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At TimeStored we believe time-series data is everywhere and that with the correct skills and technology an enormous amount of knowledge and profit can be gained from that data. We have expertise in the creation of time-series analysis software, particularly kdb+ and Java with a focus on market data capture and analysis.

## Advanced kdb+ Training

TimeStored can provide advanced on-site training, focused on the demands of your particular business needs. Typically this either focuses on **quant/end-user analytics** or **database administration**:

For this class you **must** be experienced at kdb. The first day contains a partial recap of the essential kdb foundation topics, day 2 then heavily expands on that, finally day 3 is usually more tailored to the specific class and queries related to their work.

If you have experienced particular issues common to your job or have a query about kdb architectures, best practices, etc. please let the instructor know on day 1 or 2 and they will be more than happy to answer the query with a worked example etc. on day 3. We've found that part of our course to be some of the most enjoyable, engaging and educational.

An outline of some our the training modules we typically provide are shown below. If you're interested in enrolling on one of our courses or have any questions please contact:

[training@timestored.com](mailto:training@timestored.com)

## Example Course Content

### Recap

	Description
<b>Adverbs</b>	The adverbs: each, over, scan, each-right, each-left and what each does.
<b>Table Attributes</b>	How and when to use kdb attributes to make your sql queries faster.
<b>q-SQL Select Queries</b>	How to form where clauses, perform aggregation using group by, update and exec statements.
<b>qSQL Joins a Visual Explanation</b>	The joins available in kdb / qsql. How to use ij-inner join, lj-left join, uj-union join and other table joins specific to kdb.
<b>IPC</b>	How Messaging between kdb processes works, Sync and Async methods,
<b>Timeseries Table Joins</b>	Joining timeseries data from two tables using latest time or a time window between selected start and end periods.
<b>Binary Files</b>	How to save data out of kdb+ in a simple binary format.
<b>Splayed Database Tables</b>	Creating an efficient splayed database. Querying splayed tables.
<b>Partitioned Database Tables</b>	Splitting extremely large databases over multiple partitions.

## Section 1

	Description
<b>Data Storage Exercise</b>	Exercise in storing data efficiently
<b>Parallel Processing</b>	How to speeding up kdb calculations by using multiple threads to execute functions in parallel.
<b>Sunspot Time Series Analysis</b>	Finding the cycle period of sunspot activity by analysing the time series data.
<b>Group By and Time Series Aggregation</b>	Aggregating Time Series Data, what functions and joins kdb provides.
<b>Pivot Tables</b>	Converting columns to rows using pivot tables.
<b>Moving Window Functions</b>	Built-in moving window functions such as moving average, moving deviation and how to efficiently writing our own.
<b>RSI Indicator</b>	Exercise in creating the Relative Strength Indicator analytics
<b>Fby group by filter</b>	Fby allows filtering on group calculations, it's unique to kdb

## Section 2

	Description
<b>Command Line Options</b>	Command Line options for the kdb+ Database Server. Logging, Replication, Multi-Threaded Mode.
<b>Database limits and errors</b>	Limits and errors typically encountered in kdb database: params limit branch constants rank errors.
<b>Memory Management</b>	How KDB server memory is allocated, when it is released, how to garbage collect it. What happens to memory mapped files during a query.
<b>User Permissions Security</b>	Securing a kdb database server to restrict what users can access by using a permissions system.
<b>.Q Functions</b>	Functions in the .Q namespace useful for IO,Disk storage, etc
<b>Bitmap Indexes</b>	Making where clause queries run faster by creating bitmap indexes.

## Section 3

	Description
<b>Style Guidelines</b>	Best practice guidelines and coding conventions for the q programming language.
<b>Who uses kdb+?</b>	A list of companies that use kdb+ database and what they are typically using it for.
<b>QUnit Testing</b>	A unit testing framework for the q/kdb+ language.
<b>kdb+ Tick</b>	kx's solution for storing stock tick data while allowing time series analysis.
<b>Gateway Servers</b>	Combining data from the RDB and HDB using a gateway.
<b>Load Balancing</b>	Distributing queries across multiple servers
<b>Sym Compaction</b>	Removing unused symbols