An Introduction to J for Data Analysis

(for admittedly squishy values of Data Analysis)

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OpenWest Conference
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An Intro-
duction to
J for Data
Analysis

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First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

Outline

1 First, a Little Bit of History and Motivation

2 A Brief Introduction to Syntax

3 A Tutorial Example

An Intro-
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First, a Little Bit of History and Motivation

Ken Iverson, PhD Mathematics, APL (1957, 1962)

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duction to
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Analysis

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First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

First, a Little Bit of History and Motivation

Ken Iverson, PhD Mathematics, APL (1957, 1962)

Kenneth Iverson and Roger Hui, J (1990, 2011)

An Intro-
duction to
J for Data
Analysis

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First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

First, a Little Bit of History and Motivation

James Hague, *The World's Most Mind-Bending Language Has the Best Development Environment*

The first really interesting improvements over most languages are the visualization tools. It's one line of code to graph arbitrary data. Think about that: no need to use a graphing calculator, no need to export to some separate tool, and most importantly the presence of such easy graphing ability means that you will use it. Once you get started running all kinds of data through visualization tools, you'll find you use them to spot-check for errors or to get a better understanding of what kinds of input you're dealing with.

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

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James Hague, *The World's Most Mind-Bending Language Has the Best Development Environment*

While many of the supplied labs are along the lines of "How to use sockets," the best ones aren't about J at all. They're about geometry or statistics or image processing, and you end up learning J while exploring those topics. J co-creator Ken Iverson's labs are the most striking, because they forgo the usual pedantic nature of language tutorials and come across as downright casual. ...Iverson just goes along talking about some interesting number theory, tosses out some short executable expressions to illustrate his points, and drops in a key bit of J terminology almost as an afterthought.

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

Outline

1 First, a Little Bit of History and Motivation

2 A Brief Introduction to Syntax

3 A Tutorial Example

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Brief Introduction to Syntax

Nouns

- Atoms
  1
  1j.5
  'c'

- Lists (aka Vectors)
  1 2 3 4 5
  'hello'

- Boxes (aka Matrices, Tables)

  ```
  +-------+---------+
  | 1 2 3 | 'hello' |
  +-------+---------+
  ```

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Verbs

- Monadic

```
* _3 4 0
< _3 4 0
```

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Verbs

- Monadic

  ```
  * _3 4 0
  < _3 4 0
  ```

- Diadic

  ```
  3 * _3 4 0
  1 2 3 * 4 5 6
  3 < 1 2 3 4 5
  1 2 3 < 3 2 1
  ```

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J for Data
Analysis

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A Brief In-
troduction
to Syntax

A Brief Introduction to Syntax

Verbs

- Glyphs '.' and ':' extend symbols

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Brief Introduction to Syntax

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- Glyphs '.' and ':' extend symbols
  - *. (length and angle, least common multiple)

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Brief Introduction to Syntax

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  - *. (length and angle, least common multiple)
  - *: (square, nand)

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Brief Introduction to Syntax

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  - *. (length and angle, least common multiple)
  - *: (square, nand)
  - <. (floor, min)

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

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- Glyphs '.' and ':' extend symbols
    - *. (length and angle, least common multiple)
    - *: (square, nand)
    - <. (floor, min)
    - <: (decrement, less or equal)

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duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Brief Introduction to Syntax

Precedence

- All operators are evaluated right from left
  3 * 4 + 5

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duction to
J for Data
Analysis

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First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Brief Introduction to Syntax

Precedence

- All operators are evaluated right from left
  3 * 4 + 5

- Parentheses are respected
  (3 * 4) + 5

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Analysis

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A Brief Introduction to Syntax

- Adverbs
  */1 2 3 4 5
  +/1 2 3 4 5

- Copula (i.e. is, are)
  prices =: 1 2 3 4
  tithe =: %&10

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duction to
J for Data
Analysis

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First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Tutorial Example

Ken Iverson, *Calculus*, Chapter 2: Differential Calculus

An Intro-
duction to
J for Data
Analysis

Alpheus
Madsen

First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

A Tutorial Example

Ken Iverson, *Calculus*, Chapter 2: Differential Calculus

(and if we have time) *Calculus*, Chapter 5: Fractional
Calculus

An Intro-
duction to
J for Data
Analysis

Alpheus
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First, a
Little Bit of
History and
Motivation

A Brief In-
troduction
to Syntax

A Tutorial
Example

Any Questions?

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http://www.jsoftware.com/help/learning/contents.htm.

[3] Roger Hui, *Remembering Ken Iverson*,
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[4] James Hague, *Programming in the Twenty-First Century*,
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http://prog21.dadgum.com/194.html.

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http://www.jsoftware.com/help/dictionary/vocabul.htm.

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