|  |
| --- |
| Assignment 1 |
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# 1. Loading a TAQ Quote File:

## (a) `quote set (”SDTFFIIIC”; enlist ”,”) 0: hsym ”S”$ file\_

It functions in the following steps:

1. Load the file with filename <file\_>
2. The formats of the loaded file is “Symbol, Date, Time, Float, Float, Int, Int, Int, Char”
3. The file is loaded as a table, with the first row of the file as col names, and they are separated with delimiter “,”
4. This loaded table is assigned to the symbol “Quote”

## (b) How many records are there in the table quote?

-- Code --

.taq.import\_quote\_file[“<path>/taq\_20100105\_quotes\_dow30.csv"]

-- Output --

There are 15089777 records.

## (c) What are the types of each column?

-- Code --

meta quote

-- Output --

Symbol, Date, Time, Float, Float, Int, Int, Int, Char

## (d)  Extract a list of the column names

-- Code –

*cols quote*

-- Output --

`SYMBOL`DATE`TIME`BID`OFR`BIDSIZ`OFRSIZ`MODE`EX

## (e) Extract a list of unique SYMBOLs.

-- Code –

*distinct quote[`SYMBOL]*

-- Output --

`AA`AXP`BA`BAC`CAT`CSCO`CVX`DD`DIS`GE`HD`HPQ`IBM`INTC`JNJ`JPM`KFT`KO`MCD`MMM`MRK`MSFT`PFE`PG`T`TRV`UTX`VZ`WMT`XOM

## (f) Query for the number of records for each SYMBOL.

-- Code –  
*select cnt:count DATE by SYMBOL from quote*

-- Output –

|  |  |
| --- | --- |
| AA | 767141 |
| AXP | 472911 |
| BA | 283397 |
| BAC | 1237552 |
| CAT | 358487 |
| CSCO | 741070 |
| CVX | 524716 |
| DD | 353140 |
| DIS | 395584 |
| GE | 666941 |
| HD | 374122 |
| HPQ | 468153 |
| IBM | 211773 |
| INTC | 720910 |
| JNJ | 346072 |
| JPM | 1172835 |
| KFT | 652845 |
| KO | 306632 |
| MCD | 232150 |
| MMM | 145652 |
| MRK | 445008 |
| MSFT | 600401 |
| PFE | 625112 |
| PG | 423356 |
| T | 571628 |
| TRV | 190393 |
| UTX | 215659 |
| VZ | 316796 |
| WMT | 450786 |
| XOM | 818555 |

## (g)  Query for the number of exchanges (EX) for the SYMBOL AA.

-- Code –  
*count select distinct EX from quote where SYMBOL=`AA*

-- Output –

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## (h)  Query for the number of modes (MODE) for the SYMBOL AA.

-- Code –

*count select distinct MODE from quote where SYMBOL=`AA*

-- Output --

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## (i) Find on the internet the association of these taq exchange characters to the full name of the exchange. Also find, if you can, the explanation of the MODE column.

-- Code –

*distinct quote[`EX]*

*distinct quote[`Mode]*

-- Output and Description --

The exchange that issue the quote:

* A – NYSE MKT Stock Exchange
* **B – NASDAQ OMX BX Stock Exchange**
* **C – National Stock Exchange**
* **D – FINRA**
* **I – International Securities Exchange**
* J – Direct Edge A Stock Exchange
* K – Direct Edge X Stock Exchange
* **M – Chicago Stock Exchange**
* **N – New York Stock Exchange**
* T – NASDAQ OMX Stock Exchange
* **P – NYSE Arca SM**
* S – Consolidated Tape System
* **T/Q – NASDAQ Stock Exchange**
* **W – CBOE Stock Exchange**
* X – NASDAQ OMX PSX Stock Exchange
* Y – BATS Y-Exchange
* **Z – BATS Exchange**

Mode (Selected):

* Fast trading (5) - Used during extremely active periods of short duration. While in this mode, quotes are entered on a "best efforts" basis
* Closed market maker (NASD) (8) - This condition is disseminated by each market maker to signify either the last quote of the day or the premature close of a market maker for the day. In the latter case, the market maker can re-open by transmitting a quote accompanied by Mode 12.
* Opening quote (10) – The first quote disseminated from a given market center for each security.
* Regular (NASD open) (12) - Indicates normal trading environment. May be used by NASD market makers in place of Mode 10 to indicate the first quote of the day or if a market maker re-opens a security during the day (see Mode 8).
* Order influx (15) - A non-regulatory halt used when there is a severe influx of buy and sell orders. To prevent a disorderly market, trading is temporarily suspended.

# 2. Loading a TAQ Quote File (taq\_ALL\_20100105\_trades.csv)

## (a)  What are the types of each column ?

-- Code –

*meta trade*

-- Output -*-*

|  |  |
| --- | --- |
| SYMBOL | s |
| DATE | d |
| EXCHANGE | c |
| TIME | t |
| PRICE | f |
| SIZE | i |
| COND | s |

## (b) Extract a list of the column names

-- Code –

*cols trade*

-- Output --

`SYMBOL`DATE`EXCHANGE`TIME`PRICE`SIZE`COND

## (c) Query for the number of records for each SYMBOL.

-- Code –

select CNT1:count DATE by SYMBOL from trade

-- Output –

|  |  |
| --- | --- |
| AA | 119346 |
| AXP | 40162 |
| BA | 38902 |
| BAC | 270172 |
| CAT | 30093 |
| CSCO | 118171 |
| CVX | 45046 |
| DD | 38764 |
| DIS | 39348 |
| GE | 104651 |
| HD | 53973 |
| HPQ | 55177 |
| IBM | 33682 |
| INTC | 123614 |
| JNJ | 42610 |
| JPM | 139515 |
| KFT | 114462 |
| KO | 42971 |
| MCD | 27205 |
| MMM | 16546 |
| MRK | 56589 |
| MSFT | 117683 |
| PFE | 92913 |
| PG | 38525 |
| T | 99178 |
| TRV | 26135 |
| UTX | 27960 |
| VZ | 60511 |
| WMT | 59152 |
| XOM | 114285 |

## (d) Query for the number of records for each SYMBOL, EXCHANGE.

-- Code –

*select CNT2:count DATE by SYMBOL, EXCHANGE from trade*

*--* Output --

|  |  |  |
| --- | --- | --- |
| SYMBOL | EXCHANGE | CNT2 |
| AA | B | 12751 |
| AA | C | 282 |
| AA | D | 43094 |
| AA | I | 1696 |
| AA | M | 44 |
| AA | N | 10696 |
| AA | P | 15637 |
| AA | T | 21321 |
| AA | W | 36 |
| AA | Z | 13789 |
| AXP | B | 4044 |
| AXP | C | 394 |
| AXP | D | 9909 |
| AXP | I | 576 |
| AXP | M | 51 |
| AXP | N | 7298 |
| AXP | P | 3316 |
| AXP | T | 10179 |
| AXP | W | 7 |
| AXP | Z | 4388 |
| BA | B | 2236 |
| BA | C | 90 |
| BA | D | 8090 |
| BA | I | 737 |
| BA | M | 12 |
| BA | N | 7895 |
| BA | P | 4957 |
| BA | T | 9277 |
| BA | W | 6 |
| BA | Z | 5602 |
| BAC | B | 28953 |
| BAC | C | 898 |
| BAC | D | 122847 |
| BAC | I | 4628 |
| BAC | M | 84 |
| BAC | N | 15462 |
| BAC | P | 30827 |
| BAC | T | 37133 |
| BAC | W | 45 |
| BAC | Z | 29295 |
| CAT | B | 2296 |
| CAT | C | 90 |
| CAT | D | 8129 |
| CAT | I | 467 |
| CAT | M | 10 |
| CAT | N | 5252 |
| CAT | P | 3757 |
| CAT | T | 7668 |
| CAT | W | 15 |
| CAT | Z | 2409 |
| CSCO | B | 8539 |
| CSCO | C | 277 |
| CSCO | D | 38172 |
| CSCO | I | 889 |
| CSCO | M | 23 |
| CSCO | P | 15924 |
| CSCO | Q | 30564 |
| CSCO | W | 42 |
| CSCO | Z | 23741 |
| CVX | B | 6147 |
| CVX | C | 420 |
| CVX | D | 10604 |
| CVX | I | 1041 |
| CVX | M | 179 |
| CVX | N | 9947 |
| CVX | P | 4491 |
| CVX | T | 8341 |
| CVX | W | 6 |
| CVX | Z | 3870 |
| DD | B | 6105 |
| DD | C | 177 |
| DD | D | 9009 |
| DD | I | 287 |
| DD | M | 51 |
| DD | N | 5525 |
| DD | P | 4745 |
| DD | T | 7374 |
| DD | W | 13 |
| DD | Z | 5478 |
| DIS | B | 2954 |
| DIS | C | 137 |
| DIS | D | 12637 |
| DIS | I | 300 |
| DIS | M | 36 |
| DIS | N | 4593 |
| DIS | P | 4687 |
| DIS | T | 7772 |
| DIS | W | 8 |
| DIS | Z | 6224 |
| GE | B | 12026 |
| GE | C | 313 |
| GE | D | 49203 |
| GE | I | 893 |
| GE | M | 66 |
| GE | N | 7011 |
| GE | P | 10539 |
| GE | T | 13967 |
| GE | W | 18 |
| GE | Z | 10615 |
| HD | B | 5643 |
| HD | C | 147 |
| HD | D | 16237 |
| HD | I | 313 |
| HD | M | 8 |
| HD | N | 7315 |
| HD | P | 5867 |
| HD | T | 11519 |
| HD | W | 10 |
| HD | Z | 6914 |
| HPQ | B | 4446 |
| HPQ | C | 203 |
| HPQ | D | 13376 |
| HPQ | I | 405 |
| HPQ | M | 45 |
| HPQ | N | 7233 |
| HPQ | P | 8763 |
| HPQ | T | 14188 |
| HPQ | W | 5 |
| HPQ | Z | 6513 |
| IBM | B | 462 |
| IBM | C | 101 |
| IBM | D | 8418 |
| IBM | I | 740 |
| IBM | M | 6 |
| IBM | N | 7680 |
| IBM | P | 4018 |
| IBM | T | 8271 |
| IBM | W | 14 |
| IBM | Z | 3972 |
| INTC | B | 9843 |
| INTC | C | 513 |
| INTC | D | 43767 |
| INTC | I | 1712 |
| INTC | M | 65 |
| INTC | P | 15630 |
| INTC | Q | 27788 |
| INTC | W | 22 |
| INTC | Z | 24274 |
| JNJ | B | 3099 |
| JNJ | C | 184 |
| JNJ | D | 10494 |
| JNJ | I | 558 |
| JNJ | M | 79 |
| JNJ | N | 7855 |
| JNJ | P | 5119 |
| JNJ | T | 10303 |
| JNJ | W | 7 |
| JNJ | Z | 4912 |
| JPM | B | 12042 |
| JPM | C | 582 |
| JPM | D | 35392 |
| JPM | I | 1841 |
| JPM | M | 91 |
| JPM | N | 15438 |
| JPM | P | 22517 |
| JPM | T | 35920 |
| JPM | W | 8 |
| JPM | Z | 15684 |
| KFT | B | 8537 |
| KFT | C | 188 |
| KFT | D | 35291 |
| KFT | I | 1384 |
| KFT | M | 100 |
| KFT | N | 11331 |
| KFT | P | 17961 |
| KFT | T | 23420 |
| KFT | W | 40 |
| KFT | Z | 16210 |
| KO | B | 5171 |
| KO | C | 295 |
| KO | D | 10943 |
| KO | I | 719 |
| KO | M | 102 |
| KO | N | 8335 |
| KO | P | 4044 |
| KO | T | 9207 |
| KO | W | 4 |
| KO | Z | 4151 |
| MCD | B | 2746 |
| MCD | C | 280 |
| MCD | D | 5301 |
| MCD | I | 419 |
| MCD | M | 8 |
| MCD | N | 6117 |
| MCD | P | 3235 |
| MCD | T | 6426 |
| MCD | W | 2 |
| MCD | Z | 2671 |
| MMM | B | 1042 |
| MMM | C | 92 |
| MMM | D | 3615 |
| MMM | I | 237 |
| MMM | N | 4473 |
| MMM | P | 1835 |
| MMM | T | 3829 |
| MMM | W | 2 |
| MMM | Z | 1421 |
| MRK | B | 4187 |
| MRK | C | 224 |
| MRK | D | 17391 |
| MRK | I | 413 |
| MRK | M | 80 |
| MRK | N | 8541 |
| MRK | P | 7066 |
| MRK | T | 12318 |
| MRK | W | 4 |
| MRK | Z | 6365 |
| MSFT | B | 9578 |
| MSFT | C | 431 |
| MSFT | D | 39850 |
| MSFT | I | 991 |
| MSFT | M | 41 |
| MSFT | P | 16271 |
| MSFT | Q | 27776 |
| MSFT | W | 43 |
| MSFT | Z | 22702 |
| PFE | B | 10348 |
| PFE | C | 333 |
| PFE | D | 28794 |
| PFE | I | 1106 |
| PFE | M | 124 |
| PFE | N | 8212 |
| PFE | P | 12409 |
| PFE | T | 19980 |
| PFE | W | 53 |
| PFE | Z | 11554 |
| PG | B | 3866 |
| PG | C | 451 |
| PG | D | 7824 |
| PG | I | 533 |
| PG | M | 24 |
| PG | N | 6161 |
| PG | P | 4215 |
| PG | T | 10418 |
| PG | Z | 5033 |
| T | B | 10979 |
| T | C | 270 |
| T | D | 38505 |
| T | I | 1059 |
| T | M | 14 |
| T | N | 7022 |
| T | P | 12822 |
| T | T | 17659 |
| T | W | 41 |
| T | Z | 10807 |
| TRV | B | 2057 |
| TRV | C | 157 |
| TRV | D | 5355 |
| TRV | I | 342 |
| TRV | M | 68 |
| TRV | N | 7222 |
| TRV | P | 3131 |
| TRV | T | 5204 |
| TRV | W | 3 |
| TRV | Z | 2596 |
| UTX | B | 3451 |
| UTX | C | 149 |
| UTX | D | 6928 |
| UTX | I | 424 |
| UTX | M | 13 |
| UTX | N | 6059 |
| UTX | P | 2631 |
| UTX | T | 6176 |
| UTX | Z | 2129 |
| VZ | B | 4253 |
| VZ | C | 246 |
| VZ | D | 21645 |
| VZ | I | 853 |
| VZ | M | 4 |
| VZ | N | 7858 |
| VZ | P | 8070 |
| VZ | T | 10867 |
| VZ | W | 49 |
| VZ | Z | 6666 |
| WMT | B | 5262 |
| WMT | C | 360 |
| WMT | D | 14314 |
| WMT | I | 707 |
| WMT | M | 44 |
| WMT | N | 7462 |
| WMT | P | 9097 |
| WMT | T | 13835 |
| WMT | W | 11 |
| WMT | Z | 8060 |
| XOM | B | 9876 |
| XOM | C | 243 |
| XOM | D | 27475 |
| XOM | I | 1434 |
| XOM | M | 24 |
| XOM | N | 14722 |
| XOM | P | 19202 |
| XOM | T | 23089 |
| XOM | W | 3 |
| XOM | Z | 18217 |

## (e) Find on the internet the association of the COND fields with condition description.

* ‘@’ = Regular Trade   
  ‘A’ = Acquisition   
  ‘B’ = Bunched Trade   
  ‘C’ = Cash Trade   
  ‘D’ = Distribution   
  ‘G’ = Bunched Sold Trade   
  ‘K’ = Rule 155 Trade (AMEX Only)
* ‘L’ = Sold Last   
  ‘M’ = Market Center Close Price   
  ‘N’ = Next Day   
  ‘O’ = Opened   
  ‘P’ = Prior Reference Price   
  ‘Q’ = Market Center Open Price   
  ‘R’ = Seller (Long-Form Message Formats Only)   
  ‘S’ = Split Trade   
  ‘T’ = Form - T Trade   
  ‘U’ = Extended Hours (Sold Out of Sequence)   
  ‘W’ = Average Price Trade

# 3. Wall-Clock Time Ruler

-- Code –

*/ @summary: generate time points uniformly spaced in seconds, makes a ruler in time with intervals d\_sec seconds*

*/ @param apart. A table called 'ruler' is created.*

*/ @param start\_: type time*

*/ @param end\_: type time*

*/ @param dsec\_: type int*

*.taq.make\_time\_ruler\_second: {[start\_; end\_; dsec\_]*

*/ convert to integers*

*s\_sec: `int$ `second$ start\_;*

*e\_sec: `int$ `second$ end\_;*

*/ find maximum number of intervals that fit the range*

*n\_intervals: ceiling (e\_sec - s\_sec) % dsec\_;*

*/ intervals are marked from the end backwards to roughly*

*/ the start, and the start is explicitly added to the list.*

*time\_v: `time$ `second$ distinct s\_sec, reverse e\_sec - dsec\_ \* til n\_intervals;*

*/ make a table called 'ruler' with column name TIME*

*`ruler\_second set*

*flip (enlist `TIME) ! enlist time\_v;*

*};*

# 4. Prevailing Quote and Intensity Bins

## (a) Execute the query, report and explain your result

-- Code –

* *update CNT:i from select from quote where SYMBOL="S"$ symbol\_, EX= exch\_, MODE=12*

-- Result –

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SYMBOL | DATE | TIME | BID | OFR | BIDSIZ | OFRSIZ | MODE | EX | CNT |
| AA | 2010.01.05 | 30:00.0 | 16.79 | 16.88 | 1 | 7 | 12 | I | 0 |
| AA | 2010.01.05 | 30:01.0 | 16.8 | 16.88 | 1 | 7 | 12 | I | 1 |
| AA | 2010.01.05 | 30:01.0 | 16.8 | 16.87 | 1 | 1 | 12 | I | 2 |
| AA | 2010.01.05 | 30:02.0 | 16.79 | 16.87 | 1 | 1 | 12 | I | 3 |
| AA | 2010.01.05 | 30:02.0 | 16.79 | 16.86 | 1 | 2 | 12 | I | 4 |
| AA | 2010.01.05 | 30:03.0 | 16.79 | 16.85 | 1 | 1 | 12 | I | 5 |
| AA | 2010.01.05 | 30:03.0 | 16.79 | 16.86 | 1 | 2 | 12 | I | 6 |
| AA | 2010.01.05 | 30:05.0 | 16.79 | 16.85 | 1 | 1 | 12 | I | 7 |
| AA | 2010.01.05 | 30:05.0 | 16.79 | 16.83 | 1 | 10 | 12 | I | 8 |
| AA | 2010.01.05 | 30:09.0 | 16.8 | 16.83 | 1 | 10 | 12 | I | 9 |
| AA | 2010.01.05 | 30:09.0 | 16.79 | 16.83 | 1 | 10 | 12 | I | 10 |
| AA | 2010.01.05 | 30:17.0 | 16.8 | 16.83 | 3 | 10 | 12 | I | 11 |
| AA | 2010.01.05 | 30:17.0 | 16.79 | 16.83 | 1 | 10 | 12 | I | 12 |
| AA | 2010.01.05 | 30:17.0 | 16.8 | 16.83 | 2 | 10 | 12 | I | 13 |
| AA | 2010.01.05 | 30:17.0 | 16.79 | 16.83 | 1 | 10 | 12 | I | 14 |
| AA | 2010.01.05 | 30:17.0 | 16.79 | 16.83 | 1 | 11 | 12 | I | 15 |
| AA | 2010.01.05 | 30:17.0 | 16.79 | 16.83 | 1 | 10 | 12 | I | 16 |
| AA | 2010.01.05 | 30:17.0 | 16.81 | 16.83 | 2 | 10 | 12 | I | 17 |
| AA | 2010.01.05 | 30:17.0 | 16.81 | 16.83 | 2 | 11 | 12 | I | 18 |
| AA | 2010.01.05 | 30:17.0 | 16.81 | 16.83 | 2 | 10 | 12 | I | 19 |
| .. |  |  |  |  |  |  |  |  |  |

This query does two things –

* Select a sub table from table `quote where SYMBOL is “AA”, EXCHANGE is “I”, MODE is 12
* Add one col to the sub table which is the value of the implied col.

## (b) Execute the query, report and explain your result

-- Code –

* *(update CNT:i from select from quote where SYMBOL="S"$ symbol\_, EX= exch\_, MODE=12) asof time\_ruler\_*

-- Result --

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SYMBOL | DATE | BID | OFR | BIDSIZ | OFRSIZ | MODE | EX | CNT | |
| --------------------------------------------------------- | | | |  |  |  |  |  |  |
| AA | 2010.01.05 | 16.6 | 16.62 | 79 | 11 | 12 | I | 9087 |  |
| AA | 2010.01.05 | 16.57 | 16.59 | 6 | 16 | 12 | I | 9645 |  |
| AA | 2010.01.05 | 16.59 | 16.6 | 86 | 13 | 12 | I | 10490 |  |
| AA | 2010.01.05 | 16.6 | 16.61 | 19 | 60 | 12 | I | 10816 |  |
| AA | 2010.01.05 | 16.59 | 16.6 | 21 | 13 | 12 | I | 11247 |  |
| AA | 2010.01.05 | 16.62 | 16.63 | 41 | 5 | 12 | I | 11567 |  |
| AA | 2010.01.05 | 16.6 | 16.61 | 57 | 32 | 12 | I | 11835 |  |
| AA | 2010.01.05 | 16.6 | 16.61 | 71 | 15 | 12 | I | 11990 |  |
| AA | 2010.01.05 | 16.57 | 16.58 | 15 | 30 | 12 | I | 12199 |  |
| AA | 2010.01.05 | 16.57 | 16.58 | 1 | 34 | 12 | I | 12297 |  |
| AA | 2010.01.05 | 16.57 | 16.58 | 48 | 27 | 12 | I | 12421 |  |
| AA | 2010.01.05 | 16.59 | 16.6 | 35 | 51 | 12 | I | 12576 |  |
| AA | 2010.01.05 | 16.58 | 16.59 | 40 | 16 | 12 | I | 12744 |  |
| AA | 2010.01.05 | 16.6 | 16.62 | 35 | 17 | 12 | I | 12949 |  |
| AA | 2010.01.05 | 16.63 | 16.64 | 71 | 57 | 12 | I | 13162 |  |
| AA | 2010.01.05 | 16.62 | 16.64 | 33 | 36 | 12 | I | 13389 |  |
| AA | 2010.01.05 | 16.63 | 16.64 | 16 | 77 | 12 | I | 13547 |  |
| AA | 2010.01.05 | 16.64 | 16.65 | 58 | 15 | 12 | I | 13665 |  |
| AA | 2010.01.05 | 16.63 | 16.64 | 38 | 85 | 12 | I | 13856 |  |
| AA | 2010.01.05 | 16.61 | 16.62 | 16 | 23 | 12 | I | 14130 |  |
| .. |  |  |  |  |  |  |  |  |  |

This query does three things –

* Select a sub table from table `quote where SYMBOL is “AA”, EXCHANGE is “I”, MODE is 12
* Add one col to the sub table which is the value of the implied col.
* Asof join with table time\_ruler\_ and then assigns the result to t1.

## (c) Execute the query, report and explain your result

-- Code –

* *update CNT: deltas CNT from t1*

-- Result –

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SYMBOL | DATE | BID | OFR | BIDSIZ | OFRSIZ | MODE | EX | CNT |  |
| -------------------------------------------------------- | | | |  |  |  |  |  |  |
| AA | 2010.01.05 | 16.6 | 16.62 | 79 | 11 | 12 | I | 9087 |  |
| AA | 2010.01.05 | 16.57 | 16.59 | 6 | 16 | 12 | I | 558 |  |
| AA | 2010.01.05 | 16.59 | 16.6 | 86 | 13 | 12 | I | 845 |  |
| AA | 2010.01.05 | 16.6 | 16.61 | 19 | 60 | 12 | I | 326 |  |
| AA | 2010.01.05 | 16.59 | 16.6 | 21 | 13 | 12 | I | 431 |  |
| AA | 2010.01.05 | 16.62 | 16.63 | 41 | 5 | 12 | I | 320 |  |
| AA | 2010.01.05 | 16.6 | 16.61 | 57 | 32 | 12 | I | 268 |  |
| AA | 2010.01.05 | 16.6 | 16.61 | 71 | 15 | 12 | I | 155 |  |
| AA | 2010.01.05 | 16.57 | 16.58 | 15 | 30 | 12 | I | 209 |  |
| AA | 2010.01.05 | 16.57 | 16.58 | 1 | 34 | 12 | I | 98 |  |
| AA | 2010.01.05 | 16.57 | 16.58 | 48 | 27 | 12 | I | 124 |  |
| AA | 2010.01.05 | 16.59 | 16.6 | 35 | 51 | 12 | I | 155 |  |
| AA | 2010.01.05 | 16.58 | 16.59 | 40 | 16 | 12 | I | 168 |  |
| AA | 2010.01.05 | 16.6 | 16.62 | 35 | 17 | 12 | I | 205 |  |
| AA | 2010.01.05 | 16.63 | 16.64 | 71 | 57 | 12 | I | 213 |  |
| AA | 2010.01.05 | 16.62 | 16.64 | 33 | 36 | 12 | I | 227 |  |
| AA | 2010.01.05 | 16.63 | 16.64 | 16 | 77 | 12 | I | 158 |  |
| AA | 2010.01.05 | 16.64 | 16.65 | 58 | 15 | 12 | I | 118 |  |
| AA | 2010.01.05 | 16.63 | 16.64 | 38 | 85 | 12 | I | 191 |  |
| AA | 2010.01.05 | 16.61 | 16.62 | 16 | 23 | 12 | I | 274 |  |
| .. |  |  |  |  |  |  |  |  |  |

Update the CNT column from table t1 by doing a subtraction between adjacent pairs and assign the new table to t2.

## (d) Execute the query, report and explain your result

-- Code –

* *time\_ruler\_ ,' t2*

-- Result --

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| TIME | SYMBOL | DATE | BID | OFR | BIDSIZ | OFRSIZ | MODE | EX | CNT |
| --------------------------------------------------------------------- | | | | |  |  |  |  |  |
| 00:00.0 | AA | 2010.01.05 | 16.6 | 16.62 | 79 | 11 | 12 | I | 9087 |
| 01:00.0 | AA | 2010.01.05 | 16.57 | 16.59 | 6 | 16 | 12 | I | 558 |
| 02:00.0 | AA | 2010.01.05 | 16.59 | 16.6 | 86 | 13 | 12 | I | 845 |
| 03:00.0 | AA | 2010.01.05 | 16.6 | 16.61 | 19 | 60 | 12 | I | 326 |
| 04:00.0 | AA | 2010.01.05 | 16.59 | 16.6 | 21 | 13 | 12 | I | 431 |
| 05:00.0 | AA | 2010.01.05 | 16.62 | 16.63 | 41 | 5 | 12 | I | 320 |
| 06:00.0 | AA | 2010.01.05 | 16.6 | 16.61 | 57 | 32 | 12 | I | 268 |
| 07:00.0 | AA | 2010.01.05 | 16.6 | 16.61 | 71 | 15 | 12 | I | 155 |
| 08:00.0 | AA | 2010.01.05 | 16.57 | 16.58 | 15 | 30 | 12 | I | 209 |
| 09:00.0 | AA | 2010.01.05 | 16.57 | 16.58 | 1 | 34 | 12 | I | 98 |
| 10:00.0 | AA | 2010.01.05 | 16.57 | 16.58 | 48 | 27 | 12 | I | 124 |
| 11:00.0 | AA | 2010.01.05 | 16.59 | 16.6 | 35 | 51 | 12 | I | 155 |
| 12:00.0 | AA | 2010.01.05 | 16.58 | 16.59 | 40 | 16 | 12 | I | 168 |
| 13:00.0 | AA | 2010.01.05 | 16.6 | 16.62 | 35 | 17 | 12 | I | 205 |
| 14:00.0 | AA | 2010.01.05 | 16.63 | 16.64 | 71 | 57 | 12 | I | 213 |
| 15:00.0 | AA | 2010.01.05 | 16.62 | 16.64 | 33 | 36 | 12 | I | 227 |
| 16:00.0 | AA | 2010.01.05 | 16.63 | 16.64 | 16 | 77 | 12 | I | 158 |
| 17:00.0 | AA | 2010.01.05 | 16.64 | 16.65 | 58 | 15 | 12 | I | 118 |
| 18:00.0 | AA | 2010.01.05 | 16.63 | 16.64 | 38 | 85 | 12 | I | 191 |
| 19:00.0 | AA | 2010.01.05 | 16.61 | 16.62 | 16 | 23 | 12 | I | 274 |
| .. |  |  |  |  |  |  |  |  |  |

-- Explanation --

This query joins table time\_ruler\_ and t2 records to records.

## (e) Execute the command, report and explain your result

-- Code –

* *(cols quote), `CNT*

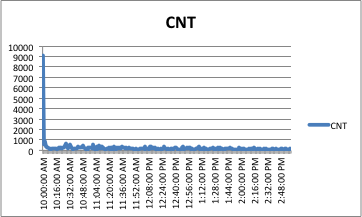
-- Result --

`SYMBOL`DATE`TIME`BID`OFR`BIDSIZ`OFRSIZ`MODE`EX`CNT

-- Explanation --

The command joins the cols names and the new col name CNT

## (f) Add this plot to your homework.



# 5. Trade-Intensity Bins

## (a) Execute the query, report and explain your result

**-- Code –**

***update CNT:i from select from trade where SYMBOL="S"$ symbol\_, EXCHANGE=exch\_, COND in (`;`$"@";`$"F";`$"@F")***

-- Result --

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SYMBOL | DATE | EXCHANGE | TIME | PRICE | SIZE | COND | CNT |
| ----------------------------------------------------------- | | | |  |  |  |  |
| AA | 2010.01.05 | I | 30:18.0 | 16.82 | 100 | F | 0 |
| AA | 2010.01.05 | I | 30:36.0 | 16.77 | 100 | F | 1 |
| AA | 2010.01.05 | I | 30:36.0 | 16.77 | 100 | F | 2 |
| AA | 2010.01.05 | I | 30:36.0 | 16.76 | 1400 | F | 3 |
| AA | 2010.01.05 | I | 30:43.0 | 16.71 | 400 | F | 4 |
| AA | 2010.01.05 | I | 30:43.0 | 16.71 | 100 | F | 5 |
| AA | 2010.01.05 | I | 30:49.0 | 16.71 | 100 | F | 6 |
| AA | 2010.01.05 | I | 31:00.0 | 16.73 | 300 | F | 7 |
| AA | 2010.01.05 | I | 31:30.0 | 16.74 | 400 | F | 8 |
| AA | 2010.01.05 | I | 31:31.0 | 16.75 | 300 | F | 9 |
| AA | 2010.01.05 | I | 32:21.0 | 16.77 | 200 | F | 10 |
| AA | 2010.01.05 | I | 32:28.0 | 16.77 | 1400 | F | 11 |
| AA | 2010.01.05 | I | 32:43.0 | 16.77 | 300 | F | 12 |
| AA | 2010.01.05 | I | 32:49.0 | 16.77 | 1000 | F | 13 |
| AA | 2010.01.05 | I | 33:31.0 | 16.75 | 100 | F | 14 |
| AA | 2010.01.05 | I | 33:32.0 | 16.75 | 483 | F | 15 |
| AA | 2010.01.05 | I | 33:32.0 | 16.75 | 500 | F | 16 |
| AA | 2010.01.05 | I | 33:32.0 | 16.75 | 900 | F | 17 |
| AA | 2010.01.05 | I | 33:43.0 | 16.75 | 2100 | @ | 18 |
| AA | 2010.01.05 | I | 33:43.0 | 16.75 | 200 | @ | 19 |
| .. |  |  |  |  |  |  |  |

-- Explanation --

This query does two things –

* Select a sub table from table trade where SYMBOL is “AA”, EXCHNANGE = “I”, COND is “@” or “F” or “@F”.
* Add implied col as a new col to the sub table

## (b) Execute the queries, report and explain your result

**-- Code –**

***T: select from trade where SYMBOL="S"$ symbol\_, EXCHANGE=exch\_, COND in (`;`$"F";`$"@";`$"@F");***

***t: ((cols trade), `CNT) xcols time\_ruler\_ ,'***

***(update CNT:i from T) asof***

***time ruler ;***

-- Result --

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table T | | | | | | | |
| SYMBOL | DATE | EXCHANGE | TIME | PRICE | SIZE | COND |  |
| ------------------------------------------------------- | | | |  |  |  |  |
| AA | 2010.01.05 | I | 30:18.0 | 16.82 | 100 | F |  |
| AA | 2010.01.05 | I | 30:36.0 | 16.77 | 100 | F |  |
| AA | 2010.01.05 | I | 30:36.0 | 16.77 | 100 | F |  |
| AA | 2010.01.05 | I | 30:36.0 | 16.76 | 1400 | F |  |
| AA | 2010.01.05 | I | 30:43.0 | 16.71 | 400 | F |  |
| AA | 2010.01.05 | I | 30:43.0 | 16.71 | 100 | F |  |
| AA | 2010.01.05 | I | 30:49.0 | 16.71 | 100 | F |  |
| AA | 2010.01.05 | I | 31:00.0 | 16.73 | 300 | F |  |
| AA | 2010.01.05 | I | 31:30.0 | 16.74 | 400 | F |  |
| AA | 2010.01.05 | I | 31:31.0 | 16.75 | 300 | F |  |
| AA | 2010.01.05 | I | 32:21.0 | 16.77 | 200 | F |  |
| AA | 2010.01.05 | I | 32:28.0 | 16.77 | 1400 | F |  |
| AA | 2010.01.05 | I | 32:43.0 | 16.77 | 300 | F |  |
| AA | 2010.01.05 | I | 32:49.0 | 16.77 | 1000 | F |  |
| AA | 2010.01.05 | I | 33:31.0 | 16.75 | 100 | F |  |
| AA | 2010.01.05 | I | 33:32.0 | 16.75 | 483 | F |  |
| AA | 2010.01.05 | I | 33:32.0 | 16.75 | 500 | F |  |
| AA | 2010.01.05 | I | 33:32.0 | 16.75 | 900 | F |  |
| AA | 2010.01.05 | I | 33:43.0 | 16.75 | 2100 | @ |  |
| AA | 2010.01.05 | I | 33:43.0 | 16.75 | 200 | @ |  |
| .. |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Table t | | | | | | | |
| SYMBOL | DATE | EXCHANGE | TIME | PRICE | SIZE | COND | CNT |
| AA | 2010.01.05 | I | 00:00.0 | 16.61 | 400 | F | 166 |
| AA | 2010.01.05 | I | 01:00.0 | 16.59 | 1100 | F | 180 |
| AA | 2010.01.05 | I | 02:00.0 | 16.59 | 100 | F | 195 |
| AA | 2010.01.05 | I | 03:00.0 | 16.59 | 100 | F | 195 |
| AA | 2010.01.05 | I | 04:00.0 | 16.6 | 300 | @ | 200 |
| AA | 2010.01.05 | I | 05:00.0 | 16.62 | 200 | F | 222 |
| AA | 2010.01.05 | I | 06:00.0 | 16.61 | 100 | F | 223 |
| AA | 2010.01.05 | I | 07:00.0 | 16.61 | 200 | F | 229 |
| AA | 2010.01.05 | I | 08:00.0 | 16.59 | 900 | F | 235 |
| AA | 2010.01.05 | I | 09:00.0 | 16.59 | 900 | F | 235 |
| AA | 2010.01.05 | I | 10:00.0 | 16.57 | 200 | F | 237 |
| AA | 2010.01.05 | I | 11:00.0 | 16.57 | 200 | F | 237 |
| AA | 2010.01.05 | I | 12:00.0 | 16.57 | 200 | F | 237 |
| AA | 2010.01.05 | I | 13:00.0 | 16.6 | 600 | F | 252 |
| AA | 2010.01.05 | I | 14:00.0 | 16.62 | 100 | F | 261 |
| AA | 2010.01.05 | I | 15:00.0 | 16.62 | 100 | F | 261 |
| AA | 2010.01.05 | I | 16:00.0 | 16.62 | 100 | F | 261 |
| AA | 2010.01.05 | I | 17:00.0 | 16.645 | 100 | @ | 262 |
| AA | 2010.01.05 | I | 18:00.0 | 16.64 | 900 | @ | 264 |
| AA | 2010.01.05 | I | 19:00.0 | 16.63 | 140 | F | 267 |
| .. |  |  |  |  |  |  |  |

Three steps in this query:

* Add implied col CNT to table T.
* Asof join with table time\_ruler.
* Add col name CNT to the col names and rearrange the table cols and assign it to t.

## (c) Execute the commands, report and explain your result

**-- Code –   
*t[`CNT]***

-- Result --

166 180 195 195 200 222 223 229 235 235 237 237 237 252 261 261 261 262 264 2..

-- Explanation --  
Return the col CNT of table t as a list.

**-- Code --   
*count t[`CNT]***

-- Result --   
301

-- Explanation --  
Count the number of elements in the list.

-- Code --   
T[`SIZE]

-- Result --   
100 100 100 1400 400 100 100 300 400 300 200 1400 300 1000 100 483 500 900 21..

-- Explanation --   
Return the col SIZE of table T as a list.

-- Code --   
count T[`SIZE]

-- Result --   
1684

-- Explanation --  
Count the number of elements in the list.

**-- Code --  
*t[`CNT] \_ T[`SIZE]***

-- Result --

400 300 500 100 100 200 100 100 200 100 2892 508 100 300i

1100 200 200 700 200 200 100 100 200 100 600 1000 100 200 100i

`int$()

100 1000 300 200 296i

300 100 100 200 100 100 1000 200 200 3700 300 100 200 100 100 100 100 100 100..

,200i

100 200 200 100 700 100i

200 200 100 100 100 700i

`int$()

900 100i

`int$()

`int$()

200 100 400 200 200 100 100 300 100 100 100 200 200 100 100i

600 100 100 100 200 100 100 100 100i

`int$()

`int$()

,100i

100 100i

900 660 100i

140 100 100i

200 100 300 200 100 100 100 100 100 200 300 100 200 100 100 100 500 200 200 5..

2900 100 100 100 200 100i

..

-- Explanation --

Cut the list T[`SIZE] with the records vector t[`CNT], which separates the trading volume between each interval on the time ruler.

**-- Code --   
*sum each t[`CNT] \_ T[`SIZE]***

-- Result --   
5900 5100 0 1896 7500 200 1400 1400 0 1000 0 0 2500 1500 0 0 100 200 1660 340..

-- Explanation --  
Sum up all the trading volume between each interval on the time ruler.

## (d) Execute the query, report and explain your result

-- Code –

update VOL: sum each t[`CNT] \_ T[`SIZE], CNT: deltas CNT  from t

-- Result --

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SYMBOL | DATE | EXCHANGE | TIME | PRICE | SIZE | COND | CNT | VOL |
|  |  |  |  |  |  |  |  |  |
| AA | 2010.01.05 | I | 00:00.0 | 16.61 | 400 | F | 166 | 5900 |
| AA | 2010.01.05 | I | 01:00.0 | 16.59 | 1100 | F | 14 | 5100 |
| AA | 2010.01.05 | I | 02:00.0 | 16.59 | 100 | F | 15 | 0 |
| AA | 2010.01.05 | I | 03:00.0 | 16.59 | 100 | F | 0 | 1896 |
| AA | 2010.01.05 | I | 04:00.0 | 16.6 | 300 | @ | 5 | 7500 |
| AA | 2010.01.05 | I | 05:00.0 | 16.62 | 200 | F | 22 | 200 |
| AA | 2010.01.05 | I | 06:00.0 | 16.61 | 100 | F | 1 | 1400 |
| AA | 2010.01.05 | I | 07:00.0 | 16.61 | 200 | F | 6 | 1400 |
| AA | 2010.01.05 | I | 08:00.0 | 16.59 | 900 | F | 6 | 0 |
| AA | 2010.01.05 | I | 09:00.0 | 16.59 | 900 | F | 0 | 1000 |
| AA | 2010.01.05 | I | 10:00.0 | 16.57 | 200 | F | 2 | 0 |
| AA | 2010.01.05 | I | 11:00.0 | 16.57 | 200 | F | 0 | 0 |
| AA | 2010.01.05 | I | 12:00.0 | 16.57 | 200 | F | 0 | 2500 |
| AA | 2010.01.05 | I | 13:00.0 | 16.6 | 600 | F | 15 | 1500 |
| AA | 2010.01.05 | I | 14:00.0 | 16.62 | 100 | F | 9 | 0 |
| AA | 2010.01.05 | I | 15:00.0 | 16.62 | 100 | F | 0 | 0 |
| AA | 2010.01.05 | I | 16:00.0 | 16.62 | 100 | F | 0 | 100 |
| AA | 2010.01.05 | I | 17:00.0 | 16.645 | 100 | @ | 1 | 200 |
| AA | 2010.01.05 | I | 18:00.0 | 16.64 | 900 | @ | 2 | 1660 |
| AA | 2010.01.05 | I | 19:00.0 | 16.63 | 140 | F | 3 | 340 |
| .. |  |  |  |  |  |  |  |  |

-- Explanation --  
Update table t with one new col VOL and the CNT col with the difference between adjacent pairs.

## (e) Add this plot to your homework.

