61A Lecture 1

Friday, August 24, 2012

Welcome to Berkeley Computer Science!

The Course Staff

John DeNero

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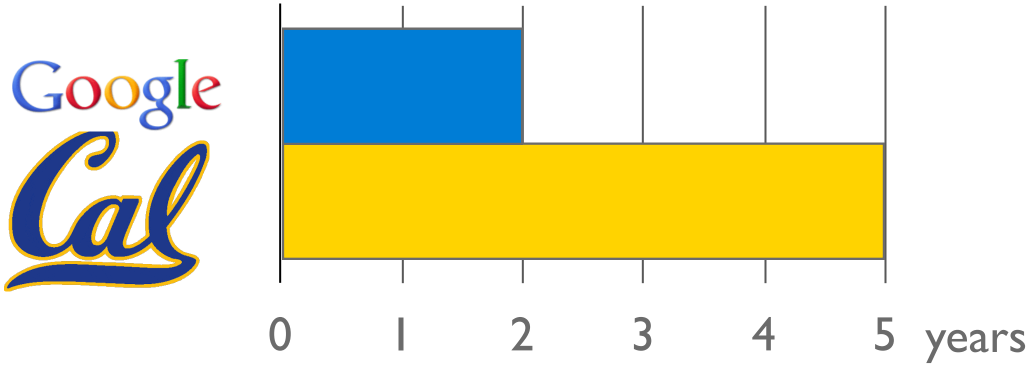

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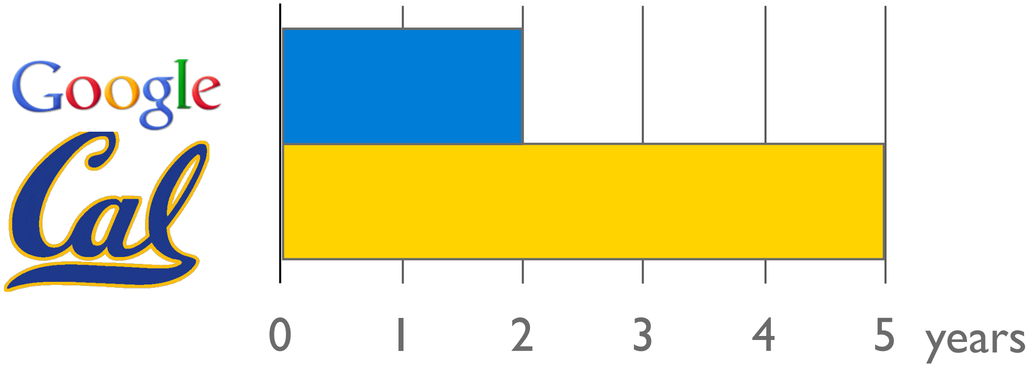

TAs run sections, labs, and also everything else

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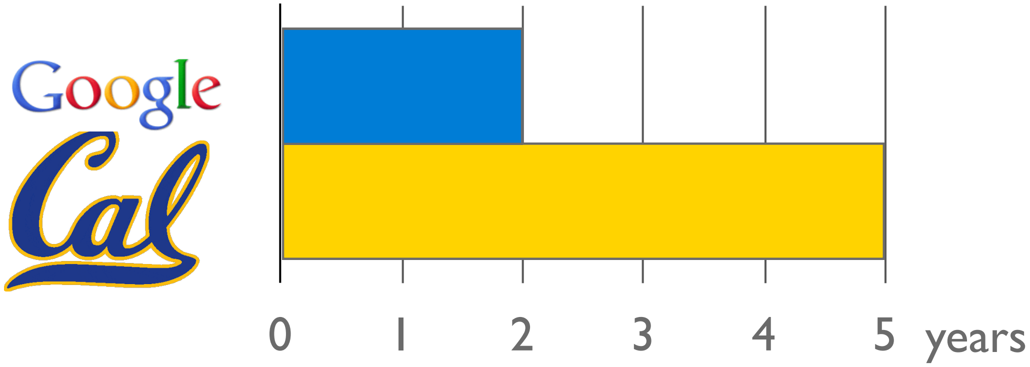

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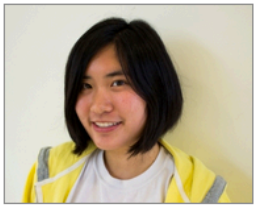

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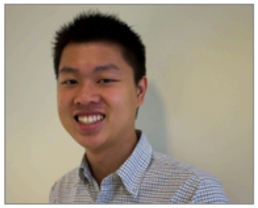

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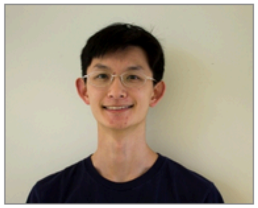

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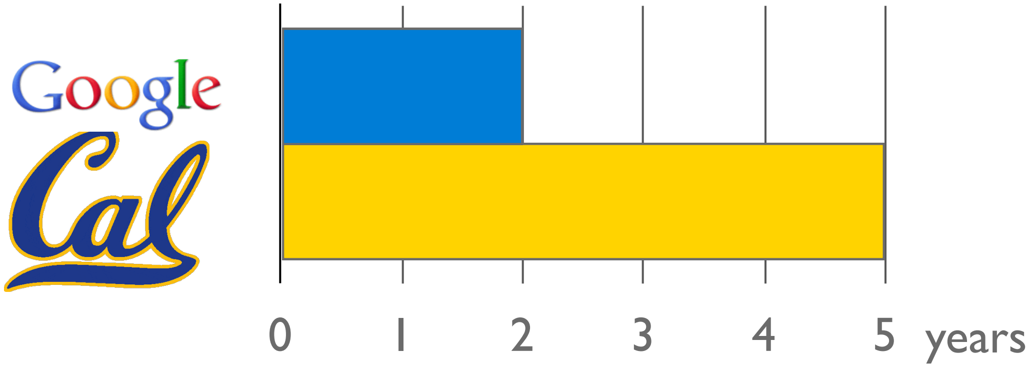

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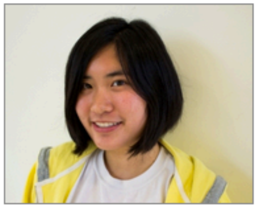

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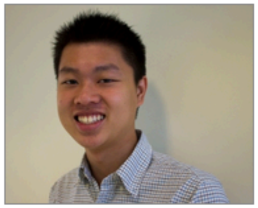

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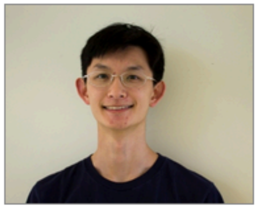

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Readers are your personal programming mentors

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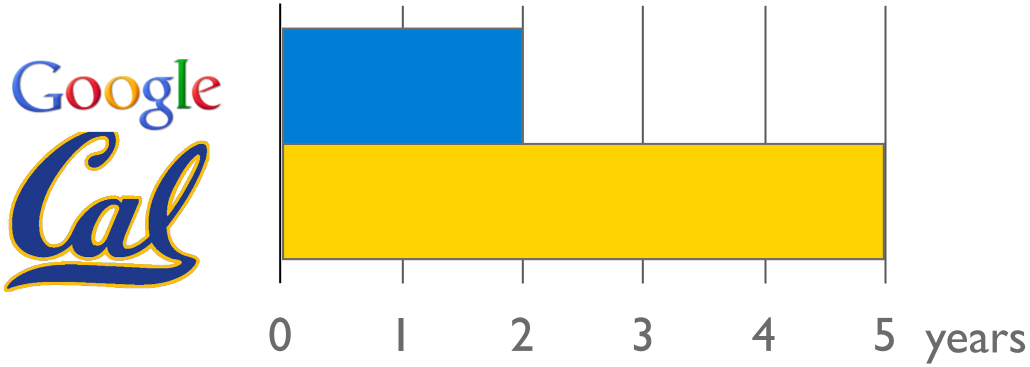

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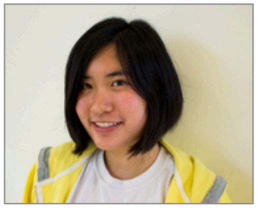

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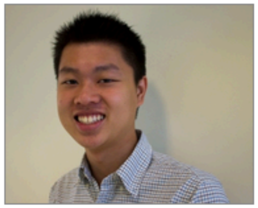

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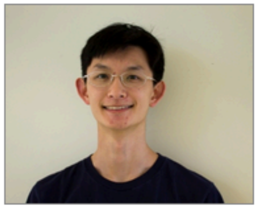

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Readers are your personal programming mentors

Lab Assistants ensure that you don’t get stuck

What is Computer Science?

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Systems

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Artificial Intelligence

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Graphics

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Networking

Programming Languages

Theory

Scientific Computing

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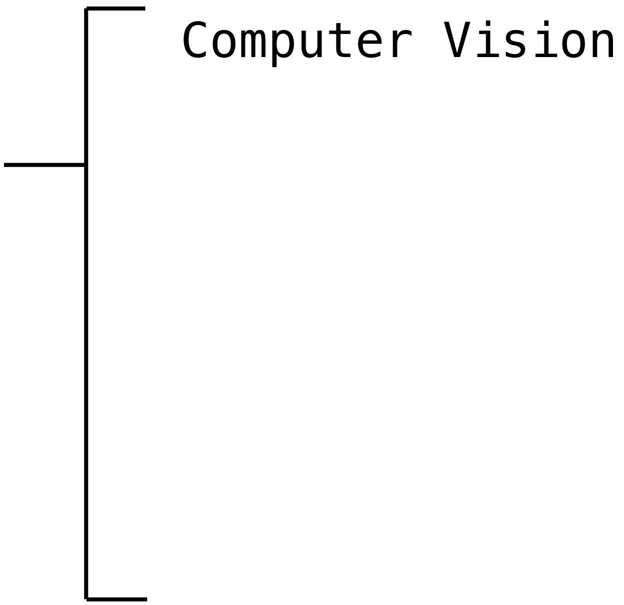

Computer Vision

Graphics

Security

Networking

Programming Languages

Theory

Scientific Computing

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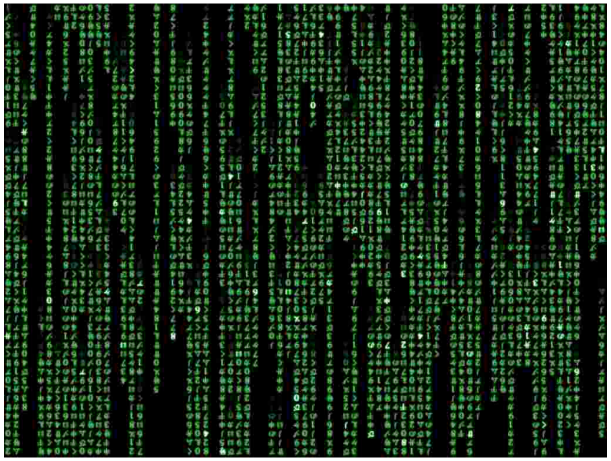
  - Not about 1’s and 0’s



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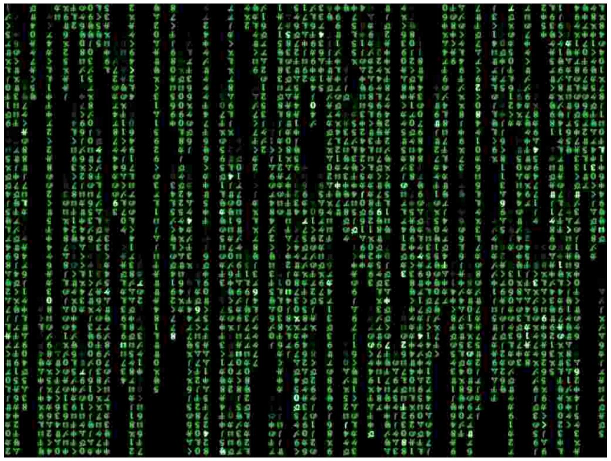

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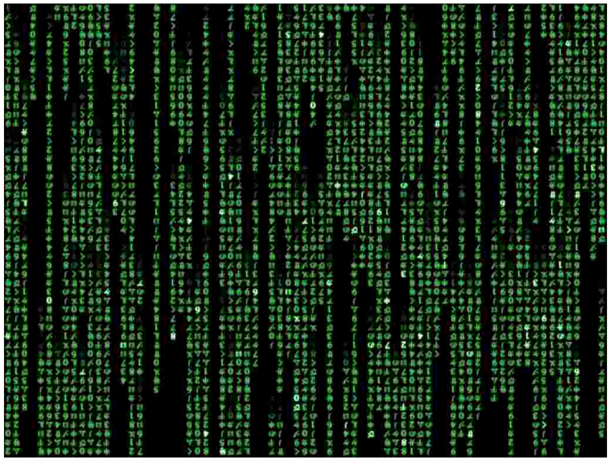

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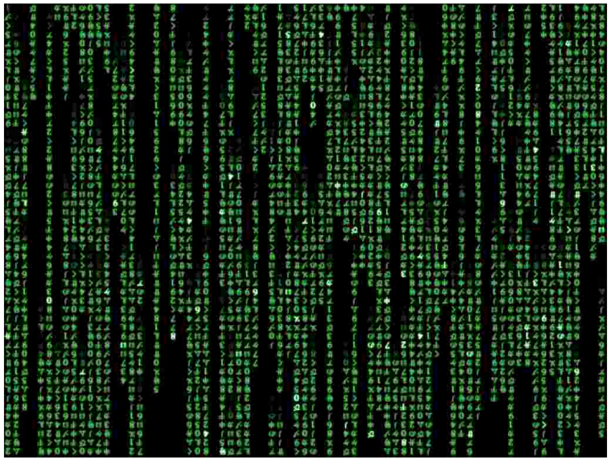

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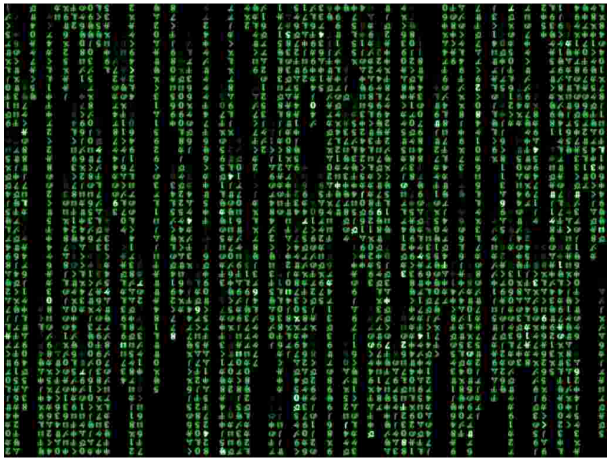

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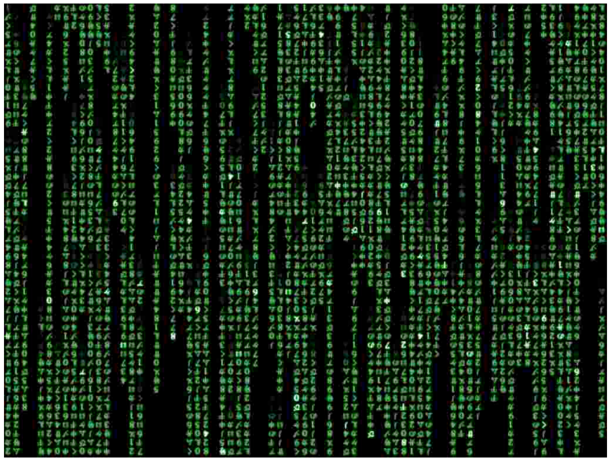

- An introduction to Python
  - All the features we really need: introduced today
  - Understanding through implementation
  - Programs that run other programs: meta-evaluation
- A challenging course that will demand **a lot** of you

What is 61A?

Plone Conference. Photo courtesy of Kriszta Szita

Alternatives to 61A

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`CS 61AS: Self-paced 61A`

Alternatives to 61A

CS 61AS: Self-paced 61A

CS 10: The Beauty and Joy of Computing

Course Policies

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The purpose of this course is to help you learn

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The staff is here to make you successful

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All the details are online:

http://inst.eecs.berkeley.edu/~cs61A/fa12/about.html

Collaboration

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- Discuss everything with each other

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- One simple rule: don’t share code

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- Homework can be completed with a partner
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The limits of collaboration

- One simple rule: don't share code
- Copying project solutions is a serious offense!

Announcements

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An expression

describes a computation

and evaluates to a value
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$|-1869|$

$\binom{69}{18}$

Call Expressions in Python

All expressions can use function call notation

(Demo)

Anatomy of a Call Expression

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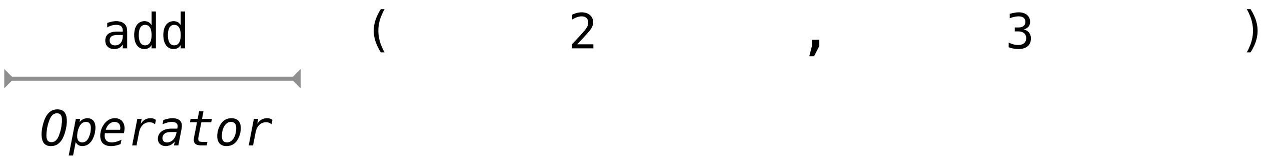
```
add          (          2          ,          3          )
```

Anatomy of a Call Expression



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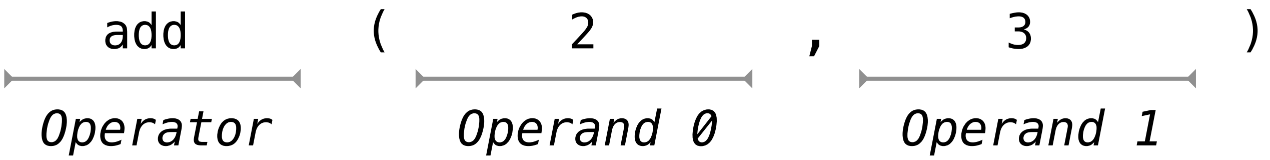
Operator

Anatomy of a Call Expression



add (2 , 3)

Operator

Operand 0

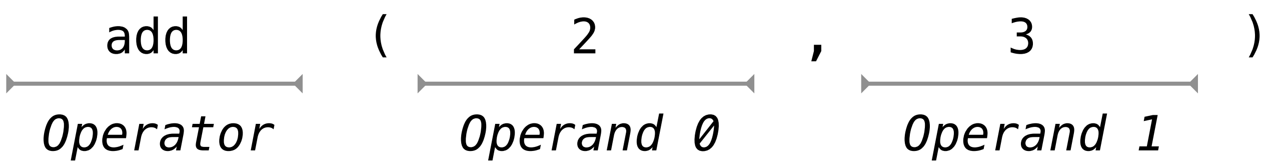
Operand 1

Anatomy of a Call Expression

$$\underbrace{\texttt{add}}_{\textit{Operator}}\ (\ \underbrace{\texttt{2}}_{\textit{Operand 0}}\ ,\ \underbrace{\texttt{3}}_{\textit{Operand 1}}\ )$$

Operators and operands are expressions

Anatomy of a Call Expression



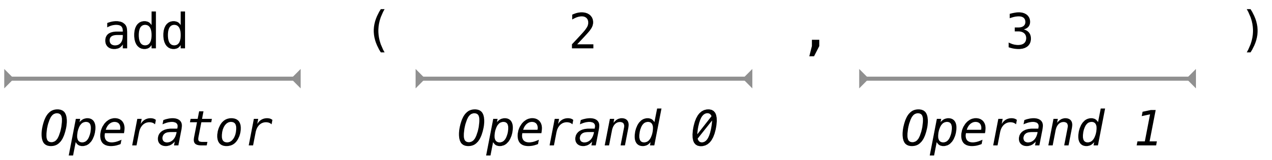
add (2 , 3)

Operator *Operand 0* *Operand 1*

Operators and operands are expressions

So they evaluate to values

Anatomy of a Call Expression



add (2 , 3)

Operator *Operand 0* *Operand 1*

Operators and operands are expressions

So they evaluate to values

Evaluation procedure for call expressions:

Anatomy of a Call Expression

$$\underbrace{\texttt{add}}_{\textit{Operator}}\ \texttt{(}\ \underbrace{\texttt{2}}_{\textit{Operand 0}}\ \texttt{,}\ \underbrace{\texttt{3}}_{\textit{Operand 1}}\ \texttt{)}$$

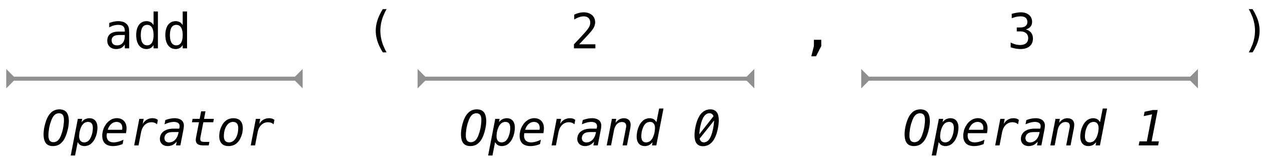
Operators and operands are expressions

So they evaluate to values

Evaluation procedure for call expressions:

1. Evaluate the operator and operand subexpressions

Anatomy of a Call Expression



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Operator

Operand 0

Operand 1

Operators and operands are expressions

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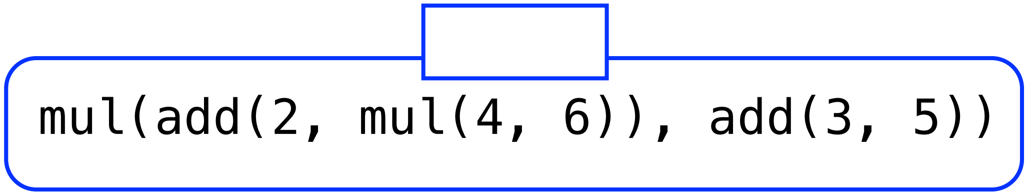
Evaluation procedure for call expressions:

1. Evaluate the operator and operand subexpressions
2. Apply the function that is the value of the operator subexpression to the arguments that are the values of the operand subexpression

Evaluating Nested Expressions

```
mul(add(2, mul(4, 6)), add(3, 5))
```

Evaluating Nested Expressions



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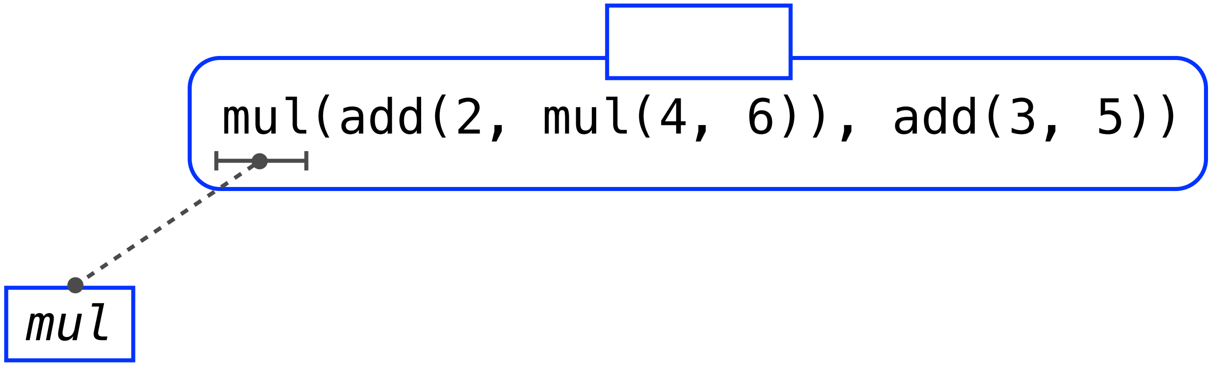

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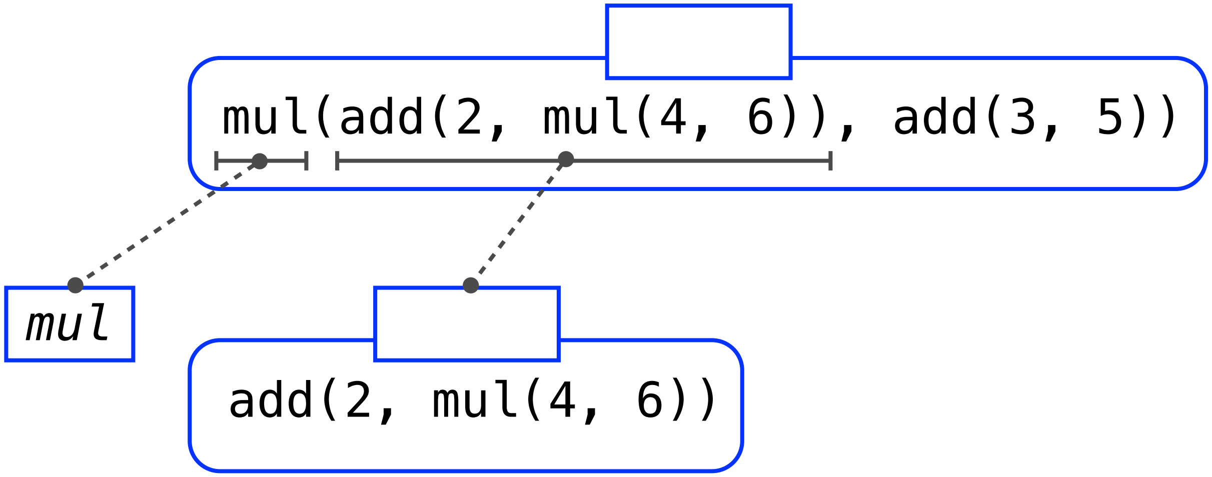

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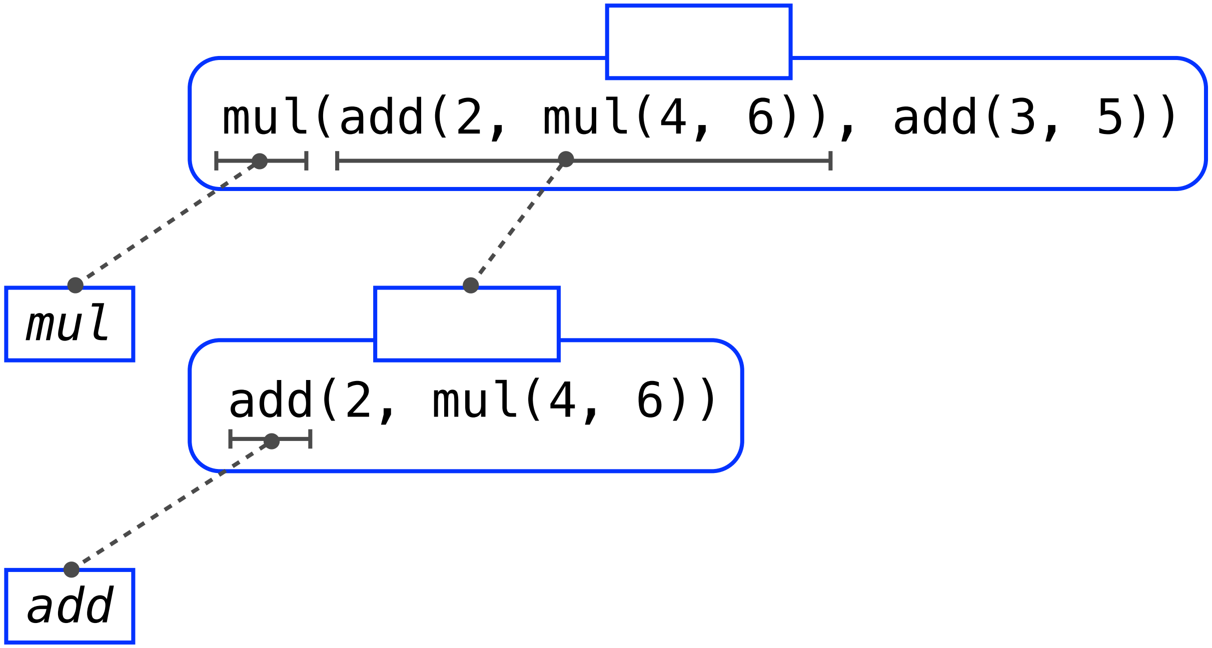

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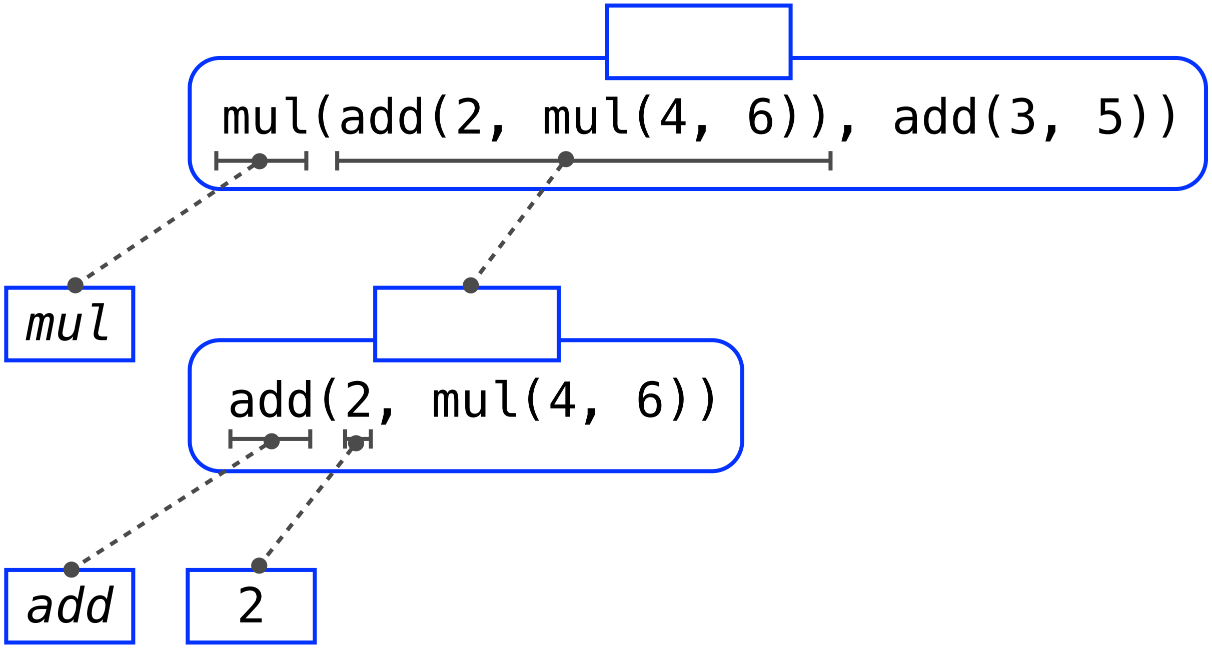

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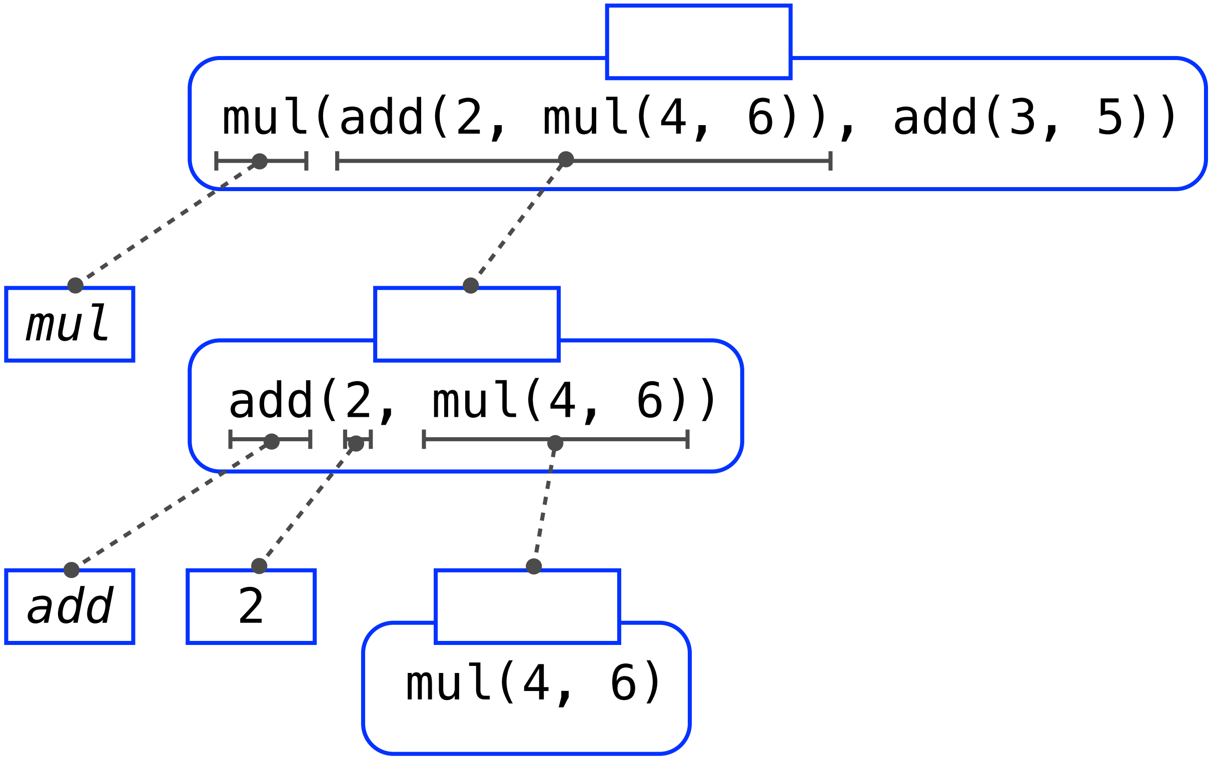

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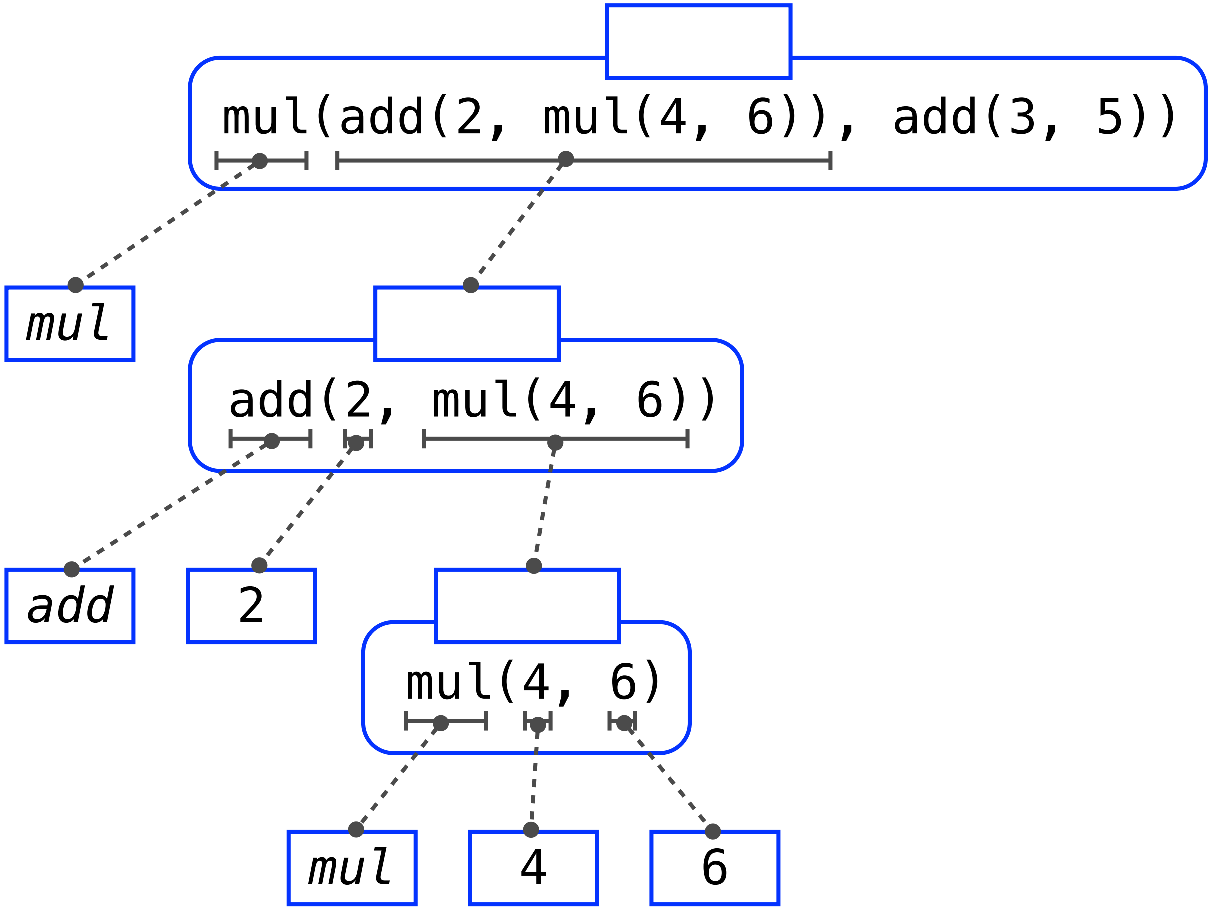

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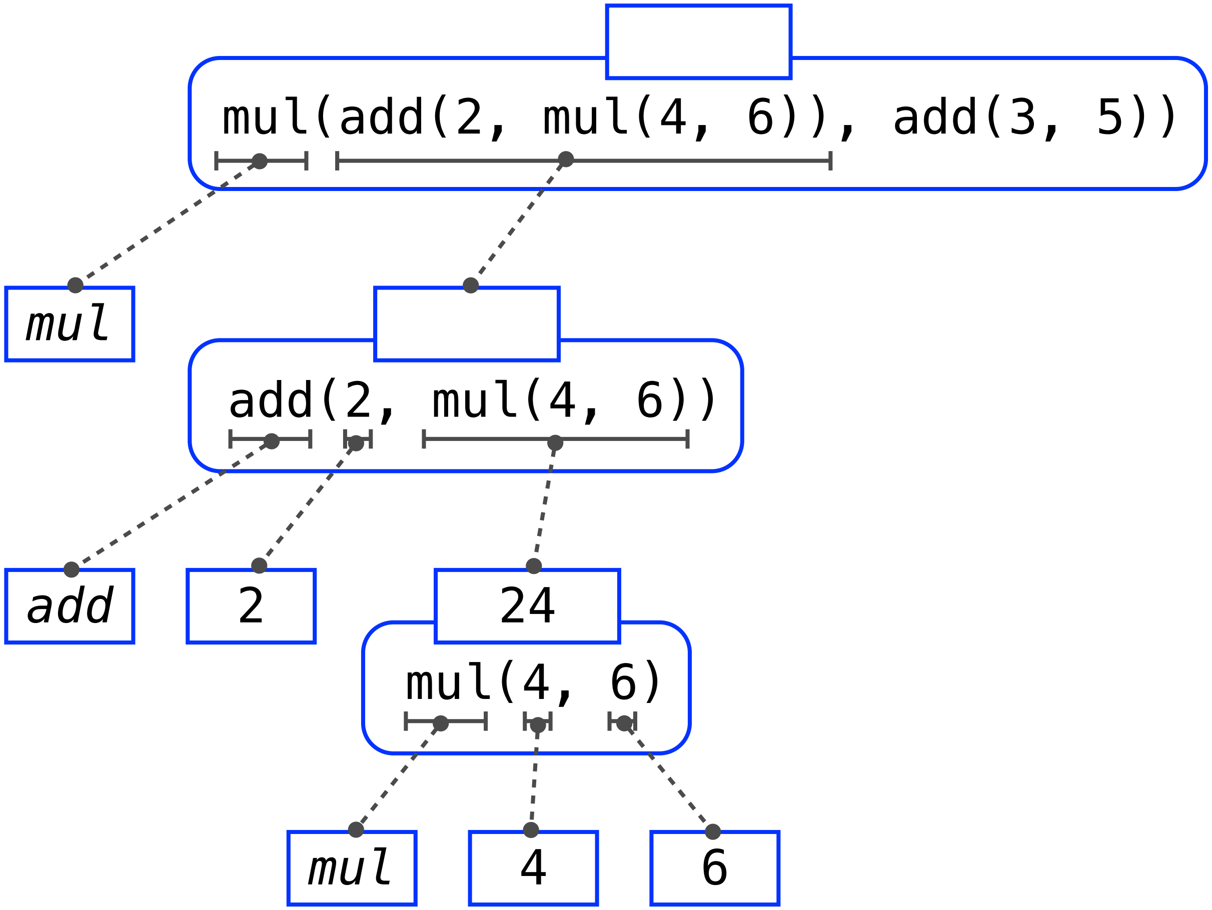

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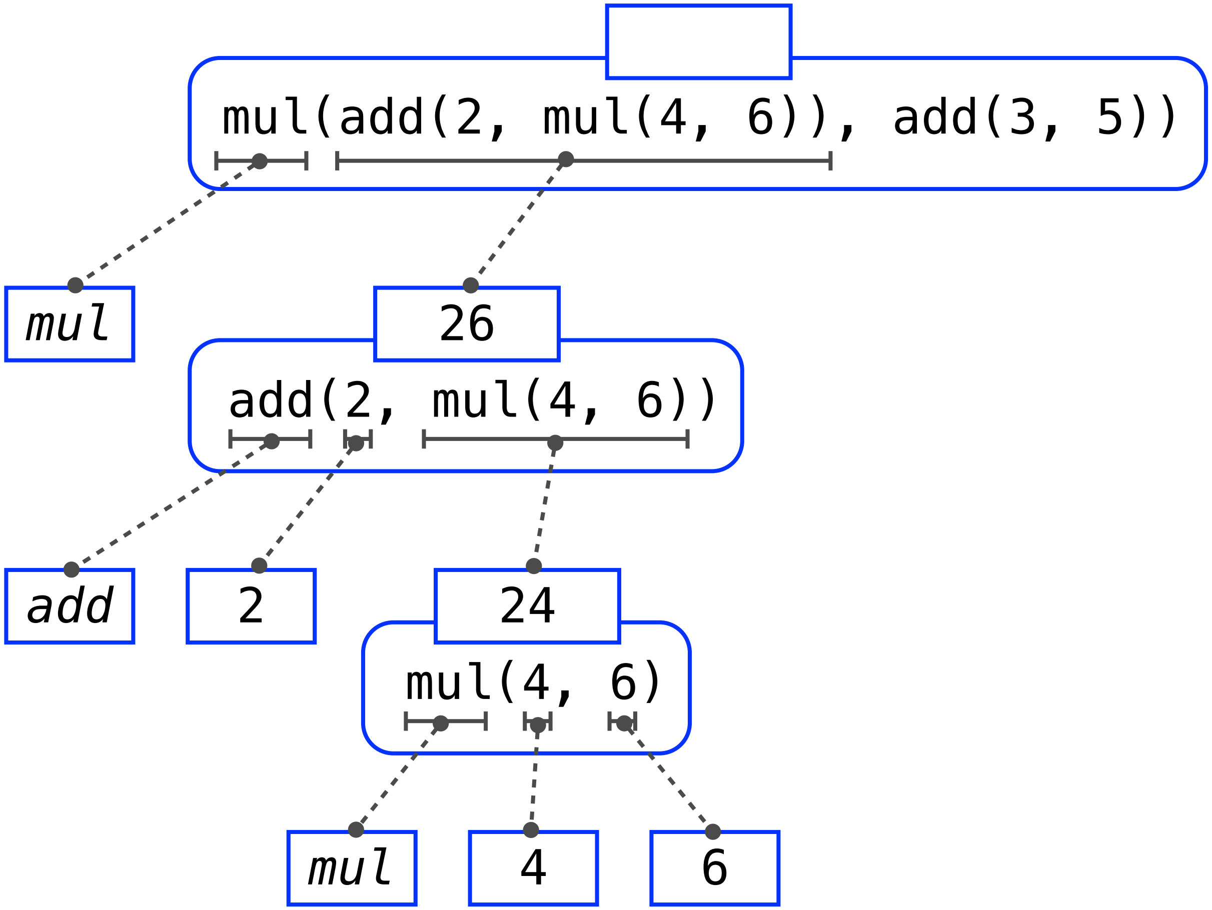

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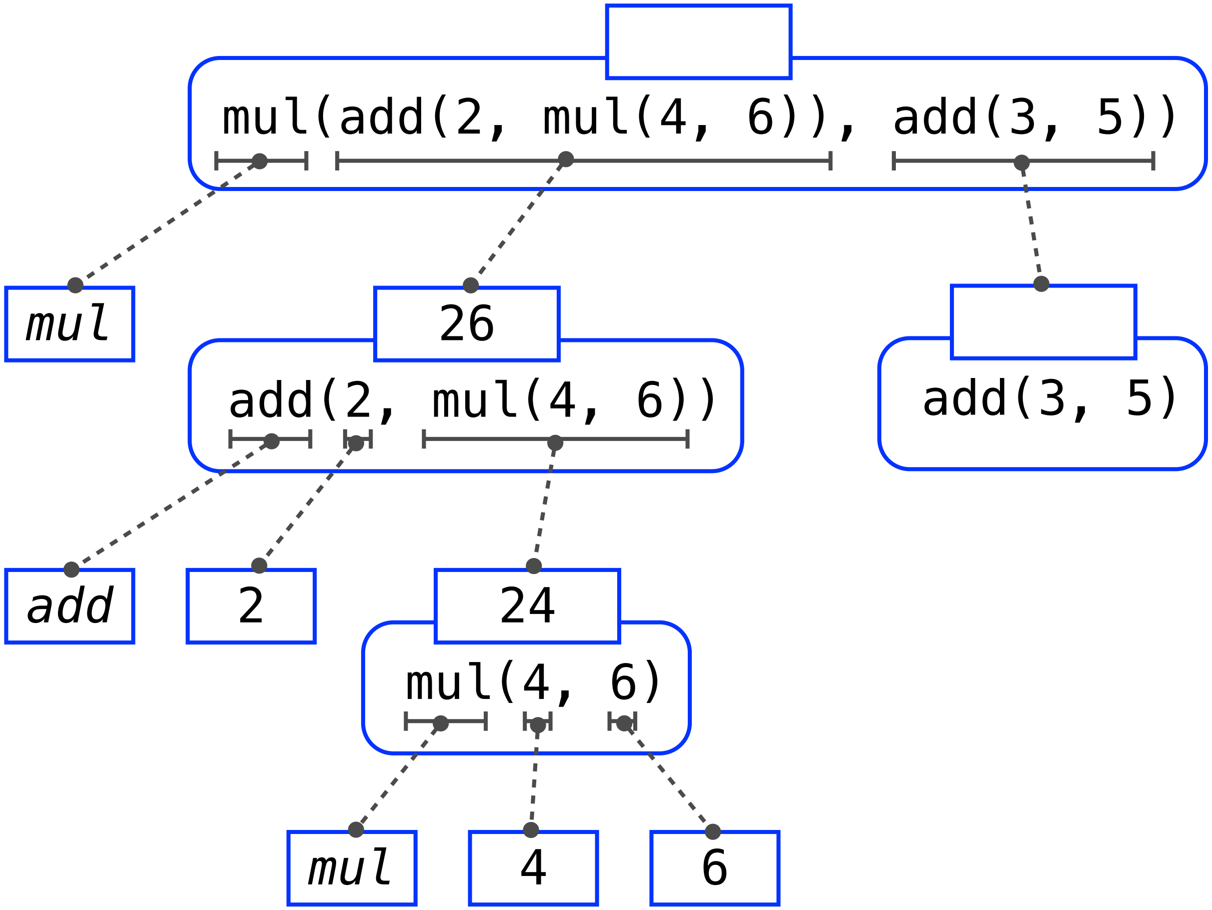

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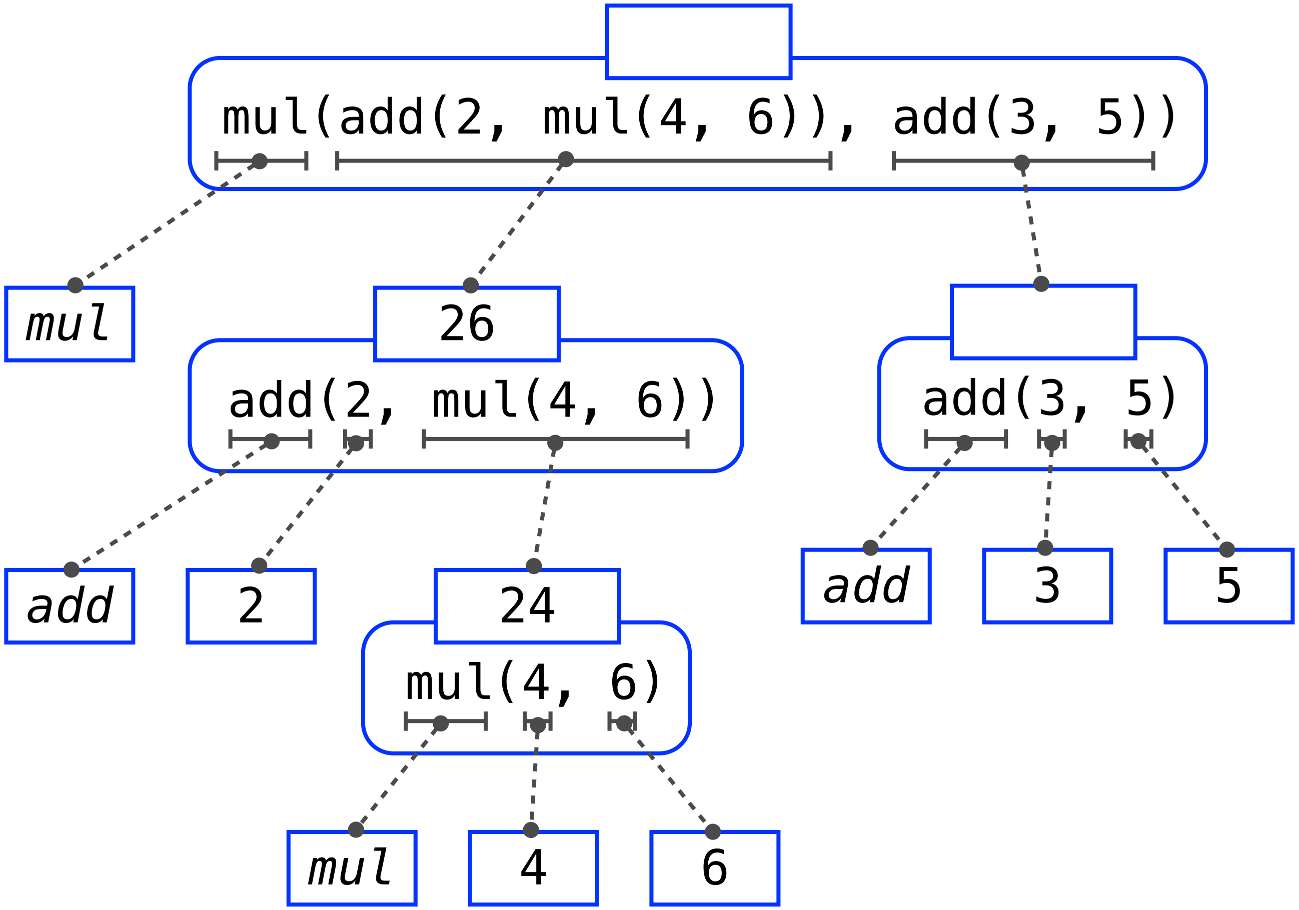

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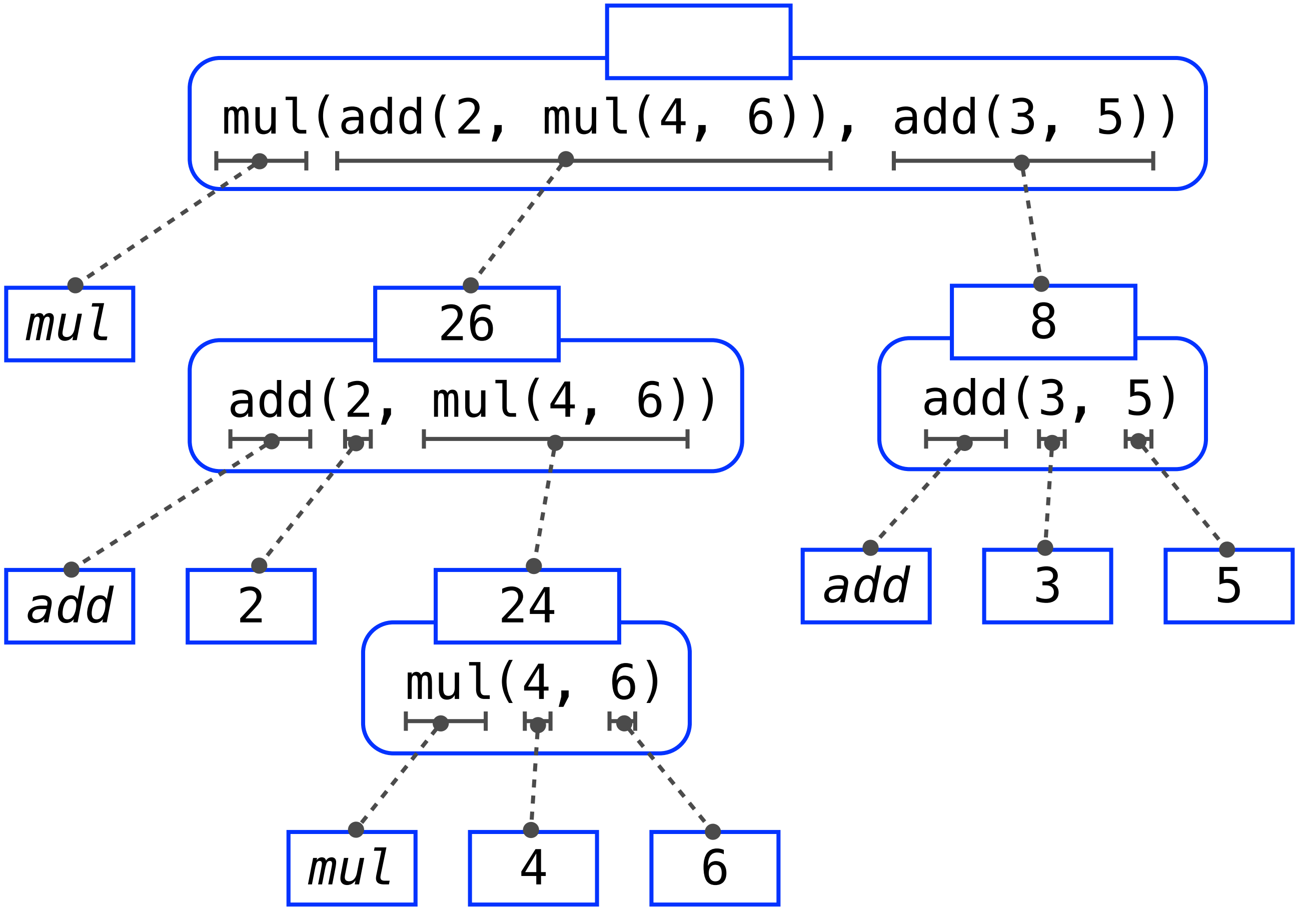

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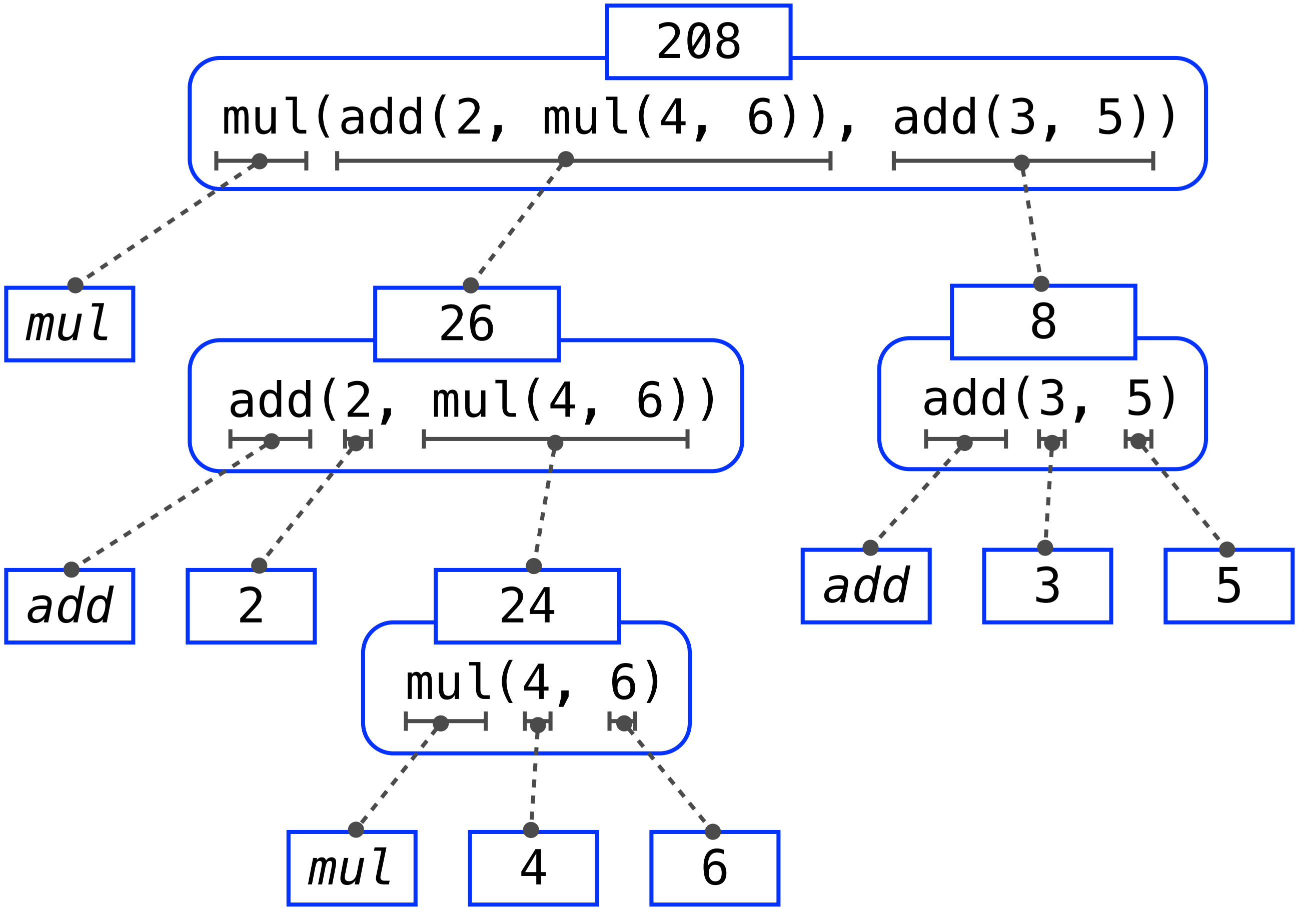

Data, Functions, and Interpreters

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Data: The things that programs fiddle with

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Data: The things that programs fiddle with

“The Art of Computer Programming”

2

Data, Functions, and Interpreters

Data: The things that programs fiddle with

“The Art of Computer Programming”

2

Donald Knuth

Data, Functions, and Interpreters

Data: The things that programs fiddle with

“The Art of Computer Programming”

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Shakespeare’s 37 plays

Donald Knuth

Data, Functions, and Interpreters

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Functions: Rules for manipulating data

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Interpreter: An implementation of the procedure for evaluation