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Stock and Technical Analysis Database

A quick and reliable trading resource

Contents

[Project Summary 2](#_Toc7183379)

[Entity and Attribute Tables 3](#_Toc7183380)

[Entity-Relationship Diagram 6](#_Toc7183381)

[Business Rules 6](#_Toc7183382)

[Creation of tables 7](#_Toc7183383)

[Insert Statements 14](#_Toc7183384)

[Suggestions and Improvements 33](#_Toc7183385)

[Data Questions 34](#_Toc7183386)

[Get all the stock price data for a particular day 34](#_Toc7183387)

[Find the best Recommendation Strategy 35](#_Toc7183388)

[Find the Weighted Daily Price for the first quarter of 2019, for a particular stock 36](#_Toc7183389)

[Find the highest and lowest weighted price for the month of March 37](#_Toc7183390)

[Find all the days the weighted stock price is above or below the Bollinger Bands for the SPY stock 38](#_Toc7183391)

[Find all days where the weighted stock price is below the 10-Day EMA 39](#_Toc7183392)

[Forms 40](#_Toc7183393)

[Daily Data Add/Delete Form 40](#_Toc7183394)

[Daily Data Details Lookup/Modification 41](#_Toc7183395)

[Add/Delete Recommendation Strategy and Version Form 42](#_Toc7183396)

[Add/Delete or Modify Strategy Version and Backtest Result Form 43](#_Toc7183397)

[Add/Delete or Modify Tickers 44](#_Toc7183398)

[Reports 45](#_Toc7183399)

[Daily Stock Data Report 45](#_Toc7183400)

[Backtest Result Report 46](#_Toc7183401)

[Weighted Daily Price Report 47](#_Toc7183402)

[Days where the weighted stock price was below the ema 48](#_Toc7183403)

[Days where the weighted stock price is lower than the lower Bollinger Band 49](#_Toc7183404)

# Project Summary

The purpose of this project is to provide information management to financial traders. There are several datatypes traders much take into consideration for every position, such as the open and close prices, the ten-day Exponential Moving Average (EMA), and the results of their trades. The process of handling and organizing this data is both tedious and prone to human error and when a single wrong digit can result in the loss of thousands of dollars, data management must be done correctly.

This database will record the opening, closing, highest, and lowest prices of a trading day, as well as three technical indicators, the EMA, Moving Average Convergence Divergence (MACD), and the Bollinger Bands (BBANDS). Finally, the database will also keep track of past strategies, and their success rates. This will allow traders to iterate and improve on their strategies.

The database can be separated into two sections, connected by a ticker table that contains a ticker symbol and a ticker key. The ‘Daily Data’ section contains information that traders can use to trade, such as the lowest price over the last 100 days (good price point to buy) and whether the stock is overbought or oversold (to know when to avoid buying or selling). The ‘Strategy’ section of the database is to allow traders to track the efficiency of their strategies. Each strategy will have multiple versions (so traders can improve), and each version will have a test result associated with it (to see how well it did).

The main advantage of using this database is that traders will be able to write programs to implement strategies in a quantitative manner. For example, while it is difficult to see what the lowest price of the last 100 days are on a chart, it is very simple to write a select statement in a SQL database.

The following document contains a table of entities and attributes that will be in the database, as well as an entity relationship diagram relating the respective entities to each other. The document also contains a list of business rules not already covered by the table and diagram, as well as a list of business questions to be answered. Finally, there is a section containing forms and reports created in Microsoft access that can be used to manipulate the data and answer the data questions.

# Entity and Attribute Tables

Ticker Entity - Represents an abbreviation used to uniquely identify publicly traded shares of a particular stock on a particular stock market. Has a one to many relationship with the Backtest\_Results and Daily\_data entities.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Ticker\_Key | Integer | Not Null | Surrogate primary key for the ticker entity |
| UNIQUE | Ticker\_symbol | VarChar | Not Null | An abbreviation of the stock used by a stock exchange to represent a stock |

Daily Data Entity – A lookup table connecting individual stocks to their daily data. Represents a many to many relationships between the Ticker entity and the Time Series Daily, EMA, MACD, and BBANDS entities. Has a many to one relationship with the Ticker entity, and a one to one relationship with the Time Series Daily, EMA, MACD, and BBANDS entities.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Daily\_data\_key | Integer | Not Null | Surrogate primary key for the daily data entity |
| Foreign Key | Ticker\_key | Integer | Not Null | Ticker the data is about |
|  | Day | Date | Not Null | Day the data is on |

Time Series Daily Entity – A table containing interesting prices of a stock on a particular day. Has a one to one relationship with the Daily Data Entity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Time\_series\_daily\_key | Integer | Not Null | Surrogate primary key for the time series daily entity |
| Foreign Key | Daily\_Data\_Key | Integer | Not Null | Which day the time series data is on |
|  | Open | Float | Not Null | Opening price of the stock on that day |
|  | Close | Float | Not Null | Closing price of the stock on that day |
|  | High | Float | Not Null | Highest price of the stock on that day |
|  | Low | Float | Not Null | Lowest price of the stock on that day |

EMA Entity - The 10 day exponential moving average of a stock price on a particular day. Has a one to one relationship with the Daily Data Entity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Ema\_key | Integer | Not Null | Surrogate primary key for the EMA entity |
|  | Ema | Float | Not Null | EMA value for the day (in numbers) |
| Foreign Key | Daily\_data\_key | Integer | Not Null | Which day the EMA data is on |

MACD Entity - The Moving Average Convergence Divergence of a stock price on a particular day. Has a one to one relationship with the Daily Data Entity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Macd\_Key | Integer | Not Null | Surrogate primary key for the MACD entity |
|  | Macd\_Hist | Float | Nullable | Macd histogram value on that day. The difference between the macd and the signal line. |
|  | Macd\_signal | Float | Nullable | Signal line used to determine macd\_hist. Using the 9 day EMA. |
|  | Macd | Float | Not Null | The MACD value. Currently using the difference between the 26 period and 12 period EMA. |
| Foreign Key | Daily\_data\_key | Integer | Not Null | Which day the MACD is on |

BBANDS Entity - The Bollinger Band data for a stock on a particular day. Has a one to one relationship with the Daily Data Entity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Bbands\_key | Integer | Not Null | Surrogate primary key for the BBANDS entity |
|  | Real\_Middle\_Band | Float | Not Null | The value the BBANDS originate from. Currently an EMA |
|  | Real\_Upper\_Band | Float | Not Null | Two standard deviations above the middle band |
|  | Real\_Lower\_Band | Float | Not Null | Two standard deviations below the middle band. |
| Foreign Key | Daily\_data\_key | Integer | Not Null | Which day the BBANDS are on |

Backtest Results Entity – The results of a recommendation strategy’s backtest. Has a one to one relationship with the Ticker Entity, and a one to one relationship with the Recommendation Strategy Version Entity.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Backtest\_Results\_  Key | Integer | Not Null | Surrogate Primary Key of the backtest results entity |
| Foreign Key | Recommendation\_  version\_key | Integer | Not Null | Version of the strategy being tested |
| Foreign Key | Ticker\_key | Integer | Not Null | Ticker of the stock being tested |
|  | Date\_tested | Date | Not Null | Day the test was run |
|  | Biggest\_lost | Float | Not Null | Biggest lost found during the test |
|  | Successes | Integer | Not Null | Number of successes found during test |
|  | Failures | Integer | Not Null | Number of failures found during test |
|  | Fizzles | Integer | Not Null | Instances of signals that are neither success or failures |
|  | Total | Integer | Not Null | Total signals discovered during backtest |
|  | Percent\_success | Float | Not Null | Percent of success signals found during backtest |
|  | Percent\_not\_failed | Float | Not Null | Percent of success + fizzle signals found during backtest |

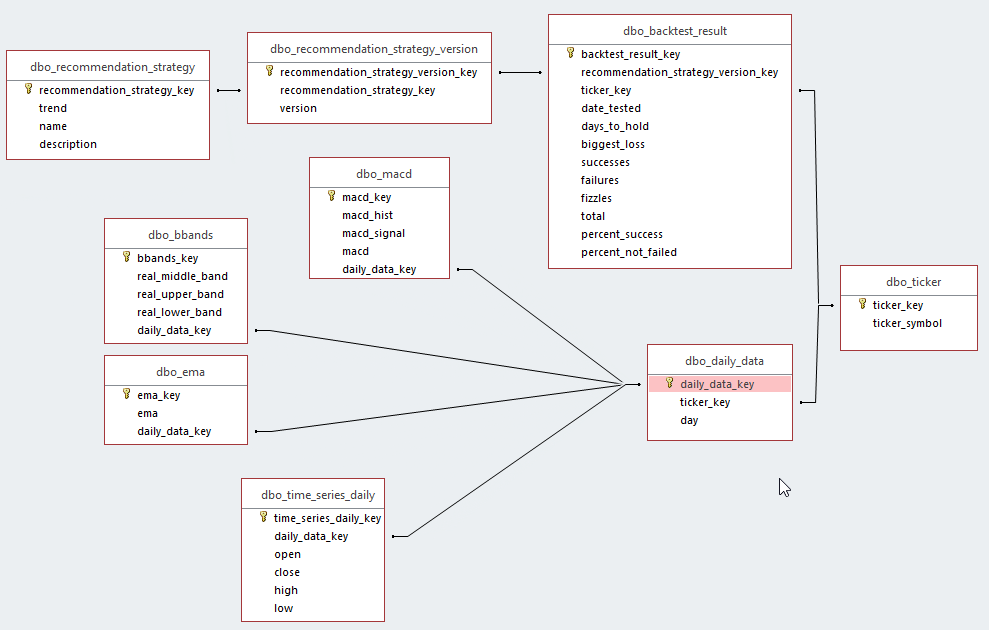
Recommendation Strategy Version Entity – Represents a version of a recommendation strategy. Has a one to one relationship with Backtest Results Entity. Has a many to one relationship with Recommendation Strategy.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Recommendation\_  Strategy\_version\_key | Integer | Not Null | Surrogate Primary Key for the Recommendation Strategy Version entity |
| Foreign Key | Recommendation\_  Strategy\_key | Integer | Not Null | The type of Recommendation strategy being versioned |
|  | Version | Integer | Not Null | Version number of recommendation strategy |

Recommendation Strategy Entity – Represents a Recommendation Strategy. Has a one to many relationship with Recommendation Strategy Version.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Constraints** | **Attribute Name** | **Field Type** | **Null/Not Null** | **Description** |
| Primary Key | Recommendation\_  Type\_key | Integer | Not Null | Surrogate Primary Key for Recommendation Type entity |
| Check :‘Bullish’ or ‘Bearish’ | Trend | VarChar | Not Null | Bearish or Bullish recommendation type |
|  | Name | VarChar | Not Null | Name of recommendation strategy |
|  | Description | VarChar | Nullable | Short description of strategy |

# Entity-Relationship Diagram



# Business Rules

1. There should be one and only one daily\_data row for every combination of ticker\_key and day.
2. There should only be one and only one row of time\_series\_daily, ema, bbands, and macd for every row of daily\_data.
3. There should be one and only one row of backest\_result for every row of recommendation\_strategy\_version.
4. “Trend” in recommendation\_strategy\_key can be either ‘BULLISH’ or ‘BEARISH’
5. “Version” in recommendation\_strategy\_version must be unique for each recommendation\_strategy\_key, but can be duplicated if the recommendation\_strategy\_keys are not the same.
6. “Ticker\_Symbol” table in ticker must be unique

# Creation of tables

-- Table: ticker

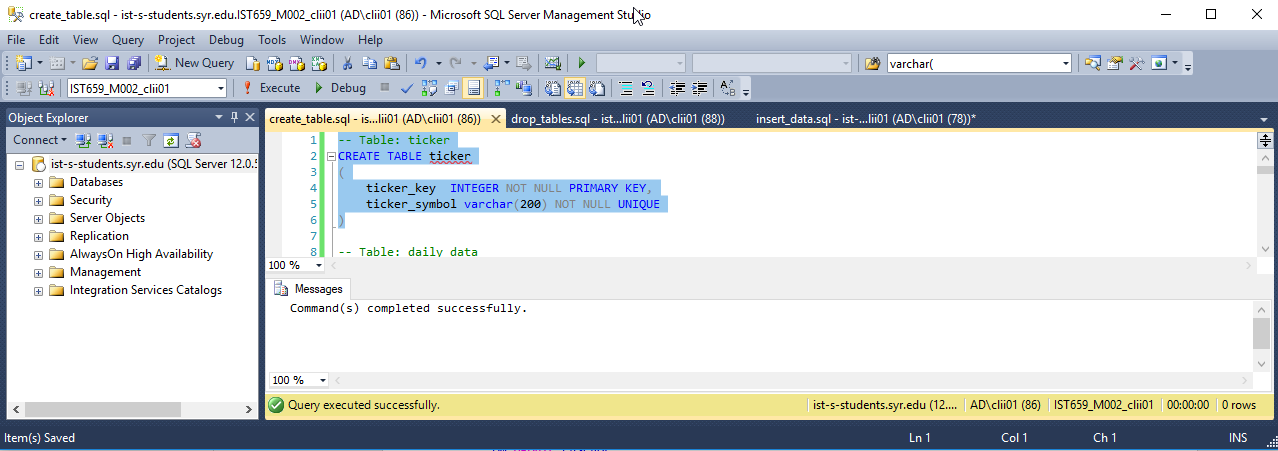
CREATE TABLE ticker

(

ticker\_key INTEGER NOT NULL PRIMARY KEY,

ticker\_symbol VARCHAR(200) NOT NULL UNIQUE

)



-- Table: daily\_data

CREATE TABLE daily\_data

(

daily\_data\_key INTEGER NOT NULL PRIMARY KEY,

ticker\_key INTEGER NOT NULL,

"day" date NOT NULL,

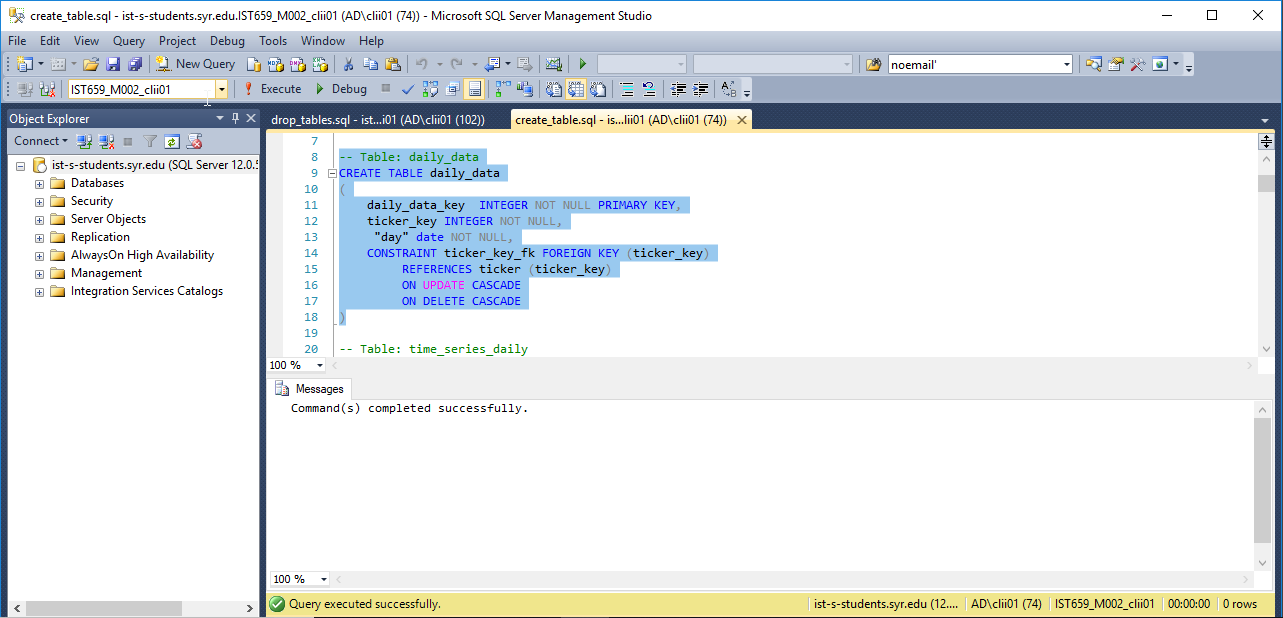
CONSTRAINT ticker\_key\_fk FOREIGN KEY (ticker\_key)

REFERENCES ticker (ticker\_key)

ON UPDATE CASCADE

ON DELETE CASCADE

)



-- Table: time\_series\_daily

CREATE TABLE time\_series\_daily

(

time\_series\_daily\_key INTEGER NOT NULL PRIMARY KEY,

daily\_data\_key integer NOT NULL,

"open" float NOT NULL,

"close" float NOT NULL,

high float NOT NULL,

low float NOT NULL,

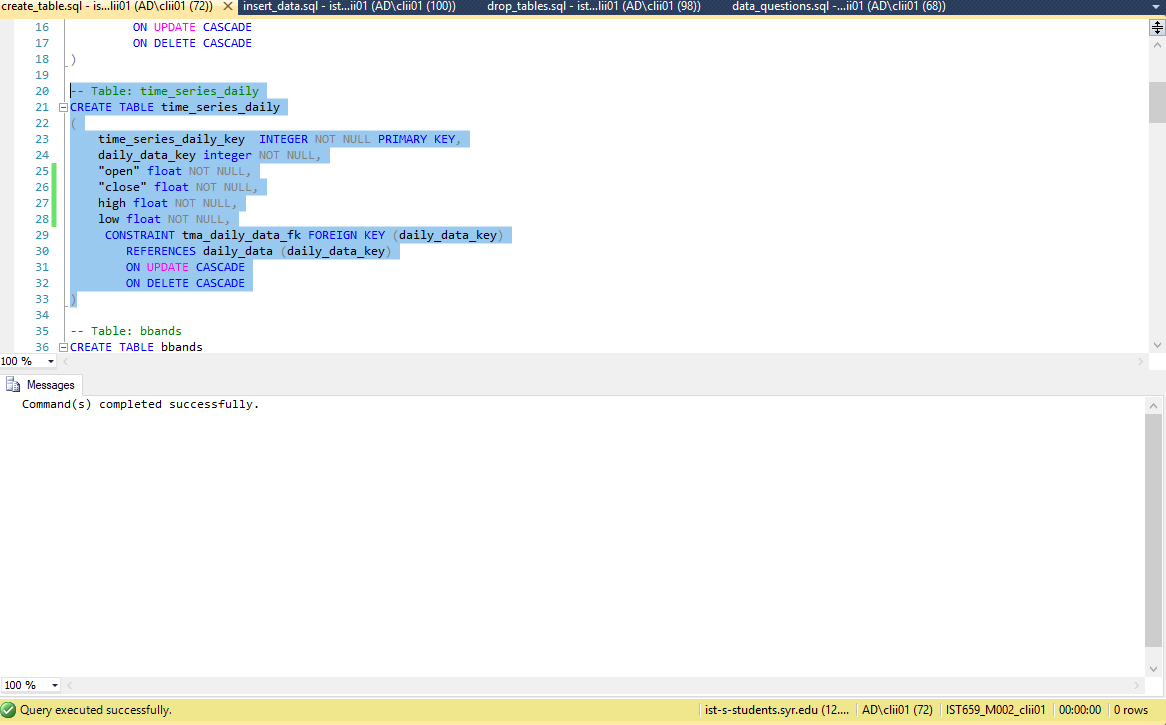
CONSTRAINT tma\_daily\_data\_fk FOREIGN KEY (daily\_data\_key)

REFERENCES daily\_data (daily\_data\_key)

ON UPDATE CASCADE

ON DELETE CASCADE

)



-- Table: bbands

CREATE TABLE bbands

(

bbands\_key INTEGER NOT NULL PRIMARY KEY,

real\_middle\_band float NOT NULL,

real\_upper\_band float NOT NULL,

real\_lower\_band float NOT NULL,

daily\_data\_key INTEGER NOT NULL,

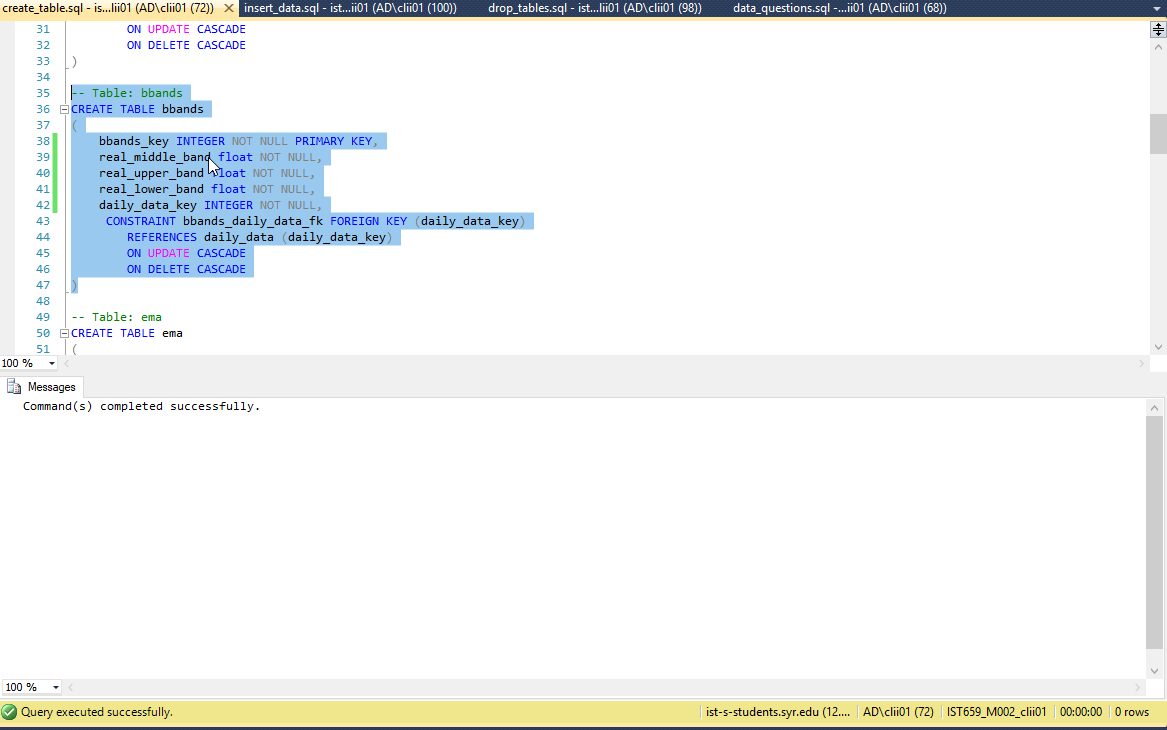
CONSTRAINT bbands\_daily\_data\_fk FOREIGN KEY (daily\_data\_key)

REFERENCES daily\_data (daily\_data\_key)

ON UPDATE CASCADE

ON DELETE CASCADE

)



-- Table: ema

CREATE TABLE ema

(

ema\_key INTEGER NOT NULL PRIMARY KEY,

ema float NOT NULL,

daily\_data\_key integer NOT NULL,

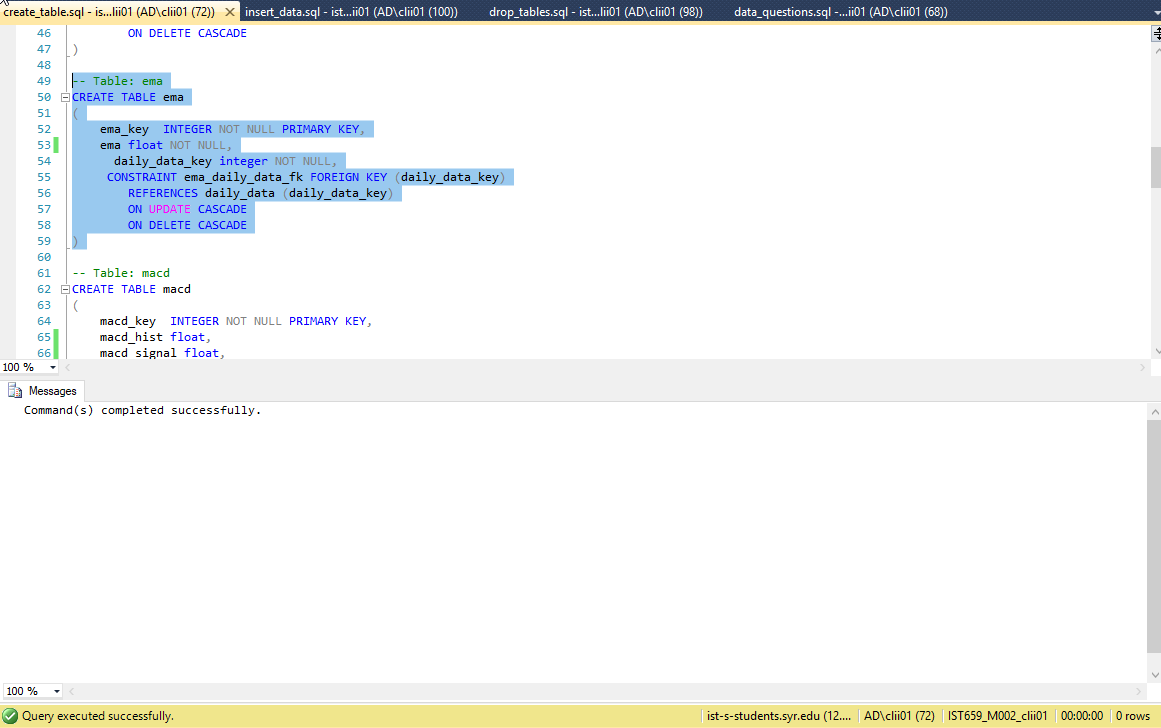
CONSTRAINT ema\_daily\_data\_fk FOREIGN KEY (daily\_data\_key)

REFERENCES daily\_data (daily\_data\_key)

ON UPDATE CASCADE

ON DELETE CASCADE

)



-- Table: macd

CREATE TABLE macd

(

macd\_key INTEGER NOT NULL PRIMARY KEY,

macd\_hist float,

macd\_signal float,

macd float NOT NULL,

daily\_data\_key integer NOT NULL,

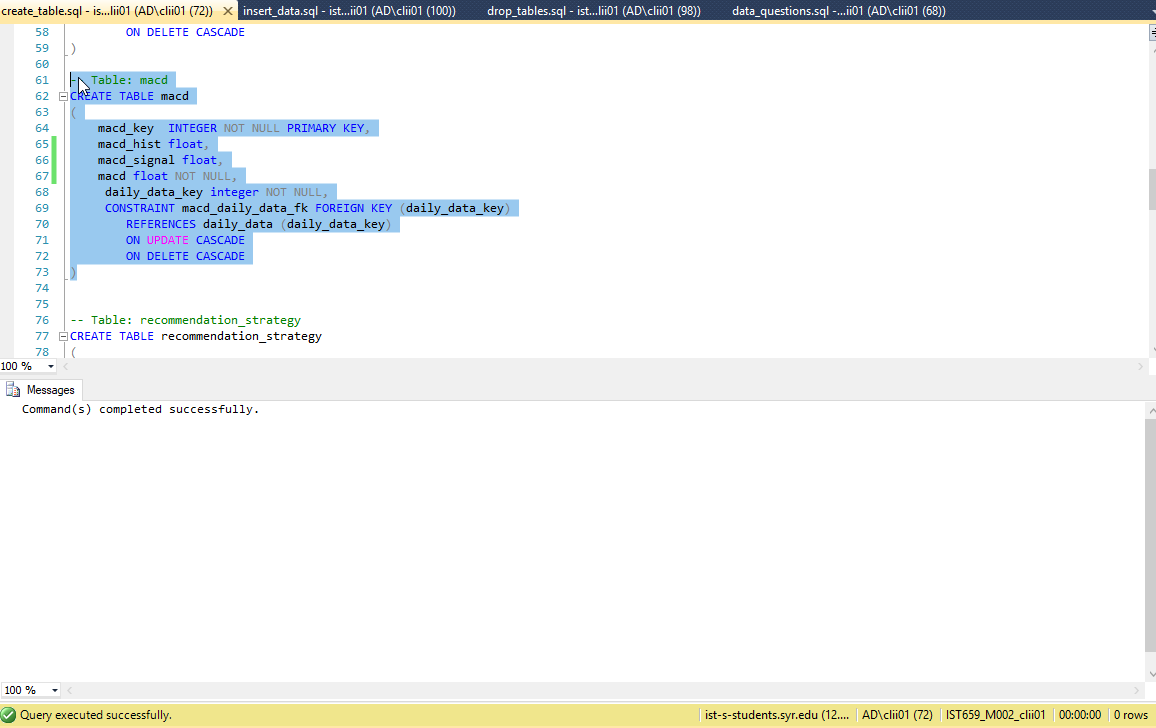
CONSTRAINT macd\_daily\_data\_fk FOREIGN KEY (daily\_data\_key)

REFERENCES daily\_data (daily\_data\_key)

ON UPDATE CASCADE

ON DELETE CASCADE

)



-- Table: recommendation\_strategy

CREATE TABLE recommendation\_strategy

(

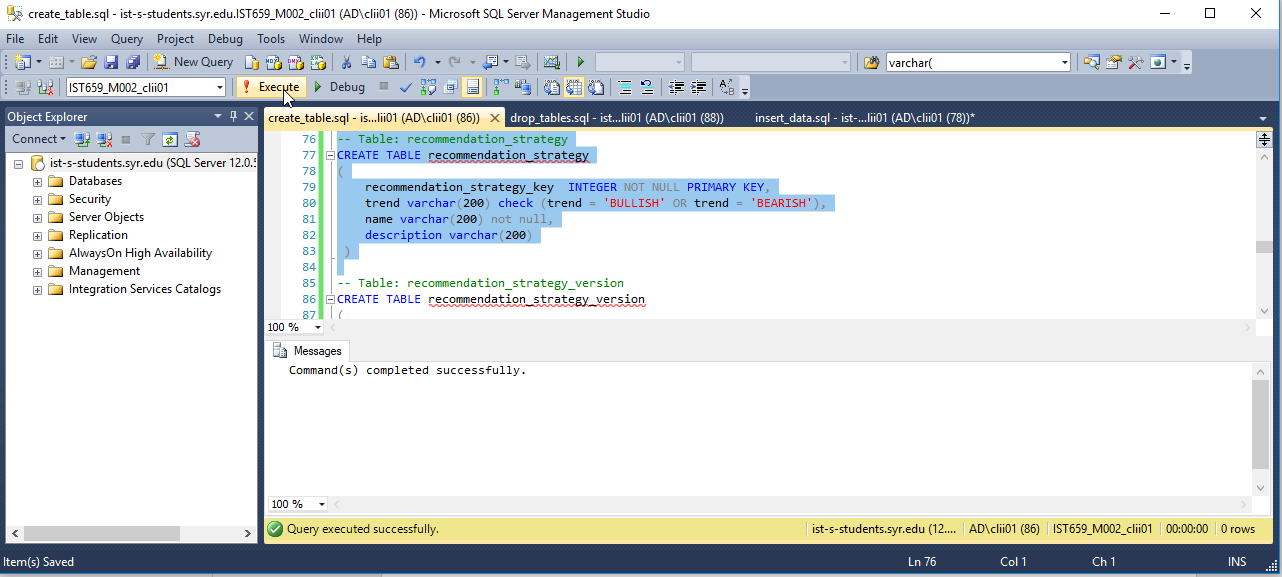
recommendation\_strategy\_key INTEGER NOT NULL PRIMARY KEY,

trend varchar(200) check (trend = 'BULLISH' OR trend = 'BEARISH'),

name varchar(200) not null,

description varchar(200)

)



-- Table: recommendation\_strategy\_version

CREATE TABLE recommendation\_strategy\_version

(

recommendation\_strategy\_version\_key INTEGER NOT NULL PRIMARY KEY,

recommendation\_strategy\_key integer NOT NULL,

version integer not null,

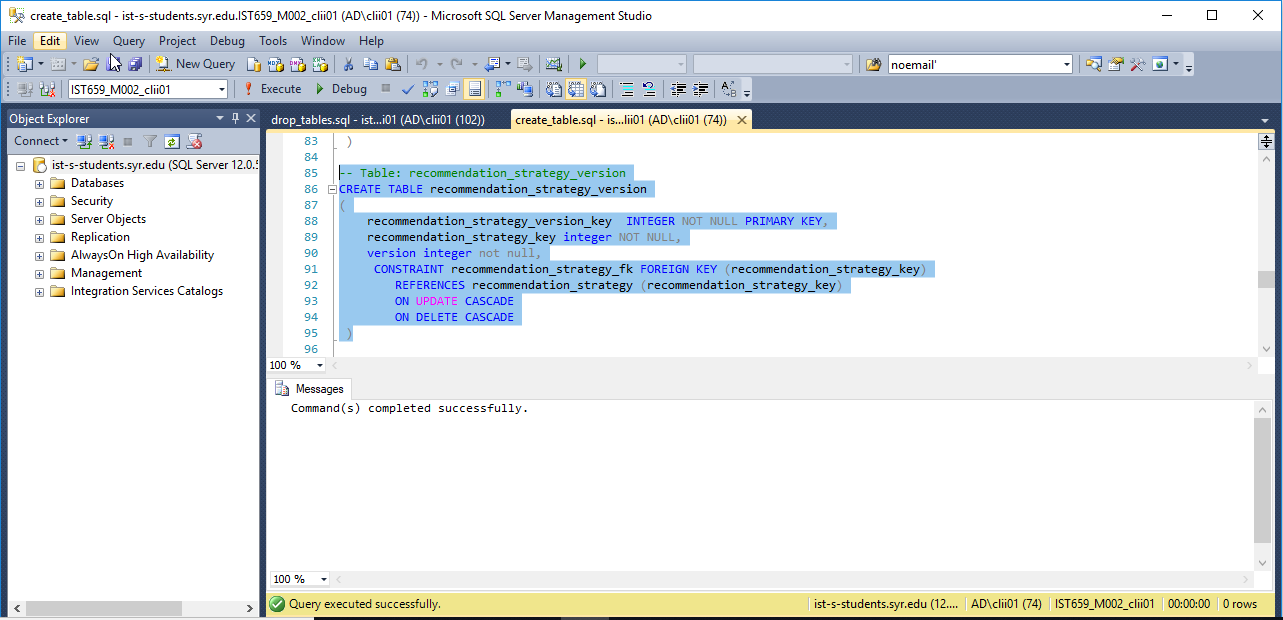
CONSTRAINT recommendation\_strategy\_fk FOREIGN KEY (recommendation\_strategy\_key)

REFERENCES recommendation\_strategy (recommendation\_strategy\_key)

ON UPDATE CASCADE

ON DELETE CASCADE

)



-- Table: backtest\_result

create table backtest\_result

(

backtest\_result\_key INTEGER NOT NULL PRIMARY KEY,

recommendation\_strategy\_version\_key integer not null,

ticker\_key integer not null,

date\_tested date not null,

days\_to\_hold integer not null,

biggest\_loss float not null,

successes integer not null,

failures integer not null,

fizzles integer not null,

total integer not null,

percent\_success float not null,

percent\_not\_failed float not null,

CONSTRAINT backtest\_ticker\_key\_fk FOREIGN KEY (ticker\_key)

REFERENCES ticker (ticker\_key)

ON UPDATE CASCADE

ON DELETE CASCADE,

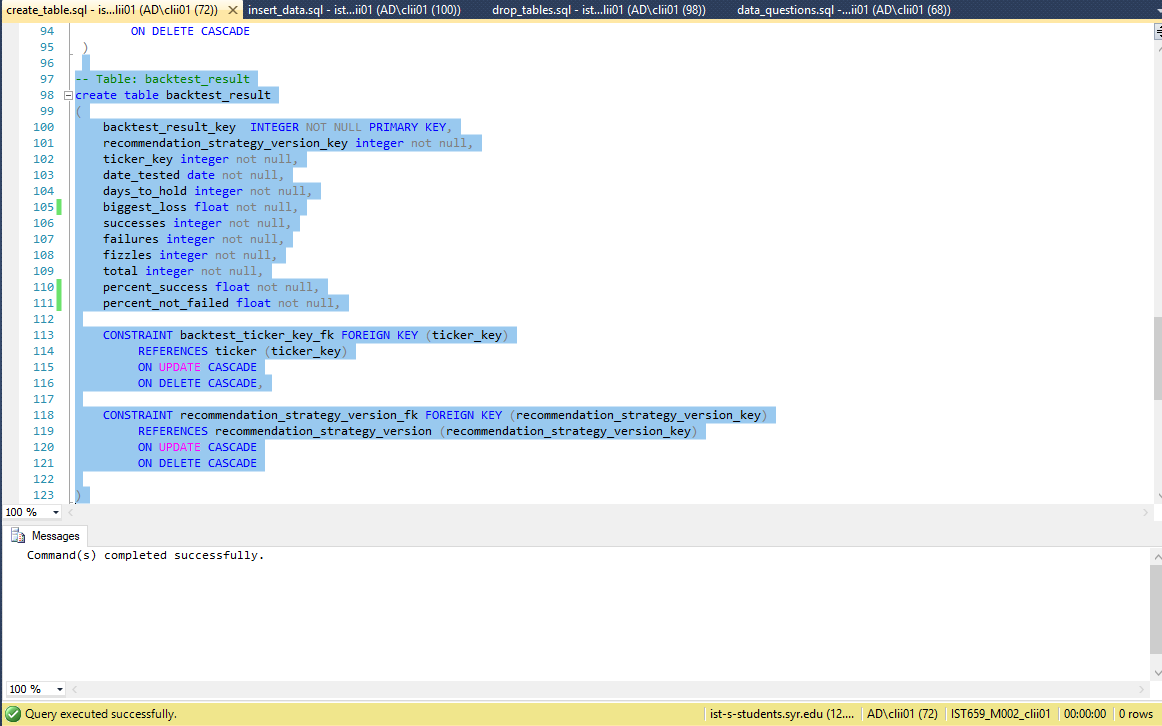
CONSTRAINT recommendation\_strategy\_version\_fk FOREIGN KEY (recommendation\_strategy\_version\_key)

REFERENCES recommendation\_strategy\_version (recommendation\_strategy\_version\_key)

ON UPDATE CASCADE

ON DELETE CASCADE

)



# Insert Statements

-- recommendation strategy table

INSERT INTO recommendation\_strategy (recommendation\_strategy\_key, trend, name) VALUES (1, 'BULLISH', '10 Day EMA Crossing Bullish');

INSERT INTO recommendation\_strategy (recommendation\_strategy\_key, trend, name, description) VALUES (2, 'BEARISH', '10 Day EMA Crossing Bearish', 'Recommends user to buy puts to sell if the stock price average for a day crosses the 10 day ema in a bearish manner');

INSERT INTO recommendation\_strategy (recommendation\_strategy\_key, trend, name, description) VALUES (3, 'BEARISH', 'Bollinger Band Exit Bearish', 'Recommends user to buy puts to sell if the stock price average retreats from the upper Bollinger Band');

INSERT INTO recommendation\_strategy (recommendation\_strategy\_key, trend, name, description) VALUES (4, 'BULLISH', 'Bollinger Band Exit Bullish', 'Recommends user to buy calls to sell if the stock price average retreats from the lower Bollinger Band');

-- recommendation strategy version table

INSERT INTO recommendation\_strategy\_version (recommendation\_strategy\_version\_key, recommendation\_strategy\_key, version) VALUES (1, 1, 1);

INSERT INTO recommendation\_strategy\_version (recommendation\_strategy\_version\_key, recommendation\_strategy\_key, version) VALUES (2, 2, 1);

INSERT INTO recommendation\_strategy\_version (recommendation\_strategy\_version\_key, recommendation\_strategy\_key, version) VALUES (3, 3, 1);

INSERT INTO recommendation\_strategy\_version (recommendation\_strategy\_version\_key, recommendation\_strategy\_key, version) VALUES (4, 4, 1);

-- ticker table

INSERT INTO ticker (ticker\_key, ticker\_symbol) VALUES (1, 'SPY');

INSERT INTO ticker (ticker\_key, ticker\_symbol) VALUES (2, 'AAPL');

--daily data table

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (1, 1, '2019-02-26');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (2, 1, '2019-02-25');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (3, 1, '2019-02-22');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (4, 1, '2019-02-21');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (5, 1, '2019-02-20');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (6, 1, '2019-02-19');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (7, 1, '2019-02-15');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (8, 1, '2019-02-14');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (9, 1, '2019-02-13');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (10, 1, '2019-02-12');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (11, 1, '2019-02-11');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (12, 1, '2019-02-08');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (13, 1, '2019-02-07');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (14, 1, '2019-02-06');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (15, 1, '2019-02-05');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (16, 1, '2019-02-04');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (17, 1, '2019-02-01');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (18, 1, '2019-01-31');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (19, 1, '2019-01-30');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (20, 1, '2019-01-29');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (21, 1, '2019-01-28');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (22, 1, '2019-01-25');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (23, 1, '2019-01-24');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (24, 1, '2019-01-23');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (25, 1, '2019-01-22');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (26, 1, '2019-01-18');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (27, 1, '2019-01-17');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (28, 1, '2019-01-16');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (29, 1, '2019-01-15');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (30, 1, '2019-01-14');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (31, 1, '2019-01-11');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (32, 1, '2019-01-10');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (33, 1, '2019-01-09');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (34, 1, '2019-01-08');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (35, 1, '2019-01-07');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (36, 1, '2019-01-04');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (37, 1, '2019-01-03');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (38, 1, '2019-01-02');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (101, 1, '2019-03-04');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (102, 1, '2019-03-01');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (103, 1, '2019-02-28');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (104, 1, '2019-02-27');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (105, 1, '2019-03-06');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (106, 1, '2019-03-05');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (107, 1, '2019-03-11');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (108, 1, '2019-03-08');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (109, 1, '2019-03-07');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (110, 1, '2019-03-12');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (111, 1, '2019-03-13');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (112, 1, '2019-03-15');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (113, 1, '2019-03-14');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (114, 1, '2019-03-21');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (115, 1, '2019-03-20');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (116, 1, '2019-03-19');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (117, 1, '2019-03-18');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (118, 1, '2019-03-22');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (119, 1, '2019-03-25');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (120, 1, '2019-03-26');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (121, 1, '2019-03-27');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (122, 1, '2019-03-29');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (123, 1, '2019-03-28');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (124, 2, '2019-04-01');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (125, 2, '2019-03-29');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (126, 2, '2019-03-28');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (127, 2, '2019-03-27');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (128, 2, '2019-03-26');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (129, 2, '2019-03-25');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (130, 2, '2019-03-22');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (131, 2, '2019-03-21');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (132, 2, '2019-03-20');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (133, 2, '2019-03-19');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (134, 2, '2019-03-18');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (135, 2, '2019-03-15');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (136, 2, '2019-03-14');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (137, 2, '2019-03-13');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (138, 2, '2019-03-12');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (139, 2, '2019-03-11');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (140, 2, '2019-03-08');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (141, 2, '2019-03-07');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (142, 2, '2019-03-06');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (143, 2, '2019-03-05');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (144, 2, '2019-03-04');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (145, 2, '2019-03-01');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (146, 2, '2019-02-28');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (147, 2, '2019-02-27');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (148, 2, '2019-02-26');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (149, 2, '2019-02-25');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (150, 2, '2019-02-22');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (151, 2, '2019-02-21');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (152, 2, '2019-02-20');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (153, 2, '2019-02-19');

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INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (155, 2, '2019-02-14');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (156, 2, '2019-02-13');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (157, 2, '2019-02-12');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (158, 2, '2019-02-11');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (159, 2, '2019-02-08');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (160, 2, '2019-02-07');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (161, 2, '2019-02-06');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (162, 2, '2019-02-05');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (163, 2, '2019-02-04');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (164, 2, '2019-02-01');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (165, 2, '2019-01-31');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (166, 2, '2019-01-30');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (167, 2, '2019-01-29');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (168, 2, '2019-01-28');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (169, 2, '2019-01-25');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (170, 2, '2019-01-24');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (171, 2, '2019-01-23');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (172, 2, '2019-01-22');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (173, 2, '2019-01-18');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (174, 2, '2019-01-17');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (175, 2, '2019-01-16');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (176, 2, '2019-01-15');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (177, 2, '2019-01-14');

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INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (179, 2, '2019-01-10');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (180, 2, '2019-01-09');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (181, 2, '2019-01-08');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (182, 2, '2019-01-07');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (183, 2, '2019-01-04');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (184, 2, '2019-01-03');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (185, 2, '2019-01-02');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (224, 1, '2019-04-02');

INSERT INTO daily\_data (daily\_data\_key, ticker\_key, day) VALUES (225, 1, '2019-04-01');

--bbands table

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INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (2, 275.0179, 281.3880, 268.6477, 2);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (3, 274.4779, 280.5022, 268.4535, 3);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (4, 273.8293, 279.6582, 268.0003, 4);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (5, 273.2943, 279.0815, 267.5071, 5);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (6, 272.5207, 278.2610, 266.7805, 6);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (7, 271.4893, 278.1448, 264.8337, 7);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (8, 270.5171, 277.4240, 263.6103, 8);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (9, 269.9029, 276.8558, 262.9499, 9);

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INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (14, 266.9686, 274.4604, 259.4767, 14);

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INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (19, 262.5971, 268.3352, 256.8591, 19);

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INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (28, 254.1593, 264.5288, 243.7898, 28);

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INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (104, 275.9236, 282.6355, 269.2117, 104);

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INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (172, 152.1743, 160.1317, 144.2168, 172);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (173, 152.4914, 160.9417, 144.0412, 173);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (174, 152.4493, 160.8183, 144.0803, 174);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (175, 152.4700, 160.8740, 144.0660, 175);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (176, 152.6293, 161.2950, 143.9636, 176);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (177, 152.1836, 161.3407, 143.0264, 177);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (178, 152.2357, 161.3507, 143.1207, 178);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (179, 152.5600, 161.9777, 143.1423, 179);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (180, 153.0664, 163.4131, 142.7198, 180);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (181, 153.9779, 166.3077, 141.6480, 181);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (182, 154.9200, 168.1054, 141.7346, 182);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (183, 156.1736, 169.7923, 142.5549, 183);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (184, 157.7943, 172.6082, 142.9803, 184);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (185, 159.7164, 172.8170, 146.6159, 185);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (224, 281.9586, 286.2068, 277.7103, 224);

INSERT INTO bbands (bbands\_key, real\_middle\_band, real\_upper\_band, real\_lower\_band, daily\_data\_key) VALUES (225, 281.6357, 285.2951, 277.9764, 225);

-- ema table

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (1, 277.0123, 1);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (2, 276.4995, 2);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (3, 275.8282, 3);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (4, 275.0923, 4);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (5, 274.5750, 5);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (6, 273.7228, 6);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (7, 272.8057, 7);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (8, 271.7914, 8);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (9, 271.2161, 9);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (10, 270.3774, 10);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (11, 269.5502, 11);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (12, 269.3125, 12);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (13, 269.0553, 13);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (14, 268.8142, 14);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (15, 267.9418, 15);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (16, 266.7955, 16);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (17, 265.6479, 17);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (18, 264.6674, 18);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (19, 263.4980, 19);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (20, 262.5908, 20);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (21, 262.4088, 21);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (22, 262.1085, 22);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (23, 261.2926, 23);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (24, 260.7910, 24);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (25, 260.2090, 25);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (26, 259.6199, 26);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (27, 258.0999, 27);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (28, 257.0199, 28);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (29, 256.1398, 29);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (30, 255.2042, 30);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (31, 254.7163, 31);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (32, 253.7688, 32);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (33, 252.6330, 33);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (34, 251.4469, 34);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (35, 250.2640, 35);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (36, 249.3494, 36);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (37, 248.6737, 37);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (38, 249.6656, 38);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (101, 278.3706, 101);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (102, 278.1462, 102);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (103, 277.6410, 103);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (104, 277.4101, 104);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (105, 278.2804, 105);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (106, 278.4916, 106);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (107, 277.1976, 107);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (108, 277.0993, 108);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (109, 277.6858, 109);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (110, 277.7334, 110);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (111, 278.3891, 111);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (112, 279.3324, 112);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (113, 278.8929, 113);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (114, 281.1592, 114);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (115, 280.5568, 115);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (116, 280.3361, 116);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (117, 279.8774, 117);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (118, 280.9400, 118);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (119, 280.5945, 119);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (120, 280.6901, 120);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (121, 280.5010, 121);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (122, 280.8919, 122);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (123, 280.5390, 123);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (124, 188.4264, 124);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (125, 187.8634, 125);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (126, 187.3997, 126);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (127, 187.1063, 127);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (128, 186.8032, 128);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (129, 186.8062, 129);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (130, 186.3764, 130);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (131, 185.3379, 131);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (132, 183.1707, 132);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (133, 182.0620, 133);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (134, 181.0691, 134);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (135, 179.5244, 135);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (136, 178.0588, 136);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (137, 176.7985, 137);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (138, 175.7070, 138);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (139, 174.5508, 139);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (140, 173.5843, 140);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (141, 173.7342, 141);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (142, 174.0084, 142);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (143, 173.8948, 143);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (144, 173.5314, 144);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (145, 173.0161, 145);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (146, 172.5819, 146);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (147, 172.4557, 147);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (148, 171.9192, 148);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (149, 171.3834, 149);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (150, 170.7509, 150);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (151, 170.2577, 151);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (152, 170.0794, 152);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (153, 169.6460, 153);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (154, 169.3607, 154);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (155, 169.1252, 155);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (156, 168.7531, 156);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (157, 168.4360, 157);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (158, 167.8906, 158);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (159, 167.5486, 159);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (160, 166.9127, 160);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (161, 166.0177, 161);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (162, 164.1905, 162);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (163, 161.9707, 163);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (164, 159.9086, 164);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (165, 158.4394, 165);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (166, 156.6615, 166);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (167, 154.7529, 167);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (168, 154.7691, 168);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (169, 154.4289, 169);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (170, 153.6887, 170);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (171, 153.9084, 171);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (172, 153.9058, 172);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (173, 154.0404, 173);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (174, 153.4228, 174);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (175, 152.8812, 175);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (176, 152.4236, 176);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (177, 152.2800, 177);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (178, 152.7867, 178);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (179, 152.8970, 179);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (180, 152.6964, 180);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (181, 152.5600, 181);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (182, 152.9622, 182);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (183, 154.0805, 183);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (184, 155.3740, 184);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (185, 158.3037, 185);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (224, 282.5334, 224);

INSERT INTO ema (ema\_key, ema, daily\_data\_key) VALUES (225, 281.7897, 225);

-- macd table

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (1, 0.2297, 4.0686, 4.2983, 1);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (2, 0.3260, 4.0112, 4.3372, 2);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (3, 0.3738, 3.9297, 4.3035, 3);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (4, 0.4003, 3.8362, 4.2365, 4);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (5, 0.5284, 3.7361, 4.2646, 5);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (6, 0.5335, 3.6040, 4.1375, 6);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (7, 0.5016, 3.4707, 3.9722, 7);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (8, 0.4070, 3.3453, 3.7523, 8);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (9, 0.4780, 3.2435, 3.7215, 9);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (10, 0.4419, 3.1240, 3.5659, 10);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (11, 0.3926, 3.0135, 3.4061, 11);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (12, 0.5915, 2.9154, 3.5069, 12);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (13, 0.8323, 2.7675, 3.5998, 13);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (14, 1.1402, 2.5594, 3.6997, 14);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (15, 1.2342, 2.2744, 3.5086, 15);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (16, 1.2111, 1.9659, 3.1769, 16);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (17, 1.1605, 1.6631, 2.8235, 17);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (18, 1.1519, 1.3730, 2.5249, 18);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (19, 1.0352, 1.0850, 2.1202, 19);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (20, 0.9858, 0.8262, 1.8120, 20);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (21, 1.2373, 0.5797, 1.8170, 21);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (22, 1.4908, 0.2704, 1.7612, 22);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (23, 1.5611, -0.1023, 1.4588, 23);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (24, 1.7711, -0.4926, 1.2786, 24);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (25, 1.9796, -0.9353, 1.0443, 25);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (26, 2.2162, -1.4302, 0.7860, 26);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (27, 2.0626, -1.9843, 0.0783, 27);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (28, 2.0302, -2.4999, -0.4697, 28);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (29, 2.0468, -3.0075, -0.9607, 29);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (30, 2.0099, -3.5192, -1.5093, 30);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (31, 2.1345, -4.0217, -1.8872, 31);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (32, 2.0524, -4.5553, -2.5029, 32);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (33, 1.8262, -5.0684, -3.2422, 33);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (34, 1.4789, -5.5249, -4.0460, 34);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (35, 1.0037, -5.8947, -4.8910, 35);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (36, 0.4906, -6.1456, -5.6549, 36);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (37, -0.0769, -6.2682, -6.3452, 37);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (38, -0.0520, -6.2490, -6.3010, 38);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (101, -0.1676, 4.0315, 3.8639, 101);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (102, -0.0556, 4.0734, 4.0178, 102);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (103, -0.0374, 4.0874, 4.0499, 103);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (104, 0.1125, 4.0967, 4.2092, 104);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (105, -0.4932, 3.8366, 3.3434, 105);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (106, -0.2880, 3.9599, 3.6718, 106);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (107, -0.8894, 3.1731, 2.2837, 107);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (108, -0.9855, 3.3955, 2.4100, 108);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (109, -0.7789, 3.6418, 2.8629, 109);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (110, -0.6672, 3.0186, 2.3514, 110);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (111, -0.4332, 2.9103, 2.4770, 111);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (112, -0.2200, 2.7798, 2.5598, 112);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (113, -0.3019, 2.8348, 2.5329, 113);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (114, -0.0092, 2.7033, 2.6941, 114);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (115, -0.1119, 2.7056, 2.5936, 115);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (116, -0.0676, 2.7336, 2.6660, 116);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (117, -0.1174, 2.7505, 2.6330, 117);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (118, -0.2344, 2.6581, 2.4236, 118);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (119, -0.4345, 2.5494, 2.1149, 119);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (120, -0.4277, 2.4425, 2.0148, 120);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (121, -0.5171, 2.3132, 1.7962, 121);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (122, -0.3692, 2.0961, 1.7269, 122);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (123, -0.4994, 2.1884, 1.6890, 123);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (124, -0.1306, 4.8387, 4.7081, 124);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (125, -0.1115, 4.8714, 4.7599, 125);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (126, -0.0386, 4.8992, 4.8607, 126);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (127, 0.1349, 4.9089, 5.0438, 127);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (128, 0.3546, 4.8752, 5.2297, 128);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (129, 0.7754, 4.7865, 5.5619, 129);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (130, 1.1139, 4.5927, 5.7065, 130);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (131, 1.2587, 4.3142, 5.5729, 131);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (132, 0.9104, 3.9995, 4.9099, 132);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (133, 0.9260, 3.7719, 4.6979, 133);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (134, 0.9845, 3.5404, 4.5249, 134);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (135, 0.7923, 3.2943, 4.0866, 135);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (136, 0.5649, 3.0962, 3.6611, 136);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (137, 0.3532, 2.9550, 3.3082, 137);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (138, 0.1486, 2.8667, 3.0153, 138);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (139, -0.1505, 2.8295, 2.6790, 139);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (140, -0.4516, 2.8672, 2.4155, 140);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (141, -0.3261, 2.9801, 2.6540, 141);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (142, -0.1002, 3.0616, 2.9614, 142);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (143, 0.0184, 3.0867, 3.1051, 143);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (144, 0.0584, 3.0820, 3.1405, 144);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (145, 0.0399, 3.0674, 3.1074, 145);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (146, 0.0521, 3.0574, 3.1095, 146);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (147, 0.2080, 3.0444, 3.2524, 147);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (148, 0.2198, 2.9924, 3.2123, 148);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (149, 0.2318, 2.9375, 3.1693, 149);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (150, 0.1990, 2.8795, 3.0786, 150);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (151, 0.2165, 2.8298, 3.0463, 151);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (152, 0.3795, 2.7756, 3.1552, 152);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (153, 0.4688, 2.6808, 3.1496, 153);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (154, 0.6450, 2.5636, 3.2086, 154);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (155, 0.8868, 2.4023, 3.2891, 155);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (156, 1.1248, 2.1806, 3.3054, 156);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (157, 1.4419, 1.8994, 3.3413, 157);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (158, 1.7272, 1.5389, 3.2662, 158);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (159, 2.1643, 1.1071, 3.2714, 159);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (160, 2.5647, 0.5660, 3.1308, 160);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (161, 2.9269, -0.0752, 2.8518, 161);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (162, 2.9250, -0.8069, 2.1181, 162);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (163, 2.6952, -1.5381, 1.1571, 163);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (164, 2.4239, -2.2119, 0.2119, 164);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (165, 2.3020, -2.8179, -0.5159, 165);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (166, 1.9641, -3.3934, -1.4293, 166);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (167, 1.4313, -3.8844, -2.4531, 167);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (168, 1.5943, -4.2423, -2.6480, 168);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (169, 1.6177, -4.6408, -3.0231, 169);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (170, 1.4386, -5.0452, -3.6067, 170);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (171, 1.6211, -5.4049, -3.7838, 171);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (172, 1.7312, -5.8102, -4.0790, 172);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (173, 1.9096, -6.2430, -4.3334, 173);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (174, 1.7669, -6.7204, -4.9535, 174);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (175, 1.5870, -7.1621, -5.5751, 175);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (176, 1.3651, -7.5588, -6.1937, 176);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (177, 1.1972, -7.9001, -6.7029, 177);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (178, 1.2568, -8.1994, -6.9426, 178);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (179, 1.1328, -8.5136, -7.3808, 179);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (180, 0.8103, -8.7968, -7.9865, 180);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (181, 0.4059, -8.9994, -8.5935, 181);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (182, 0.1182, -9.1009, -8.9827, 182);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (183, 0.0688, -9.1304, -9.0616, 183);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (184, 0.0836, -9.1476, -9.0640, 184);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (185, 0.8512, -9.1685, -8.3173, 185);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (224, 0.0999, 2.1027, 2.2026, 224);

INSERT INTO macd (macd\_key, macd\_hist, macd\_signal, macd, daily\_data\_key) VALUES (225, -0.0735, 2.0777, 2.0042, 225);

-- Time series daily table

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (1, 1, 279.1300, 279.3200, 280.3000, 278.9000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (2, 2, 280.7300, 279.5200, 281.3100, 279.4300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (3, 3, 278.1100, 279.1400, 279.3600, 277.4029);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (4, 4, 277.7000, 277.4200, 278.1000, 276.3450);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (5, 5, 277.8100, 278.4100, 278.9200, 277.2500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (6, 6, 276.4813, 277.8500, 278.5800, 276.4700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (7, 7, 276.3600, 277.3700, 277.4100, 276.1300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (8, 8, 273.7800, 274.3800, 275.6400, 272.8700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (9, 9, 275.0300, 274.9900, 275.9300, 274.5600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (10, 10, 272.4200, 274.1000, 274.5200, 272.3400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (11, 11, 271.2000, 270.6200, 271.4900, 270.0300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (12, 12, 268.7500, 270.4700, 270.5800, 267.8300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (13, 13, 270.9400, 270.1400, 271.5500, 268.2900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (14, 14, 272.7900, 272.7400, 273.3400, 271.9200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (15, 15, 272.4400, 273.1000, 273.4400, 271.8800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (16, 16, 270.1100, 271.9600, 272.0300, 269.3600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (17, 17, 270.1500, 270.0600, 271.2000, 269.1800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (18, 18, 267.5100, 269.9300, 270.4700, 267.2700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (19, 19, 265.1000, 267.5800, 268.5200, 264.2500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (20, 20, 263.9200, 263.4100, 264.5500, 262.4800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (21, 21, 263.3900, 263.7600, 263.8300, 261.7900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (22, 22, 265.6100, 265.7800, 266.7000, 263.6595);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (23, 23, 263.2100, 263.5500, 264.2000, 262.0800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (24, 24, 264.0100, 263.4100, 264.7900, 260.6600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (25, 25, 264.8200, 262.8600, 265.0600, 261.0600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (26, 26, 264.9800, 266.4600, 266.9800, 262.9980);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (27, 27, 260.0100, 262.9600, 263.9200, 259.9600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (28, 28, 260.8300, 260.9800, 261.9666, 260.6000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (29, 29, 257.8200, 260.3500, 260.7000, 257.8100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (30, 30, 256.8600, 257.4000, 258.3000, 256.4100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (31, 31, 257.6800, 258.9800, 259.0098, 257.0300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (32, 32, 256.2600, 258.8800, 259.1600, 255.5000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (33, 33, 257.5600, 257.9700, 258.9100, 256.1900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (34, 34, 256.8200, 256.7700, 257.3100, 254.0000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (35, 35, 252.6900, 254.3800, 255.9500, 251.6900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (36, 36, 247.5900, 252.3900, 253.1100, 247.1700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (37, 37, 248.2300, 244.2100, 248.5700, 243.6700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (38, 38, 245.9800, 250.1800, 251.2100, 245.9500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (101, 101, 281.6000, 279.3800, 281.8700, 276.8400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (102, 102, 280.4400, 280.4200, 280.8800, 278.8200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (103, 103, 278.9600, 278.6800, 279.4500, 278.3200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (104, 104, 278.5200, 279.2000, 279.5900, 277.4800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (105, 105, 279.1500, 277.3300, 279.1600, 276.9700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (106, 106, 279.5400, 279.0200, 279.7600, 278.4100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (107, 107, 275.2600, 277.6400, 277.9800, 275.2300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (108, 108, 272.9400, 274.4600, 274.6500, 272.4200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (109, 109, 276.8300, 275.0100, 276.9900, 274.0700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (110, 110, 279.0600, 279.4900, 280.0700, 278.8500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (111, 111, 280.4800, 281.3400, 282.3800, 280.3000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (112, 112, 280.5400, 281.3100, 282.2100, 280.3300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (113, 113, 281.3700, 281.1600, 281.8400, 280.6662);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (114, 114, 280.6400, 283.8700, 284.2500, 280.6100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (115, 115, 282.1600, 281.5500, 283.5000, 280.3200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (116, 116, 283.5100, 282.4000, 284.3600, 281.4100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (117, 117, 281.5500, 282.3300, 282.6600, 281.3000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (118, 118, 283.2200, 279.2500, 283.8030, 279.1800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (119, 119, 278.8700, 279.0400, 280.1800, 277.6500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (120, 120, 280.9900, 281.1200, 282.1800, 279.5600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (121, 121, 281.1100, 279.6500, 281.7600, 277.9300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (122, 122, 282.3900, 282.4800, 282.8400, 281.1400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (123, 123, 280.3500, 280.7100, 281.2100, 279.0700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (124, 124, 191.6400, 190.9600, 191.6800, 188.3800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (125, 125, 189.8300, 189.9500, 190.0800, 188.5400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (126, 126, 188.9500, 188.7200, 189.5590, 187.5300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (127, 127, 188.7500, 188.4700, 189.7600, 186.5500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (128, 128, 191.6640, 186.7900, 192.8800, 184.5800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (129, 129, 191.5100, 188.7400, 191.9800, 186.6000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (130, 130, 195.3400, 191.0500, 197.6900, 190.7800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (131, 131, 190.0200, 195.0900, 196.3300, 189.8100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (132, 132, 186.2300, 188.1600, 189.4900, 184.7300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (133, 133, 188.3500, 186.5300, 188.9900, 185.9200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (134, 134, 185.8000, 188.0200, 188.3900, 185.7900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (135, 135, 184.8500, 186.1200, 187.3300, 183.7400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (136, 136, 183.9000, 183.7300, 184.1000, 182.5600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (137, 137, 182.2500, 181.7100, 183.3000, 180.9200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (138, 138, 180.0000, 180.9100, 182.6700, 179.3700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (139, 139, 175.4900, 178.9000, 179.1200, 175.3500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (140, 140, 170.3200, 172.9100, 173.0700, 169.5000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (141, 141, 173.8700, 172.5000, 174.4400, 172.0200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (142, 142, 174.6700, 174.5200, 175.4900, 173.9400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (143, 143, 175.9400, 175.5300, 176.0000, 174.5400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (144, 144, 175.6900, 175.8500, 177.7500, 173.9700);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (145, 145, 174.2800, 174.9700, 175.1500, 172.8900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (146, 146, 174.3200, 173.1500, 174.9100, 172.9200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (147, 147, 173.2100, 174.8700, 175.0000, 172.7300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (148, 148, 173.7100, 174.3300, 175.3000, 173.1732);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (149, 149, 174.1600, 174.2300, 175.8700, 173.9500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (150, 150, 171.5800, 172.9700, 173.0000, 171.3800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (151, 151, 171.8000, 171.0600, 172.3700, 170.3000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (152, 152, 171.1900, 172.0300, 173.3200, 170.9900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (153, 153, 169.7100, 170.9300, 171.4400, 169.4900);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (154, 154, 171.2500, 170.4200, 171.7000, 169.7500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (155, 155, 169.7100, 170.8000, 171.2615, 169.3800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (156, 156, 171.3900, 170.1800, 172.4800, 169.9200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (157, 157, 170.1000, 170.8900, 171.0000, 169.7000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (158, 158, 171.0500, 169.4300, 171.2100, 169.2500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (159, 159, 168.9900, 170.4100, 170.6600, 168.4200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (160, 160, 172.4000, 170.9400, 173.9400, 170.3400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (161, 161, 174.6500, 174.2400, 175.5700, 172.8531);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (162, 162, 172.8600, 174.1800, 175.0800, 172.3501);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (163, 163, 167.4100, 171.2500, 171.6550, 167.2800);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (164, 164, 166.9600, 166.5200, 168.9800, 165.9300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (165, 165, 166.1100, 166.4400, 169.0000, 164.5600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (166, 166, 163.2500, 165.2500, 166.1500, 160.2300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (167, 167, 156.2500, 154.6800, 158.1300, 154.1100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (168, 168, 155.7900, 156.3000, 156.3300, 153.6600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (169, 169, 155.4800, 157.7600, 158.1300, 154.3200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (170, 170, 154.1100, 152.7000, 154.4800, 151.7400);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (171, 171, 154.1500, 153.9200, 155.1400, 151.7000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (172, 172, 156.4100, 153.3000, 156.7300, 152.6200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (173, 173, 157.5000, 156.8200, 157.8800, 155.9806);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (174, 174, 154.2000, 155.8600, 157.6600, 153.2600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (175, 175, 153.0800, 154.9400, 155.8800, 153.0000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (176, 176, 150.2700, 153.0700, 153.3900, 150.0500);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (177, 177, 150.8500, 150.0000, 151.2700, 149.2200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (178, 178, 152.8800, 152.2900, 153.7000, 151.5100);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (179, 179, 152.5000, 153.8000, 153.9700, 150.8600);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (180, 180, 151.2900, 153.3100, 154.5300, 149.6300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (181, 181, 149.5600, 150.7500, 151.8200, 148.5200);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (182, 182, 148.7000, 147.9300, 148.8300, 145.9000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (183, 183, 144.5300, 148.2600, 148.5499, 143.8000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (184, 184, 143.9800, 142.1900, 145.7200, 142.0000);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (185, 185, 154.8900, 157.9200, 158.8500, 154.2300);

INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (224, 224, 286.0400, 285.8600, 286.0600, 285.0900);

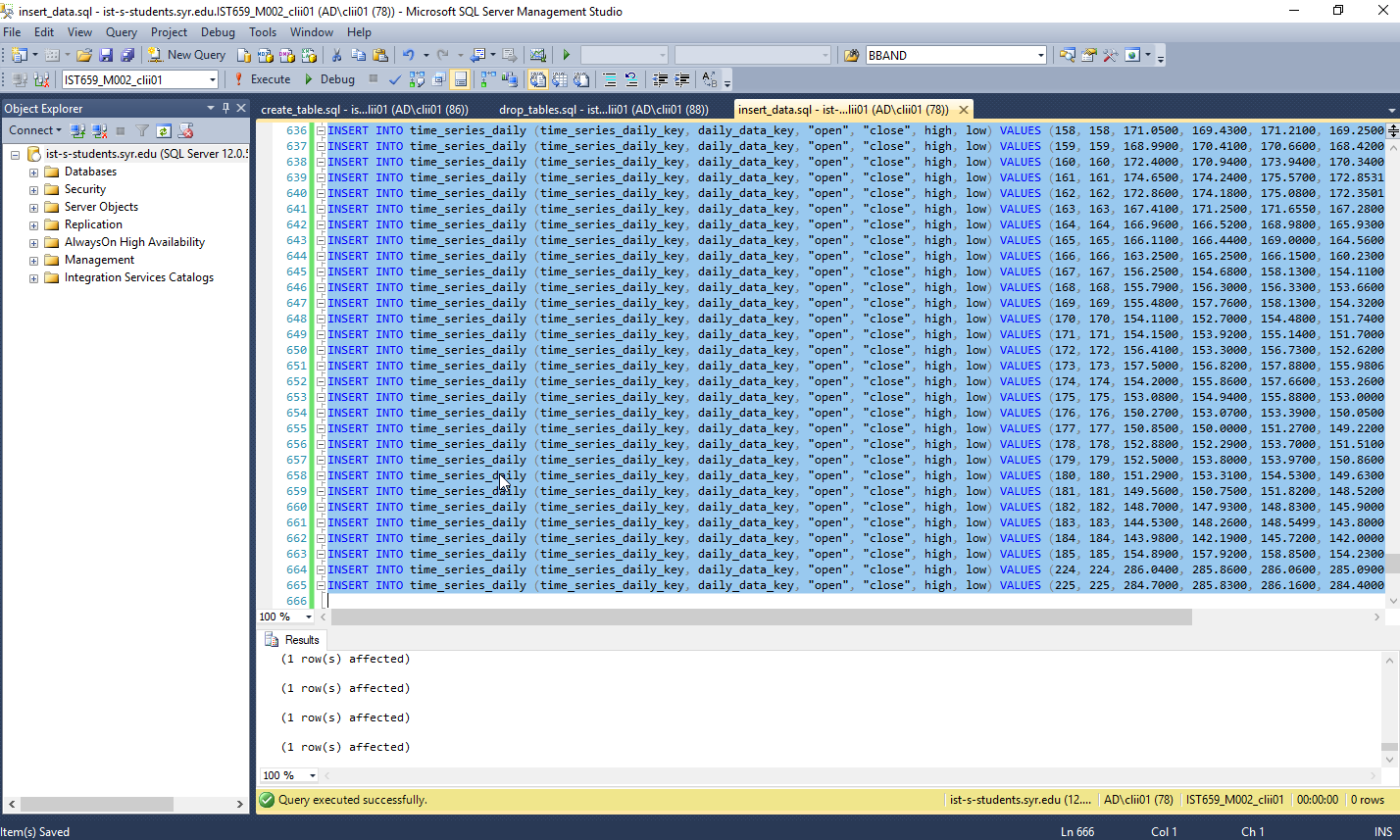
INSERT INTO time\_series\_daily (time\_series\_daily\_key, daily\_data\_key, "open", "close", high, low) VALUES (225, 225, 284.7000, 285.8300, 286.1600, 284.4000);

insert into backtest\_result (backtest\_result\_key, recommendation\_strategy\_version\_key, ticker\_key, date\_tested, days\_to\_hold, biggest\_loss, successes, failures, fizzles, total, percent\_success, percent\_not\_failed)

values (1, 1, 1, '2019-04-07', 2, 5.0, 5, 3, 2, 10, 0.5, 0.8);

insert into backtest\_result (backtest\_result\_key, recommendation\_strategy\_version\_key, ticker\_key, date\_tested, days\_to\_hold, biggest\_loss, successes, failures, fizzles, total, percent\_success, percent\_not\_failed)

values (2, 2, 1, '2019-04-07', 2, 5.0, 6, 3, 0, 9, 0.666665, 666665);



# Suggestions and Improvements

A common suggestion was adding buttons and clarifying the report/form names. Some data questions were also suggested. I decided to rename the report/form names and add buttons to the forms, and clarify many of the data questions.

Professor Yang

1. Add buttons to forms for adding and deleting a record, and traversing records
2. Report have more readable names
3. Add a new report, see all technical data, grouped by ticker

John

1. Putting company name into the reports

Ming Xuan

1. Make data question for recommending when to buy stock

Jessica Dischiave

1. Change the names of the forms and reports to be more readable
2. Add buttons to the bottom to go between forms.

Vidisha

1. Change the names of the attributes so they can be easily read
2. Add buttons to navigate between forms

Jing Wang

1. Remove things like "dbo\_macd" from forms
2. Add button to save and delete data.

Mingkang Zhang

1. Write a query looking at a specific stock, and whether or not it went up or not

# Data Questions

## Get all the stock price data for a particular day

SELECT \*

FROM daily\_data

join time\_series\_daily

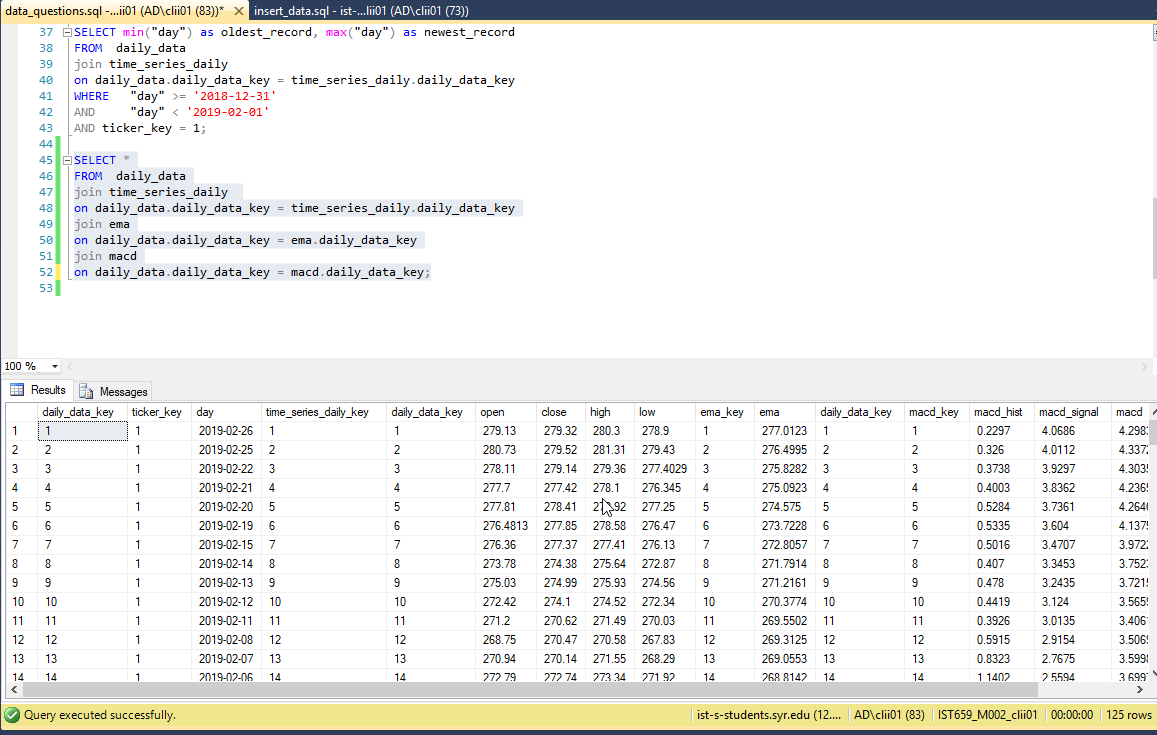
on daily\_data.daily\_data\_key = time\_series\_daily.daily\_data\_key

join ema

on daily\_data.daily\_data\_key = ema.daily\_data\_key

join macd

on daily\_data.daily\_data\_key = macd.daily\_data\_key;

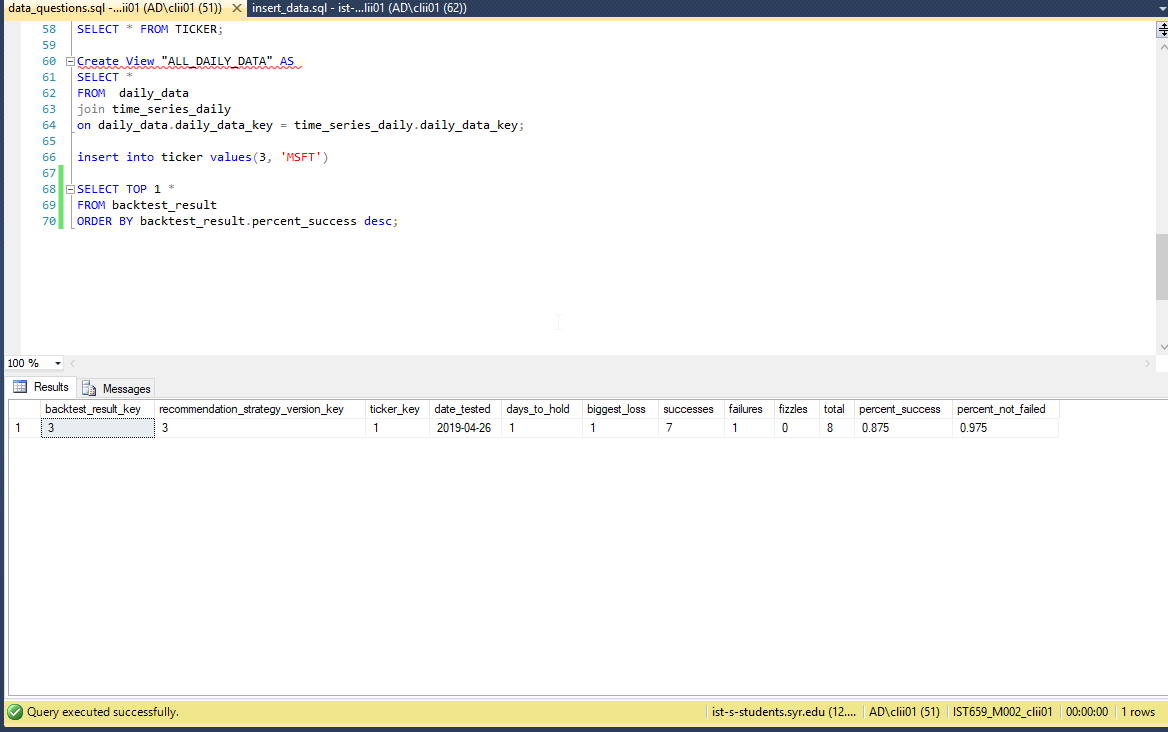


## Find the best Recommendation Strategy

SELECT TOP 1 \*

FROM backtest\_result

ORDER BY backtest\_result.percent\_success desc;



## Find the Weighted Daily Price for the first quarter of 2019, for a particular stock

SELECT "day", (2\*"open" + 3\*"close" + "high" + "low")/7 as weighted daily price

FROM daily\_data

join time\_series\_daily

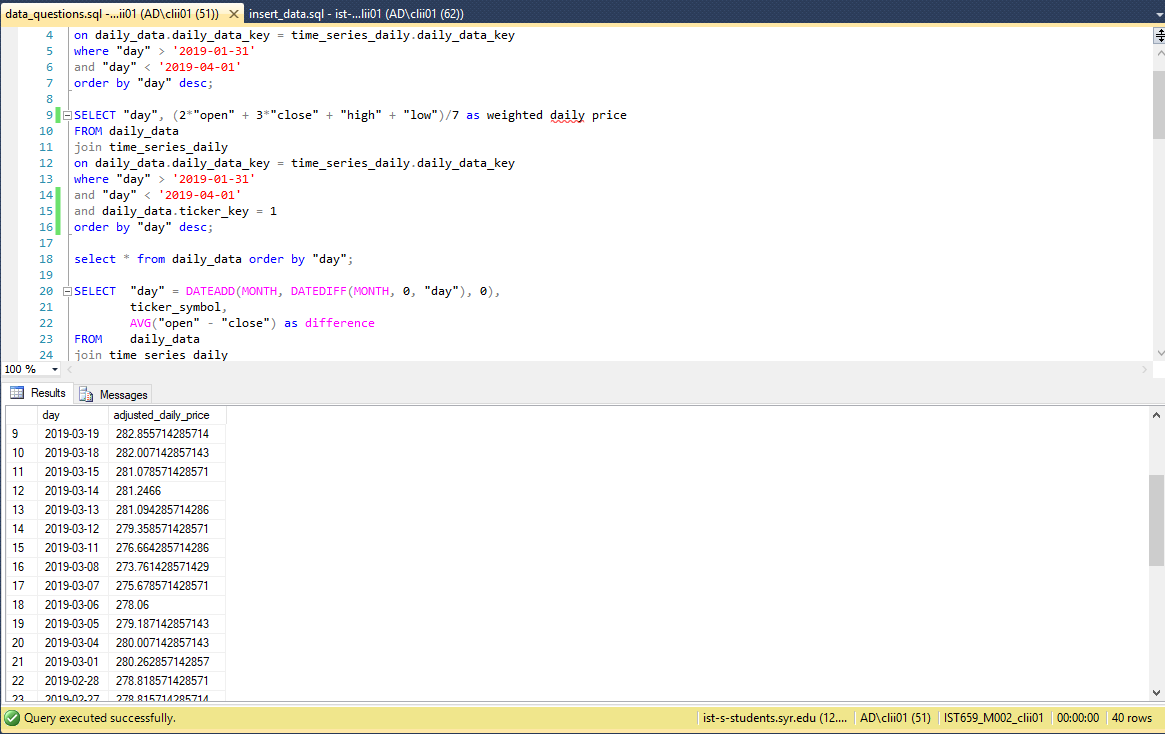
on daily\_data.daily\_data\_key = time\_series\_daily.daily\_data\_key

where "day" > '2019-01-31'

and "day" < '2019-04-01'

and daily\_data.ticker\_key = 1

order by "day" desc;



## Find the highest and lowest weighted price for the month of March

select max((2\*"open" + 3\*"close" + "high" + "low")/7) as HIGHEST, MIN((2\*"open" + 3\*"close" + "high" + "low")/7) as LOWEST

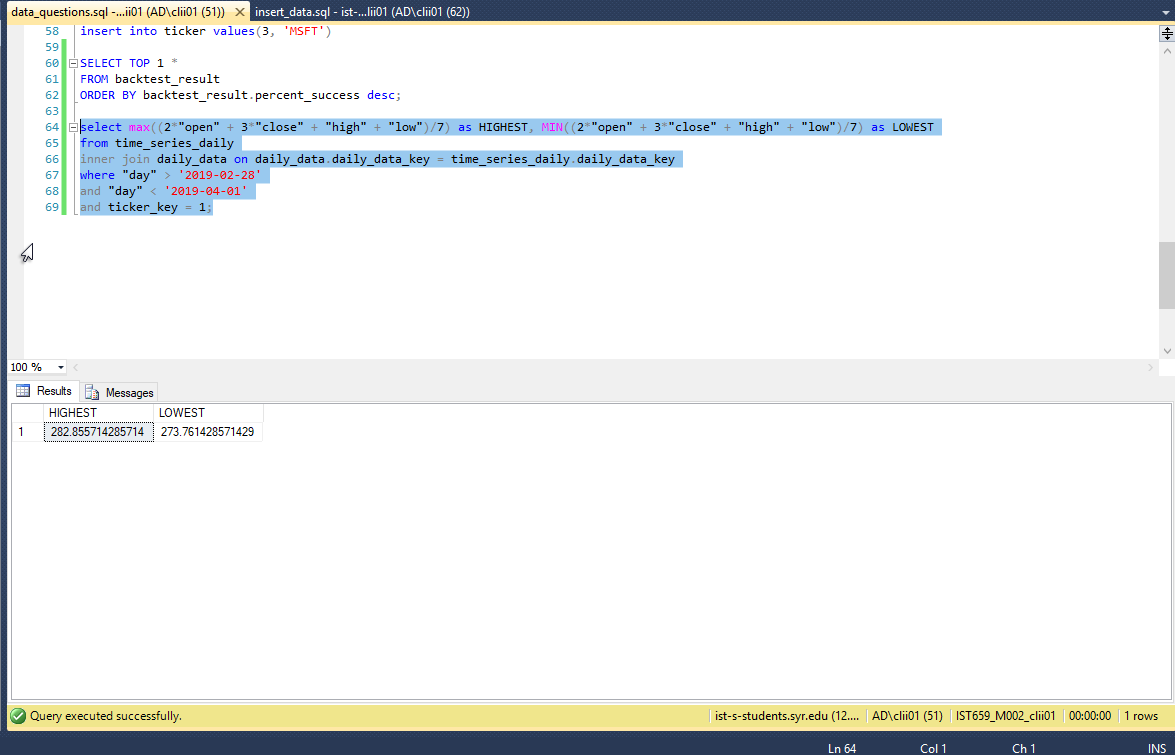
from time\_series\_daily

inner join daily\_data on daily\_data.daily\_data\_key = time\_series\_daily.daily\_data\_key

where "day" > '2019-02-28'

and "day" < '2019-04-01'

and ticker\_key = 1;



## Find all the days the weighted stock price is above or below the Bollinger Bands for the SPY stock

select "day", (2\*"open" + 3\*"close" + "high" + "low")/7 as Weighted\_Stock\_Price, real\_lower\_band, real\_upper\_band

from daily\_data

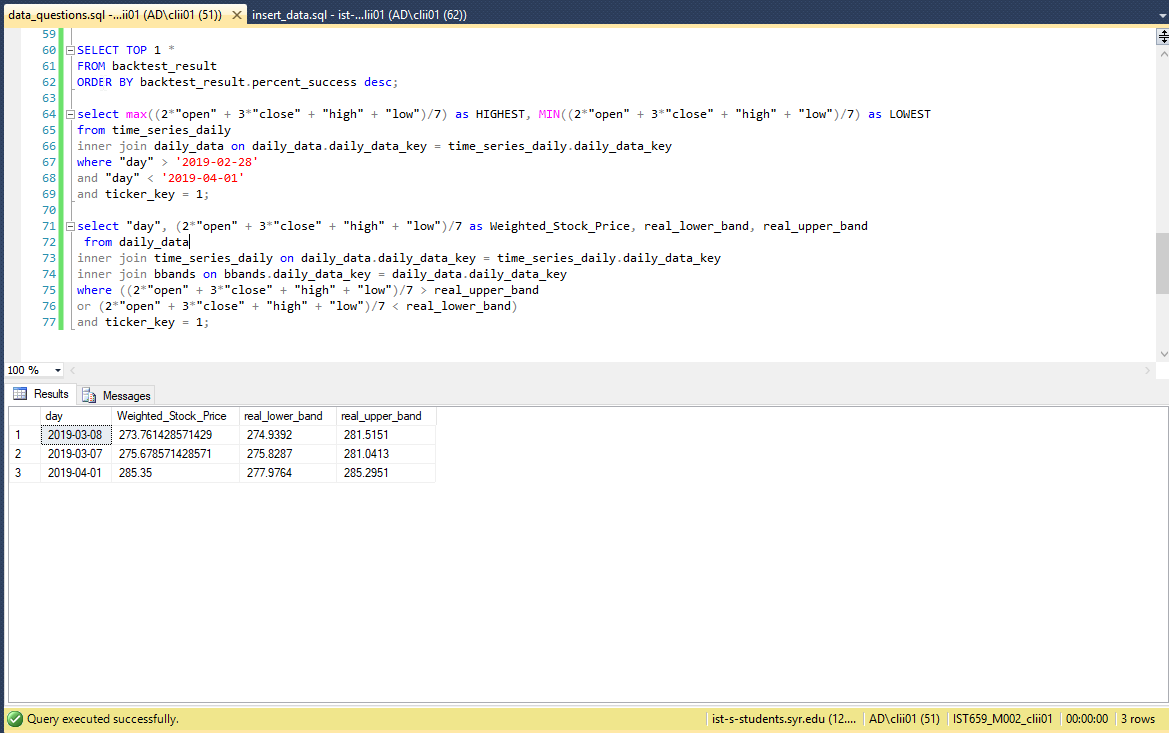
inner join time\_series\_daily on daily\_data.daily\_data\_key = time\_series\_daily.daily\_data\_key

inner join bbands on bbands.daily\_data\_key = daily\_data.daily\_data\_key

where ((2\*"open" + 3\*"close" + "high" + "low")/7 > real\_upper\_band

or (2\*"open" + 3\*"close" + "high" + "low")/7 < real\_lower\_band)

and ticker\_key = 1;



## Find all days where the weighted stock price is below the 10-Day EMA

select "day", (2\*"open" + 3\*"close" + "high" + "low")/7 as Weighted\_Stock\_Price, ema

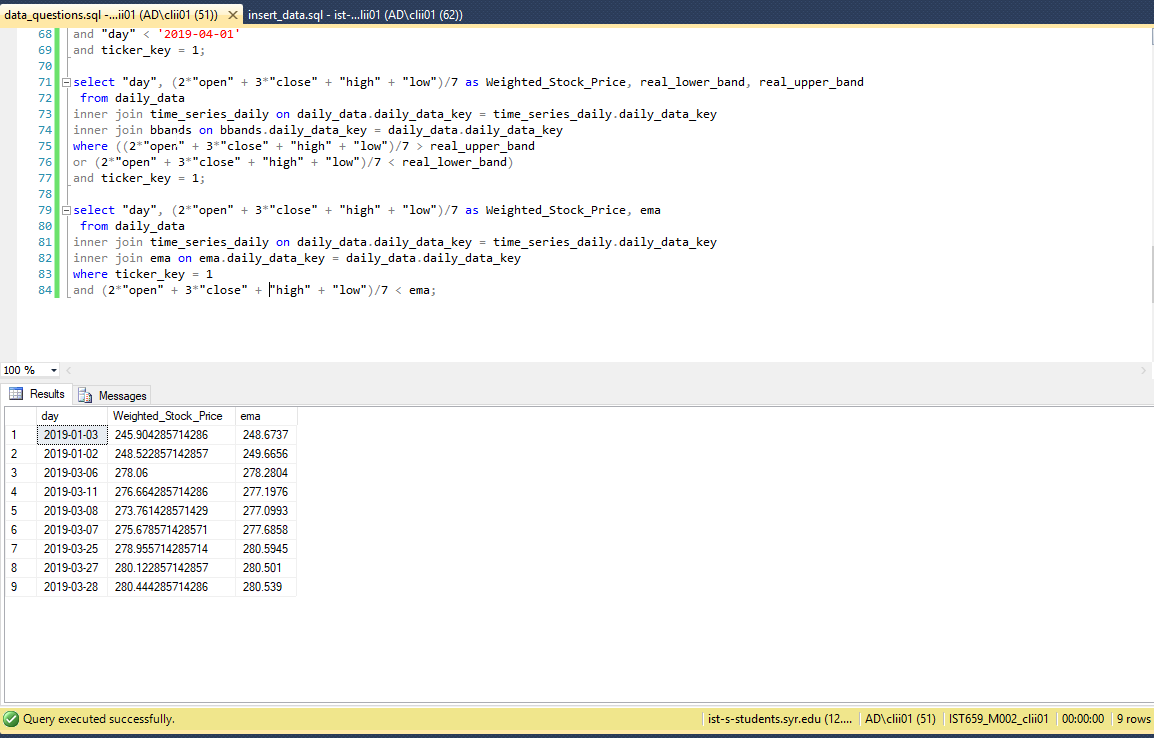
from daily\_data

inner join time\_series\_daily on daily\_data.daily\_data\_key = time\_series\_daily.daily\_data\_key

inner join ema on ema.daily\_data\_key = daily\_data.daily\_data\_key

where ticker\_key = 1

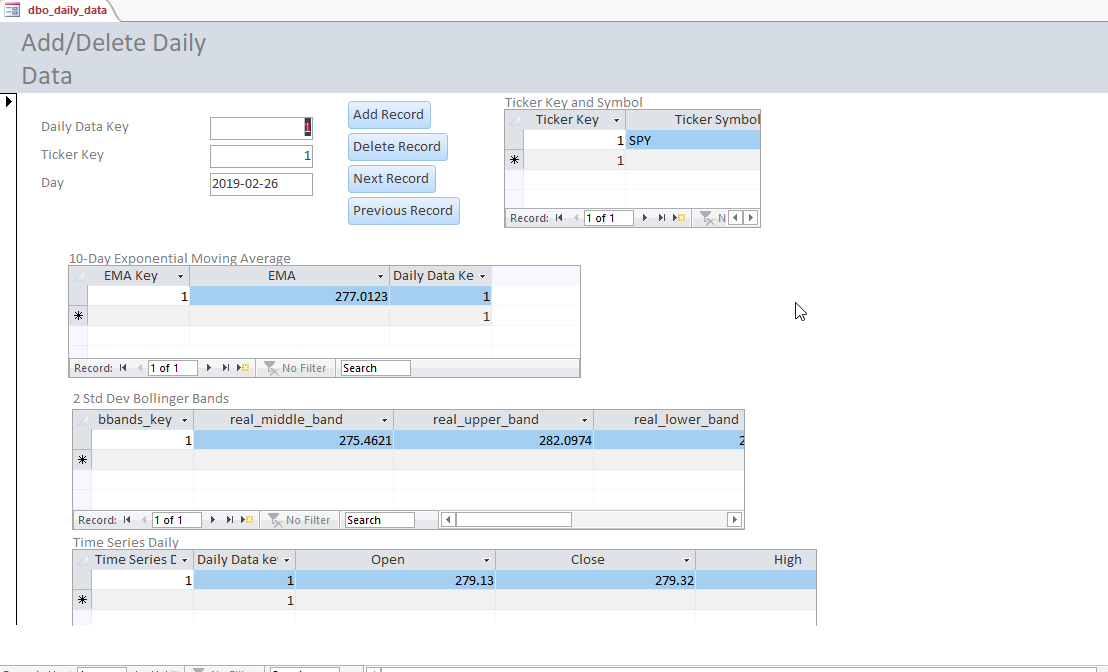
and (2\*"open" + 3\*"close" + "high" + "low")/7 < ema;



# Forms

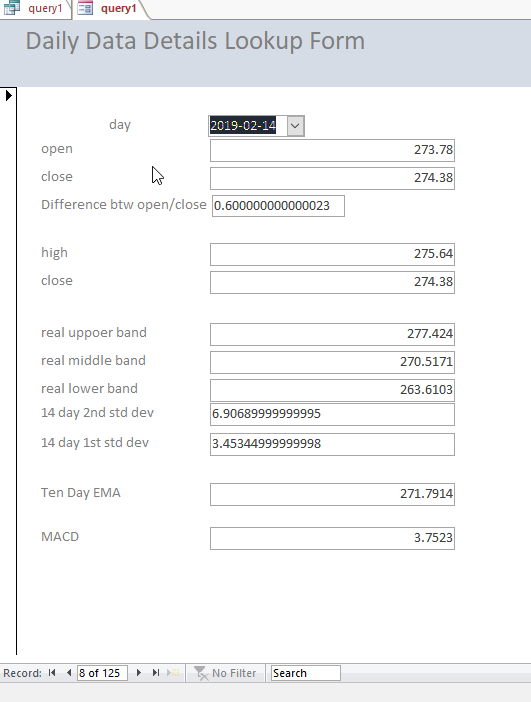
## Daily Data Add/Delete Form

This form allows users to add new daily data or remove daily data. It has multiple subforms to make allow people to see, add, and delete the details of other tables.



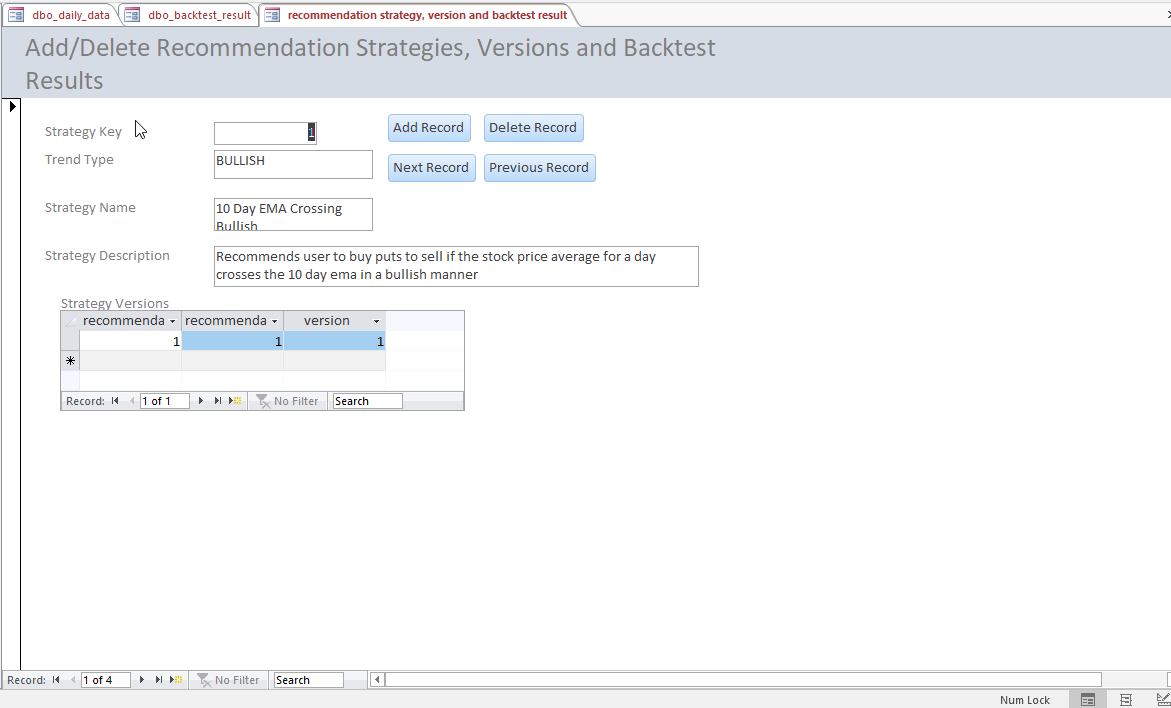
## Daily Data Details Lookup/Modification

This interface allows users to look up a particular day’s data and modify it according to their needs.



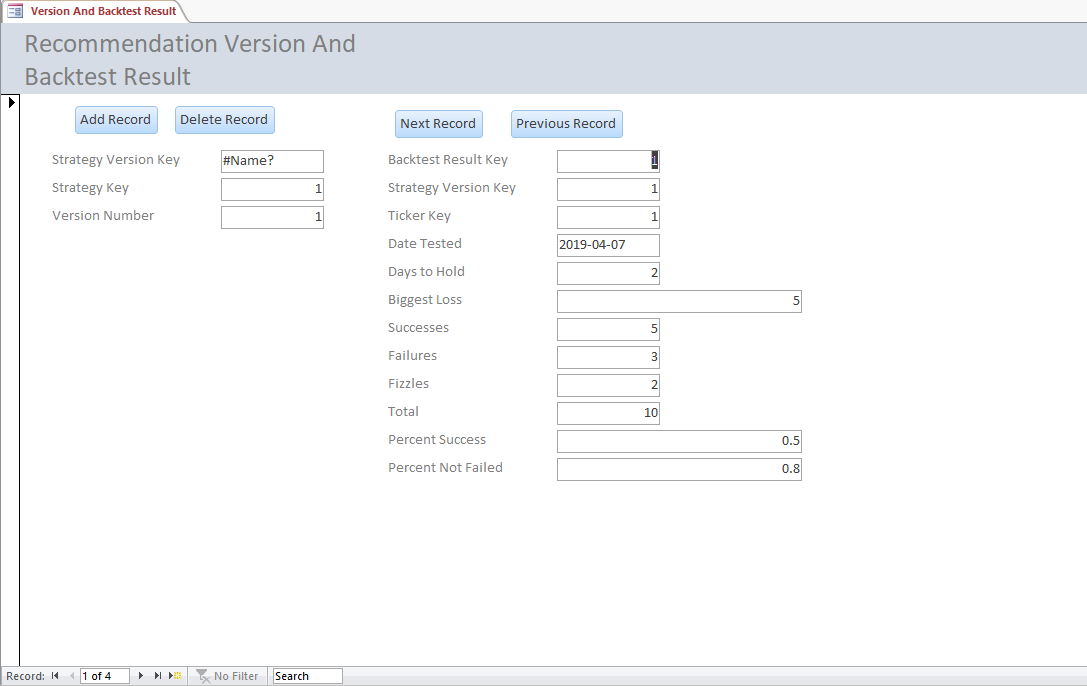
## Add/Delete Recommendation Strategy and Version Form

The purpose of this form is to allow user to add or delete new recommendation strategies and versions. Per peer review suggestions buttons were added and form names were clarified.



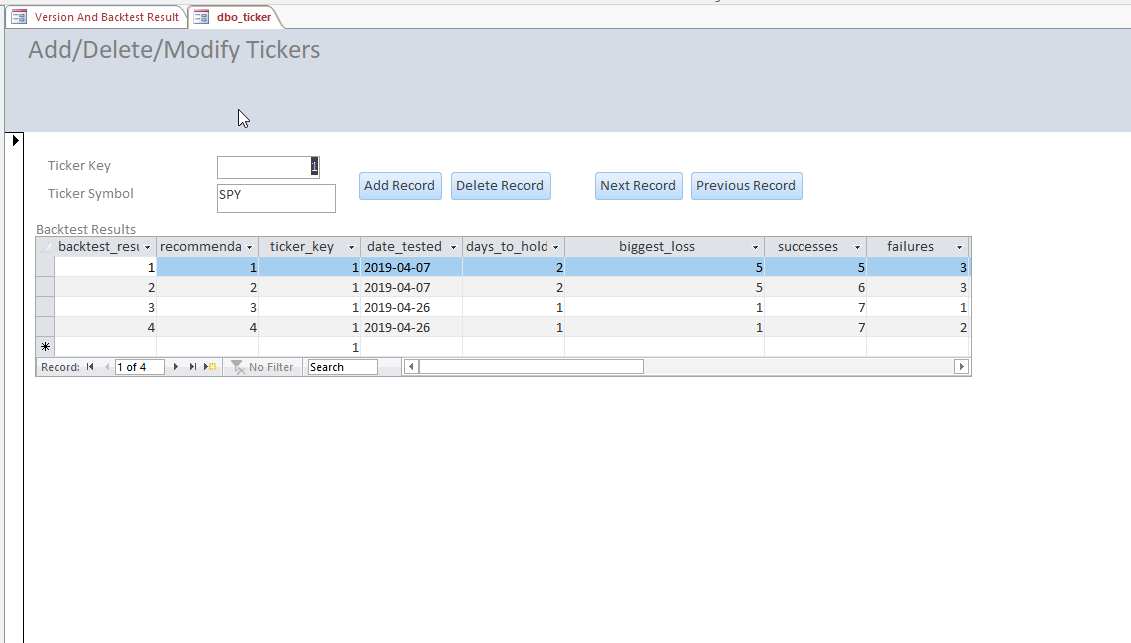
## Add/Delete or Modify Strategy Version and Backtest Result Form

This form is to add/delete or modify backtest results for a given recommendation version strategy



## Add/Delete or Modify Tickers

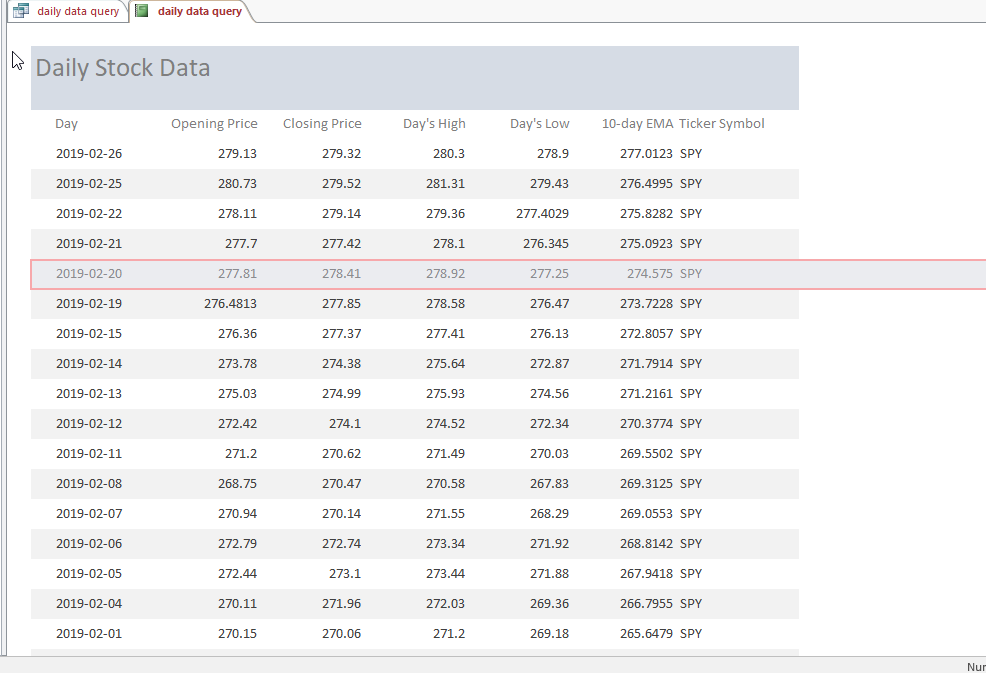
The purpose of this form is to add, delete or modify tickers. Per peer suggestions, buttons were added and names were clarified. A subform to the backtest result table was also added, to see what would be deleted when deleting the ticker rows.



# Reports

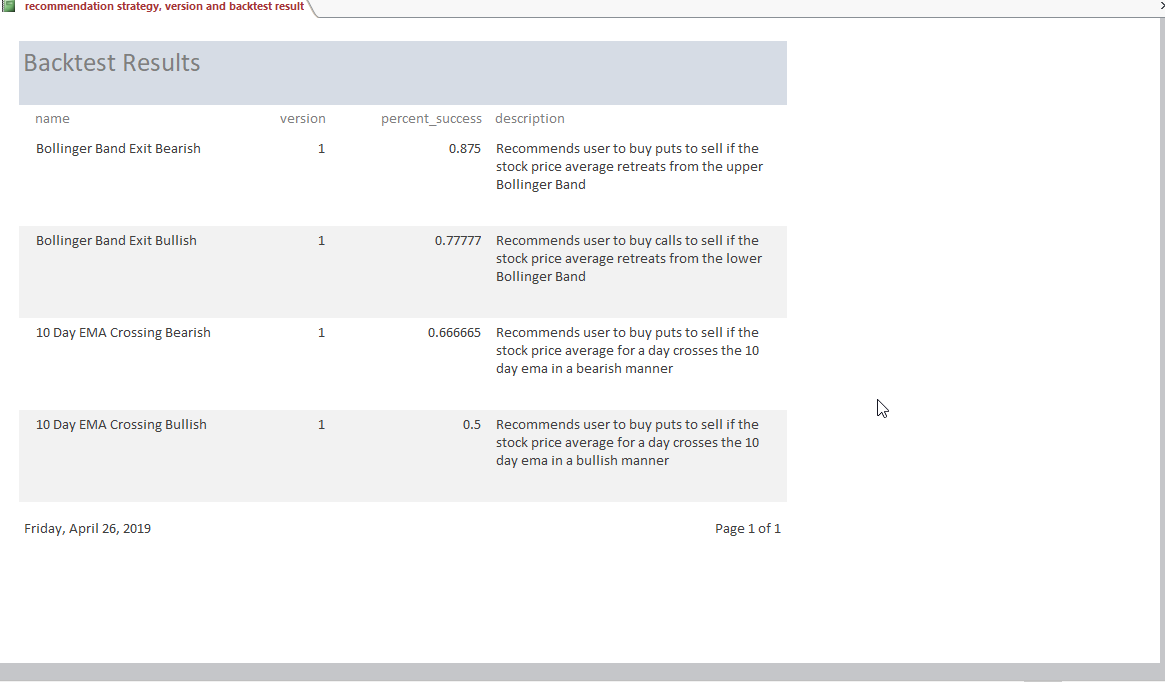
## Daily Stock Data Report

This Daily Stock Data Report shows important technical data for a particular day. As per improvements suggested by peers, the names have been clarified, and some distracting fields have been removed. The report also now sorts by Ticker Symbol.



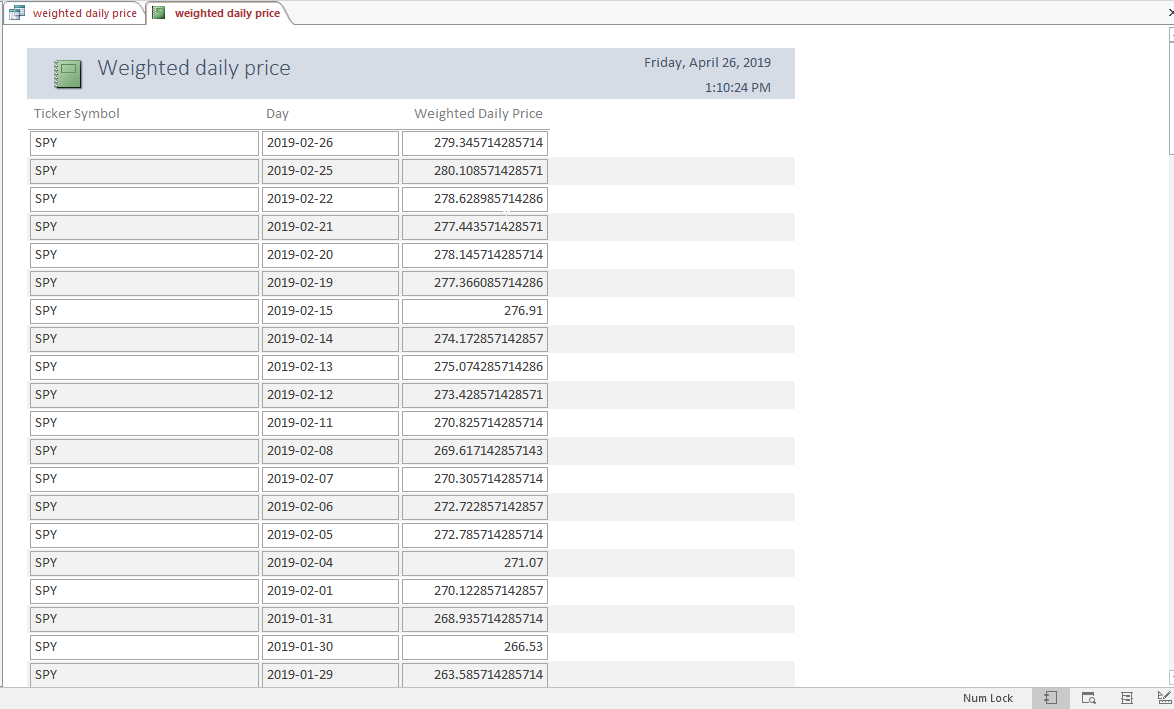
## Backtest Result Report

This Backtest Result Report shows recommendation strategies and their backtest results, sorted by success rate, perfect for picking which strategy to use. Per the peer suggestsion, unnessary fields were removed, and the naming was clarified.

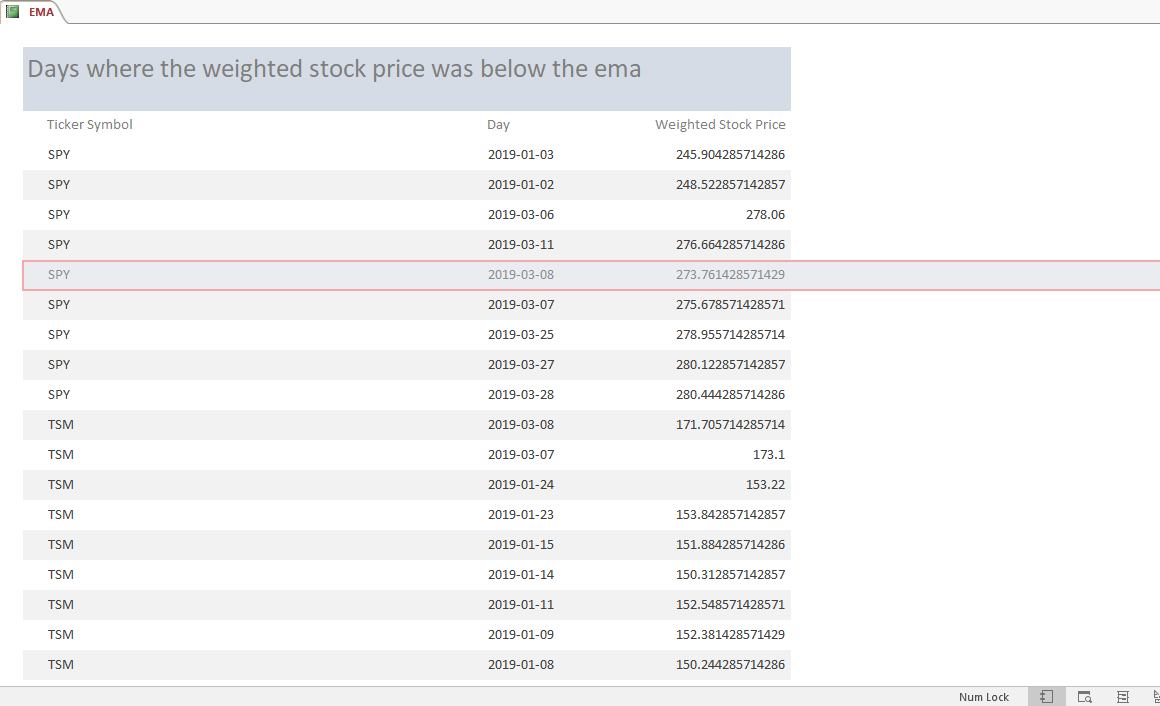


## Weighted Daily Price Report

When analyzing stock data, it is useful to weigh the various data using different values. This report calculates a weighted daily price for a specific price and put it into a report.



## Days where the weighted stock price was below the ema



## Days where the weighted stock price is lower than the lower Bollinger Band

