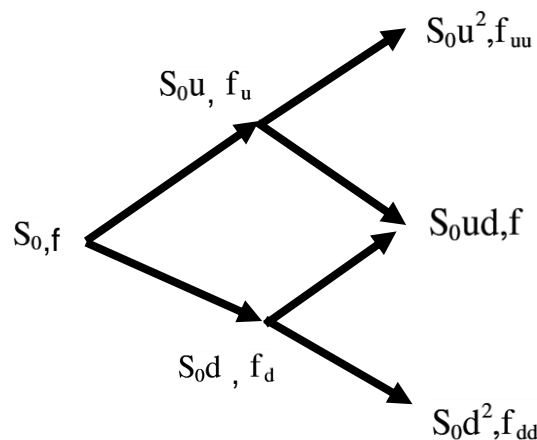
Substituting the value of  $\Delta$  and simplifying, we obtain

$$f = e^{-rT}[pf_u + (1-p)f_d]$$

where

$$p = \frac{e^{rT} - d}{u - d}$$

## Two-Step Binomial Tree



Stock and option prices in two-step tree

For a two-step binomial process, the above equation can be generalized as

$$f = e^{-2r\Delta t}[p^2f_{uu} + 2p(1-p)f_{ud} + (1-p)^2f_{dd}]$$

Where  $\Delta t$  = Length of time step



$f_{uu}$  = Value of option after two up movements

$f_{dd}$  = Value of option after two down movements

From Cox, Rox and Rubinstein (1979), the value  $u$  and  $d$  can be obtained as

$$u = e^{\sigma\sqrt{\Delta t}} \text{ and } d = e^{-\sigma\sqrt{\Delta t}}$$

Where  $\sigma$  = Volatility of stock. It is defined as standard deviation of a continuously compounded return on a stock in 1 year.

Limitations:-

- I. There is no such thing as risk neutral world. Investors expect higher return for higher risks. Nonetheless, the option price zeroed in assuming risk neutral world is also the practical price. An investor's risk preferences affect the stock prices but the formula relating an option's price to underlying stock price remains same.
- II. The assumption of random walk with constant volatility may not hold true as volatility can change over time
- III. Multi – period binomial model becomes complex and computationally intensive

It is to be noted that as the number of time steps increases, the option price calculated using the binomial method starts converging towards price given by Black Scholes model.

### 4.3 Monte Carlo Method

Monte Carlo simulations, a computational method that originated in mid-20th century computational physics, have become an essential tool in quantitative finance. They are particularly versatile for pricing options, allowing for the estimation of the value of financial derivatives in complex and uncertain market conditions. These simulations provide a robust and adaptable strategy for determining option prices under a variety of scenarios

Assumptions:-

- I. It assumes that the underlying asset follows a geometric Brownian motion process
- II. It employs risk-neutral pricing
- III. Market frictions like transaction costs and taxes are not taken under consideration

IV. The price of the underlying asset follows a log-normal distribution

The following steps are performed [Hull and Basu (2022)]: -

- I. Create many different random scenarios for how the price of the underlying asset might change over time. Each scenario represents a possible future path for the asset's price.
- II. For each scenario, determine the payoff that the option would have at the end of the scenario based on its contract terms and the final asset price
- III. Repeat the process of generating random scenarios and calculating option payoffs many times to gather a large collection of potential outcomes.
- IV. Calculate the average payoff from all the scenarios. This gives an estimate of the expected payoff of the option under the assumption of a risk-neutral world.
- V. Adjust the expected payoff by discounting it back to the present time using the risk-free interest rate to get an estimate of current value of the option.

Limitations:-

- I. Monte Carlo simulations can be computationally intensive. Often a tradeoff is required between time and accuracy.
- II. It cannot easily handle early exercise preferences. Though, there are complex ways of extending it to value American options.

---

## 5. VAR AND ES: MODEL BUILDING APPROACH

### Value at Risk and Expected Shortfall

Option Greeks—such as delta, gamma, and vega—are essential for assessing various risk aspects in a derivatives portfolio. Financial institutions routinely compute these measures daily for every market variable they are exposed to. Given the multitude of market variables (often numbering in the hundreds or thousands), delta-gamma-vega analysis yields a vast array of risk metrics. While these metrics provide valuable insights for traders, they fall short in capturing the overall risk faced by the institution.

To address this, Value at Risk (VaR) and Expected Shortfall (ES) offer consolidated risk summaries for portfolios of financial assets. These measures are widely adopted by corporate treasurers, fund managers, and financial institutions. Historically, bank regulators relied on VaR to determine capital requirements for risk-bearing. However, there's a shift toward ES for market risks.

When utilizing VaR measure, an analyst aims to make a statement such as: "I am X percent confident that there will not be a loss exceeding V dollars within the next N days." The variable V represents the VaR of the portfolio, which depends on two parameters: the time horizon (N days) and the confidence level (X%). VaR calculates the loss level over N days, with only a  $(100 - X)\%$  probability of being exceeded.

VaR is favoured due to its straightforward nature, answering the essential question, "How bad can things get?" This is exactly what senior managers want to know, as consolidating all complex market variables into a single number is very reassuring for them.

While VaR asks, "How bad can things get?" expected shortfall (ES) addresses, "If things go bad, how much can the company expect to lose?" ES represents the expected loss over an N-day period if the loss surpasses the VaR threshold. For instance, with a 99% confidence level ( $X = 99$ ) and a 10-day period ( $N = 10$ ), the expected shortfall calculates the average loss over those 10 days if losses exceed the 10-day 99% VaR.

VaR, recognized globally, plays a pivotal role in market risk management. In India, where banking-related segments of capital markets are more stringently regulated than equity segments, VaR remains a critical tool. The Reserve Bank of India (RBI) mandates VaR as the methodology for measuring market risk in portfolios of individual banks and financial institutions. This aligns with the Basel II

guidelines issued by the Bank for International Settlements (BIS). RBI ensures that all entities under its regulation adhere to these recommendations, emphasizing the regular use of VaR for market risk measurement and reporting. There are two main approaches for calculating VaR and ES – historical simulation approach (involves using past data to predict future) and model building approach (estimates of daily volatilities is readily available). The latter is used in this project.

## 6. IMPLEMENTATION WITH REAL WORLD DATA

### 6.1 Volatility Forecasting

#### Description of Data

The NIFTY 50, a leading index of the National Stock Exchange (NSE), serves as a benchmark that showcases the top 50 equity stocks out of around 1600 traded on the exchange. These stocks encompass 12 sectors of India's economy, including sectors like information technology, financial services, consumer goods, entertainment and media, metals, pharmaceuticals, telecommunications, cement and related products, automobiles, pesticides and fertilizers, energy, and various other services.

The NIFTY 50 mirrors the movements and patterns of the most liquid and largest Indian securities. Together with the Sensex, they act as indicators of the overall performance of India's equity market. The index options based on them are the most frequently traded in India, making them essential instruments for investors, traders, and market analysts.

#### Methodology

1. For volatility estimation, last 10 years of NIFTY50 price data i.e. 1<sup>st</sup> January 2014 to 31<sup>st</sup> March 2024, has been taken under consideration. The data is openly available on Yahoo Finance.
2. After preprocessing, returns were calculated on adjusted close price and its statistical properties were obtained.
3. Before applying EWMA and GARCH model, standard econometric tests were performed  
Reference –Introductory Econometrics for Finance [Brooks (2019)]: -
  - a. Stationarity Test (ADF Test)
    - i. The null hypothesis presumes that the series is not stationary, suggesting that applying differencing could be a suitable approach to achieve stationarity in the data. The obtained p-value should fall below the significance threshold (0.05) to discard the null hypothesis. This would lead to the assessment that the series is indeed stationary.
  - b. Autocorrelation (ACF, PACF Test)
    - i. Statistical correlation provides a measure of how strongly two variables are related. In the context of time series data, the correlation between an observation

and its preceding observations, known as lags, can be computed. This correlation, calculated with previous values of the same series, is referred to as serial correlation or autocorrelation. A graph that depicts the autocorrelation of a time series by lag is termed the Auto-Correlation Function (ACF).

ii. Partial autocorrelation (PACF) , on the other hand, offers a summary of the relationship between a time series observation and observations at earlier time steps, with the influence of intervening observations eliminated.

iii. In ACF and PACF plots:

- The x-axis represents the various lags of the residuals.
- The y-axis displays the correlation for each lag.
- The blue area signifies the level of significance.
- Both plots commence with a lag of 0, which is the correlation of the time series with itself, hence resulting in a correlation of 1.

c. Ljung-Box test and associated p-value on returns.

4. Daily Volatility values were calculated using EWMA model. The decay factor lambda was taken as 0.94 which is widely used in literature.

5. GARCH(1,1) model was fitted to find daily volatilities and a summary was obtained.

6. Following model diagnostic tests for GARCH were performed: -

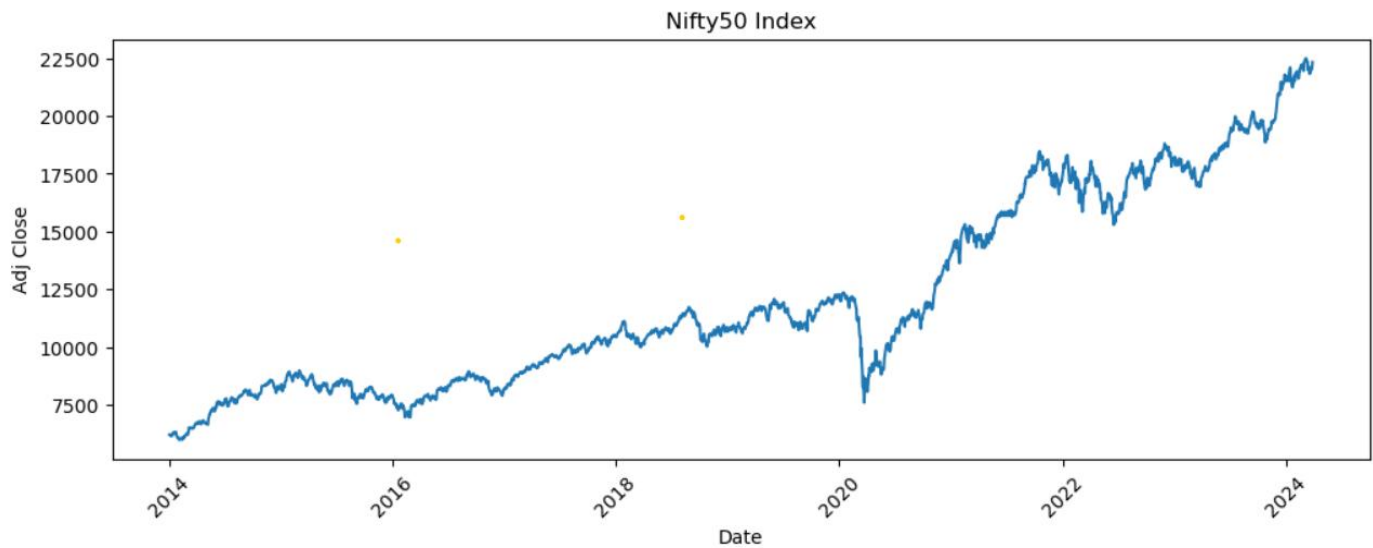
- a. Residual analysis - After fitting a GARCH model, the residuals should ideally behave like white noise (i.e., no significant autocorrelation).
- b. ACF and PACF of residuals to check if residuals are uncorrelated.
- c. Ljung-Box Test on Residuals.
- d. ARCH LM Test and associated p-value.

7. The daily volatilities obtained were scaled to yearly using following formula: -

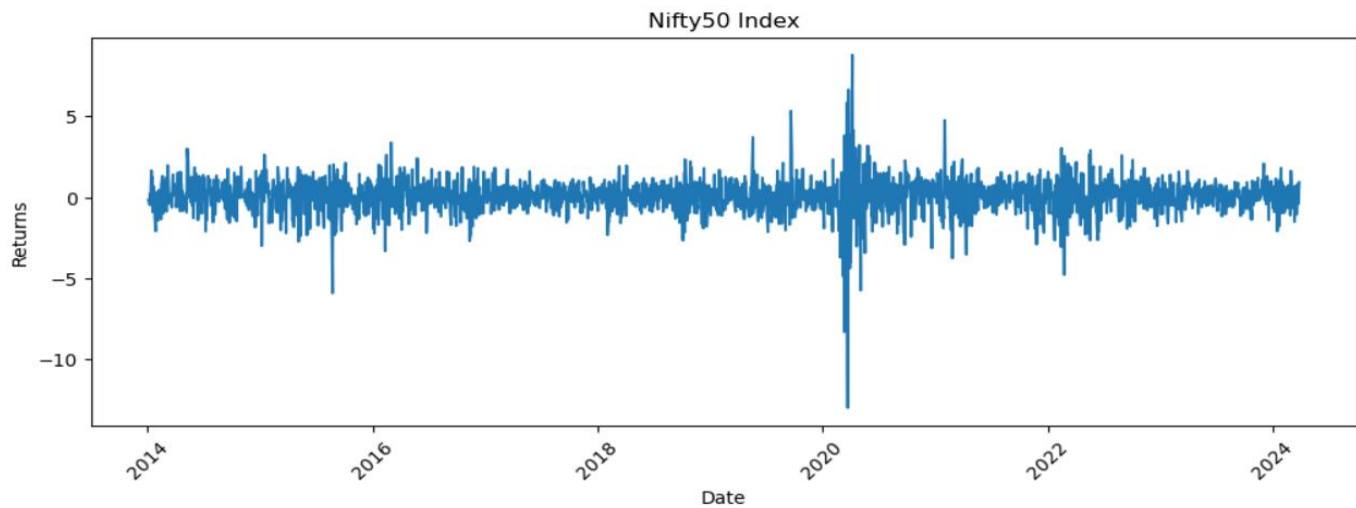
$$\text{Volatility per annum} = \text{Volatility per trading day} * \sqrt{\text{Number of trading days per annum (252)}}$$

8. To validate forecasted volatilities, historical realized volatility was calculated for corresponding period. A rolling window of past 50 days was used for estimation. MAE, MSE and RMSE values were obtained.

## Observations



Time Series plot of NIFTY50 Adjusted Close Price



Time Series plot of NIFTY50 returns

### Summary Statistics of NIFTY50 Returns

Mean: 0.0563

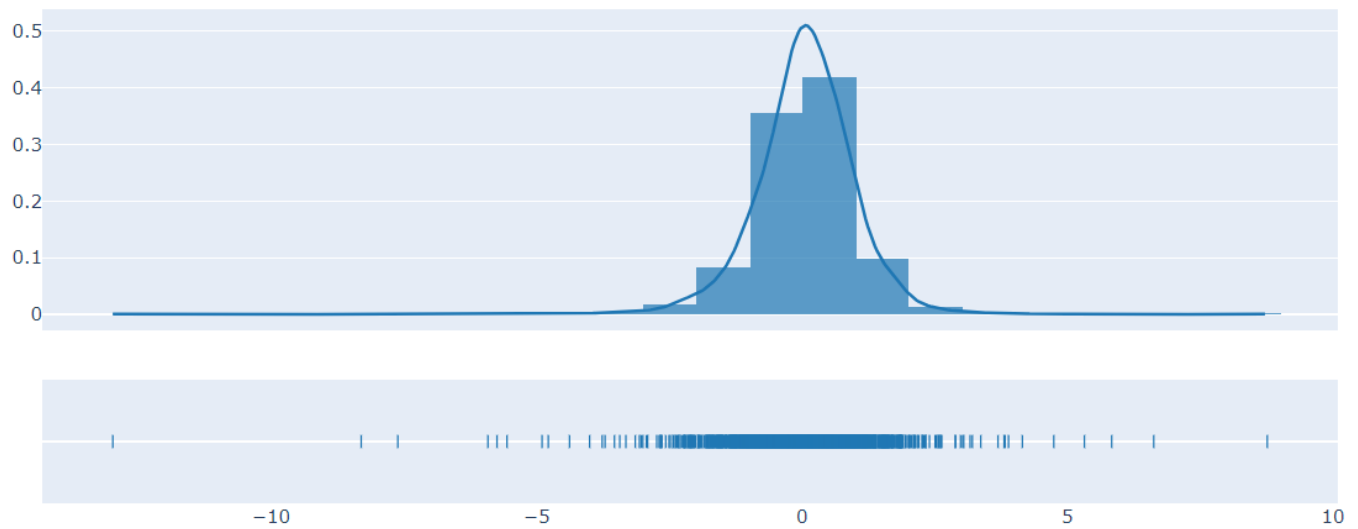
Variance: 1.0741

Skewness: -1.0632

Kurtosis: 17.6968

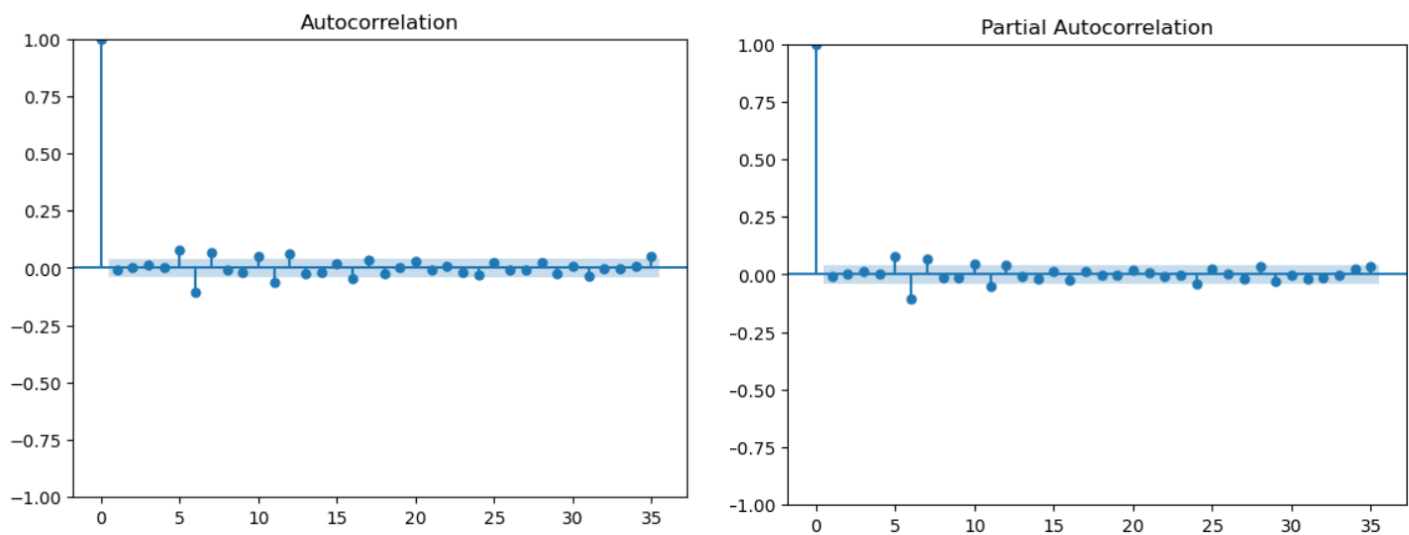
count	2512.000000
mean	0.056293
std	1.036381
min	-12.980466
25%	-0.432138
50%	0.081864
75%	0.613329
max	8.763210

## Distribution of daily Nifty50 Returns



ADF Test Statistic: -13.827753967816198  
p-value: 7.692975515147641e-26

ADF Test statistics on returns



ACF and PACF plots for returns



	lb_stat	lb_pvalue
20	95.475535	8.054282e-12
Ljung-Box value for returns		
	lb_stat	lb_pvalue
20	2118.567855	0.0
Ljung-Box value for squared returns		

#### Constant Mean - GARCH Model Results

<b>Dep. Variable:</b>	Returns	<b>R-squared:</b>	0.000
<b>Mean Model:</b>	Constant Mean	<b>Adj. R-squared:</b>	0.000
<b>Vol Model:</b>	GARCH	<b>Log-Likelihood:</b>	-3242.32
<b>Distribution:</b>	Normal	<b>AIC:</b>	6492.64
<b>Method:</b>	Maximum Likelihood	<b>BIC:</b>	6515.96
<b>No. Observations:</b>			2512
<b>Date:</b>	Sat, Jun 08 2024	<b>Df Residuals:</b>	2511
<b>Time:</b>	13:07:31	<b>Df Model:</b>	1

#### Mean Model

	coef	std err	t	P> t	95.0% Conf. Int.
<b>mu</b>	0.0837	1.697e-02	4.936	7.983e-07	[5.049e-02, 0.117]

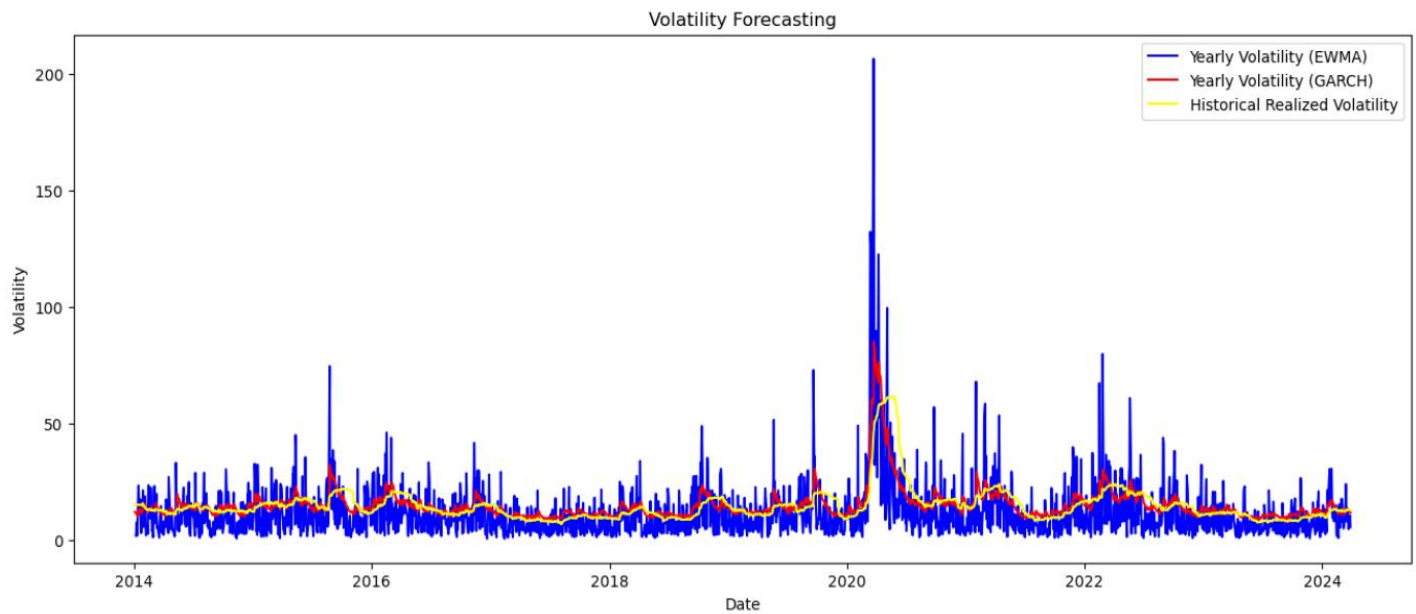
#### Volatility Model

	coef	std err	t	P> t	95.0% Conf. Int.
<b>omega</b>	0.0216	6.192e-03	3.493	4.777e-04	[9.491e-03, 3.376e-02]
<b>alpha[1]</b>	0.0904	1.647e-02	5.486	4.117e-08	[5.809e-02, 0.123]
<b>beta[1]</b>	0.8878	1.710e-02	51.919	0.000	[0.854, 0.921]

Covariance estimator: robust

	lb_stat	lb_pvalue
20	95.475535	8.054282e-12
Ljung-Box value for residuals		
	lb_stat	lb_pvalue
20	2096.27004	0.0
Ljung-Box value for squared residuals		

ARCH LM Test p-value: 4.7984729437166025e-149



	EWMA	GARCH(1,1)
MAE	7.883	2.55
MSE	132.671	19.423
RMSE	11.518	4.407

Error of volatility forecast

- The p-value for ADF test and Ljung-Box test of returns is negligible. The series is stationary with no significant autocorrelations.
- The ACF and PACF plots show no significant correlations with lags.
- Similarly, p-value of Ljung-Box and ARCH LM Test on residuals is quite small.
- When reference to historical volatility, there is considerable difference between volatility forecasts. Compared to EWMA, GARCH (1,1) is more favourably forecasting volatility of NIFTY50 index.
- An investigation into higher order GARCH models and its different variants can further be undertaken to increase efficiency of forecasts.

## 6.2 Option Valuation

### Description of Data

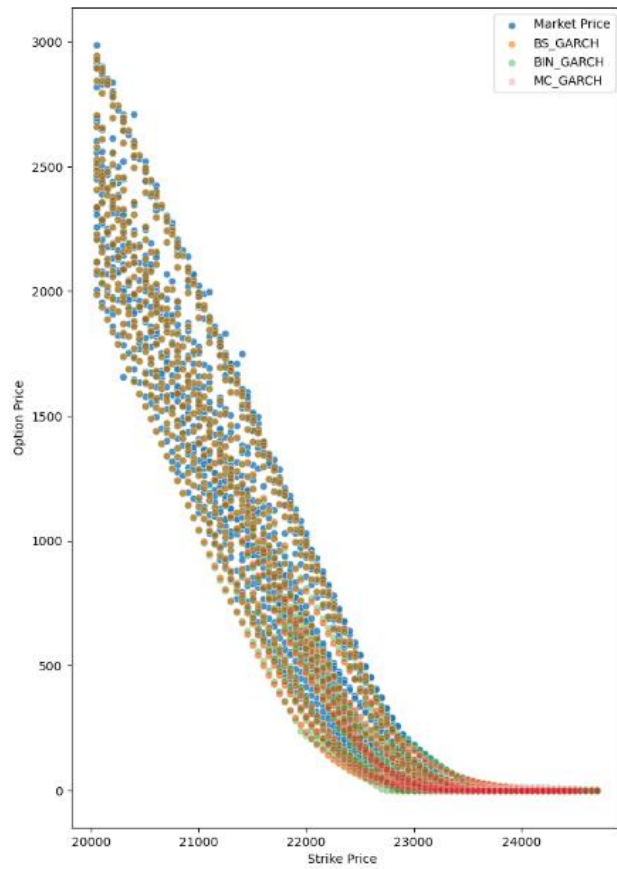
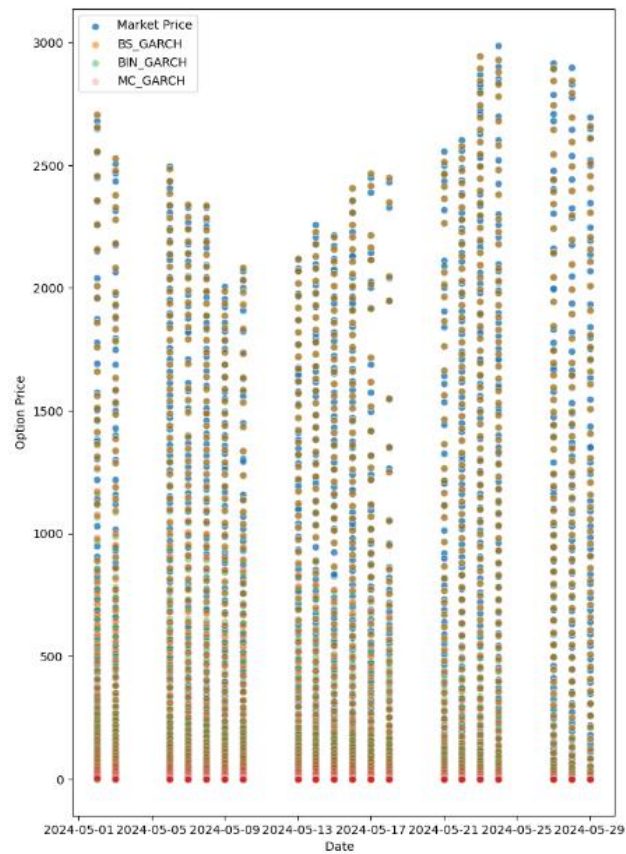
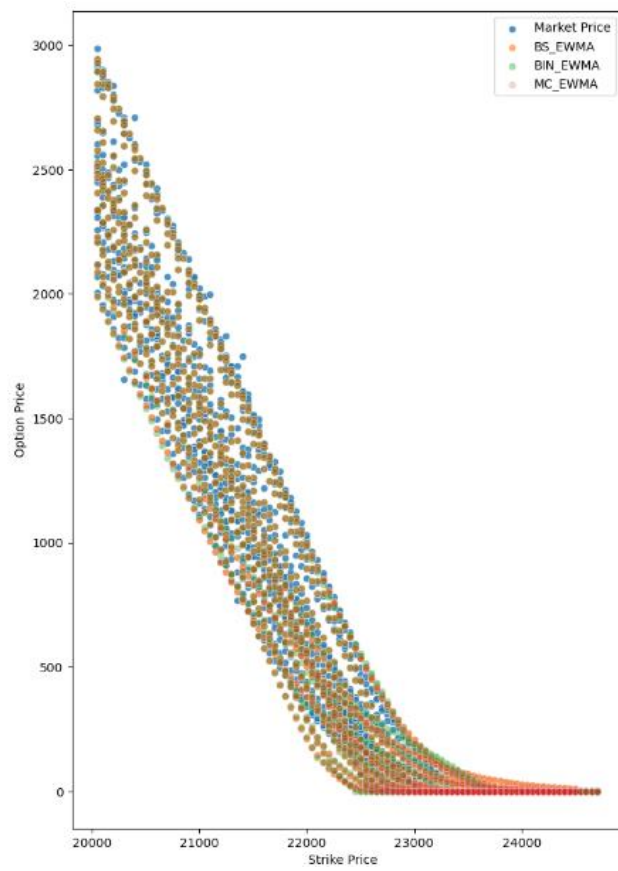
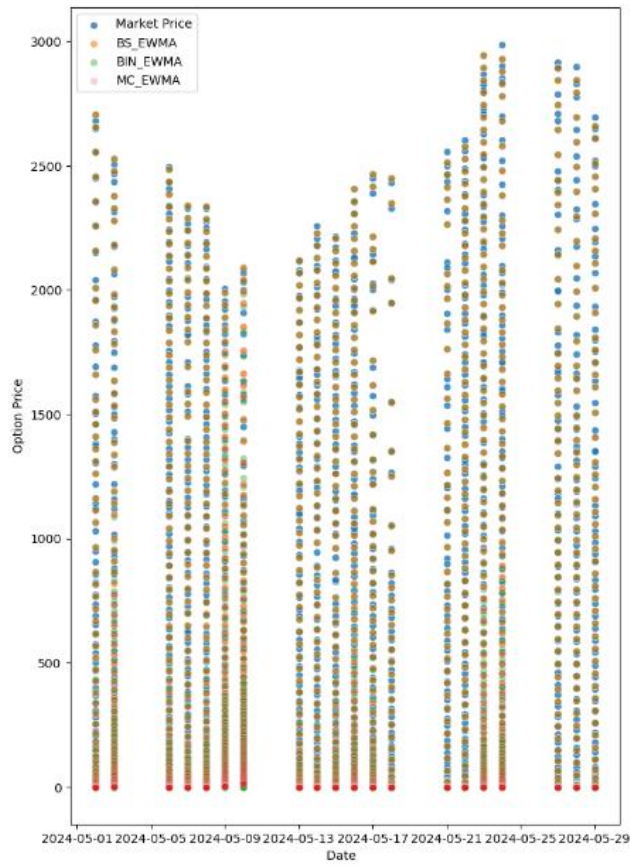
- Options on NIFTY50 index were chosen for analysis. The historical price data for the index was taken from 1<sup>st</sup> January 2023 to 29<sup>th</sup> May 2024.
- The near month put and call options price volume data was collected from NSE ([https://www.nseindia.com/report-detail/fo\\_eq\\_security](https://www.nseindia.com/report-detail/fo_eq_security)). The option price data is from 1<sup>st</sup> May 2024 to 29<sup>th</sup> May 2024 with expiry on 30<sup>th</sup>. At any given trading day, multiple options were available on exchange trading at different strike prices.

### Methodology

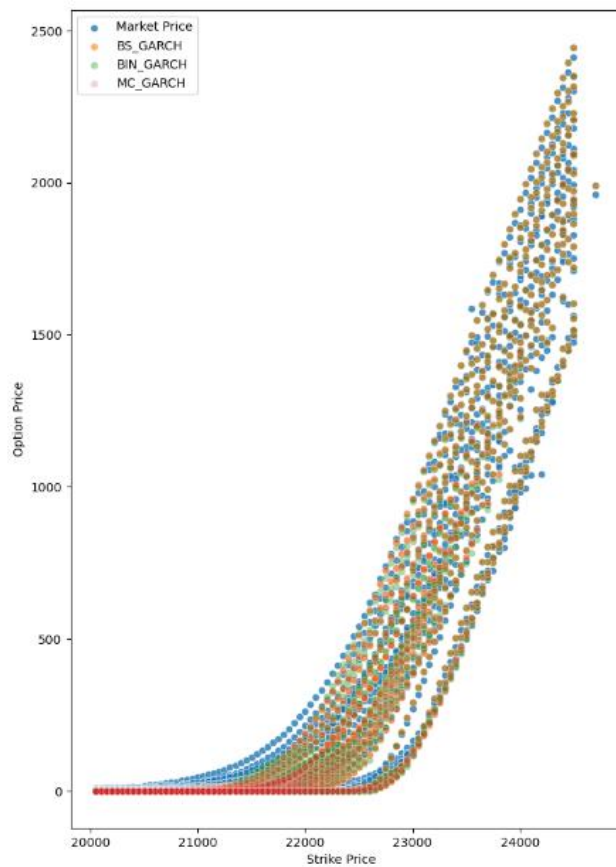
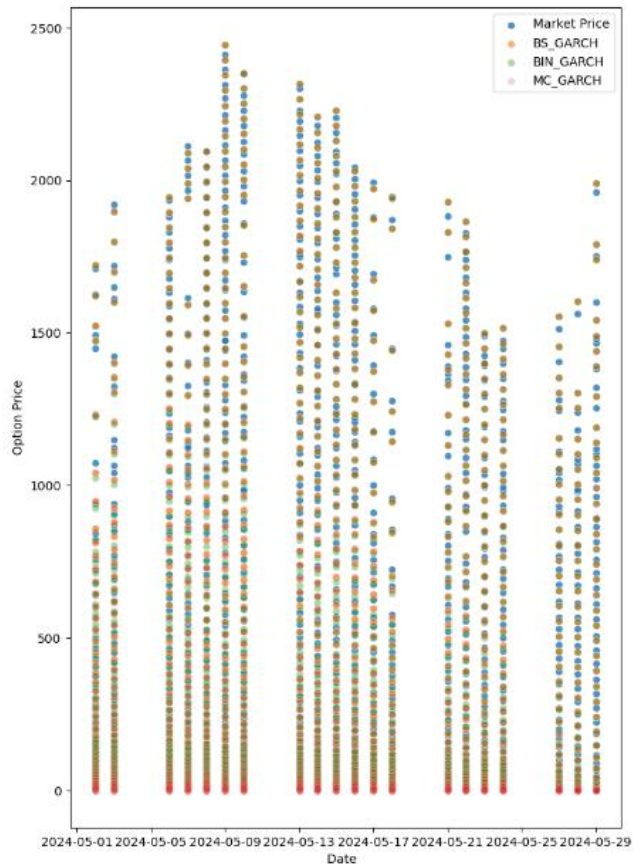
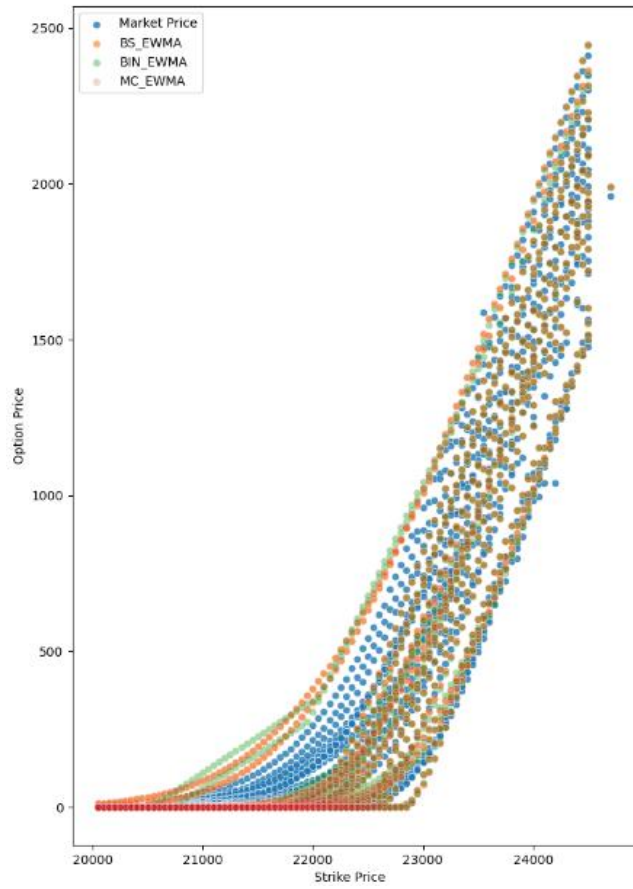
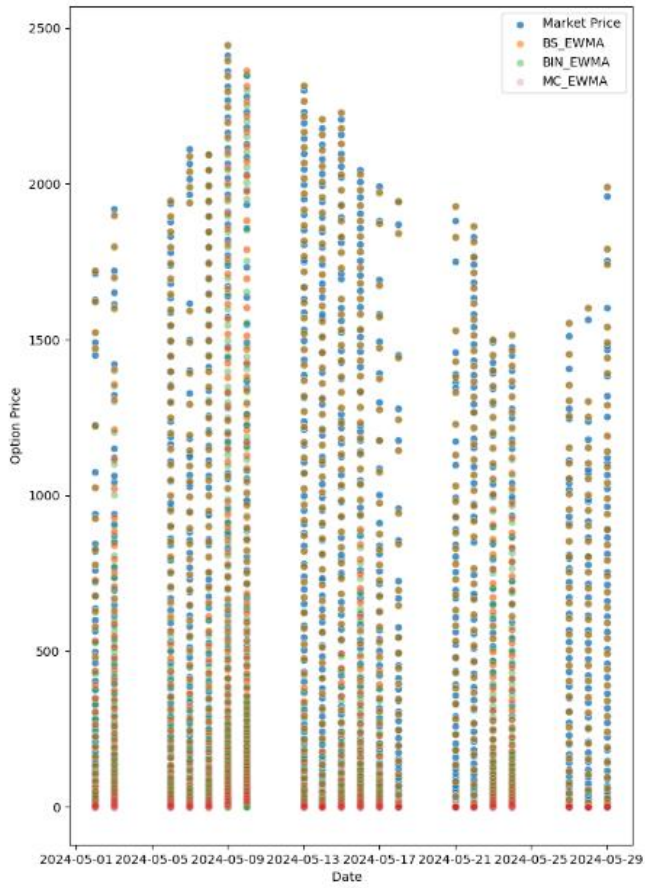
1. The coded Black Scholes, Binomial and Monte Carlo models were validated against solved examples provided in Hull and Basu (2022). Based on results, number of time steps for Binomial method and number of simulations for Monte Carlo method were chosen as 2 and 10000 respectively.
2. India's 10-year Treasury Bond yield (7%) was taken as risk free rate of interest for analysis.
3. Daily forecast of yearly volatility was done using EWMA and GARCH(1,1) models and taken as input for price calculations.
4. To calculate implied volatility, the market price was taken as input to Black Scholes model and Brent's method was used for optimization.
5. To analyze the trends: -
  - a. A scatterplot of option price (Market and Model) vs Strike price for both EWMA and GARCH models was made to evaluate trends with respect to changing strike prices.
  - b. A scatterplot of option price (Market and Model) vs Date for both EWMA and GARCH models was plotted to know changes in prices in relation to option expiry.
  - c. Mean Absolute Error (MAE), Mean Squared Error (MSE) and Root Mean Squared Error (RMSE) were calculated to statistically analyse model performances.
6. As a number of options are available on any given date, for a particular day, mean implied volatility has been calculated and plotted against forecasted volatilities to analyse the trends.

## Observations

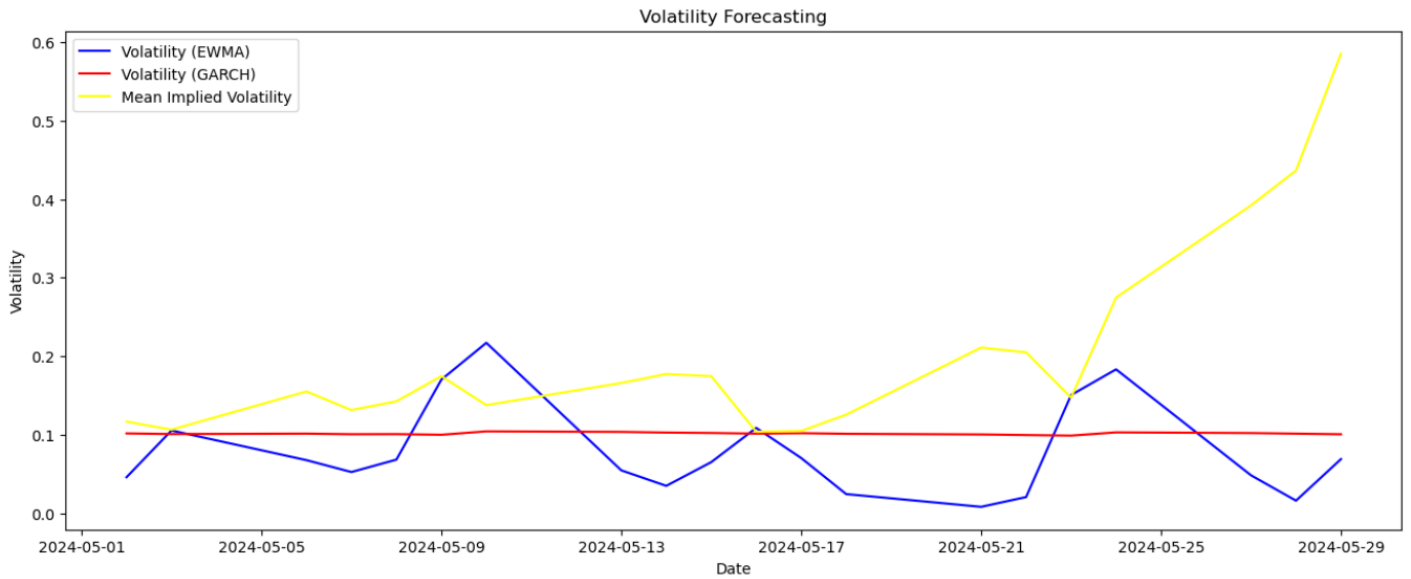
### For Call Options



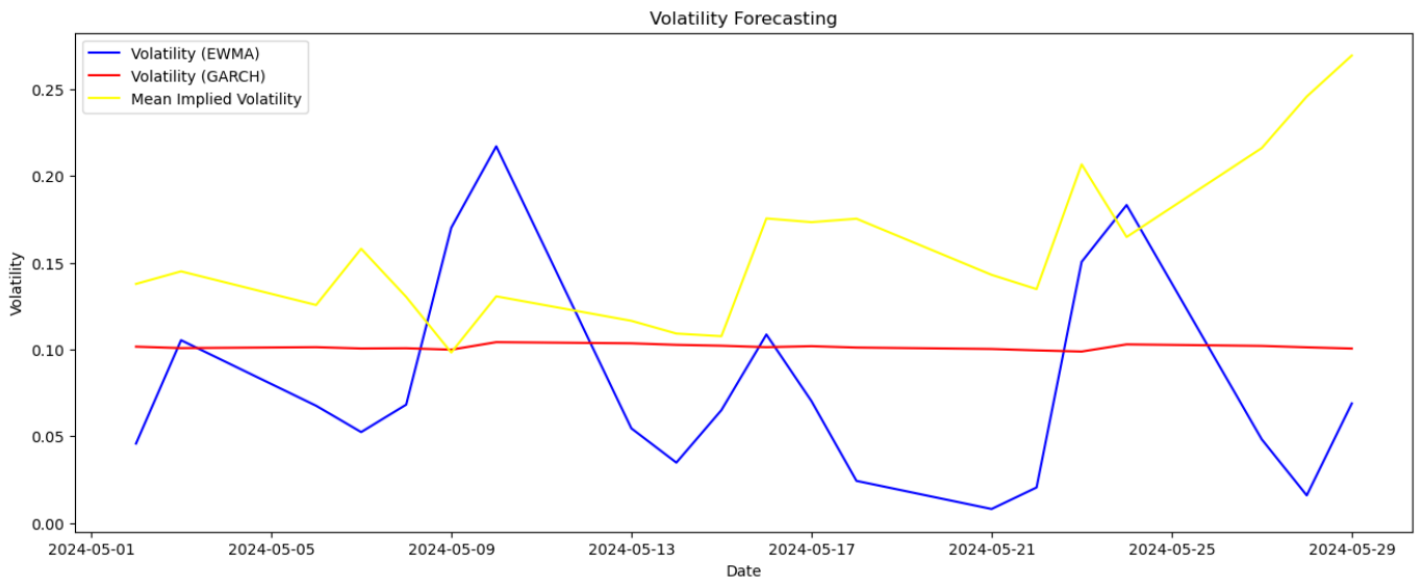
## For Put Options







Forecasted vs Mean Implied Volatility for Call Options



Forecasted vs Mean Implied Volatility for Put Options

Method	Call Options						Put Options					
	EWMA			GARCH (1,1)			EWMA			GARCH (1,1)		
	MAE	MSE	RMSE	MAE	MSE	RMSE	MAE	MSE	RMSE	MAE	MSE	RMSE
Binomial	43.83	4146	64.39	31.13	1865.41	43.19	39.59	3597	59.98	25.35	1292	35.95
Black Scholes	44.83	4346	65.92	31.43	1853	43.05	40.41	3784	61.51	25.13	1275	35.71
Monte Carlo	43.96	4158	64.48	31.29	1881	43.38	39.68	3610	60	25.17	1275	35.71

- On any given trading day, when the option prices are at the higher end on the spectrum, there is considerable mismatch between theoretical and market prices. Generally, the models value more than markets. On the lower end, the market and the models are much more in agreement.
- As options expiration approaches, there is greater price fluctuations. This can be due to many factors
  - Fluctuations in implied volatility amplifying price volatility as seen in volatility forecasting graphs.
  - Market participants may be reassessing their expectations and perceptions of future stock price movements, which may be leading to increased uncertainty and volatility in option prices.
  - Other trading dynamics, like liquidity, supply-demand imbalance, and trading strategies may also be contributing to this trend.
  - As time to maturity decreases, the time value of options also decreases. This may lead to larger price fluctuations in response to changes in the underlying stock price.
- The errors in price predictions are comparatively on higher side. As volatility is the only input which is not an observed variable but an estimation, the deviations are reflective of mismatch between volatility forecasted by EWMA and GARCH (1,1) models and market estimation. The historical price data period of the underlying (NIFTY50 index) can be increased so that the models are better able to capture trends.
- Other factors like investors' expectations of future price movements, hedging strategies, trading preferences may also be contributing to this trend. This may also be a signal of market inefficiencies or mispricing leading to arbitrage opportunities. However, further analysis is

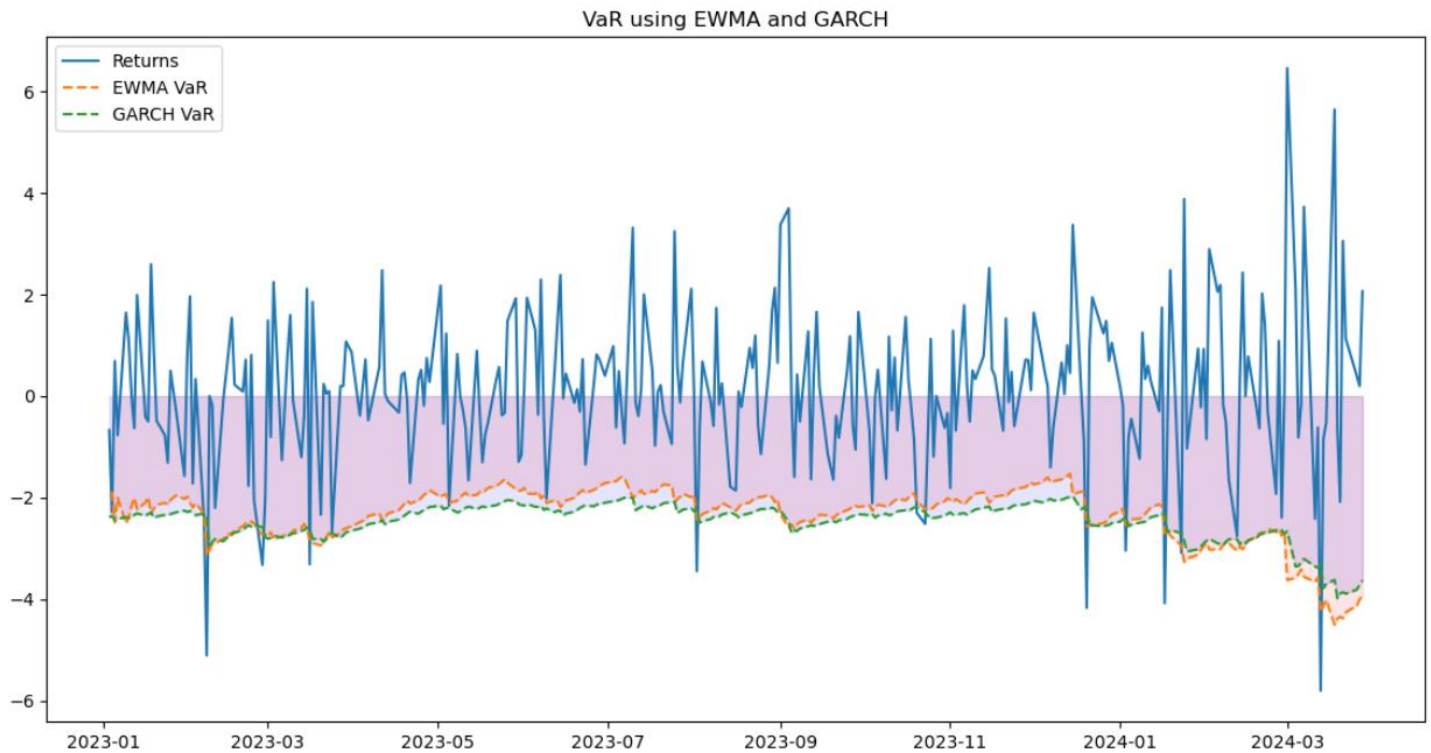


required to determine exact reasons and whether these deviations are persistent and exploitable.

## 6.3 VaR

### One Stock Portfolio

1. This exercise has been done to understand how VaR can be forecasted to desired horizon and confidence level.
2. For analysis, a single stock portfolio has been constructed consisting of Tata Steel shares.
3. Data for historical prices has been taken from 1<sup>st</sup> January 2023 to 31<sup>st</sup> March 2024.
4. The VaR is calculated using EWMA and GARCH (1,1) forecasted volatilities for a 95% confidence interval (5% VaR).
5. The actual returns are compared with VaR forecasts to count the number of violations where actual returns are lower.
6. The returns and VaR limits are plotted to visualize the back-testing results: -



Number of EWMA VaR violations: 14  
Number of GARCH VaR violations: 12

## 7. CONCLUSION AND RECOMMENDATION

### Volatility Estimation

- The RMSE of GARCH (1,1) is 4.407 and that of EWMA is 11.518. Compared to EWMA, GARCH (1,1) is better able to pick up trends in returns data.
- The volatility forecasting plot can be compared to returns time series to visually identify and verify fluctuations in returns corresponding to volatility disturbances.
- Further investigation using GARCH variants needs to be undertaken for a more comprehensive analysis.

### Option Valuation

- For the provided number of time steps and number of simulations, among the three models, Black Sholes estimates > Monte Carlo estimates > Binomial estimates.
- Volatility is the most crucial input for option valuation. The deviations in price estimates are a proxy for mismatch in volatility forecasts by EWMA and GARCH models and market estimations.
- As time to expiration decreases, Implied Volatility in both put and call options shows an upward trend.
- The RMSE for valuation models using GARCH (1,1) is lesser than that of EWMA model. Other market related considerations like hedging practices, investor sentiments, arbitrage and other inefficiencies also have to be considered to holistic analysis.

### VaR Calculation

- 1-day 95% VaR for one stock portfolio has 14 EWMA VaR violations and 12 GARCH VaR violations.
- This corresponds to 3.07% and 2.64% respectively for the given period. Comfortability with these numbers will depend upon risk preferences and regulatory guidelines.

---

## 8. CHALLENGES AND FUTURE WORK

- Higher order GARCH models and their variants like GJR, EGARCH, QGARCH can be considered for volatility forecasting.
- The rolling window taken for calculation of historical volatility as a benchmark for comparing EWMA and GARCH models is open to subjective interpretation.
- Deciding number of computations for Monte Carlo simulation is a trade-off between computational time and accuracy required. This also holds true for increasing number of time steps in Binomial method.
- Stochastic volatility models like SABR, IVF and Rough Volatility models can be considered for option price calculations.
- Back testing ER is difficult as compared to VaR.
- The number of items in the portfolio can be increased and made up of cross – assets for in depth analysis of VaR and ES calculation using model-based approach.

---

## 9. REFERENCES

- Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica: Journal of the econometric society*, 987-1007.
- Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of econometrics*, 31(3), 307-327.
- Engle, R. (2002). New frontiers for ARCH models. *Journal of applied econometrics*, 17(5), 425-446.
- Hansen, P. R., Lunde, A., & Nason, J. M. (2003). Choosing the best volatility models: the model confidence set approach. *Oxford Bulletin of Economics and Statistics*, 65, 839-861.
- Angelidis, T., Benos, A., & Degiannakis, S. (2004). The use of GARCH models in VaR estimation. *Statistical methodology*, 1(1-2), 105-128.
- Hansen, P. R., & Lunde, A. (2005). A forecast comparison of volatility models: does anything beat a GARCH (1, 1)? *Journal of applied econometrics*, 20(7), 873-889.
- Porter, D. C., & Gujarati, D. N. (2008). *Basic Econometrics*. McGraw-Hill Education.
- Natenberg, S. (2014). *Option Volatility and Pricing: Advanced Trading Strategies and Techniques*, 2nd edition. McGraw-Hill Education.
- Brooks, C. (2019b). *Introductory Econometrics for Finance*. Cambridge University Press.
- Hull, J., & Basu, S. (2022). *Options, futures, and other derivatives*. Pearson Education India.

# 10. APPENDIX

Representative sample of Call Options data.

S.No.	Date	Strike Price	Close	Underlying Value	EWMA_Vol_Annual	GARCH_Vol_Annual	BS_EWM A	BIN_EWMA	MC_EWMA	BS_GARCH	BIN_GARCH	MC_GARCH	Implied Volatility
1	2-5-24	20050	2682	22648.2	0.045787715	0.101630422	2705.58	2705.58	2704.98	2705.58	2705.58	2704.28	4.84722E-07
2	2-5-24	20100	2648.95	22648.2	0.045787715	0.101630422	2655.84	2655.84	2655.24	2655.85	2655.84	2654.54	2.29075E-07
3	2-5-24	20200	2553.9	22648.2	0.045787715	0.101630422	2556.38	2556.38	2555.78	2556.38	2556.38	2555.08	5.71965E-07
4	2-5-24	20300	2450	22648.2	0.045787715	0.101630422	2456.92	2456.92	2456.32	2456.92	2456.92	2455.62	9.01175E-07
5	2-5-24	20400	2355	22648.2	0.045787715	0.101630422	2357.45	2357.45	2356.85	2357.46	2357.45	2356.15	1.96447E-07
6	2-5-24	20500	2262.3	22648.2	0.045787715	0.101630422	2257.99	2257.99	2257.39	2258	2257.99	2256.71	0.168884788
7	2-5-24	20600	2150	22648.2	0.045787715	0.101630422	2158.52	2158.52	2157.92	2158.55	2158.52	2157.27	4.61222E-07
8	2-5-24	20750	2040	22648.2	0.045787715	0.101630422	2009.33	2009.33	2008.73	2009.4	2009.33	2008.14	0.211878949
9	2-5-24	20800	1962	22648.2	0.045787715	0.101630422	1959.59	1959.59	1958.99	1959.7	1959.59	1958.43	0.137492894
10	2-5-24	20900	1875	22648.2	0.045787715	0.101630422	1860.13	1860.13	1859.53	1860.33	1860.13	1859.06	0.172163225
11	2-5-24	21000	1776.25	22648.2	0.045787715	0.101630422	1760.66	1760.66	1760.06	1761.03	1760.66	1759.76	0.165647973
12	2-5-24	21100	1693.8	22648.2	0.045787715	0.101630422	1661.2	1661.2	1660.6	1661.84	1661.2	1660.63	0.183562923
13	2-5-24	21200	1576.5	22648.2	0.045787715	0.101630422	1561.74	1561.74	1561.13	1562.83	1561.74	1561.67	0.148054146
14	2-5-24	21250	1507.75	22648.2	0.045787715	0.101630422	1512	1512	1511.4	1513.42	1512	1512.29	2.90421E-07
15	2-5-24	21300	1505	22648.2	0.045787715	0.101630422	1462.27	1462.27	1461.67	1464.1	1462.27	1462.98	0.176894657
16	2-5-24	21350	1460	22648.2	0.045787715	0.101630422	1412.54	1412.54	1411.94	1414.88	1412.54	1413.76	0.176927565
17	2-5-24	21400	1382.35	22648.2	0.045787715	0.101630422	1362.81	1362.81	1362.21	1365.79	1362.81	1364.62	0.139670527
18	2-5-24	21450	1376.5	22648.2	0.045787715	0.101630422	1313.07	1313.07	1312.47	1316.84	1313.07	1315.66	0.181427207
19	2-5-24	21500	1305.05	22648.2	0.045787715	0.101630422	1263.34	1263.34	1262.74	1268.08	1263.34	1266.91	0.156957575
20	2-5-24	21600	1219.15	22648.2	0.045787715	0.101630422	1163.88	1163.88	1163.28	1171.21	1163.88	1170.12	0.15946629
21	2-5-24	21650	1142	22648.2	0.045787715	0.101630422	1114.15	1114.15	1113.54	1123.2	1114.15	1122.15	0.128636425
22	2-5-24	21700	1122.6	22648.2	0.045787715	0.101630422	1064.42	1064.41	1063.82	1075.52	1064.41	1074.56	0.151702785
23	2-5-24	21800	1032.1	22648.2	0.045787715	0.101630422	964.97	964.95	964.39	981.37	971.74	980.43	0.148018707
24	2-5-24	21900	950.1	22648.2	0.045787715	0.101630422	865.57	865.48	864.98	889.22	891.31	888.37	0.148859633
25	2-5-24	21950	905.6	22648.2	0.045787715	0.101630422	815.91	815.75	815.32	844.05	851.09	843.31	0.146447507

26	2-5-24	22000	856.5	22648.2	0.045787715	0.101630422	766.31	766.02	765.75	799.59	810.88	798.9	0.141064285
27	2-5-24	22050	823.3	22648.2	0.045787715	0.101630422	716.8	716.29	716.26	755.9	770.66	755.21	0.144705531
28	2-5-24	22100	773.2	22648.2	0.045787715	0.101630422	667.44	666.56	666.92	713.06	730.44	712.37	0.138423347
29	2-5-24	22150	733.6	22648.2	0.045787715	0.101630422	618.3	616.82	617.76	671.13	690.23	670.47	0.137666623
30	2-5-24	22200	688.95	22648.2	0.045787715	0.101630422	569.5	567.09	568.97	630.21	650.01	629.61	0.133939779
31	2-5-24	22250	654.1	22648.2	0.045787715	0.101630422	521.19	517.9	520.7	590.35	609.8	589.79	0.134828112
32	2-5-24	22300	613.7	22648.2	0.045787715	0.101630422	473.56	474.34	473.14	551.64	569.58	551.19	0.132551565
33	2-5-24	22350	574.8	22648.2	0.045787715	0.101630422	426.85	430.78	426.44	514.14	529.37	513.71	0.130630648
34	2-5-24	22400	538	22648.2	0.045787715	0.101630422	381.34	387.22	381	477.92	489.15	477.49	0.12928543
35	2-5-24	22450	501.95	22648.2	0.045787715	0.101630422	337.37	343.67	337.05	443.04	448.94	442.65	0.127848561
36	2-5-24	22500	467.5	22648.2	0.045787715	0.101630422	295.28	300.11	294.99	409.55	408.72	409.23	0.126668245
37	2-5-24	22550	434.65	22648.2	0.045787715	0.101630422	255.43	256.55	255.2	377.5	368.5	377.21	0.125712188
38	2-5-24	22600	401	22648.2	0.045787715	0.101630422	218.17	212.99	217.97	346.93	328.29	346.68	0.12396022
39	2-5-24	22650	369.2	22648.2	0.045787715	0.101630422	183.83	170.25	183.68	317.87	288.95	317.68	0.122501295
40	2-5-24	22700	338.55	22648.2	0.045787715	0.101630422	152.66	149.39	152.54	290.34	273.22	290.19	0.121023654
41	2-5-24	22750	309.2	22648.2	0.045787715	0.101630422	124.83	128.53	124.75	264.35	257.48	264.2	0.119567127
42	2-5-24	22800	279.95	22648.2	0.045787715	0.101630422	100.42	107.67	100.39	239.92	241.74	239.83	0.117633137
43	2-5-24	22850	253.05	22648.2	0.045787715	0.101630422	79.42	86.8	79.4	217.02	226	216.97	0.116100871
44	2-5-24	22900	227.65	22648.2	0.045787715	0.101630422	61.69	65.94	61.74	195.66	210.26	195.59	0.114614206
45	2-5-24	22950	205.2	22648.2	0.045787715	0.101630422	47.04	45.08	47.19	175.79	194.52	175.77	0.113751663
46	2-5-24	23000	182.25	22648.2	0.045787715	0.101630422	35.19	24.22	35.44	157.39	178.78	157.44	0.112102633
47	2-5-24	23050	162.8	22648.2	0.045787715	0.101630422	25.81	3.36	26.07	140.43	163.04	140.54	0.111311906
48	2-5-24	23100	143.8	22648.2	0.045787715	0.101630422	18.55	0	18.76	124.85	147.3	125.07	0.110113082
49	2-5-24	23150	126.65	22648.2	0.045787715	0.101630422	13.06	0	13.23	110.59	131.57	110.91	0.109106251
50	2-5-24	23200	110	22648.2	0.045787715	0.101630422	9	0	9.13	97.61	115.83	97.99	0.107670855
51	2-5-24	23250	95.8	22648.2	0.045787715	0.101630422	6.07	0	6.16	85.83	100.09	86.35	0.106748725
52	2-5-24	23300	82.25	22648.2	0.045787715	0.101630422	4.01	0	4.12	75.19	84.35	75.78	0.105476162
53	2-5-24	23350	71	22648.2	0.045787715	0.101630422	2.59	0	2.68	65.63	68.61	66.26	0.104752421
54	2-5-24	23400	60.85	22648.2	0.045787715	0.101630422	1.63	0	1.71	57.06	52.87	57.65	0.103995425
55	2-5-24	23450	52.05	22648.2	0.045787715	0.101630422	1.01	0	1.09	49.42	37.13	49.94	0.103406011
56	2-5-24	23500	45.05	22648.2	0.045787715	0.101630422	0.61	0	0.67	42.64	21.39	43.12	0.103391214
57	2-5-24	23550	37.6	22648.2	0.045787715	0.101630422	0.36	0	0.4	36.64	5.66	37.07	0.102398671
58	2-5-24	23600	31.6	22648.2	0.045787715	0.101630422	0.21	0	0.23	31.37	0	31.78	0.101835803
59	2-5-24	23650	27.1	22648.2	0.045787715	0.101630422	0.12	0	0.13	26.75	0	27.12	0.101965188
60	2-5-24	23700	23.2	22648.2	0.045787715	0.101630422	0.06	0	0.06	22.72	0	23.05	0.102146449

61	2-5-24	23750	20.1	22648.2	0.045787715	0.101630422	0.03	0	0.04	19.22	0	19.5	0.102669491
62	2-5-24	23800	16.95	22648.2	0.045787715	0.101630422	0.02	0	0.02	16.2	0	16.43	0.102628445
63	2-5-24	23850	15.6	22648.2	0.045787715	0.101630422	0.01	0	0.01	13.59	0	13.81	0.104553179
64	2-5-24	23900	13.75	22648.2	0.045787715	0.101630422	0	0	0	11.36	0	11.61	0.105507281
65	2-5-24	23950	13.1	22648.2	0.045787715	0.101630422	0	0	0	9.46	0	9.73	0.108081321
66	2-5-24	24000	12.55	22648.2	0.045787715	0.101630422	0	0	0	7.84	0	8.1	0.110709335
67	2-5-24	24050	10.9	22648.2	0.045787715	0.101630422	0	0	0	6.48	0	6.72	0.111235774
68	2-5-24	24100	10.35	22648.2	0.045787715	0.101630422	0	0	0	5.33	0	5.52	0.113582818
69	2-5-24	24150	9.4	22648.2	0.045787715	0.101630422	0	0	0	4.36	0	4.54	0.11497907
70	2-5-24	24200	8.75	22648.2	0.045787715	0.101630422	0	0	0	3.56	0	3.75	0.116833878
71	2-5-24	24250	9	22648.2	0.045787715	0.101630422	0	0	0	2.89	0	3.1	0.120672644
72	2-5-24	24300	6.9	22648.2	0.045787715	0.101630422	0	0	0	2.34	0	2.53	0.118624723
73	2-5-24	24350	7.3	22648.2	0.045787715	0.101630422	0	0	0	1.89	0	2.06	0.12286033
74	2-5-24	24400	6.1	22648.2	0.045787715	0.101630422	0	0	0	1.51	0	1.66	0.122482489
75	2-5-24	24450	6.1	22648.2	0.045787715	0.101630422	0	0	0	1.21	0	1.33	0.125544573
76	2-5-24	24500	4.85	22648.2	0.045787715	0.101630422	0	0	0	0.96	0	1.06	0.124297984
77	3-5-24	20050	2506.1	22475.85	0.10535178	0.10080132	2529.4	2529.4	2528.09	2529.4	2529.4	2528.14	8.54426E-07
78	3-5-24	20100	2468.75	22475.85	0.10535178	0.10080132	2479.66	2479.66	2478.35	2479.66	2479.66	2478.4	9.55175E-08
79	3-5-24	20200	2315	22475.85	0.10535178	0.10080132	2380.18	2380.18	2378.87	2380.18	2380.18	2378.92	1.66615E-07
80	3-5-24	20250	2435	22475.85	0.10535178	0.10080132	2330.44	2330.44	2329.13	2330.44	2330.44	2329.18	0.331568095
81	3-5-24	20300	2183	22475.85	0.10535178	0.10080132	2280.71	2280.69	2279.4	2280.7	2280.69	2279.44	4.65034E-07
82	3-5-24	20400	2174.4	22475.85	0.10535178	0.10080132	2181.24	2181.21	2179.95	2181.22	2181.21	2179.97	1.93509E-07
83	3-5-24	20500	2065.75	22475.85	0.10535178	0.10080132	2081.78	2081.73	2080.5	2081.75	2081.73	2080.52	2.17093E-07
84	3-5-24	20600	1971.7	22475.85	0.10535178	0.10080132	1982.35	1982.24	1981.06	1982.3	1982.24	1981.08	6.09866E-07
85	3-5-24	20650	1927.65	22475.85	0.10535178	0.10080132	1932.64	1932.5	1931.36	1932.58	1932.5	1931.35	2.84629E-08
86	3-5-24	20700	1875.55	22475.85	0.10535178	0.10080132	1882.95	1882.76	1881.67	1882.87	1882.76	1881.64	6.10581E-07
87	3-5-24	20750	1796.3	22475.85	0.10535178	0.10080132	1833.28	1833.02	1831.99	1833.17	1833.02	1831.95	9.38203E-08
88	3-5-24	20800	1690	22475.85	0.10535178	0.10080132	1783.63	1783.28	1782.35	1783.49	1783.28	1782.26	1.78779E-07
89	3-5-24	20950	1750	22475.85	0.10535178	0.10080132	1634.86	1634.05	1633.67	1634.58	1634.05	1633.4	0.263013705
90	3-5-24	21000	1581.2	22475.85	0.10535178	0.10080132	1585.37	1584.31	1584.2	1585.01	1584.31	1583.86	1.29394E-07
91	3-5-24	21050	1501.1	22475.85	0.10535178	0.10080132	1535.94	1534.57	1534.79	1535.5	1534.57	1534.37	1.96669E-10
92	3-5-24	21100	1430	22475.85	0.10535178	0.10080132	1486.59	1484.83	1485.46	1486.04	1484.83	1484.94	4.07122E-07
93	3-5-24	21200	1401	22475.85	0.10535178	0.10080132	1388.22	1385.34	1387.05	1387.4	1385.34	1386.32	0.138930998
94	3-5-24	21250	1529.5	22475.85	0.10535178	0.10080132	1339.23	1335.6	1338.04	1338.25	1335.6	1337.13	0.277655999
95	3-5-24	21300	1300	22475.85	0.10535178	0.10080132	1290.42	1285.86	1289.24	1289.24	1285.86	1288.1	0.12798119



96	3-5-24	21400	1218.45	22475.85	0.10535178	0.10080132	1193.44	1186.37	1192.32	1191.77	1186.37	1190.66	0.143545843
97	3-5-24	21450	1160	22475.85	0.10535178	0.10080132	1145.34	1136.63	1144.28	1143.39	1136.63	1142.32	0.128692789
98	3-5-24	21500	1119.2	22475.85	0.10535178	0.10080132	1097.57	1086.89	1096.58	1095.3	1086.89	1094.28	0.134356229
99	3-5-24	21600	1014.9	22475.85	0.10535178	0.10080132	1003.19	990.64	1002.24	1000.18	987.41	999.29	0.119789139
100	3-5-24	21650	931.85	22475.85	0.10535178	0.10080132	956.69	950.58	955.77	953.26	943.18	952.36	5.89016E-07
101	3-5-24	21700	944.75	22475.85	0.10535178	0.10080132	910.73	910.51	909.85	906.86	902.98	906	0.135829376
102	3-5-24	21750	855	22475.85	0.10535178	0.10080132	865.37	870.45	864.59	861.03	862.78	860.21	0.0937251
103	3-5-24	21800	860.55	22475.85	0.10535178	0.10080132	820.69	830.39	819.98	815.85	822.58	815.13	0.135649988
104	3-5-24	21850	880	22475.85	0.10535178	0.10080132	776.75	790.32	776.06	771.39	782.38	770.72	0.170458527
105	3-5-24	21900	772.6	22475.85	0.10535178	0.10080132	733.63	750.26	732.94	727.74	742.18	727.07	0.131361821
106	3-5-24	21950	736	22475.85	0.10535178	0.10080132	691.4	710.2	690.71	684.96	701.98	684.3	0.133030915
107	3-5-24	22000	695.2	22475.85	0.10535178	0.10080132	650.14	670.13	649.52	643.15	661.78	642.53	0.131742085
108	3-5-24	22050	659.15	22475.85	0.10535178	0.10080132	609.91	630.07	609.32	602.38	621.58	601.81	0.132542391
109	3-5-24	22100	618.6	22475.85	0.10535178	0.10080132	570.79	590	570.3	562.73	581.38	562.22	0.13051487
110	3-5-24	22150	580.3	22475.85	0.10535178	0.10080132	532.85	549.94	532.42	524.28	541.19	523.86	0.129213346
111	3-5-24	22200	545.3	22475.85	0.10535178	0.10080132	496.15	509.88	495.69	487.1	500.99	486.67	0.129038775
112	3-5-24	22250	510.2	22475.85	0.10535178	0.10080132	460.75	469.81	460.34	451.26	460.79	450.85	0.128314633
113	3-5-24	22300	475.5	22475.85	0.10535178	0.10080132	426.72	429.75	426.37	416.82	420.59	416.47	0.127288686
114	3-5-24	22350	443.75	22475.85	0.10535178	0.10080132	394.09	389.69	393.79	383.84	380.39	383.54	0.127066808
115	3-5-24	22400	411.45	22475.85	0.10535178	0.10080132	362.92	349.62	362.65	352.37	340.19	352.11	0.126100166
116	3-5-24	22450	378.7	22475.85	0.10535178	0.10080132	333.22	309.56	332.99	322.44	299.99	322.21	0.124451868
117	3-5-24	22500	350.5	22475.85	0.10535178	0.10080132	305.04	281.34	304.88	294.09	271.62	293.93	0.124195705
118	3-5-24	22550	320.85	22475.85	0.10535178	0.10080132	278.38	265.8	278.21	267.32	255.9	267.15	0.122815716
119	3-5-24	22600	294.9	22475.85	0.10535178	0.10080132	253.26	250.26	253.13	242.16	240.19	242.04	0.122427714
120	3-5-24	22650	270.45	22475.85	0.10535178	0.10080132	229.67	234.73	229.61	218.6	224.48	218.55	0.122111512
121	3-5-24	22700	244.95	22475.85	0.10535178	0.10080132	207.59	219.19	207.53	196.63	208.77	196.56	0.12082084
122	3-5-24	22750	218.6	22475.85	0.10535178	0.10080132	187.02	203.65	186.99	176.22	193.06	176.19	0.118599347
123	3-5-24	22800	197.25	22475.85	0.10535178	0.10080132	167.92	188.11	167.92	157.35	177.35	157.37	0.117883965
124	3-5-24	22850	177.55	22475.85	0.10535178	0.10080132	150.25	172.57	150.32	139.97	161.64	140.05	0.117292279
125	3-5-24	22900	157.55	22475.85	0.10535178	0.10080132	133.98	157.04	134.14	124.04	145.93	124.22	0.115971923
126	3-5-24	22950	141.15	22475.85	0.10535178	0.10080132	119.05	141.5	119.34	109.49	130.21	109.79	0.115660665
127	3-5-24	23000	123.8	22475.85	0.10535178	0.10080132	105.41	125.96	105.77	96.28	114.5	96.64	0.114292363
128	3-5-24	23050	108.8	22475.85	0.10535178	0.10080132	93	110.42	93.44	84.32	98.79	84.8	0.113406925
129	3-5-24	23100	95.5	22475.85	0.10535178	0.10080132	81.75	94.88	82.33	73.55	83.08	74.12	0.112737067
130	3-5-24	23150	82.65	22475.85	0.10535178	0.10080132	71.6	79.35	72.21	63.9	67.37	64.51	0.111650166

131	3-5-24	23200	71.95	22475.85	0.10535178	0.10080132	62.48	63.81	63.1	55.29	51.66	55.86	0.111109883
132	3-5-24	23250	63.15	22475.85	0.10535178	0.10080132	54.31	48.27	54.89	47.64	35.95	48.15	0.111095433
133	3-5-24	23300	54.25	22475.85	0.10535178	0.10080132	47.04	32.73	47.55	40.88	20.23	41.34	0.110411194
134	3-5-24	23350	46.4	22475.85	0.10535178	0.10080132	40.58	17.19	41.03	34.94	4.52	35.35	0.10978313
135	3-5-24	23400	39.5	22475.85	0.10535178	0.10080132	34.88	1.65	35.31	29.73	0	30.13	0.109190796
136	3-5-24	23450	34.05	22475.85	0.10535178	0.10080132	29.87	0	30.27	25.19	0	25.54	0.109156248
137	3-5-24	23500	29.75	22475.85	0.10535178	0.10080132	25.47	0	25.83	21.26	0	21.56	0.109617093
138	3-5-24	23550	24.7	22475.85	0.10535178	0.10080132	21.64	0	21.96	17.86	0	18.12	0.108748684
139	3-5-24	23600	20.25	22475.85	0.10535178	0.10080132	18.32	0	18.59	14.94	0	15.16	0.107758426
140	3-5-24	23650	17.95	22475.85	0.10535178	0.10080132	15.44	0	15.67	12.44	0	12.66	0.108796979
141	3-5-24	23700	15.1	22475.85	0.10535178	0.10080132	12.97	0	13.2	10.32	0	10.58	0.108653118
142	3-5-24	23750	13.35	22475.85	0.10535178	0.10080132	10.85	0	11.11	8.52	0	8.78	0.109655914
143	3-5-24	23800	11.65	22475.85	0.10535178	0.10080132	9.04	0	9.31	7.01	0	7.25	0.110395203
144	3-5-24	23850	11.25	22475.85	0.10535178	0.10080132	7.5	0	7.76	5.74	0	5.95	0.113233466
145	3-5-24	23900	10.4	22475.85	0.10535178	0.10080132	6.2	0	6.43	4.67	0	4.84	0.115097273
146	3-5-24	23950	10.2	22475.85	0.10535178	0.10080132	5.1	0	5.29	3.79	0	3.97	0.11814184
147	3-5-24	24000	9.9	22475.85	0.10535178	0.10080132	4.19	0	4.37	3.07	0	3.26	0.120946666
148	3-5-24	24050	9.1	22475.85	0.10535178	0.10080132	3.42	0	3.61	2.47	0	2.66	0.122553703
149	3-5-24	24100	8.45	22475.85	0.10535178	0.10080132	2.78	0	2.99	1.97	0	2.15	0.124321605
150	3-5-24	24150	8	22475.85	0.10535178	0.10080132	2.25	0	2.44	1.57	0	1.73	0.126467939
151	3-5-24	24200	8	22475.85	0.10535178	0.10080132	1.82	0	1.99	1.25	0	1.37	0.129739195
152	3-5-24	24250	8.15	22475.85	0.10535178	0.10080132	1.46	0	1.61	0.99	0	1.08	0.133363831
153	3-5-24	24300	6.7	22475.85	0.10535178	0.10080132	1.17	0	1.28	0.78	0	0.86	0.132430087
154	3-5-24	24350	7.95	22475.85	0.10535178	0.10080132	0.93	0	1.03	0.61	0	0.68	0.139224912
155	3-5-24	24400	6.55	22475.85	0.10535178	0.10080132	0.74	0	0.82	0.48	0	0.53	0.138171368
156	3-5-24	24450	6.15	22475.85	0.10535178	0.10080132	0.59	0	0.66	0.37	0	0.41	0.139945813
157	3-5-24	24500	5.8	22475.85	0.10535178	0.10080132	0.46	0	0.52	0.29	0	0.31	0.141767958
158	6-5-24	20050	2494.45	22442.7	0.067576841	0.101336854	2484.77	2484.77	2483.97	2484.77	2484.77	2483.58	0.225761622
159	6-5-24	20100	2436.35	22442.7	0.067576841	0.101336854	2435	2435	2434.19	2435	2435	2433.81	0.171991396
160	6-5-24	20150	2407.25	22442.7	0.067576841	0.101336854	2385.23	2385.23	2384.42	2385.23	2385.23	2384.04	0.250381195
161	6-5-24	20200	2340.9	22442.7	0.067576841	0.101336854	2335.46	2335.46	2334.65	2335.46	2335.46	2334.27	0.196058728
162	6-5-24	20250	2308.95	22442.7	0.067576841	0.101336854	2285.69	2285.69	2284.88	2285.69	2285.69	2284.5	0.243803572
163	6-5-24	20300	2242.45	22442.7	0.067576841	0.101336854	2235.92	2235.92	2235.11	2235.92	2235.92	2234.73	0.193404854
164	6-5-24	20350	2192.9	22442.7	0.067576841	0.101336854	2186.15	2186.15	2185.34	2186.16	2186.15	2184.96	0.190403664
165	6-5-24	20400	2140	22442.7	0.067576841	0.101336854	2136.38	2136.38	2135.57	2136.39	2136.38	2135.19	0.170983543

166	6-5-24	20450	2113.75	22442.7	0.067576841	0.101336854	2086.61	2086.61	2085.8	2086.62	2086.61	2085.43	0.232525029
167	6-5-24	20500	2044.25	22442.7	0.067576841	0.101336854	2036.84	2036.84	2036.03	2036.86	2036.84	2035.67	0.181143332
168	6-5-24	20550	1997.5	22442.7	0.067576841	0.101336854	1987.07	1987.07	1986.26	1987.09	1987.07	1985.92	0.187073109
169	6-5-24	20600	1952.25	22442.7	0.067576841	0.101336854	1937.3	1937.3	1936.49	1937.33	1937.3	1936.17	0.194643836
170	6-5-24	20650	1900.2	22442.7	0.067576841	0.101336854	1887.53	1887.53	1886.72	1887.58	1887.53	1886.42	0.184802888
171	6-5-24	20700	1855	22442.7	0.067576841	0.101336854	1837.76	1837.76	1836.95	1837.83	1837.76	1836.67	0.190953423
172	6-5-24	20750	1895.8	22442.7	0.067576841	0.101336854	1787.99	1787.99	1787.18	1788.09	1787.99	1786.93	0.291286684
173	6-5-24	20800	1755.9	22442.7	0.067576841	0.101336854	1738.22	1738.22	1737.41	1738.37	1738.22	1737.2	0.182962484
174	6-5-24	20850	1708.45	22442.7	0.067576841	0.101336854	1688.45	1688.45	1687.64	1688.65	1688.45	1687.49	0.18287728
175	6-5-24	20900	1660.9	22442.7	0.067576841	0.101336854	1638.68	1638.68	1637.87	1638.96	1638.68	1637.79	0.182193051
176	6-5-24	20950	1612.95	22442.7	0.067576841	0.101336854	1588.91	1588.91	1588.1	1589.3	1588.91	1588.15	0.18053156
177	6-5-24	21000	1564.4	22442.7	0.067576841	0.101336854	1539.14	1539.14	1538.33	1539.67	1539.14	1538.55	0.177739421
178	6-5-24	21050	1518.5	22442.7	0.067576841	0.101336854	1489.37	1489.37	1488.56	1490.08	1489.37	1489	0.178597038
179	6-5-24	21100	1470.95	22442.7	0.067576841	0.101336854	1439.6	1439.59	1438.79	1440.56	1439.59	1439.49	0.176726078
180	6-5-24	21150	1424.05	22442.7	0.067576841	0.101336854	1389.83	1389.82	1389.03	1391.1	1389.82	1390.06	0.175440173
181	6-5-24	21200	1360	22442.7	0.067576841	0.101336854	1340.07	1340.05	1339.28	1341.74	1340.05	1340.71	0.150833889
182	6-5-24	21250	1318.15	22442.7	0.067576841	0.101336854	1290.31	1290.28	1289.53	1292.49	1290.28	1291.46	0.157528207
183	6-5-24	21300	1294.55	22442.7	0.067576841	0.101336854	1240.56	1240.51	1239.78	1243.38	1240.51	1242.31	0.181104919
184	6-5-24	21350	1258.8	22442.7	0.067576841	0.101336854	1190.83	1190.74	1190.04	1194.43	1190.74	1193.35	0.188104697
185	6-5-24	21400	1198	22442.7	0.067576841	0.101336854	1141.11	1140.97	1140.32	1145.69	1140.97	1144.63	0.172919007
186	6-5-24	21450	1152.4	22442.7	0.067576841	0.101336854	1091.42	1091.2	1090.64	1097.2	1091.2	1096.17	0.170985727
187	6-5-24	21500	1101.9	22442.7	0.067576841	0.101336854	1041.78	1041.43	1041.03	1048.99	1041.43	1048.02	0.164738479
188	6-5-24	21550	1126.45	22442.7	0.067576841	0.101336854	992.2	991.66	991.47	1001.13	991.66	1000.22	0.211484913
189	6-5-24	21600	1019.2	22442.7	0.067576841	0.101336854	942.72	941.89	942.01	953.67	941.89	952.83	0.166358866
190	6-5-24	21650	969.35	22442.7	0.067576841	0.101336854	893.36	892.12	892.67	906.67	895.44	905.81	0.160306307
191	6-5-24	21700	929.3	22442.7	0.067576841	0.101336854	844.17	842.35	843.45	860.21	855.39	859.39	0.161032686
192	6-5-24	21750	890.7	22442.7	0.067576841	0.101336854	795.23	792.58	794.5	814.35	815.34	813.57	0.162139782
193	6-5-24	21800	844.3	22442.7	0.067576841	0.101336854	746.59	742.81	745.89	769.18	775.28	768.5	0.157829459
194	6-5-24	21850	801.4	22442.7	0.067576841	0.101336854	698.37	693.04	697.71	724.78	735.23	724.14	0.155480167
195	6-5-24	21900	763.35	22442.7	0.067576841	0.101336854	650.66	643.37	650.08	681.24	695.18	680.6	0.155628875
196	6-5-24	21950	715.4	22442.7	0.067576841	0.101336854	603.6	601.92	603.02	638.64	655.13	638.01	0.149747729
197	6-5-24	22000	681.3	22442.7	0.067576841	0.101336854	557.34	560.48	556.8	597.08	615.08	596.5	0.151274139
198	6-5-24	22050	636.35	22442.7	0.067576841	0.101336854	512.06	519.04	511.6	556.64	575.03	556.11	0.146517804
199	6-5-24	22100	605.25	22442.7	0.067576841	0.101336854	467.92	477.6	467.5	517.42	534.98	516.97	0.148577578
200	6-5-24	22150	569.35	22442.7	0.067576841	0.101336854	425.14	436.15	424.71	479.5	494.92	479.11	0.147640329

201	6-5-24	22200	531.7	22442.7	0.067576841	0.101336854	383.89	394.71	383.52	442.96	454.87	442.55	0.145408068
202	6-5-24	22250	501.5	22442.7	0.067576841	0.101336854	344.4	353.27	344.1	407.86	414.82	407.5	0.146245501
203	6-5-24	22300	464.15	22442.7	0.067576841	0.101336854	306.84	311.82	306.56	374.29	374.77	373.99	0.143261201
204	6-5-24	22350	434.7	22442.7	0.067576841	0.101336854	271.39	270.38	271.14	342.29	334.72	342.02	0.14341669
205	6-5-24	22400	399.2	22442.7	0.067576841	0.101336854	238.2	228.94	238.01	311.91	294.67	311.68	0.140358783
206	6-5-24	22450	368.55	22442.7	0.067576841	0.101336854	207.4	191.01	207.25	283.19	258.2	283.03	0.138974444
207	6-5-24	22500	338	22442.7	0.067576841	0.101336854	179.08	173.63	178.99	256.15	242.7	255.99	0.13711137
208	6-5-24	22550	310.45	22442.7	0.067576841	0.101336854	153.29	156.25	153.21	230.8	227.19	230.68	0.136031114
209	6-5-24	22600	284.7	22442.7	0.067576841	0.101336854	130.04	138.87	130	207.14	211.69	207.09	0.135188942
210	6-5-24	22650	258.9	22442.7	0.067576841	0.101336854	109.29	121.49	109.27	185.17	196.19	185.1	0.133763935
211	6-5-24	22700	235.1	22442.7	0.067576841	0.101336854	90.97	104.1	91	164.85	180.69	164.83	0.132642948
212	6-5-24	22750	210.9	22442.7	0.067576841	0.101336854	74.98	86.72	75.11	146.15	165.19	146.18	0.130751094
213	6-5-24	22800	189.15	22442.7	0.067576841	0.101336854	61.18	69.34	61.39	129.03	149.68	129.12	0.129339865
214	6-5-24	22850	168.65	22442.7	0.067576841	0.101336854	49.4	51.96	49.73	113.42	134.18	113.63	0.127882226
215	6-5-24	22900	150.3	22442.7	0.067576841	0.101336854	39.47	34.58	39.85	99.27	118.68	99.57	0.126790285
216	6-5-24	22950	131.95	22442.7	0.067576841	0.101336854	31.2	17.2	31.53	86.5	103.18	86.87	0.125039104
217	6-5-24	23000	116.6	22442.7	0.067576841	0.101336854	24.4	0	24.67	75.04	87.67	75.54	0.124115983
218	6-5-24	23050	101.6	22442.7	0.067576841	0.101336854	18.87	0	19.11	64.8	72.17	65.35	0.122699689
219	6-5-24	23100	88.6	22442.7	0.067576841	0.101336854	14.42	0	14.63	55.7	56.67	56.26	0.12168075
220	6-5-24	23150	76.25	22442.7	0.067576841	0.101336854	10.9	0	11.06	47.66	41.17	48.16	0.120320538
221	6-5-24	23200	65.6	22442.7	0.067576841	0.101336854	8.15	0	8.28	40.59	25.67	41.04	0.11927562
222	6-5-24	23250	56.3	22442.7	0.067576841	0.101336854	6.02	0	6.18	34.41	10.16	34.79	0.118403599
223	6-5-24	23300	48.3	22442.7	0.067576841	0.101336854	4.4	0	4.55	29.03	0	29.41	0.117756085
224	6-5-24	23350	40.95	22442.7	0.067576841	0.101336854	3.17	0	3.29	24.37	0	24.71	0.116900242
225	6-5-24	23400	34.9	22442.7	0.067576841	0.101336854	2.26	0	2.37	20.37	0	20.66	0.116434343
226	6-5-24	23450	29.9	22442.7	0.067576841	0.101336854	1.59	0	1.71	16.94	0	17.19	0.116290741
227	6-5-24	23500	25.75	22442.7	0.067576841	0.101336854	1.11	0	1.21	14.02	0	14.22	0.116409022
228	6-5-24	23550	21.8	22442.7	0.067576841	0.101336854	0.76	0	0.84	11.55	0	11.75	0.116155574
229	6-5-24	23600	18.5	22442.7	0.067576841	0.101336854	0.52	0	0.57	9.46	0	9.71	0.116078709
230	6-5-24	23650	16.65	22442.7	0.067576841	0.101336854	0.35	0	0.39	7.72	0	7.96	0.117541808
231	6-5-24	23700	14.1	22442.7	0.067576841	0.101336854	0.23	0	0.26	6.26	0	6.49	0.117526358
232	6-5-24	23750	13.35	22442.7	0.067576841	0.101336854	0.15	0	0.16	5.06	0	5.25	0.120150854
233	6-5-24	23800	11.5	22442.7	0.067576841	0.101336854	0.1	0	0.1	4.07	0	4.23	0.120534949
234	6-5-24	23850	11.45	22442.7	0.067576841	0.101336854	0.06	0	0.07	3.25	0	3.42	0.124198173
235	6-5-24	23900	10.75	22442.7	0.067576841	0.101336854	0.04	0	0.05	2.59	0	2.77	0.126463877

236	6-5-24	23950	10.55	22442.7	0.067576841	0.101336854	0.02	0	0.03	2.05	0	2.22	0.129717387
237	6-5-24	24000	10.2	22442.7	0.067576841	0.101336854	0.02	0	0.02	1.61	0	1.77	0.132567903
238	6-5-24	24050	9.3	22442.7	0.067576841	0.101336854	0.01	0	0.01	1.27	0	1.39	0.134021068
239	6-5-24	24100	8.7	22442.7	0.067576841	0.101336854	0.01	0	0	0.99	0	1.08	0.136019546
240	6-5-24	24150	8.6	22442.7	0.067576841	0.101336854	0	0	0	0.77	0	0.85	0.139238505
241	6-5-24	24200	8.25	22442.7	0.067576841	0.101336854	0	0	0	0.59	0	0.66	0.14175202
242	6-5-24	24250	8.2	22442.7	0.067576841	0.101336854	0	0	0	0.45	0	0.51	0.1450429
243	6-5-24	24300	7.35	22442.7	0.067576841	0.101336854	0	0	0	0.35	0	0.39	0.145874722
244	6-5-24	24350	7.4	22442.7	0.067576841	0.101336854	0	0	0	0.26	0	0.29	0.14937654
245	6-5-24	24400	6.7	22442.7	0.067576841	0.101336854	0	0	0	0.2	0	0.21	0.150384867
246	6-5-24	24450	6.15	22442.7	0.067576841	0.101336854	0	0	0	0.15	0	0.15	0.151710223
247	6-5-24	24500	5.95	22442.7	0.067576841	0.101336854	0	0	0	0.11	0	0.12	0.154200036
248	7-5-24	20050	2329.65	22302.5	0.052405764	0.100580415	2340.74	2340.74	2340.13	2340.75	2340.74	2339.59	2.84239E-07
249	7-5-24	20100	2267.35	22302.5	0.052405764	0.100580415	2290.97	2290.97	2290.35	2290.97	2290.97	2289.81	3.40602E-08
250	7-5-24	20150	2243.5	22302.5	0.052405764	0.100580415	2241.19	2241.19	2240.57	2241.19	2241.19	2240.03	0.173845146
251	7-5-24	20200	2178.5	22302.5	0.052405764	0.100580415	2191.41	2191.41	2190.79	2191.41	2191.41	2190.25	2.0714E-07
252	7-5-24	20250	2143.2	22302.5	0.052405764	0.100580415	2141.63	2141.63	2141.01	2141.63	2141.63	2140.47	0.159264768
253	7-5-24	20300	2109.9	22302.5	0.052405764	0.100580415	2091.85	2091.85	2091.23	2091.85	2091.85	2090.69	0.221401752
254	7-5-24	20350	2046.9	22302.5	0.052405764	0.100580415	2042.07	2042.07	2041.45	2042.07	2042.07	2040.92	0.175416652
255	7-5-24	20400	1973.6	22302.5	0.052405764	0.100580415	1992.29	1992.29	1991.67	1992.3	1992.29	1991.15	6.25138E-07
256	7-5-24	20450	1925.95	22302.5	0.052405764	0.100580415	1942.51	1942.51	1941.89	1942.53	1942.51	1941.39	2.54827E-07
257	7-5-24	20500	1875.8	22302.5	0.052405764	0.100580415	1892.73	1892.73	1892.11	1892.76	1892.73	1891.63	1.73625E-07
258	7-5-24	20550	1825	22302.5	0.052405764	0.100580415	1842.95	1842.95	1842.33	1842.99	1842.95	1841.87	1.01515E-07
259	7-5-24	20600	1820	22302.5	0.052405764	0.100580415	1793.17	1793.17	1792.55	1793.23	1793.17	1792.11	0.210025642
260	7-5-24	20700	1710	22302.5	0.052405764	0.100580415	1693.61	1693.61	1692.99	1693.74	1693.61	1692.61	0.181363735
261	7-5-24	20800	1612.95	22302.5	0.052405764	0.100580415	1594.05	1594.05	1593.43	1594.3	1594.05	1593.17	0.177161414
262	7-5-24	20850	1581.3	22302.5	0.052405764	0.100580415	1544.27	1544.27	1543.65	1544.62	1544.27	1543.51	0.199891874
263	7-5-24	20900	1510.55	22302.5	0.052405764	0.100580415	1494.49	1494.49	1493.87	1494.98	1494.49	1493.9	0.162528787
264	7-5-24	21000	1401.55	22302.5	0.052405764	0.100580415	1394.93	1394.93	1394.31	1395.84	1394.93	1394.81	0.130966848
265	7-5-24	21050	1368.2	22302.5	0.052405764	0.100580415	1345.15	1345.15	1344.53	1346.37	1345.15	1345.36	0.160481685
266	7-5-24	21100	1320	22302.5	0.052405764	0.100580415	1295.37	1295.37	1294.75	1296.99	1295.37	1296	0.157958025
267	7-5-24	21150	1273.75	22302.5	0.052405764	0.100580415	1245.59	1245.59	1244.97	1247.73	1245.59	1246.73	0.157872564
268	7-5-24	21200	1226.95	22302.5	0.052405764	0.100580415	1195.81	1195.81	1195.19	1198.62	1195.81	1197.58	0.156603952
269	7-5-24	21250	1165.3	22302.5	0.052405764	0.100580415	1146.03	1146.03	1145.41	1149.68	1146.03	1148.63	0.135516777
270	7-5-24	21300	1125.15	22302.5	0.052405764	0.100580415	1096.25	1096.25	1095.64	1100.95	1096.25	1099.93	0.143664483

271	7-5-24	21350	1092.45	22302.5	0.052405764	0.100580415	1046.48	1046.47	1045.87	1052.49	1046.47	1051.5	0.156744534
272	7-5-24	21400	1047.5	22302.5	0.052405764	0.100580415	996.71	996.69	996.11	1004.33	996.69	1003.4	0.155679339
273	7-5-24	21450	990	22302.5	0.052405764	0.100580415	946.94	946.91	946.35	956.54	946.91	955.68	0.142919022
274	7-5-24	21500	946.5	22302.5	0.052405764	0.100580415	897.2	897.13	896.6	909.18	897.13	908.36	0.143050729
275	7-5-24	21550	912.1	22302.5	0.052405764	0.100580415	847.48	847.35	846.88	862.31	853.16	861.49	0.149845282
276	7-5-24	21600	864.3	22302.5	0.052405764	0.100580415	797.81	797.57	797.23	816.02	813.13	815.24	0.145289611
277	7-5-24	21650	795	22302.5	0.052405764	0.100580415	748.22	747.79	747.67	770.39	773.1	769.67	0.123986814
278	7-5-24	21700	776.45	22302.5	0.052405764	0.100580415	698.75	698.01	698.22	725.5	733.08	724.87	0.141126359
279	7-5-24	21750	726.6	22302.5	0.052405764	0.100580415	649.48	648.23	648.94	681.44	693.05	680.83	0.134627333
280	7-5-24	21800	701.75	22302.5	0.052405764	0.100580415	600.49	598.45	599.94	638.31	653.02	637.69	0.143665135
281	7-5-24	21850	633.45	22302.5	0.052405764	0.100580415	551.93	548.67	551.4	596.2	613	595.6	0.125494522
282	7-5-24	21900	622.25	22302.5	0.052405764	0.100580415	503.94	500.15	503.48	555.21	572.97	554.68	0.140949699
283	7-5-24	21950	583.85	22302.5	0.052405764	0.100580415	456.76	457.69	456.32	515.44	532.94	514.96	0.139642943
284	7-5-24	22000	548	22302.5	0.052405764	0.100580415	410.63	415.24	410.23	476.97	492.92	476.59	0.139172331
285	7-5-24	22050	513.6	22302.5	0.052405764	0.100580415	365.85	372.79	365.52	439.9	452.89	439.5	0.138893798
286	7-5-24	22100	477.3	22302.5	0.052405764	0.100580415	322.75	330.33	322.43	404.31	412.86	403.95	0.137132184
287	7-5-24	22150	446.85	22302.5	0.052405764	0.100580415	281.68	287.88	281.4	370.27	372.83	369.97	0.137665736
288	7-5-24	22200	414.3	22302.5	0.052405764	0.100580415	242.98	245.43	242.78	337.85	332.81	337.59	0.136620323
289	7-5-24	22250	381.45	22302.5	0.052405764	0.100580415	206.97	202.97	206.78	307.09	292.78	306.87	0.134899225
290	7-5-24	22300	352.45	22302.5	0.052405764	0.100580415	173.94	160.52	173.8	278.04	252.75	277.88	0.134379298
291	7-5-24	22350	325.45	22302.5	0.052405764	0.100580415	144.1	140.43	144.01	250.73	236.06	250.59	0.134180509
292	7-5-24	22400	295.8	22302.5	0.052405764	0.100580415	117.59	121.52	117.52	225.18	220.6	225.05	0.132205408
293	7-5-24	22450	270.15	22302.5	0.052405764	0.100580415	94.43	102.61	94.4	201.38	205.13	201.32	0.131431837
294	7-5-24	22500	245.05	22302.5	0.052405764	0.100580415	74.59	83.7	74.59	179.32	189.67	179.25	0.13029797
295	7-5-24	22550	223.1	22302.5	0.052405764	0.100580415	57.9	64.79	57.98	158.97	174.2	158.95	0.129972312
296	7-5-24	22600	201.15	22302.5	0.052405764	0.100580415	44.14	45.88	44.31	140.31	158.74	140.34	0.129031614
297	7-5-24	22650	180.65	22302.5	0.052405764	0.100580415	33.03	26.97	33.3	123.27	143.27	123.37	0.128123061
298	7-5-24	22700	162.5	22302.5	0.052405764	0.100580415	24.25	8.06	24.51	107.81	127.81	108.02	0.127698102
299	7-5-24	22750	144.35	22302.5	0.052405764	0.100580415	17.46	0	17.65	93.84	112.34	94.14	0.126623595
300	7-5-24	22800	126.8	22302.5	0.052405764	0.100580415	12.32	0	12.49	81.29	96.88	81.67	0.12515292
301	7-5-24	22850	113	22302.5	0.052405764	0.100580415	8.52	0	8.65	70.08	81.42	70.59	0.124966371
302	7-5-24	22900	99.05	22302.5	0.052405764	0.100580415	5.77	0	5.87	60.12	65.95	60.67	0.124037244
303	7-5-24	22950	87.5	22302.5	0.052405764	0.100580415	3.83	0	3.95	51.33	50.49	51.85	0.123805795
304	7-5-24	23000	76.5	22302.5	0.052405764	0.100580415	2.49	0	2.58	43.6	35.02	44.06	0.123248995
305	7-5-24	23050	66.25	22302.5	0.052405764	0.100580415	1.58	0	1.66	36.85	19.56	37.26	0.122481968

306	7-5-24	23100	56.95	22302.5	0.052405764	0.100580415	0.98	0	1.07	30.99	4.09	31.36	0.121648813
307	7-5-24	23150	49.9	22302.5	0.052405764	0.100580415	0.6	0	0.66	25.92	0	26.28	0.121794644
308	7-5-24	23200	42.85	22302.5	0.052405764	0.100580415	0.36	0	0.39	21.58	0	21.88	0.121305638
309	7-5-24	23250	37.25	22302.5	0.052405764	0.100580415	0.21	0	0.23	17.87	0	18.13	0.121410804
310	7-5-24	23300	31.5	22302.5	0.052405764	0.100580415	0.12	0	0.13	14.72	0	14.94	0.12073037
311	7-5-24	23350	27.9	22302.5	0.052405764	0.100580415	0.07	0	0.07	12.06	0	12.25	0.121642715
312	7-5-24	23400	23.75	22302.5	0.052405764	0.100580415	0.04	0	0.04	9.83	0	10.05	0.121396733
313	7-5-24	23450	21.5	22302.5	0.052405764	0.100580415	0.02	0	0.03	7.97	0	8.21	0.122993937
314	7-5-24	23500	19.4	22302.5	0.052405764	0.100580415	0.01	0	0.01	6.43	0	6.65	0.124458675
315	7-5-24	23550	16.35	22302.5	0.052405764	0.100580415	0.01	0	0	5.16	0	5.35	0.124115019
316	7-5-24	23600	14.45	22302.5	0.052405764	0.100580415	0	0	0	4.12	0	4.27	0.125064612
317	7-5-24	23650	13.6	22302.5	0.052405764	0.100580415	0	0	0	3.27	0	3.43	0.127550709
318	7-5-24	23700	12.3	22302.5	0.052405764	0.100580415	0	0	0	2.58	0	2.76	0.1290096
319	7-5-24	23750	11.6	22302.5	0.052405764	0.100580415	0	0	0	2.03	0	2.19	0.131447385
320	7-5-24	23800	10.1	22302.5	0.052405764	0.100580415	0	0	0	1.58	0	1.73	0.13193838
321	7-5-24	23850	10.05	22302.5	0.052405764	0.100580415	0	0	0	1.23	0	1.35	0.135539998
322	7-5-24	23900	9.85	22302.5	0.052405764	0.100580415	0	0	0	0.95	0	1.04	0.138763665
323	7-5-24	23950	9.75	22302.5	0.052405764	0.100580415	0	0	0	0.73	0	0.81	0.142171924
324	7-5-24	24000	9.65	22302.5	0.052405764	0.100580415	0	0	0	0.56	0	0.62	0.145557585
325	7-5-24	24050	9.25	22302.5	0.052405764	0.100580415	0	0	0	0.42	0	0.48	0.14813106
326	7-5-24	24100	8.3	22302.5	0.052405764	0.100580415	0	0	0	0.32	0	0.36	0.149025673
327	7-5-24	24150	8.15	22302.5	0.052405764	0.100580415	0	0	0	0.24	0	0.26	0.152095884
328	7-5-24	24200	8	22302.5	0.052405764	0.100580415	0	0	0	0.18	0	0.19	0.155119544
329	7-5-24	24250	7.85	22302.5	0.052405764	0.100580415	0	0	0	0.13	0	0.14	0.158073881
330	7-5-24	24300	7.2	22302.5	0.052405764	0.100580415	0	0	0	0.1	0	0.11	0.159358532
331	7-5-24	24350	6.9	22302.5	0.052405764	0.100580415	0	0	0	0.07	0	0.09	0.161677059
332	7-5-24	24400	6.9	22302.5	0.052405764	0.100580415	0	0	0	0.05	0	0.07	0.165020732
333	7-5-24	24450	5.8	22302.5	0.052405764	0.100580415	0	0	0	0.04	0	0.05	0.164101096
334	7-5-24	24500	6.05	22302.5	0.052405764	0.100580415	0	0	0	0.03	0	0.04	0.168385969
335	8-5-24	20050	2328.45	22302.5	0.068231321	0.100715251	2336.92	2336.92	2336.14	2336.92	2336.92	2335.79	1.10608E-07
336	8-5-24	20100	2276.8	22302.5	0.068231321	0.100715251	2287.13	2287.13	2286.35	2287.13	2287.13	2286	2.09395E-07
337	8-5-24	20150	2250.25	22302.5	0.068231321	0.100715251	2237.34	2237.34	2236.56	2237.34	2237.34	2236.21	0.226352242
338	8-5-24	20200	2195	22302.5	0.068231321	0.100715251	2187.55	2187.55	2186.77	2187.55	2187.55	2186.42	0.20328102
339	8-5-24	20250	2166.6	22302.5	0.068231321	0.100715251	2137.76	2137.76	2136.98	2137.76	2137.76	2136.63	0.252655769
340	8-5-24	20300	2093.3	22302.5	0.068231321	0.100715251	2087.97	2087.97	2087.19	2087.97	2087.97	2086.84	0.185565954

341	8-5-24	20350	2045.45	22302.5	0.068231321	0.100715251	2038.18	2038.18	2037.4	2038.19	2038.18	2037.05	0.190006557
342	8-5-24	20400	1985	22302.5	0.068231321	0.100715251	1988.39	1988.39	1987.61	1988.4	1988.39	1987.27	3.04878E-07
343	8-5-24	20450	1962.85	22302.5	0.068231321	0.100715251	1938.6	1938.6	1937.82	1938.62	1938.6	1937.49	0.224519155
344	8-5-24	20500	1886.05	22302.5	0.068231321	0.100715251	1888.81	1888.81	1888.03	1888.83	1888.81	1887.72	6.90422E-08
345	8-5-24	20550	1857.7	22302.5	0.068231321	0.100715251	1839.02	1839.02	1838.24	1839.05	1839.02	1837.95	0.203947725
346	8-5-24	20600	1830	22302.5	0.068231321	0.100715251	1789.23	1789.23	1788.46	1789.28	1789.23	1788.18	0.235326838
347	8-5-24	20650	1752.45	22302.5	0.068231321	0.100715251	1739.44	1739.44	1738.67	1739.51	1739.44	1738.41	0.181829735
348	8-5-24	20700	1720	22302.5	0.068231321	0.100715251	1689.65	1689.65	1688.88	1689.76	1689.65	1688.65	0.209969052
349	8-5-24	20750	1663.2	22302.5	0.068231321	0.100715251	1639.86	1639.86	1639.09	1640.01	1639.86	1638.91	0.19360501
350	8-5-24	20800	1604.6	22302.5	0.068231321	0.100715251	1590.07	1590.07	1589.3	1590.28	1590.07	1589.18	0.171790848
351	8-5-24	20850	1494	22302.5	0.068231321	0.100715251	1540.29	1540.28	1539.51	1540.58	1540.28	1539.48	5.51342E-07
352	8-5-24	20900	1510.15	22302.5	0.068231321	0.100715251	1490.5	1490.5	1489.72	1490.9	1490.5	1489.83	0.1726151
353	8-5-24	20950	1461.2	22302.5	0.068231321	0.100715251	1440.71	1440.71	1439.93	1441.27	1440.71	1440.22	0.169265625
354	8-5-24	21000	1406.95	22302.5	0.068231321	0.100715251	1390.92	1390.92	1390.14	1391.69	1390.92	1390.67	0.15640352
355	8-5-24	21050	1365.8	22302.5	0.068231321	0.100715251	1341.14	1341.13	1340.36	1342.17	1341.13	1341.17	0.166158828
356	8-5-24	21100	1317.6	22302.5	0.068231321	0.100715251	1291.35	1291.34	1290.59	1292.74	1291.34	1291.76	0.163455706
357	8-5-24	21150	1271.7	22302.5	0.068231321	0.100715251	1241.58	1241.55	1240.82	1243.42	1241.55	1242.45	0.163638032
358	8-5-24	21200	1215.9	22302.5	0.068231321	0.100715251	1191.81	1191.76	1191.05	1194.23	1191.76	1193.22	0.150364155
359	8-5-24	21250	1178.85	22302.5	0.068231321	0.100715251	1142.05	1141.97	1141.3	1145.2	1141.97	1144.18	0.161232067
360	8-5-24	21300	1128.95	22302.5	0.068231321	0.100715251	1092.32	1092.18	1091.56	1096.38	1092.18	1095.37	0.155700543
361	8-5-24	21350	1088.95	22302.5	0.068231321	0.100715251	1042.62	1042.39	1041.86	1047.81	1042.39	1046.83	0.160367679
362	8-5-24	21400	1049.4	22302.5	0.068231321	0.100715251	992.97	992.6	992.24	999.53	992.6	998.6	0.164133258
363	8-5-24	21450	979.65	22302.5	0.068231321	0.100715251	943.38	942.81	942.69	951.61	942.81	950.74	0.139397191
364	8-5-24	21500	946.75	22302.5	0.068231321	0.100715251	893.9	893.02	893.23	904.1	893.02	903.3	0.149624814
365	8-5-24	21550	916.3	22302.5	0.068231321	0.100715251	844.57	843.23	843.9	857.08	845.96	856.26	0.159152588
366	8-5-24	21600	859.75	22302.5	0.068231321	0.100715251	795.44	793.44	794.74	810.62	805.99	809.85	0.14771311
367	8-5-24	21650	821.65	22302.5	0.068231321	0.100715251	746.57	743.65	745.88	764.81	766.01	764.08	0.149974727
368	8-5-24	21700	774.65	22302.5	0.068231321	0.100715251	698.07	693.86	697.41	719.74	726.04	719.11	0.145374636
369	8-5-24	21750	744.55	22302.5	0.068231321	0.100715251	650.04	644.07	649.44	675.5	686.06	674.9	0.151563575
370	8-5-24	21800	693.05	22302.5	0.068231321	0.100715251	602.61	597.63	602.05	632.19	646.09	631.59	0.143490822
371	8-5-24	21850	691.05	22302.5	0.068231321	0.100715251	555.93	556.37	555.39	589.91	606.11	589.31	0.164175982
372	8-5-24	21900	618.3	22302.5	0.068231321	0.100715251	510.17	515.11	509.7	548.75	566.14	548.22	0.143614741
373	8-5-24	21950	580.1	22302.5	0.068231321	0.100715251	465.54	473.84	465.13	508.83	526.16	508.35	0.142359174
374	8-5-24	22000	542.65	22302.5	0.068231321	0.100715251	422.23	432.58	421.82	470.23	486.19	469.85	0.141009887
375	8-5-24	22050	505.85	22302.5	0.068231321	0.100715251	380.46	391.32	380.09	433.04	446.21	432.65	0.139488961



376	8-5-24	22100	472.35	22302.5	0.068231321	0.100715251	340.44	350.05	340.13	397.37	406.24	397.01	0.139109607
377	8-5-24	22150	437.95	22302.5	0.068231321	0.100715251	302.39	308.79	302.13	363.27	366.26	362.97	0.137713376
378	8-5-24	22200	405.25	22302.5	0.068231321	0.100715251	266.5	267.53	266.26	330.82	326.29	330.56	0.136588214
379	8-5-24	22250	375.5	22302.5	0.068231321	0.100715251	232.94	226.26	232.75	300.07	286.31	299.85	0.136279843
380	8-5-24	22300	344	22302.5	0.068231321	0.100715251	201.86	185	201.71	271.07	246.34	270.92	0.134561398
381	8-5-24	22350	315.3	22302.5	0.068231321	0.100715251	173.34	166.68	173.25	243.85	229.71	243.71	0.133548285
382	8-5-24	22400	286.95	22302.5	0.068231321	0.100715251	147.46	149.58	147.38	218.42	214.32	218.3	0.132090929
383	8-5-24	22450	262.85	22302.5	0.068231321	0.100715251	124.22	132.47	124.19	194.78	198.93	194.73	0.131953252
384	8-5-24	22500	237.8	22302.5	0.068231321	0.100715251	103.59	115.36	103.57	172.92	183.54	172.85	0.130749348
385	8-5-24	22550	214.65	22302.5	0.068231321	0.100715251	85.49	98.25	85.52	152.8	168.14	152.78	0.129776694
386	8-5-24	22600	194.4	22302.5	0.068231321	0.100715251	69.79	81.14	69.94	134.4	152.75	134.44	0.129519094
387	8-5-24	22650	174.05	22302.5	0.068231321	0.100715251	56.35	64.04	56.57	117.65	137.36	117.76	0.128559272
388	8-5-24	22700	155.3	22302.5	0.068231321	0.100715251	44.99	46.93	45.33	102.49	121.97	102.72	0.127698294
389	8-5-24	22750	137.85	22302.5	0.068231321	0.100715251	35.51	29.82	35.86	88.84	106.57	89.15	0.126811567
390	8-5-24	22800	120.15	22302.5	0.068231321	0.100715251	27.7	12.71	27.99	76.63	91.18	77.04	0.125062118
391	8-5-24	22850	106.05	22302.5	0.068231321	0.100715251	21.35	0	21.59	65.76	75.79	66.26	0.124517009
392	8-5-24	22900	93.05	22302.5	0.068231321	0.100715251	16.26	0	16.48	56.14	60.39	56.69	0.123898314
393	8-5-24	22950	81.95	22302.5	0.068231321	0.100715251	12.23	0	12.4	47.69	45	48.19	0.1237251
394	8-5-24	23000	71.1	22302.5	0.068231321	0.100715251	9.08	0	9.21	40.29	29.61	40.73	0.123014271
395	8-5-24	23050	61.45	22302.5	0.068231321	0.100715251	6.66	0	6.8	33.87	14.22	34.24	0.122380667
396	8-5-24	23100	52.95	22302.5	0.068231321	0.100715251	4.83	0	4.98	28.31	0	28.68	0.121849707
397	8-5-24	23150	45.6	22302.5	0.068231321	0.100715251	3.45	0	3.58	23.54	0	23.87	0.12149689
398	8-5-24	23200	38.95	22302.5	0.068231321	0.100715251	2.44	0	2.54	19.47	0	19.75	0.121026771
399	8-5-24	23250	33.8	22302.5	0.068231321	0.100715251	1.7	0	1.81	16.02	0	16.25	0.121261881
400	8-5-24	23300	28.2	22302.5	0.068231321	0.100715251	1.17	0	1.27	13.11	0	13.3	0.120350069
401	8-5-24	23350	24.8	22302.5	0.068231321	0.100715251	0.79	0	0.87	10.66	0	10.86	0.121199262
402	8-5-24	23400	20.75	22302.5	0.068231321	0.100715251	0.53	0	0.58	8.63	0	8.86	0.120667073
403	8-5-24	23450	19.05	22302.5	0.068231321	0.100715251	0.35	0	0.39	6.94	0	7.17	0.122771084
404	8-5-24	23500	17.6	22302.5	0.068231321	0.100715251	0.23	0	0.26	5.56	0	5.76	0.124984184
405	8-5-24	23550	15.1	22302.5	0.068231321	0.100715251	0.15	0	0.16	4.42	0	4.58	0.125215452
406	8-5-24	23600	13.25	22302.5	0.068231321	0.100715251	0.09	0	0.09	3.5	0	3.66	0.12606879
407	8-5-24	23650	12.35	22302.5	0.068231321	0.100715251	0.06	0	0.07	2.75	0	2.92	0.128373361
408	8-5-24	23700	11.35	22302.5	0.068231321	0.100715251	0.04	0	0.05	2.16	0	2.32	0.130294288
409	8-5-24	23750	10.8	22302.5	0.068231321	0.100715251	0.02	0	0.03	1.68	0	1.83	0.133018123
410	8-5-24	23800	10	22302.5	0.068231321	0.100715251	0.01	0	0.02	1.3	0	1.43	0.135018994

411	8-5-24	23850	9.8	22302.5	0.068231321	0.100715251	0.01	0	0.01	1	0	1.09	0.138328156
412	8-5-24	23900	9.25	22302.5	0.068231321	0.100715251	0	0	0	0.76	0	0.84	0.140690117
413	8-5-24	23950	9.15	22302.5	0.068231321	0.100715251	0	0	0	0.58	0	0.65	0.144158503
414	8-5-24	24000	9	22302.5	0.068231321	0.100715251	0	0	0	0.44	0	0.49	0.147430787
415	8-5-24	24050	8.7	22302.5	0.068231321	0.100715251	0	0	0	0.33	0	0.37	0.150268111
416	8-5-24	24100	7.95	22302.5	0.068231321	0.100715251	0	0	0	0.25	0	0.27	0.151658346
417	8-5-24	24150	8.2	22302.5	0.068231321	0.100715251	0	0	0	0.18	0	0.2	0.155991412
418	8-5-24	24200	7.25	22302.5	0.068231321	0.100715251	0	0	0	0.14	0	0.14	0.156496885
419	8-5-24	24250	7.15	22302.5	0.068231321	0.100715251	0	0	0	0.1	0	0.11	0.159628855
420	8-5-24	24300	6.35	22302.5	0.068231321	0.100715251	0	0	0	0.07	0	0.09	0.160199484
421	8-5-24	24350	6.2	22302.5	0.068231321	0.100715251	0	0	0	0.05	0	0.07	0.162995189
422	8-5-24	24400	5.7	22302.5	0.068231321	0.100715251	0	0	0	0.04	0	0.05	0.16435152
423	8-5-24	24450	5.85	22302.5	0.068231321	0.100715251	0	0	0	0.03	0	0.04	0.168333388
424	8-5-24	24500	5.5	22302.5	0.068231321	0.100715251	0	0	0	0.02	0	0.03	0.170133747
425	9-5-24	20050	2004.05	21957.5	0.170129732	0.099896399	1990.99	1988.09	1989.45	1988.09	1988.09	1987.01	0.220327332
426	9-5-24	20100	1954.3	21957.5	0.170129732	0.099896399	1941.76	1938.29	1940.19	1938.29	1938.29	1937.21	0.215660006
427	9-5-24	20150	1923	21957.5	0.170129732	0.099896399	1892.63	1888.49	1891.02	1888.5	1888.49	1887.42	0.246268937
428	9-5-24	20200	1859.95	21957.5	0.170129732	0.099896399	1843.61	1838.69	1841.99	1838.71	1838.69	1837.63	0.217553248
429	9-5-24	20250	1825.5	21957.5	0.170129732	0.099896399	1794.72	1788.89	1793.1	1788.92	1788.89	1787.85	0.238728554
430	9-5-24	20300	1785	21957.5	0.170129732	0.099896399	1745.97	1739.09	1744.37	1739.13	1739.09	1738.07	0.246225696
431	9-5-24	20350	1752	21957.5	0.170129732	0.099896399	1697.38	1689.29	1695.81	1689.35	1689.29	1688.3	0.260810677
432	9-5-24	20400	1690	21957.5	0.170129732	0.099896399	1648.98	1639.49	1647.45	1639.57	1639.49	1638.52	0.240711425
433	9-5-24	20450	1636.4	21957.5	0.170129732	0.099896399	1600.78	1589.69	1599.3	1589.81	1589.69	1588.76	0.230322259
434	9-5-24	20500	1577.4	21957.5	0.170129732	0.099896399	1552.8	1539.9	1551.38	1540.07	1539.9	1539.01	0.21276574
435	9-5-24	20550	1548.75	21957.5	0.170129732	0.099896399	1505.08	1490.1	1503.75	1490.34	1490.1	1489.28	0.232633166
436	9-5-24	20600	1495.8	21957.5	0.170129732	0.099896399	1457.64	1440.3	1456.37	1440.65	1440.3	1439.61	0.223275309
437	9-5-24	20650	1451.1	21957.5	0.170129732	0.099896399	1410.5	1390.5	1409.22	1390.99	1390.5	1389.98	0.22279111
438	9-5-24	20700	1400.7	21957.5	0.170129732	0.099896399	1363.7	1340.7	1362.41	1341.38	1340.7	1340.4	0.216179722
439	9-5-24	20750	1356.9	21957.5	0.170129732	0.099896399	1317.27	1296.19	1316.04	1291.84	1290.9	1290.87	0.216115638
440	9-5-24	20800	1276.85	21957.5	0.170129732	0.099896399	1271.24	1257.5	1270.03	1242.38	1241.1	1241.44	0.177411379
441	9-5-24	20850	1263.25	21957.5	0.170129732	0.099896399	1225.65	1218.81	1224.51	1193.03	1191.3	1192.1	0.209307281
442	9-5-24	20900	1193.45	21957.5	0.170129732	0.099896399	1180.53	1180.12	1179.5	1143.81	1141.5	1142.85	0.184061884
443	9-5-24	20950	1170.35	21957.5	0.170129732	0.099896399	1135.91	1141.43	1134.95	1094.77	1091.7	1093.79	0.20247417
444	9-5-24	21000	1111.1	21957.5	0.170129732	0.099896399	1091.84	1102.74	1090.9	1045.94	1041.91	1044.97	0.187972741
445	9-5-24	21050	1326.05	21957.5	0.170129732	0.099896399	1048.36	1064.05	1047.41	997.37	992.11	996.43	0.352949813

446	9-5-24	21100	1029	21957.5	0.170129732	0.099896399	1005.5	1025.35	1004.55	949.11	942.31	948.22	0.189332881
447	9-5-24	21150	988.75	21957.5	0.170129732	0.099896399	963.3	986.66	962.35	901.23	892.51	900.41	0.189781907
448	9-5-24	21200	923.65	21957.5	0.170129732	0.099896399	921.8	947.97	920.93	853.79	842.71	853.02	0.171547649
449	9-5-24	21250	911.1	21957.5	0.170129732	0.099896399	881.04	909.28	880.22	806.88	797.66	806.11	0.191047114
450	9-5-24	21300	849.25	21957.5	0.170129732	0.099896399	841.06	870.59	840.27	760.59	757.71	759.85	0.175729334
451	9-5-24	21350	882	21957.5	0.170129732	0.099896399	801.89	831.9	801.2	715	717.76	714.33	0.219350931
452	9-5-24	21400	778.25	21957.5	0.170129732	0.099896399	763.57	793.21	762.98	670.21	677.81	669.63	0.179255262
453	9-5-24	21450	729.85	21957.5	0.170129732	0.099896399	726.14	754.52	725.54	626.33	637.86	625.76	0.172366868
454	9-5-24	21500	677.5	21957.5	0.170129732	0.099896399	689.62	715.83	689.01	583.48	597.92	582.91	0.163009072
455	9-5-24	21550	623.95	21957.5	0.170129732	0.099896399	654.06	677.14	653.49	541.75	557.97	541.23	0.152898296
456	9-5-24	21600	608.4	21957.5	0.170129732	0.099896399	619.47	638.45	618.95	501.26	518.02	500.78	0.164069964
457	9-5-24	21650	558.95	21957.5	0.170129732	0.099896399	585.88	599.75	585.44	462.12	478.07	461.73	0.1557193
458	9-5-24	21700	525.35	21957.5	0.170129732	0.099896399	553.32	561.06	552.91	424.43	438.12	424.07	0.155558955
459	9-5-24	21750	498	21957.5	0.170129732	0.099896399	521.82	522.37	521.43	388.28	398.17	387.93	0.158020038
460	9-5-24	21800	469.5	21957.5	0.170129732	0.099896399	491.37	483.68	491.03	353.78	358.22	353.48	0.159229875
461	9-5-24	21850	423.25	21957.5	0.170129732	0.099896399	462.01	444.99	461.71	320.98	318.28	320.73	0.151087764
462	9-5-24	21900	396.9	21957.5	0.170129732	0.099896399	433.74	406.3	433.52	289.96	278.33	289.75	0.152274439
463	9-5-24	21950	368.4	21957.5	0.170129732	0.099896399	406.57	367.61	406.36	260.77	238.38	260.61	0.151805317
464	9-5-24	22000	339.65	21957.5	0.170129732	0.099896399	380.5	350.02	380.27	233.43	219.34	233.3	0.150637001
465	9-5-24	22050	307.55	21957.5	0.170129732	0.099896399	355.54	336.15	355.38	207.98	203.98	207.87	0.147286455
466	9-5-24	22100	284.1	21957.5	0.170129732	0.099896399	331.68	322.28	331.58	184.4	188.63	184.36	0.147460399
467	9-5-24	22150	258.8	21957.5	0.170129732	0.099896399	308.92	308.41	308.87	162.69	173.28	162.62	0.146140893
468	9-5-24	22200	234.3	21957.5	0.170129732	0.099896399	287.25	294.55	287.16	142.8	157.93	142.78	0.144579256
469	9-5-24	22250	208.75	21957.5	0.170129732	0.099896399	266.66	280.68	266.61	124.7	142.57	124.74	0.14183955
470	9-5-24	22300	189.25	21957.5	0.170129732	0.099896399	247.12	266.81	247.11	108.32	127.22	108.45	0.141410765
471	9-5-24	22350	170.2	21957.5	0.170129732	0.099896399	228.63	252.94	228.69	93.59	111.87	93.83	0.140557846
472	9-5-24	22400	151.2	21957.5	0.170129732	0.099896399	211.17	239.07	211.27	80.42	96.51	80.73	0.139049782
473	9-5-24	22450	134.15	21957.5	0.170129732	0.099896399	194.7	225.21	194.89	68.72	81.16	69.17	0.137864101
474	9-5-24	22500	121.1	21957.5	0.170129732	0.099896399	179.2	211.34	179.52	58.4	65.81	58.89	0.138218827
475	9-5-24	22550	105.4	21957.5	0.170129732	0.099896399	164.65	197.47	165.08	49.34	50.45	49.84	0.136374304
476	9-5-24	22600	95.4	21957.5	0.170129732	0.099896399	151.01	183.6	151.51	41.45	35.1	41.89	0.137266693
477	9-5-24	22650	82.45	21957.5	0.170129732	0.099896399	138.26	169.73	138.82	34.63	19.75	35.01	0.135649578
478	9-5-24	22700	74.25	21957.5	0.170129732	0.099896399	126.36	155.87	127.05	28.75	4.4	29.1	0.136507121
479	9-5-24	22750	63.25	21957.5	0.170129732	0.099896399	115.27	142	116.09	23.74	0	24.06	0.134724957
480	9-5-24	22800	56.5	21957.5	0.170129732	0.099896399	104.97	128.13	105.83	19.48	0	19.76	0.135428877

481	9-5-24	22850	49.1	21957.5	0.170129732	0.099896399	95.42	114.26	96.32	15.89	0	16.12	0.135015834
482	9-5-24	22900	42.05	21957.5	0.170129732	0.099896399	86.58	100.39	87.44	12.88	0	13.07	0.13419603
483	9-5-24	22950	38.05	21957.5	0.170129732	0.099896399	78.41	86.53	79.24	10.38	0	10.57	0.13565032
484	9-5-24	23000	32.8	21957.5	0.170129732	0.099896399	70.88	72.66	71.64	8.32	0	8.54	0.135332462
485	9-5-24	23050	28.75	21957.5	0.170129732	0.099896399	63.96	58.79	64.68	6.62	0	6.84	0.135711599
486	9-5-24	23100	25.2	21957.5	0.170129732	0.099896399	57.61	44.92	58.25	5.24	0	5.44	0.13616916
487	9-5-24	23150	23	21957.5	0.170129732	0.099896399	51.79	31.06	52.41	4.12	0	4.27	0.137937811
488	9-5-24	23200	20.3	21957.5	0.170129732	0.099896399	46.48	17.19	47.08	3.22	0	3.37	0.138648496
489	9-5-24	23250	19.4	21957.5	0.170129732	0.099896399	41.63	3.32	42.2	2.5	0	2.67	0.141748895
490	9-5-24	23300	17.35	21957.5	0.170129732	0.099896399	37.22	0	37.74	1.93	0	2.09	0.142813927
491	9-5-24	23350	16.3	21957.5	0.170129732	0.099896399	33.21	0	33.69	1.48	0	1.62	0.145303302
492	9-5-24	23400	15.15	21957.5	0.170129732	0.099896399	29.58	0	30.02	1.13	0	1.24	0.147414721
493	9-5-24	23450	14.35	21957.5	0.170129732	0.099896399	26.3	0	26.69	0.86	0	0.94	0.150028386
494	9-5-24	23500	13.7	21957.5	0.170129732	0.099896399	23.34	0	23.68	0.64	0	0.72	0.152820353
495	9-5-24	23550	12.05	21957.5	0.170129732	0.099896399	20.67	0	20.99	0.48	0	0.54	0.153244582
496	9-5-24	23600	11.25	21957.5	0.170129732	0.099896399	18.27	0	18.61	0.36	0	0.4	0.155314079
497	9-5-24	23650	10.9	21957.5	0.170129732	0.099896399	16.12	0	16.49	0.27	0	0.29	0.158382803
498	9-5-24	23700	10.45	21957.5	0.170129732	0.099896399	14.2	0	14.6	0.19	0	0.21	0.161100054
499	9-5-24	23750	10.5	21957.5	0.170129732	0.099896399	12.48	0	12.87	0.14	0	0.14	0.165070012

# Representative Sample of Put Option Data

S.No.	Date	Strike Price	Close	Underlying Value	EWMA_Vol_Annual	GARCH_Vol_Annual	BS_EWMA	BIN_EWMA	MC_EWMA	BS_GARCH	BIN_GARCH	MC_GARCH	Implied Volatility
1	2-5-24	20050	6.15	22648.2	0.045787715	0.101630422	0	0	0	0	0	0	0.209487184
2	2-5-24	20100	5.8	22648.2	0.045787715	0.101630422	0	0	0	0	0	0	0.204235225
3	2-5-24	20150	5.8	22648.2	0.045787715	0.101630422	0	0	0	0	0	0	0.200697561
4	2-5-24	20200	6	22648.2	0.045787715	0.101630422	0	0	0	0	0	0	0.198081604
5	2-5-24	20250	5.9	22648.2	0.045787715	0.101630422	0	0	0	0	0	0	0.194067134
6	2-5-24	20300	5.95	22648.2	0.045787715	0.101630422	0	0	0	0	0	0	0.190747741
7	2-5-24	20350	5.95	22648.2	0.045787715	0.101630422	0	0	0	0	0	0	0.187204514
8	2-5-24	20400	7.05	22648.2	0.045787715	0.101630422	0	0	0	0.01	0	0	0.188199078
9	2-5-24	20450	7.15	22648.2	0.045787715	0.101630422	0	0	0	0.01	0	0.01	0.184943171
10	2-5-24	20500	8.6	22648.2	0.045787715	0.101630422	0	0	0	0.01	0	0.02	0.186449174
11	2-5-24	20550	9.25	22648.2	0.045787715	0.101630422	0	0	0	0.02	0	0.03	0.184815144
12	2-5-24	20600	9.8	22648.2	0.045787715	0.101630422	0	0	0	0.03	0	0.05	0.182766919
13	2-5-24	20650	10.7	22648.2	0.045787715	0.101630422	0	0	0	0.04	0	0.07	0.1815627
14	2-5-24	20700	11.35	22648.2	0.045787715	0.101630422	0	0	0	0.06	0	0.09	0.179512133
15	2-5-24	20750	12.05	22648.2	0.045787715	0.101630422	0	0	0	0.08	0	0.11	0.177468686
16	2-5-24	20800	12.65	22648.2	0.045787715	0.101630422	0	0	0	0.11	0	0.14	0.175067173
17	2-5-24	20850	13.95	22648.2	0.045787715	0.101630422	0	0	0	0.15	0	0.18	0.174140772
18	2-5-24	20900	15.15	22648.2	0.045787715	0.101630422	0	0	0	0.2	0	0.23	0.172759484
19	2-5-24	20950	16.45	22648.2	0.045787715	0.101630422	0	0	0	0.27	0	0.29	0.171360607
20	2-5-24	21000	18.85	22648.2	0.045787715	0.101630422	0	0	0	0.36	0	0.4	0.171726821
21	2-5-24	21050	18.95	22648.2	0.045787715	0.101630422	0	0	0	0.48	0	0.55	0.167796987
22	2-5-24	21100	20.5	22648.2	0.045787715	0.101630422	0	0	0	0.64	0	0.73	0.166252219
23	2-5-24	21150	21.6	22648.2	0.045787715	0.101630422	0	0	0	0.84	0	0.96	0.163821282
24	2-5-24	21200	23.5	22648.2	0.045787715	0.101630422	0	0	0	1.09	0	1.23	0.162442659
25	2-5-24	21250	25.15	22648.2	0.045787715	0.101630422	0	0	0	1.42	0	1.59	0.16049446
26	2-5-24	21300	26.65	22648.2	0.045787715	0.101630422	0	0	0	1.83	0	2.01	0.158175085
27	2-5-24	21350	29.3	22648.2	0.045787715	0.101630422	0	0	0	2.34	0	2.52	0.157149173
28	2-5-24	21400	32.15	22648.2	0.045787715	0.101630422	0	0	0	2.98	0	3.12	0.156066348
29	2-5-24	21450	35.45	22648.2	0.045787715	0.101630422	0	0	0	3.77	0	3.89	0.155196968
30	2-5-24	21500	39.45	22648.2	0.045787715	0.101630422	0	0	0	4.73	0	4.87	0.154715772

31	2-5-24	21550	41.8	22648.2	0.045787715	0.101630422	0	0	0	5.91	0	6.07	0.152294934
32	2-5-24	21600	44.8	22648.2	0.045787715	0.101630422	0	0	0	7.34	0	7.54	0.150307775
33	2-5-24	21650	48.6	22648.2	0.045787715	0.101630422	0	0	0	9.05	0	9.31	0.148807983
34	2-5-24	21700	52.4	22648.2	0.045787715	0.101630422	0	0	0	11.1	0	11.44	0.147037933
35	2-5-24	21750	57.05	22648.2	0.045787715	0.101630422	0.01	0	0.02	13.54	0	13.91	0.145686204
36	2-5-24	21800	61.9	22648.2	0.045787715	0.101630422	0.02	0	0.04	16.42	6.79	16.78	0.144188194
37	2-5-24	21850	67.55	22648.2	0.045787715	0.101630422	0.04	0	0.06	19.79	16.31	20.2	0.142967294
38	2-5-24	21900	72.85	22648.2	0.045787715	0.101630422	0.08	0	0.1	23.73	25.82	24.18	0.141186591
39	2-5-24	21950	79.4	22648.2	0.045787715	0.101630422	0.16	0	0.17	28.3	35.34	28.86	0.13992008
40	2-5-24	22000	86.75	22648.2	0.045787715	0.101630422	0.29	0	0.33	33.57	44.86	34.18	0.138814179
41	2-5-24	22050	93.2	22648.2	0.045787715	0.101630422	0.51	0	0.57	39.61	54.37	40.22	0.136827708
42	2-5-24	22100	101.05	22648.2	0.045787715	0.101630422	0.88	0	0.97	46.5	63.89	47.11	0.135327107
43	2-5-24	22150	110.15	22648.2	0.045787715	0.101630422	1.48	0	1.54	54.31	73.41	54.95	0.134152098
44	2-5-24	22200	117.9	22648.2	0.045787715	0.101630422	2.41	0	2.48	63.12	82.92	63.82	0.131909176
45	2-5-24	22250	128.85	22648.2	0.045787715	0.101630422	3.83	0.54	3.94	72.99	92.44	73.74	0.130943153
46	2-5-24	22300	139.2	22648.2	0.045787715	0.101630422	5.93	6.71	6.11	84.01	101.96	84.87	0.129274419
47	2-5-24	22350	151.05	22648.2	0.045787715	0.101630422	8.96	12.89	9.15	96.25	111.47	97.11	0.127929895
48	2-5-24	22400	164.8	22648.2	0.045787715	0.101630422	13.18	19.06	13.44	109.76	120.99	110.63	0.127022959
49	2-5-24	22450	178.25	22648.2	0.045787715	0.101630422	18.94	25.23	19.22	124.61	130.5	125.52	0.125544589
50	2-5-24	22500	193.75	22648.2	0.045787715	0.101630422	26.58	31.41	26.89	140.85	140.02	141.83	0.124513381
51	2-5-24	22550	209.5	22648.2	0.045787715	0.101630422	36.46	37.58	36.83	158.54	149.54	159.55	0.123128451
52	2-5-24	22600	226.2	22648.2	0.045787715	0.101630422	48.94	43.76	49.34	177.7	159.05	178.75	0.121674107
53	2-5-24	22650	243.9	22648.2	0.045787715	0.101630422	64.33	50.75	64.78	198.37	169.45	199.48	0.120151366
54	2-5-24	22700	263.05	22648.2	0.045787715	0.101630422	82.89	79.62	83.37	220.57	203.45	221.72	0.118721694
55	2-5-24	22750	282.45	22648.2	0.045787715	0.101630422	104.79	108.49	105.31	244.32	237.44	245.46	0.116881938
56	2-5-24	22800	302.6	22648.2	0.045787715	0.101630422	130.12	137.36	130.69	269.61	271.43	270.82	0.11481835
57	2-5-24	22850	327	22648.2	0.045787715	0.101630422	158.84	166.23	159.43	296.45	305.43	297.7	0.113900644
58	2-5-24	22900	349.65	22648.2	0.045787715	0.101630422	190.85	195.1	191.5	324.81	339.42	326.05	0.111711973
59	2-5-24	22950	375.75	22648.2	0.045787715	0.101630422	225.94	223.97	226.69	354.68	373.41	355.96	0.110322342
60	2-5-24	23000	403.05	22648.2	0.045787715	0.101630422	263.82	252.85	264.67	386.02	407.41	387.36	0.108815554
61	2-5-24	23050	432.1	22648.2	0.045787715	0.101630422	304.17	281.72	305.03	418.79	441.4	420.2	0.107412125
62	2-5-24	23100	463.8	22648.2	0.045787715	0.101630422	346.64	328.09	347.45	452.94	475.39	454.46	0.106510761
63	2-5-24	23150	496.75	22648.2	0.045787715	0.101630422	390.88	377.82	391.66	488.41	509.39	490.03	0.10553281
64	2-5-24	23200	529.95	22648.2	0.045787715	0.101630422	436.55	427.55	437.28	525.16	543.38	526.85	0.103981496
65	2-5-24	23250	565.45	22648.2	0.045787715	0.101630422	483.35	477.29	484.05	563.12	577.37	564.94	0.102839353

66	2-5-24	23300	598.5	22648.2	0.045787715	0.101630422	531.02	527.02	531.74	602.21	611.37	604.1	0.099569217
67	2-5-24	23350	638.45	22648.2	0.045787715	0.101630422	579.33	576.75	580.03	642.38	645.36	644.31	0.09930232
68	2-5-24	23400	678.45	22648.2	0.045787715	0.101630422	628.11	626.48	628.79	683.54	679.35	685.43	0.098369707
69	2-5-24	23450	721.15	22648.2	0.045787715	0.101630422	677.22	676.21	677.9	725.63	713.35	727.46	0.098526533
70	2-5-24	23500	758.6	22648.2	0.045787715	0.101630422	726.55	725.95	727.21	768.58	747.34	770.36	0.093877993
71	2-5-24	23550	820.8	22648.2	0.045787715	0.101630422	776.04	775.68	776.68	812.32	781.33	814.05	0.108154959
72	2-5-24	23600	843.05	22648.2	0.045787715	0.101630422	825.62	825.41	826.24	856.78	825.41	858.49	0.087954714
73	2-5-24	23700	939	22648.2	0.045787715	0.101630422	924.94	924.88	925.54	947.59	924.88	949.22	0.091279573
74	2-5-24	23800	1074.25	22648.2	0.045787715	0.101630422	1024.36	1024.34	1024.97	1040.53	1024.34	1042.07	0.134712975
75	2-5-24	24000	1227.05	22648.2	0.045787715	0.101630422	1223.27	1223.27	1223.87	1231.11	1223.27	1232.67	0.090483347
76	2-5-24	24250	1450	22648.2	0.045787715	0.101630422	1471.93	1471.93	1472.53	1474.82	1471.93	1476.33	7.73855E-07
77	2-5-24	24300	1491.8	22648.2	0.045787715	0.101630422	1521.66	1521.66	1522.26	1524	1521.66	1525.49	2.83587E-07
78	2-5-24	24400	1627.65	22648.2	0.045787715	0.101630422	1621.13	1621.13	1621.73	1622.64	1621.13	1624.09	0.123757638
79	2-5-24	24500	1711.75	22648.2	0.045787715	0.101630422	1720.59	1720.59	1721.19	1721.55	1720.59	1722.95	2.63753E-07
80	3-5-24	20050	6	22475.85	0.10535178	0.10080132	0	0	0	0	0	0	0.201361038
81	3-5-24	20100	5.75	22475.85	0.10535178	0.10080132	0	0	0	0	0	0	0.196554148
82	3-5-24	20150	7.85	22475.85	0.10535178	0.10080132	0	0	0	0	0	0	0.20177168
83	3-5-24	20200	7.2	22475.85	0.10535178	0.10080132	0.01	0	0	0	0	0	0.195502528
84	3-5-24	20250	6.45	22475.85	0.10535178	0.10080132	0.01	0	0.01	0	0	0	0.188702644
85	3-5-24	20300	7.1	22475.85	0.10535178	0.10080132	0.01	0	0.02	0.01	0	0	0.187659188
86	3-5-24	20350	7.75	22475.85	0.10535178	0.10080132	0.02	0	0.03	0.01	0	0.01	0.186348636
87	3-5-24	20400	8.4	22475.85	0.10535178	0.10080132	0.03	0	0.05	0.01	0	0.02	0.184848568
88	3-5-24	20450	8.55	22475.85	0.10535178	0.10080132	0.04	0	0.07	0.02	0	0.03	0.181558403
89	3-5-24	20500	10.2	22475.85	0.10535178	0.10080132	0.05	0	0.09	0.03	0	0.05	0.182833783
90	3-5-24	20550	10.85	22475.85	0.10535178	0.10080132	0.08	0	0.11	0.04	0	0.07	0.180770959
91	3-5-24	20600	11.75	22475.85	0.10535178	0.10080132	0.1	0	0.13	0.06	0	0.09	0.179256425
92	3-5-24	20650	12.55	22475.85	0.10535178	0.10080132	0.14	0	0.18	0.08	0	0.11	0.17728669
93	3-5-24	20700	13.9	22475.85	0.10535178	0.10080132	0.19	0	0.23	0.11	0	0.14	0.17643544
94	3-5-24	20750	14.75	22475.85	0.10535178	0.10080132	0.26	0	0.29	0.16	0	0.19	0.174246026
95	3-5-24	20800	16.6	22475.85	0.10535178	0.10080132	0.35	0	0.39	0.21	0	0.24	0.173933924
96	3-5-24	20850	18.4	22475.85	0.10535178	0.10080132	0.47	0	0.53	0.29	0	0.32	0.173163028
97	3-5-24	20900	19.95	22475.85	0.10535178	0.10080132	0.62	0	0.71	0.39	0	0.44	0.171669347
98	3-5-24	20950	21.35	22475.85	0.10535178	0.10080132	0.81	0	0.93	0.53	0	0.6	0.169703391
99	3-5-24	21000	24.8	22475.85	0.10535178	0.10080132	1.06	0	1.2	0.7	0	0.81	0.170664826
100	3-5-24	21050	25.9	22475.85	0.10535178	0.10080132	1.37	0	1.54	0.93	0	1.06	0.167816447

101	3-5-24	21100	28.15	22475.85	0.10535178	0.10080132	1.77	0	1.95	1.22	0	1.37	0.166411398
102	3-5-24	21150	29.85	22475.85	0.10535178	0.10080132	2.26	0	2.45	1.59	0	1.76	0.164064658
103	3-5-24	21200	32.35	22475.85	0.10535178	0.10080132	2.88	0	3.02	2.06	0	2.24	0.162535768
104	3-5-24	21250	34.75	22475.85	0.10535178	0.10080132	3.63	0	3.76	2.65	0	2.79	0.160646096
105	3-5-24	21300	37.05	22475.85	0.10535178	0.10080132	4.56	0	4.69	3.38	0	3.5	0.158442534
106	3-5-24	21350	40.6	22475.85	0.10535178	0.10080132	5.69	0	5.84	4.28	0	4.41	0.157325718
107	3-5-24	21400	43.6	22475.85	0.10535178	0.10080132	7.06	0	7.26	5.4	0	5.54	0.155378192
108	3-5-24	21450	47.8	22475.85	0.10535178	0.10080132	8.71	0	8.96	6.76	0	6.95	0.154297366
109	3-5-24	21500	53.3	22475.85	0.10535178	0.10080132	10.68	0	11	8.41	0	8.65	0.154003703
110	3-5-24	21550	57.35	22475.85	0.10535178	0.10080132	13.02	0	13.4	10.4	0	10.71	0.152145747
111	3-5-24	21600	61.85	22475.85	0.10535178	0.10080132	15.78	3.23	16.15	12.77	0	13.14	0.150371387
112	3-5-24	21650	67.9	22475.85	0.10535178	0.10080132	19.02	12.91	19.42	15.6	5.52	15.95	0.149457653
113	3-5-24	21700	72.25	22475.85	0.10535178	0.10080132	22.8	22.59	23.24	18.93	15.06	19.33	0.147009673
114	3-5-24	21750	80.45	22475.85	0.10535178	0.10080132	27.19	32.27	27.72	22.85	24.6	23.28	0.146885143
115	3-5-24	21800	86.35	22475.85	0.10535178	0.10080132	32.25	41.95	32.85	27.41	34.14	27.95	0.144865729
116	3-5-24	21850	94.45	22475.85	0.10535178	0.10080132	38.06	51.62	38.68	32.69	43.68	33.28	0.14389117
117	3-5-24	21900	103.95	22475.85	0.10535178	0.10080132	44.68	61.3	45.29	38.78	53.23	39.37	0.143341445
118	3-5-24	21950	111.3	22475.85	0.10535178	0.10080132	52.19	70.98	52.8	45.75	62.77	46.34	0.141181079
119	3-5-24	22000	123	22475.85	0.10535178	0.10080132	60.66	80.66	61.35	53.68	72.31	54.31	0.141025563
120	3-5-24	22050	132.1	22475.85	0.10535178	0.10080132	70.18	90.34	70.9	62.65	81.85	63.34	0.139080162
121	3-5-24	22100	145.9	22475.85	0.10535178	0.10080132	80.8	100.01	81.62	72.74	91.4	73.48	0.139107317
122	3-5-24	22150	157.3	22475.85	0.10535178	0.10080132	92.6	109.69	93.49	84.03	100.94	84.87	0.13750781
123	3-5-24	22200	169.4	22475.85	0.10535178	0.10080132	105.64	119.37	106.5	96.59	110.48	97.42	0.135843411
124	3-5-24	22250	185.45	22475.85	0.10535178	0.10080132	119.99	129.05	120.89	110.5	120.02	111.35	0.135558663
125	3-5-24	22300	199.45	22475.85	0.10535178	0.10080132	135.69	138.73	136.66	125.8	129.56	126.7	0.133898097
126	3-5-24	22350	216.75	22475.85	0.10535178	0.10080132	152.81	148.4	153.82	142.56	139.11	143.52	0.133234669
127	3-5-24	22400	233.55	22475.85	0.10535178	0.10080132	171.38	158.08	172.43	160.83	148.65	161.83	0.131888141
128	3-5-24	22450	252.95	22475.85	0.10535178	0.10080132	191.43	167.76	192.51	180.64	158.19	181.67	0.131163972
129	3-5-24	22500	270	22475.85	0.10535178	0.10080132	212.99	189.28	214.14	202.03	179.56	203.14	0.128978741
130	3-5-24	22550	295.2	22475.85	0.10535178	0.10080132	236.07	223.49	237.21	225.01	213.59	226.1	0.12966619
131	3-5-24	22600	316.55	22475.85	0.10535178	0.10080132	260.69	257.69	261.87	249.59	247.62	250.73	0.128259673
132	3-5-24	22650	339.8	22475.85	0.10535178	0.10080132	286.84	291.9	288.09	275.77	281.65	276.97	0.127117066
133	3-5-24	22700	365.35	22475.85	0.10535178	0.10080132	314.5	326.1	315.75	303.54	315.68	304.73	0.126394879
134	3-5-24	22750	396.45	22475.85	0.10535178	0.10080132	343.67	360.3	344.95	332.88	349.71	334.1	0.127449597
135	3-5-24	22800	417.15	22475.85	0.10535178	0.10080132	374.31	394.51	375.63	363.74	383.74	365.02	0.12361422



136	3-5-24	22850	453	22475.85	0.10535178	0.10080132	406.39	428.71	407.77	396.11	417.77	397.45	0.125646595
137	3-5-24	22900	479.3	22475.85	0.10535178	0.10080132	439.86	462.91	441.33	429.92	451.8	431.35	0.123024045
138	3-5-24	22950	514.7	22475.85	0.10535178	0.10080132	474.67	497.12	476.27	465.11	485.83	466.67	0.123853182
139	3-5-24	23000	542.1	22475.85	0.10535178	0.10080132	510.77	531.32	512.44	501.64	519.86	503.26	0.120444236
140	3-5-24	23050	582.4	22475.85	0.10535178	0.10080132	548.1	565.52	549.86	539.42	553.89	541.16	0.122532807
141	3-5-24	23100	614.95	22475.85	0.10535178	0.10080132	586.6	599.73	588.48	578.4	587.93	580.22	0.120312113
142	3-5-24	23150	647.5	22475.85	0.10535178	0.10080132	626.19	633.93	628.11	618.49	621.96	620.36	0.117299611
143	3-5-24	23200	696.15	22475.85	0.10535178	0.10080132	666.8	668.14	668.74	659.62	655.99	661.45	0.122511423
144	3-5-24	23250	735.85	22475.85	0.10535178	0.10080132	708.38	702.34	710.27	701.71	690.02	703.48	0.122430747
145	3-5-24	23300	769.5	22475.85	0.10535178	0.10080132	750.85	736.54	752.68	744.7	724.05	746.41	0.117973882
146	3-5-24	23350	849.1	22475.85	0.10535178	0.10080132	794.14	770.75	795.9	788.49	758.08	790.16	0.141522358
147	3-5-24	23400	870.35	22475.85	0.10535178	0.10080132	838.18	804.95	839.92	833.03	803.3	834.68	0.129204641
148	3-5-24	23450	907.7	22475.85	0.10535178	0.10080132	882.9	853.04	884.62	878.23	853.04	879.83	0.125578806
149	3-5-24	23500	940.2	22475.85	0.10535178	0.10080132	928.25	902.78	929.92	924.03	902.78	925.6	0.116614702
150	3-5-24	23600	1042.3	22475.85	0.10535178	0.10080132	1020.58	1002.26	1022.16	1017.2	1002.26	1018.68	0.127870547
151	3-5-24	23700	1122.35	22475.85	0.10535178	0.10080132	1114.71	1101.75	1116.25	1112.07	1101.75	1113.58	0.116161318
152	3-5-24	23800	1149.4	22475.85	0.10535178	0.10080132	1210.27	1201.23	1211.86	1208.24	1201.23	1209.74	1.54342E-07
153	3-5-24	23900	1322.45	22475.85	0.10535178	0.10080132	1306.91	1300.71	1308.46	1305.39	1300.71	1306.82	0.133213222
154	3-5-24	23950	1063.95	22475.85	0.10535178	0.10080132	1355.56	1350.46	1357.05	1354.25	1350.46	1355.69	4.45629E-07
155	3-5-24	24000	1422.15	22475.85	0.10535178	0.10080132	1404.38	1400.2	1405.88	1403.26	1400.2	1404.71	0.141151588
156	3-5-24	24200	1650.5	22475.85	0.10535178	0.10080132	1600.98	1599.16	1602.47	1600.41	1599.16	1601.8	0.190027065
157	3-5-24	24300	1720	22475.85	0.10535178	0.10080132	1699.82	1698.65	1701.24	1699.43	1698.65	1700.77	0.162532128
158	3-5-24	24400	1611.95	22475.85	0.10535178	0.10080132	1798.87	1798.13	1800.27	1798.61	1798.13	1799.92	4.22016E-08
159	3-5-24	24500	1919.4	22475.85	0.10535178	0.10080132	1898.08	1897.61	1899.45	1897.9	1897.61	1899.19	0.177572831
160	6-5-24	20050	5.95	22442.7	0.067576841	0.101336854	0	0	0	0	0	0	0.210211978
161	6-5-24	20100	6.2	22442.7	0.067576841	0.101336854	0	0	0	0	0	0	0.207538385
162	6-5-24	20150	6.15	22442.7	0.067576841	0.101336854	0	0	0	0	0	0	0.203393357
163	6-5-24	20200	7.4	22442.7	0.067576841	0.101336854	0	0	0	0	0	0	0.204958289
164	6-5-24	20250	7.6	22442.7	0.067576841	0.101336854	0	0	0	0	0	0	0.201764762
165	6-5-24	20300	7.5	22442.7	0.067576841	0.101336854	0	0	0	0	0	0	0.197381007
166	6-5-24	20350	8.55	22442.7	0.067576841	0.101336854	0	0	0	0.01	0	0	0.197327491
167	6-5-24	20400	9.05	22442.7	0.067576841	0.101336854	0	0	0	0.01	0	0	0.195019423
168	6-5-24	20450	10.45	22442.7	0.067576841	0.101336854	0	0	0	0.01	0	0.01	0.195415148
169	6-5-24	20500	10.95	22442.7	0.067576841	0.101336854	0	0	0	0.02	0	0.03	0.192757028
170	6-5-24	20550	10.75	22442.7	0.067576841	0.101336854	0	0	0	0.02	0	0.04	0.18799449

171	6-5-24	20600	12.5	22442.7	0.067576841	0.101336854	0	0	0	0.04	0	0.06	0.188610509
172	6-5-24	20650	14.25	22442.7	0.067576841	0.101336854	0	0	0	0.05	0	0.08	0.188674408
173	6-5-24	20700	15.15	22442.7	0.067576841	0.101336854	0	0	0	0.07	0	0.1	0.186420478
174	6-5-24	20750	16.3	22442.7	0.067576841	0.101336854	0	0	0	0.11	0	0.13	0.184545159
175	6-5-24	20800	18.1	22442.7	0.067576841	0.101336854	0	0	0	0.15	0	0.18	0.183792742
176	6-5-24	20850	20.35	22442.7	0.067576841	0.101336854	0	0	0	0.21	0	0.23	0.183502597
177	6-5-24	20900	21.8	22442.7	0.067576841	0.101336854	0	0	0	0.29	0	0.31	0.181470986
178	6-5-24	20950	23.25	22442.7	0.067576841	0.101336854	0	0	0	0.39	0	0.44	0.179268042
179	6-5-24	21000	27.45	22442.7	0.067576841	0.101336854	0	0	0	0.53	0	0.61	0.180992424
180	6-5-24	21050	28.55	22442.7	0.067576841	0.101336854	0	0	0	0.72	0	0.82	0.177777638
181	6-5-24	21100	31.05	22442.7	0.067576841	0.101336854	0.01	0	0	0.96	0	1.09	0.176321032
182	6-5-24	21150	32.7	22442.7	0.067576841	0.101336854	0.01	0	0.01	1.28	0	1.43	0.173538636
183	6-5-24	21200	36.2	22442.7	0.067576841	0.101336854	0.02	0	0.03	1.69	0	1.85	0.172818396
184	6-5-24	21250	40.1	22442.7	0.067576841	0.101336854	0.03	0	0.05	2.21	0	2.37	0.172176032
185	6-5-24	21300	43.05	22442.7	0.067576841	0.101336854	0.05	0	0.07	2.86	0	2.99	0.170170263
186	6-5-24	21350	45.75	22442.7	0.067576841	0.101336854	0.09	0	0.1	3.69	0	3.8	0.167683344
187	6-5-24	21400	48.6	22442.7	0.067576841	0.101336854	0.14	0	0.16	4.72	0	4.85	0.165135818
188	6-5-24	21450	52.8	22442.7	0.067576841	0.101336854	0.22	0	0.24	6	0	6.16	0.1636181
189	6-5-24	21500	59.55	22442.7	0.067576841	0.101336854	0.35	0	0.4	7.56	0	7.78	0.163965784
190	6-5-24	21550	63.45	22442.7	0.067576841	0.101336854	0.54	0	0.62	9.47	0	9.76	0.161521227
191	6-5-24	21600	69.4	22442.7	0.067576841	0.101336854	0.83	0	0.93	11.78	0	12.13	0.160416252
192	6-5-24	21650	75.25	22442.7	0.067576841	0.101336854	1.24	0	1.35	14.55	3.32	14.89	0.158869038
193	6-5-24	21700	80.95	22442.7	0.067576841	0.101336854	1.82	0	1.91	17.86	13.04	18.23	0.156894739
194	6-5-24	21750	88.2	22442.7	0.067576841	0.101336854	2.65	0	2.72	21.77	22.76	22.18	0.155643012
195	6-5-24	21800	95.65	22442.7	0.067576841	0.101336854	3.78	0	3.89	26.37	32.47	26.89	0.154144667
196	6-5-24	21850	104.65	22442.7	0.067576841	0.101336854	5.33	0	5.48	31.74	42.19	32.3	0.153230052
197	6-5-24	21900	114.8	22442.7	0.067576841	0.101336854	7.39	0.1	7.62	37.97	51.91	38.52	0.152567399
198	6-5-24	21950	122.4	22442.7	0.067576841	0.101336854	10.1	8.43	10.33	45.14	61.63	45.7	0.150028612
199	6-5-24	22000	133.55	22442.7	0.067576841	0.101336854	13.62	16.75	13.88	53.35	71.35	53.97	0.149098972
200	6-5-24	22050	133.45	22442.7	0.067576841	0.101336854	18.1	25.08	18.45	62.69	81.07	63.34	0.141797536
201	6-5-24	22100	157.9	22442.7	0.067576841	0.101336854	23.74	33.41	24.12	73.24	90.79	73.98	0.146976168
202	6-5-24	22150	169.7	22442.7	0.067576841	0.101336854	30.72	41.74	31.1	85.08	100.51	85.89	0.145066475
203	6-5-24	22200	183.5	22442.7	0.067576841	0.101336854	39.25	50.06	39.68	98.31	110.23	99.1	0.14370355
204	6-5-24	22250	197.1	22442.7	0.067576841	0.101336854	49.52	58.39	50.03	112.99	119.95	113.82	0.141794465
205	6-5-24	22300	213.8	22442.7	0.067576841	0.101336854	61.73	66.72	62.26	129.18	129.66	130.08	0.140856776

206	6-5-24	22350	228.75	22442.7	0.067576841	0.101336854	76.05	75.05	76.62	146.95	139.38	147.88	0.138633567
207	6-5-24	22400	247.55	22442.7	0.067576841	0.101336854	92.64	83.37	93.25	166.34	149.1	167.31	0.13765477
208	6-5-24	22450	267.05	22442.7	0.067576841	0.101336854	111.61	95.22	112.26	187.39	162.41	188.43	0.136462286
209	6-5-24	22500	286.65	22442.7	0.067576841	0.101336854	133.06	127.6	133.77	210.12	196.67	211.16	0.134784816
210	6-5-24	22550	307.65	22442.7	0.067576841	0.101336854	157.04	159.99	157.76	234.55	230.94	235.62	0.133180173
211	6-5-24	22600	333.8	22442.7	0.067576841	0.101336854	183.55	192.38	184.32	260.66	265.21	261.8	0.133260374
212	6-5-24	22650	354.8	22442.7	0.067576841	0.101336854	212.57	224.77	213.36	288.46	299.48	289.58	0.130521282
213	6-5-24	22700	381.6	22442.7	0.067576841	0.101336854	244.03	257.16	244.86	317.91	333.75	319.08	0.129737324
214	6-5-24	22750	407.95	22442.7	0.067576841	0.101336854	277.81	289.55	278.75	348.98	368.01	350.21	0.128148796
215	6-5-24	22800	436.55	22442.7	0.067576841	0.101336854	313.77	321.94	314.8	381.63	402.28	382.92	0.126956763
216	6-5-24	22850	463.4	22442.7	0.067576841	0.101336854	351.77	354.33	352.91	415.79	436.55	417.2	0.124287108
217	6-5-24	22900	499.5	22442.7	0.067576841	0.101336854	391.61	386.72	392.8	451.41	470.82	452.9	0.125365276
218	6-5-24	22950	528.25	22442.7	0.067576841	0.101336854	433.11	419.11	434.25	488.41	505.09	489.97	0.122207787
219	6-5-24	23000	560.9	22442.7	0.067576841	0.101336854	476.08	451.68	477.15	526.72	539.35	528.42	0.12022159
220	6-5-24	23050	590.2	22442.7	0.067576841	0.101336854	520.32	501.45	521.37	566.25	573.62	567.99	0.115504804
221	6-5-24	23100	630.35	22442.7	0.067576841	0.101336854	565.65	551.22	566.66	606.92	607.89	608.67	0.116082115
222	6-5-24	23150	670.65	22442.7	0.067576841	0.101336854	611.9	600.99	612.86	648.65	642.16	650.35	0.116177999
223	6-5-24	23200	705.9	22442.7	0.067576841	0.101336854	658.91	650.76	659.85	691.35	676.43	693	0.11212398
224	6-5-24	23250	751.05	22442.7	0.067576841	0.101336854	706.55	700.53	707.52	734.94	710.7	736.52	0.114183861
225	6-5-24	23300	790.4	22442.7	0.067576841	0.101336854	754.7	750.3	755.66	779.33	750.3	780.9	0.111167717
226	6-5-24	23350	840	22442.7	0.067576841	0.101336854	803.24	800.07	804.17	824.45	800.07	825.98	0.116027749
227	6-5-24	23400	862	22442.7	0.067576841	0.101336854	852.11	849.84	853.02	870.21	849.84	871.7	0.090296539
228	6-5-24	23450	899.95	22442.7	0.067576841	0.101336854	901.21	899.61	902.13	916.55	899.61	917.99	0.056565022
229	6-5-24	23500	961.95	22442.7	0.067576841	0.101336854	950.49	949.38	951.4	963.4	949.38	964.8	0.099054628
230	6-5-24	23550	975.85	22442.7	0.067576841	0.101336854	999.92	999.15	1000.8	1010.7	999.15	1012.1	8.77206E-08
231	6-5-24	23600	1045.7	22442.7	0.067576841	0.101336854	1049.44	1048.92	1050.31	1058.39	1048.92	1059.83	7.52229E-07
232	6-5-24	23650	1108.35	22442.7	0.067576841	0.101336854	1099.04	1098.7	1099.89	1106.41	1098.7	1107.85	0.105505112
233	6-5-24	23700	1188.35	22442.7	0.067576841	0.101336854	1148.7	1148.47	1149.53	1154.73	1148.47	1156.15	0.149390482
234	6-5-24	23750	1163.2	22442.7	0.067576841	0.101336854	1198.39	1198.24	1199.21	1203.29	1198.24	1204.68	8.52646E-08
235	6-5-24	23800	1237.15	22442.7	0.067576841	0.101336854	1248.1	1248.01	1248.91	1252.07	1248.01	1253.43	2.21469E-07
236	6-5-24	23850	1301.8	22442.7	0.067576841	0.101336854	1297.84	1297.78	1298.65	1301.03	1297.78	1302.39	0.104494704
237	6-5-24	23900	1352.75	22442.7	0.067576841	0.101336854	1347.59	1347.55	1348.4	1350.13	1347.55	1351.51	0.112043761
238	6-5-24	23950	1396.5	22442.7	0.067576841	0.101336854	1397.34	1397.32	1398.16	1399.37	1397.32	1400.73	1.47725E-07
239	6-5-24	24000	1447	22442.7	0.067576841	0.101336854	1447.1	1447.09	1447.92	1448.7	1447.09	1450.05	2.46331E-07
240	6-5-24	24050	1494.35	22442.7	0.067576841	0.101336854	1496.87	1496.86	1497.68	1498.12	1496.86	1499.44	2.71515E-07

241	6-5-24	24100	1544.25	22442.7	0.067576841	0.101336854	1546.63	1546.63	1547.44	1547.62	1546.63	1548.9	2.48382E-07
242	6-5-24	24150	1587.55	22442.7	0.067576841	0.101336854	1596.4	1596.4	1597.21	1597.17	1596.4	1598.44	4.73988E-07
243	6-5-24	24200	1632.65	22442.7	0.067576841	0.101336854	1646.17	1646.17	1646.98	1646.76	1646.17	1648.02	2.00402E-07
244	6-5-24	24250	1679.7	22442.7	0.067576841	0.101336854	1695.94	1695.94	1696.75	1696.4	1695.94	1697.64	2.4772E-07
245	6-5-24	24300	1739	22442.7	0.067576841	0.101336854	1745.71	1745.71	1746.52	1746.06	1745.71	1747.29	4.94602E-07
246	6-5-24	24350	1778.2	22442.7	0.067576841	0.101336854	1795.48	1795.48	1796.29	1795.75	1795.48	1796.96	7.79456E-08
247	6-5-24	24400	1830.9	22442.7	0.067576841	0.101336854	1845.25	1845.25	1846.06	1845.45	1845.25	1846.66	3.9688E-07
248	6-5-24	24450	1879.45	22442.7	0.067576841	0.101336854	1895.02	1895.02	1895.83	1895.17	1895.02	1896.37	3.32597E-08
249	6-5-24	24500	1935.55	22442.7	0.067576841	0.101336854	1944.79	1944.79	1945.6	1944.91	1944.79	1946.11	1.61184E-07
250	7-5-24	20050	6.2	22302.5	0.052405764	0.100580415	0	0	0	0	0	0	0.205819725
251	7-5-24	20100	6.2	22302.5	0.052405764	0.100580415	0	0	0	0	0	0	0.20183053
252	7-5-24	20150	6.65	22302.5	0.052405764	0.100580415	0	0	0	0	0	0	0.199825685
253	7-5-24	20200	7.5	22302.5	0.052405764	0.100580415	0	0	0	0	0	0	0.199311424
254	7-5-24	20250	7.35	22302.5	0.052405764	0.100580415	0	0	0	0	0	0	0.194651767
255	7-5-24	20300	8.2	22302.5	0.052405764	0.100580415	0	0	0	0.01	0	0	0.193784121
256	7-5-24	20350	9.7	22302.5	0.052405764	0.100580415	0	0	0	0.01	0	0.01	0.194735117
257	7-5-24	20400	9.7	22302.5	0.052405764	0.100580415	0	0	0	0.01	0	0.02	0.190521934
258	7-5-24	20500	11.9	22302.5	0.052405764	0.100580415	0	0	0	0.03	0	0.05	0.188434708
259	7-5-24	20550	12.5	22302.5	0.052405764	0.100580415	0	0	0	0.04	0	0.07	0.185679169
260	7-5-24	20600	13.3	22302.5	0.052405764	0.100580415	0	0	0	0.06	0	0.09	0.183313412
261	7-5-24	20650	15.6	22302.5	0.052405764	0.100580415	0	0	0	0.09	0	0.12	0.18418285
262	7-5-24	20700	16.8	22302.5	0.052405764	0.100580415	0	0	0	0.13	0	0.16	0.182214697
263	7-5-24	20750	17.85	22302.5	0.052405764	0.100580415	0	0	0	0.18	0	0.21	0.179758538
264	7-5-24	20800	19.8	22302.5	0.052405764	0.100580415	0	0	0	0.26	0	0.28	0.17880949
265	7-5-24	20850	22.15	22302.5	0.052405764	0.100580415	0	0	0	0.36	0	0.4	0.178199021
266	7-5-24	20900	24.7	22302.5	0.052405764	0.100580415	0	0	0	0.49	0	0.57	0.177517813
267	7-5-24	20950	26.85	22302.5	0.052405764	0.100580415	0	0	0	0.67	0	0.77	0.175887969
268	7-5-24	21000	30.85	22302.5	0.052405764	0.100580415	0	0	0	0.91	0	1.03	0.176504558
269	7-5-24	21050	31.45	22302.5	0.052405764	0.100580415	0	0	0	1.22	0	1.37	0.172250003
270	7-5-24	21100	35.1	22302.5	0.052405764	0.100580415	0	0	0	1.63	0	1.79	0.171706867
271	7-5-24	21150	37.8	22302.5	0.052405764	0.100580415	0	0	0	2.15	0	2.3	0.169671896
272	7-5-24	21200	41.25	22302.5	0.052405764	0.100580415	0	0	0	2.81	0	2.93	0.168204829
273	7-5-24	21250	45.05	22302.5	0.052405764	0.100580415	0	0	0	3.65	0	3.76	0.166790102
274	7-5-24	21300	47.8	22302.5	0.052405764	0.100580415	0	0	0	4.71	0	4.84	0.164028249
275	7-5-24	21350	52.3	22302.5	0.052405764	0.100580415	0.01	0	0.01	6.02	0	6.19	0.162688555

276	7-5-24	21400	56.55	22302.5	0.052405764	0.100580415	0.02	0	0.03	7.65	0	7.86	0.160774564
277	7-5-24	21450	63.35	22302.5	0.052405764	0.100580415	0.04	0	0.05	9.63	0	9.93	0.160668817
278	7-5-24	21500	70.2	22302.5	0.052405764	0.100580415	0.07	0	0.09	12.05	0	12.39	0.160102862
279	7-5-24	21550	76.2	22302.5	0.052405764	0.100580415	0.13	0	0.15	14.97	5.81	15.29	0.158477955
280	7-5-24	21600	82.9	22302.5	0.052405764	0.100580415	0.24	0	0.28	18.46	15.56	18.82	0.156982519
281	7-5-24	21650	89.6	22302.5	0.052405764	0.100580415	0.43	0	0.49	22.6	25.32	23.03	0.155120012
282	7-5-24	21700	98.15	22302.5	0.052405764	0.100580415	0.75	0	0.83	27.49	35.07	28.01	0.154090277
283	7-5-24	21750	107.55	22302.5	0.052405764	0.100580415	1.25	0	1.33	33.21	44.82	33.76	0.153151705
284	7-5-24	21800	118.2	22302.5	0.052405764	0.100580415	2.05	0	2.11	39.86	54.58	40.4	0.152504734
285	7-5-24	21850	129.2	22302.5	0.052405764	0.100580415	3.26	0	3.35	47.53	64.33	48.09	0.15157577
286	7-5-24	21900	140.25	22302.5	0.052405764	0.100580415	5.06	1.26	5.21	56.32	74.08	56.95	0.150212067
287	7-5-24	21950	152.15	22302.5	0.052405764	0.100580415	7.65	8.58	7.82	66.33	83.84	67.01	0.148865172
288	7-5-24	22000	164.8	22302.5	0.052405764	0.100580415	11.3	15.91	11.52	77.64	93.59	78.42	0.14744005
289	7-5-24	22050	178.85	22302.5	0.052405764	0.100580415	16.3	23.24	16.59	90.36	103.34	91.11	0.146258981
290	7-5-24	22100	195.05	22302.5	0.052405764	0.100580415	22.98	30.57	23.27	104.54	113.09	105.34	0.145628924
291	7-5-24	22150	212.7	22302.5	0.052405764	0.100580415	31.69	37.89	32.03	120.28	122.85	121.14	0.145169169
292	7-5-24	22200	228.9	22302.5	0.052405764	0.100580415	42.77	45.22	43.18	137.64	132.6	138.53	0.143505426
293	7-5-24	22250	247.1	22302.5	0.052405764	0.100580415	56.54	52.55	56.97	156.66	142.35	157.59	0.142260215
294	7-5-24	22300	266.45	22302.5	0.052405764	0.100580415	73.29	59.87	73.77	177.39	152.11	178.39	0.141007605
295	7-5-24	22350	287.95	22302.5	0.052405764	0.100580415	93.24	89.57	93.76	199.86	185.19	200.87	0.140183972
296	7-5-24	22400	310.65	22302.5	0.052405764	0.100580415	116.5	120.43	117.04	224.09	219.51	225.12	0.139344195
297	7-5-24	22450	336.15	22302.5	0.052405764	0.100580415	143.13	151.3	143.71	250.07	253.82	251.16	0.139187183
298	7-5-24	22500	359.6	22302.5	0.052405764	0.100580415	173.06	182.17	173.67	277.79	288.14	278.87	0.137543989
299	7-5-24	22550	387.85	22302.5	0.052405764	0.100580415	206.15	213.04	206.84	307.23	322.45	308.36	0.137482982
300	7-5-24	22600	416.55	22302.5	0.052405764	0.100580415	242.17	243.91	242.95	338.34	356.77	339.53	0.137051228
301	7-5-24	22650	450	22302.5	0.052405764	0.100580415	280.84	274.78	281.72	371.09	391.09	372.34	0.138254872
302	7-5-24	22700	478.5	22302.5	0.052405764	0.100580415	321.84	305.65	322.71	405.4	425.4	406.77	0.136567484
303	7-5-24	22750	513.2	22302.5	0.052405764	0.100580415	364.83	347.37	365.64	441.21	459.72	442.66	0.137263704
304	7-5-24	22800	542.95	22302.5	0.052405764	0.100580415	409.47	397.15	410.26	478.44	494.03	479.98	0.134915116
305	7-5-24	22850	578.25	22302.5	0.052405764	0.100580415	455.45	446.93	456.19	517.01	528.35	518.67	0.134741544
306	7-5-24	22900	614.55	22302.5	0.052405764	0.100580415	502.48	496.71	503.2	556.84	562.66	558.53	0.134516372
307	7-5-24	22950	644.85	22302.5	0.052405764	0.100580415	550.32	546.49	551.05	597.82	596.98	599.49	0.130216862
308	7-5-24	23000	690	22302.5	0.052405764	0.100580415	598.76	596.27	599.46	639.87	631.29	641.49	0.133890951
309	7-5-24	23050	730.9	22302.5	0.052405764	0.100580415	647.63	646.05	648.33	682.9	665.61	684.47	0.134637618
310	7-5-24	23100	768.8	22302.5	0.052405764	0.100580415	696.81	695.83	697.51	726.82	699.92	728.35	0.13287069

311	7-5-24	23150	814.55	22302.5	0.052405764	0.100580415	746.21	745.61	746.88	771.53	745.61	773.04	0.135868864
312	7-5-24	23200	855.6	22302.5	0.052405764	0.100580415	795.75	795.39	796.4	816.97	795.39	818.43	0.135139548
313	7-5-24	23250	882.05	22302.5	0.052405764	0.100580415	845.38	845.17	846.02	863.04	845.17	864.45	0.121070818
314	7-5-24	23300	949.5	22302.5	0.052405764	0.100580415	895.07	894.95	895.69	909.67	894.95	911.04	0.141457473
315	7-5-24	23350	1027.15	22302.5	0.052405764	0.100580415	944.8	944.73	945.41	956.79	944.73	958.14	0.167945718
316	7-5-24	23400	1037.7	22302.5	0.052405764	0.100580415	994.55	994.51	995.17	1004.34	994.51	1005.72	0.141815708
317	7-5-24	23450	1064.65	22302.5	0.052405764	0.100580415	1044.31	1044.29	1044.93	1052.26	1044.29	1053.66	0.12147089
318	7-5-24	23500	1132.6	22302.5	0.052405764	0.100580415	1094.08	1094.07	1094.7	1100.5	1094.07	1101.88	0.146980557
319	7-5-24	23550	1182.2	22302.5	0.052405764	0.100580415	1143.86	1143.85	1144.47	1149.01	1143.85	1150.36	0.151524364
320	7-5-24	23600	1123.45	22302.5	0.052405764	0.100580415	1193.63	1193.63	1194.24	1197.75	1193.63	1199.05	1.23038E-07
321	7-5-24	23700	1327.75	22302.5	0.052405764	0.100580415	1293.19	1293.19	1293.8	1295.77	1293.19	1297.1	0.161191082
322	7-5-24	23800	1400.95	22302.5	0.052405764	0.100580415	1392.75	1392.75	1393.36	1394.33	1392.75	1395.63	0.127274536
323	7-5-24	23900	1499.2	22302.5	0.052405764	0.100580415	1492.31	1492.31	1492.92	1493.26	1492.31	1494.5	0.130745945
324	7-5-24	24000	1615.05	22302.5	0.052405764	0.100580415	1591.87	1591.87	1592.48	1592.43	1591.87	1593.65	0.171753015
325	7-5-24	24350	1966.8	22302.5	0.052405764	0.100580415	1940.33	1940.33	1940.94	1940.4	1940.33	1941.57	0.205035654
326	7-5-24	24400	2016.05	22302.5	0.052405764	0.100580415	1990.11	1990.11	1990.72	1990.16	1990.11	1991.33	0.208117044
327	7-5-24	24450	2065.6	22302.5	0.052405764	0.100580415	2039.89	2039.89	2040.5	2039.93	2039.89	2041.1	0.211662841
328	7-5-24	24500	2111.15	22302.5	0.052405764	0.100580415	2089.67	2089.67	2090.28	2089.7	2089.67	2090.86	0.20807124
329	8-5-24	20050	6	22302.5	0.068231321	0.100715251	0	0	0	0	0	0	0.209144641
330	8-5-24	20100	5.55	22302.5	0.068231321	0.100715251	0	0	0	0	0	0	0.202837039
331	8-5-24	20150	5.95	22302.5	0.068231321	0.100715251	0	0	0	0	0	0	0.20076264
332	8-5-24	20200	7.05	22302.5	0.068231321	0.100715251	0	0	0	0	0	0	0.201585359
333	8-5-24	20250	6.9	22302.5	0.068231321	0.100715251	0	0	0	0	0	0	0.19681648
334	8-5-24	20300	7.3	22302.5	0.068231321	0.100715251	0	0	0	0	0	0	0.194327046
335	8-5-24	20400	8.25	22302.5	0.068231321	0.100715251	0	0	0	0.01	0	0.01	0.18951394
336	8-5-24	20500	9.95	22302.5	0.068231321	0.100715251	0	0	0	0.02	0	0.04	0.186597913
337	8-5-24	20550	10.9	22302.5	0.068231321	0.100715251	0	0	0	0.03	0	0.06	0.185082164
338	8-5-24	20600	11.8	22302.5	0.068231321	0.100715251	0	0	0	0.05	0	0.08	0.183179969
339	8-5-24	20650	13.15	22302.5	0.068231321	0.100715251	0	0	0	0.07	0	0.1	0.182194184
340	8-5-24	20700	13.9	22302.5	0.068231321	0.100715251	0	0	0	0.1	0	0.13	0.179484509
341	8-5-24	20750	14.95	22302.5	0.068231321	0.100715251	0	0	0	0.15	0	0.18	0.17730901
342	8-5-24	20800	16.15	22302.5	0.068231321	0.100715251	0	0	0	0.21	0	0.23	0.175274259
343	8-5-24	20850	17.4	22302.5	0.068231321	0.100715251	0	0	0	0.29	0	0.32	0.173137406
344	8-5-24	20900	19.2	22302.5	0.068231321	0.100715251	0	0	0	0.41	0	0.47	0.171784719
345	8-5-24	20950	21.6	22302.5	0.068231321	0.100715251	0	0	0	0.56	0	0.65	0.171149662

346	8-5-24	21000	24.35	22302.5	0.068231321	0.100715251	0.01	0	0	0.77	0	0.88	0.170653769
347	8-5-24	21050	25.35	22302.5	0.068231321	0.100715251	0.01	0	0.01	1.04	0	1.17	0.167167266
348	8-5-24	21100	27.5	22302.5	0.068231321	0.100715251	0.02	0	0.03	1.4	0	1.55	0.165207209
349	8-5-24	21150	29.6	22302.5	0.068231321	0.100715251	0.03	0	0.05	1.87	0	2.03	0.162907538
350	8-5-24	21200	32.75	22302.5	0.068231321	0.100715251	0.05	0	0.07	2.47	0	2.59	0.161685175
351	8-5-24	21250	35.7	22302.5	0.068231321	0.100715251	0.08	0	0.1	3.24	0	3.34	0.159883332
352	8-5-24	21300	39.65	22302.5	0.068231321	0.100715251	0.14	0	0.16	4.2	0	4.32	0.158848149
353	8-5-24	21350	43.5	22302.5	0.068231321	0.100715251	0.23	0	0.25	5.42	0	5.57	0.157320704
354	8-5-24	21400	47.9	22302.5	0.068231321	0.100715251	0.37	0	0.42	6.93	0	7.13	0.155975543
355	8-5-24	21450	52.55	22302.5	0.068231321	0.100715251	0.57	0	0.65	8.8	0	9.06	0.154466071
356	8-5-24	21500	59.5	22302.5	0.068231321	0.100715251	0.88	0	0.99	11.08	0	11.41	0.15452856
357	8-5-24	21550	64.2	22302.5	0.068231321	0.100715251	1.34	0	1.45	13.85	2.73	14.16	0.152264578
358	8-5-24	21600	70.25	22302.5	0.068231321	0.100715251	1.99	0	2.07	17.18	12.54	17.54	0.15070941
359	8-5-24	21650	77.4	22302.5	0.068231321	0.100715251	2.92	0	3	21.16	22.36	21.56	0.149545629
360	8-5-24	21700	84.75	22302.5	0.068231321	0.100715251	4.21	0	4.32	25.88	32.17	26.38	0.148082941
361	8-5-24	21750	93.1	22302.5	0.068231321	0.100715251	5.96	0	6.14	31.43	41.99	31.96	0.146846343
362	8-5-24	21800	102.55	22302.5	0.068231321	0.100715251	8.32	3.35	8.55	37.91	51.8	38.43	0.145836454
363	8-5-24	21850	112.1	22302.5	0.068231321	0.100715251	11.43	11.87	11.67	45.41	61.62	45.94	0.144402443
364	8-5-24	21900	124.3	22302.5	0.068231321	0.100715251	15.47	20.4	15.77	54.05	71.43	54.65	0.14401319
365	8-5-24	21950	135.55	22302.5	0.068231321	0.100715251	20.62	28.93	20.99	63.91	81.25	64.56	0.142559581
366	8-5-24	22000	149	22302.5	0.068231321	0.100715251	27.1	37.45	27.47	75.1	91.06	75.85	0.141790875
367	8-5-24	22050	161.75	22302.5	0.068231321	0.100715251	35.12	45.98	35.53	87.71	100.87	88.45	0.140124651
368	8-5-24	22100	177.25	22302.5	0.068231321	0.100715251	44.9	54.51	45.36	101.82	110.69	102.59	0.13933091
369	8-5-24	22150	194.35	22302.5	0.068231321	0.100715251	56.63	63.03	57.15	117.51	120.5	118.35	0.138764687
370	8-5-24	22200	211.7	22302.5	0.068231321	0.100715251	70.53	71.56	71.07	134.85	130.32	135.73	0.137741508
371	8-5-24	22250	229.5	22302.5	0.068231321	0.100715251	86.76	80.08	87.35	153.89	140.13	154.81	0.136362274
372	8-5-24	22300	250.35	22302.5	0.068231321	0.100715251	105.47	88.61	106.09	174.68	149.95	175.66	0.135829216
373	8-5-24	22350	271.4	22302.5	0.068231321	0.100715251	126.74	120.08	127.43	197.25	183.11	198.24	0.134791003
374	8-5-24	22400	294.2	22302.5	0.068231321	0.100715251	150.65	152.77	151.35	221.61	217.51	222.62	0.1339463
375	8-5-24	22450	318.05	22302.5	0.068231321	0.100715251	177.2	185.45	177.94	247.76	251.91	248.84	0.132971226
376	8-5-24	22500	342.85	22302.5	0.068231321	0.100715251	206.36	218.13	207.12	275.69	286.3	276.75	0.131803451
377	8-5-24	22550	370.05	22302.5	0.068231321	0.100715251	238.05	250.81	238.86	305.36	320.7	306.47	0.131103388
378	8-5-24	22600	401.85	22302.5	0.068231321	0.100715251	272.14	283.49	273.07	336.75	355.1	337.92	0.131938053
379	8-5-24	22650	428	22302.5	0.068231321	0.100715251	308.49	316.17	309.49	369.79	389.49	371.03	0.129436292
380	8-5-24	22700	463.85	22302.5	0.068231321	0.100715251	346.92	348.85	348.03	404.41	423.89	405.78	0.130995288

381	8-5-24	22750	490.8	22302.5	0.068231321	0.100715251	387.23	381.54	388.36	440.56	458.29	441.99	0.127448855
382	8-5-24	22800	526.15	22302.5	0.068231321	0.100715251	429.2	414.22	430.28	478.13	492.69	479.67	0.127472046
383	8-5-24	22850	559.45	22302.5	0.068231321	0.100715251	472.64	451.29	473.66	517.05	527.08	518.69	0.125699726
384	8-5-24	22900	600.2	22302.5	0.068231321	0.100715251	517.34	501.08	518.34	557.23	561.48	558.9	0.127457485
385	8-5-24	22950	639.05	22302.5	0.068231321	0.100715251	563.1	550.87	564.05	598.56	595.88	600.19	0.127571819
386	8-5-24	23000	675.35	22302.5	0.068231321	0.100715251	609.75	600.66	610.65	640.96	630.27	642.53	0.12538284
387	8-5-24	23050	710	22302.5	0.068231321	0.100715251	657.12	650.45	658.03	684.32	664.67	685.82	0.121019506
388	8-5-24	23100	754.75	22302.5	0.068231321	0.100715251	705.07	700.24	706	728.56	700.24	730.05	0.123041845
389	8-5-24	23150	731.2	22302.5	0.068231321	0.100715251	753.48	750.03	754.39	773.58	750.03	775.03	2.4461E-07
390	8-5-24	23200	842.55	22302.5	0.068231321	0.100715251	802.26	799.82	803.14	819.29	799.82	820.71	0.124397642
391	8-5-24	23250	859.35	22302.5	0.068231321	0.100715251	851.31	849.61	852.2	865.63	849.61	867	0.090712383
392	8-5-24	23300	941.05	22302.5	0.068231321	0.100715251	900.57	899.4	901.45	912.51	899.4	913.83	0.133834986
393	8-5-24	23350	935.95	22302.5	0.068231321	0.100715251	949.98	949.19	950.84	959.85	949.19	961.19	1.7825E-07
394	8-5-24	23400	1025.75	22302.5	0.068231321	0.100715251	999.51	998.98	1000.34	1007.61	998.98	1008.97	0.128214268
395	8-5-24	23450	1062.8	22302.5	0.068231321	0.100715251	1049.12	1048.77	1049.94	1055.71	1048.77	1057.07	0.115009967
396	8-5-24	23500	1113.55	22302.5	0.068231321	0.100715251	1098.79	1098.56	1099.59	1104.11	1098.56	1105.45	0.12082449
397	8-5-24	23550	1158.1	22302.5	0.068231321	0.100715251	1148.5	1148.35	1149.29	1152.77	1148.35	1154.06	0.115038208
398	8-5-24	23600	1207.7	22302.5	0.068231321	0.100715251	1198.23	1198.14	1199.01	1201.64	1198.14	1202.93	0.118561796
399	8-5-24	23650	1255.8	22302.5	0.068231321	0.100715251	1247.99	1247.93	1248.77	1250.68	1247.93	1251.98	0.118348052
400	8-5-24	23700	1305	22302.5	0.068231321	0.100715251	1297.75	1297.72	1298.54	1299.87	1297.72	1301.17	0.120526444
401	8-5-24	23750	1337.25	22302.5	0.068231321	0.100715251	1347.53	1347.51	1348.31	1349.18	1347.51	1350.47	5.97809E-07
402	8-5-24	23800	1411.25	22302.5	0.068231321	0.100715251	1397.31	1397.3	1398.09	1398.59	1397.3	1399.85	0.143535681
403	8-5-24	23850	1450.35	22302.5	0.068231321	0.100715251	1447.09	1447.08	1447.87	1448.08	1447.08	1449.31	0.116655628
404	8-5-24	23900	1500.2	22302.5	0.068231321	0.100715251	1496.88	1496.87	1497.65	1497.64	1496.87	1498.85	0.120295467
405	8-5-24	23950	1549.45	22302.5	0.068231321	0.100715251	1546.67	1546.66	1547.44	1547.25	1546.66	1548.44	0.12065876
406	8-5-24	24000	1595.1	22302.5	0.068231321	0.100715251	1596.45	1596.45	1597.23	1596.89	1596.45	1598.08	4.99539E-07
407	8-5-24	24050	1648.25	22302.5	0.068231321	0.100715251	1646.24	1646.24	1647.02	1646.57	1646.24	1647.74	0.121991881
408	8-5-24	24100	1697.8	22302.5	0.068231321	0.100715251	1696.03	1696.03	1696.81	1696.28	1696.03	1697.43	0.123164731
409	8-5-24	24150	1746.5	22302.5	0.068231321	0.100715251	1745.82	1745.82	1746.6	1746.01	1745.82	1747.15	0.113618679
410	8-5-24	24200	1796.25	22302.5	0.068231321	0.100715251	1795.61	1795.61	1796.39	1795.75	1795.61	1796.88	0.115584542
411	8-5-24	24250	1845.25	22302.5	0.068231321	0.100715251	1845.4	1845.4	1846.18	1845.5	1845.4	1846.64	3.49007E-07
412	8-5-24	24300	1895	22302.5	0.068231321	0.100715251	1895.19	1895.19	1895.97	1895.26	1895.19	1896.41	7.57057E-08
413	8-5-24	24350	1943.85	22302.5	0.068231321	0.100715251	1944.98	1944.98	1945.76	1945.03	1944.98	1946.18	1.49999E-07
414	8-5-24	24400	1993.35	22302.5	0.068231321	0.100715251	1994.77	1994.77	1995.55	1994.81	1994.77	1995.95	4.80491E-07
415	8-5-24	24450	2043.2	22302.5	0.068231321	0.100715251	2044.56	2044.56	2045.33	2044.59	2044.56	2045.73	2.89524E-07



416	8-5-24	24500	2093.55	22302.5	0.068231321	0.100715251	2094.35	2094.35	2095.12	2094.37	2094.35	2095.51	5.21242E-07
417	9-5-24	20050	7.95	21957.5	0.170129732	0.099896399	2.9	0	3.15	0	0	0	0.196024516
418	9-5-24	20100	8.35	21957.5	0.170129732	0.099896399	3.47	0	3.69	0.01	0	0	0.193103335
419	9-5-24	20150	10.2	21957.5	0.170129732	0.099896399	4.14	0	4.32	0.01	0	0.01	0.194928268
420	9-5-24	20200	10.95	21957.5	0.170129732	0.099896399	4.92	0	5.09	0.02	0	0.03	0.192668316
421	9-5-24	20250	10.95	21957.5	0.170129732	0.099896399	5.83	0	5.99	0.02	0	0.04	0.188090741
422	9-5-24	20300	12.05	21957.5	0.170129732	0.099896399	6.88	0	7.07	0.04	0	0.06	0.186604603
423	9-5-24	20350	4.35	21957.5	0.170129732	0.099896399	8.09	0	8.31	0.06	0	0.08	0.154882604
424	9-5-24	20400	14.6	21957.5	0.170129732	0.099896399	9.49	0	9.75	0.08	0	0.11	0.183597697
425	9-5-24	20500	17.4	21957.5	0.170129732	0.099896399	12.91	0	13.28	0.17	0	0.2	0.180060773
426	9-5-24	20550	19.8	21957.5	0.170129732	0.099896399	14.99	0	15.44	0.25	0	0.27	0.17977747
427	9-5-24	20600	20.5	21957.5	0.170129732	0.099896399	17.34	0	17.86	0.35	0	0.39	0.176039881
428	9-5-24	20650	23.8	21957.5	0.170129732	0.099896399	20	0	20.51	0.49	0	0.56	0.176560991
429	9-5-24	20700	24.65	21957.5	0.170129732	0.099896399	23	0	23.5	0.68	0	0.78	0.172739934
430	9-5-24	20750	27.4	21957.5	0.170129732	0.099896399	26.37	5.29	26.92	0.94	0	1.05	0.171634551
431	9-5-24	20800	29.75	21957.5	0.170129732	0.099896399	30.14	16.4	30.72	1.28	0	1.42	0.169596602
432	9-5-24	20850	33.65	21957.5	0.170129732	0.099896399	34.35	27.51	34.99	1.73	0	1.88	0.169260143
433	9-5-24	20900	37.35	21957.5	0.170129732	0.099896399	39.02	38.62	39.78	2.31	0	2.43	0.168180884
434	9-5-24	20950	41.15	21957.5	0.170129732	0.099896399	44.21	49.72	45.03	3.07	0	3.17	0.166817573
435	9-5-24	21000	45.65	21957.5	0.170129732	0.099896399	49.94	60.83	50.78	4.03	0	4.15	0.165796346
436	9-5-24	21050	49.15	21957.5	0.170129732	0.099896399	56.25	71.94	57.09	5.26	0	5.4	0.163376861
437	9-5-24	21100	53.25	21957.5	0.170129732	0.099896399	63.19	83.05	64.03	6.8	0	6.99	0.161235836
438	9-5-24	21150	58.2	21957.5	0.170129732	0.099896399	70.79	94.16	71.63	8.72	0	8.98	0.159510198
439	9-5-24	21200	63	21957.5	0.170129732	0.099896399	79.09	105.26	80.01	11.08	0	11.4	0.157284634
440	9-5-24	21250	69.7	21957.5	0.170129732	0.099896399	88.13	116.37	89.1	13.97	4.75	14.28	0.156227592
441	9-5-24	21300	76.5	21957.5	0.170129732	0.099896399	97.95	127.48	98.95	17.47	14.6	17.82	0.154775303
442	9-5-24	21350	84.3	21957.5	0.170129732	0.099896399	108.58	138.59	109.68	21.68	24.45	22.1	0.153591361
443	9-5-24	21400	92.45	21957.5	0.170129732	0.099896399	120.06	149.7	121.26	26.7	34.3	27.2	0.152182035
444	9-5-24	21450	100.85	21957.5	0.170129732	0.099896399	132.43	160.8	133.62	32.62	44.15	33.13	0.150466084
445	9-5-24	21500	111.25	21957.5	0.170129732	0.099896399	145.71	171.91	146.88	39.56	54	40.07	0.149536817
446	9-5-24	21550	121.65	21957.5	0.170129732	0.099896399	159.94	183.02	161.16	47.63	63.85	48.19	0.148090331
447	9-5-24	21600	132.8	21957.5	0.170129732	0.099896399	175.15	194.13	176.42	56.94	73.7	57.54	0.146569089
448	9-5-24	21650	145.1	21957.5	0.170129732	0.099896399	191.36	205.24	192.71	67.6	83.55	68.29	0.145181017
449	9-5-24	21700	159	21957.5	0.170129732	0.099896399	208.61	216.34	209.98	79.71	93.4	80.43	0.144121962
450	9-5-24	21750	170.4	21957.5	0.170129732	0.099896399	226.9	227.45	228.3	93.37	103.25	94.09	0.141201401

451	9-5-24	21800	186.6	21957.5	0.170129732	0.099896399	246.25	238.56	247.7	108.66	113.1	109.44	0.140234281
452	9-5-24	21850	204.35	21957.5	0.170129732	0.099896399	266.69	249.67	268.18	125.66	122.95	126.49	0.139439289
453	9-5-24	21900	223.25	21957.5	0.170129732	0.099896399	288.22	260.78	289.79	144.44	132.81	145.31	0.138592912
454	9-5-24	21950	242.4	21957.5	0.170129732	0.099896399	310.84	271.89	312.43	165.04	142.66	165.97	0.1372465
455	9-5-24	22000	260.7	21957.5	0.170129732	0.099896399	334.58	304.09	336.14	187.51	173.41	188.45	0.134869228
456	9-5-24	22050	284.35	21957.5	0.170129732	0.099896399	359.41	340.02	361.04	211.85	207.86	212.82	0.134400903
457	9-5-24	22100	306.55	21957.5	0.170129732	0.099896399	385.36	375.95	387.04	238.08	242.3	239.11	0.132575324
458	9-5-24	22150	331.75	21957.5	0.170129732	0.099896399	412.4	411.89	414.13	266.16	276.75	267.18	0.13150148
459	9-5-24	22200	358.35	21957.5	0.170129732	0.099896399	440.52	447.82	442.22	296.07	311.2	297.14	0.130405155
460	9-5-24	22250	384.95	21957.5	0.170129732	0.099896399	469.73	483.75	471.47	327.77	345.64	328.89	0.128584869
461	9-5-24	22300	411.4	21957.5	0.170129732	0.099896399	499.99	519.68	501.77	361.19	380.09	362.4	0.125911977
462	9-5-24	22350	443.95	21957.5	0.170129732	0.099896399	531.3	555.61	533.15	396.26	414.54	397.58	0.125563271
463	9-5-24	22400	474.55	21957.5	0.170129732	0.099896399	563.63	591.54	565.53	432.89	448.98	434.28	0.123414635
464	9-5-24	22450	510	21957.5	0.170129732	0.099896399	596.96	627.47	598.95	470.99	483.43	472.51	0.123113505
465	9-5-24	22500	541.2	21957.5	0.170129732	0.099896399	631.26	663.4	633.37	510.46	517.87	512.04	0.119483485
466	9-5-24	22550	576.75	21957.5	0.170129732	0.099896399	666.51	699.34	668.73	551.21	552.32	552.78	0.117435354
467	9-5-24	22600	617.75	21957.5	0.170129732	0.099896399	702.67	735.27	704.96	593.12	586.77	594.64	0.118104423
468	9-5-24	22650	645.95	21957.5	0.170129732	0.099896399	739.72	771.2	742.07	636.09	621.21	637.56	0.10822307
469	9-5-24	22700	697.65	21957.5	0.170129732	0.099896399	777.62	807.13	780.1	680.01	655.66	681.44	0.115603329
470	9-5-24	22750	739.9	21957.5	0.170129732	0.099896399	816.33	843.06	818.94	724.8	701.06	726.2	0.114823379
471	9-5-24	22800	778.25	21957.5	0.170129732	0.099896399	855.83	878.99	858.48	770.34	750.86	771.7	0.109016534
472	9-5-24	22850	828.45	21957.5	0.170129732	0.099896399	896.08	914.92	898.77	816.55	800.66	817.86	0.114589946
473	9-5-24	22900	870.75	21957.5	0.170129732	0.099896399	937.03	950.85	939.69	863.34	850.46	864.61	0.110639411
474	9-5-24	22950	884.25	21957.5	0.170129732	0.099896399	978.67	986.78	981.29	910.64	900.26	911.91	5.58344E-07
475	9-5-24	23000	961.15	21957.5	0.170129732	0.099896399	1020.94	1022.72	1023.49	958.37	950.06	959.68	0.105571515
476	9-5-24	23050	911.45	21957.5	0.170129732	0.099896399	1063.82	1058.65	1066.32	1006.48	999.86	1007.77	1.22273E-07
477	9-5-24	23100	1053.65	21957.5	0.170129732	0.099896399	1107.26	1094.58	1109.69	1054.89	1049.65	1056.17	0.095690078
478	9-5-24	23150	1072.2	21957.5	0.170129732	0.099896399	1151.25	1130.51	1153.65	1103.57	1099.45	1104.8	2.41274E-07
479	9-5-24	23200	1146.2	21957.5	0.170129732	0.099896399	1195.73	1166.44	1198.12	1152.47	1149.25	1153.7	2.0349E-07
480	9-5-24	23250	1173.2	21957.5	0.170129732	0.099896399	1240.68	1202.37	1243.04	1201.55	1199.05	1202.8	1.62587E-07
481	9-5-24	23300	1238.95	21957.5	0.170129732	0.099896399	1286.07	1248.85	1288.37	1250.78	1248.85	1252.02	2.66733E-07
482	9-5-24	23350	1280.05	21957.5	0.170129732	0.099896399	1331.86	1298.65	1334.13	1300.13	1298.65	1301.35	3.08163E-07
483	9-5-24	23400	1328.8	21957.5	0.170129732	0.099896399	1378.03	1348.45	1380.25	1349.58	1348.45	1350.77	2.94128E-07
484	9-5-24	23450	1203	21957.5	0.170129732	0.099896399	1424.55	1398.25	1426.72	1399.1	1398.25	1400.27	4.83291E-08
485	9-5-24	23500	1441.9	21957.5	0.170129732	0.099896399	1471.38	1448.05	1473.52	1448.69	1448.05	1449.84	8.81118E-07

486	9-5-24	23550	1475.05	21957.5	0.170129732	0.099896399	1518.51	1497.85	1520.62	1498.33	1497.85	1499.47	6.19539E-07
487	9-5-24	23600	1475	21957.5	0.170129732	0.099896399	1565.92	1547.64	1568.04	1548	1547.64	1549.13	8.32198E-08
488	9-5-24	23650	1573.55	21957.5	0.170129732	0.099896399	1613.57	1597.44	1615.73	1597.71	1597.44	1598.82	2.85007E-07
489	9-5-24	23700	1640	21957.5	0.170129732	0.099896399	1661.44	1647.24	1663.63	1647.44	1647.24	1648.53	9.84993E-08
490	9-5-24	23750	1671.85	21957.5	0.170129732	0.099896399	1709.53	1697.04	1711.7	1697.18	1697.04	1698.26	4.96469E-07
491	9-5-24	23800	1740	21957.5	0.170129732	0.099896399	1757.79	1746.84	1759.95	1746.94	1746.84	1748.03	7.43366E-07
492	9-5-24	23850	1770.35	21957.5	0.170129732	0.099896399	1806.23	1796.64	1808.38	1796.71	1796.64	1797.81	2.7055E-07
493	9-5-24	23900	1821.45	21957.5	0.170129732	0.099896399	1854.82	1846.44	1856.93	1846.49	1846.44	1847.59	3.71816E-07
494	9-5-24	23950	1868.4	21957.5	0.170129732	0.099896399	1903.55	1896.24	1905.6	1896.28	1896.24	1897.37	4.58003E-07
495	9-5-24	24000	1910.85	21957.5	0.170129732	0.099896399	1952.41	1946.04	1954.46	1946.06	1946.04	1947.16	3.66955E-07
496	9-5-24	24050	1967.15	21957.5	0.170129732	0.099896399	2001.38	1995.84	2003.43	1995.85	1995.84	1996.94	3.67958E-07
497	9-5-24	24100	2017.4	21957.5	0.170129732	0.099896399	2050.44	2045.63	2052.51	2045.65	2045.63	2046.73	3.28715E-07
498	9-5-24	24150	2065.95	21957.5	0.170129732	0.099896399	2099.6	2095.43	2101.68	2095.44	2095.43	2096.52	1.5428E-07
499	9-5-24	24200	2115.4	21957.5	0.170129732	0.099896399	2148.83	2145.23	2150.9	2145.24	2145.23	2146.31	4.7326E-07
500	9-5-24	24250	2165.05	21957.5	0.170129732	0.099896399	2198.14	2195.03	2200.2	2195.04	2195.03	2196.11	3.4163E-07