61A Lecture 7

Monday, September 10

Hog Contest Rules

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Fall 2011 Winners

Keegan Mann,
Yan Duan & Ziming Li,
Brian Prike & Zhenghao Qian,
Parker Schuh & Robert Chatham

Choosing Names

Practical guidance

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Names typically *don't* matter for correctness

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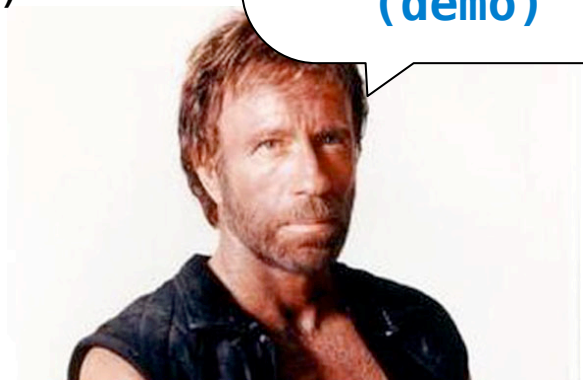

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You can't depend upon code that hasn't been tested

Run your old tests again after you make new changes

Function Decorators

(demo)

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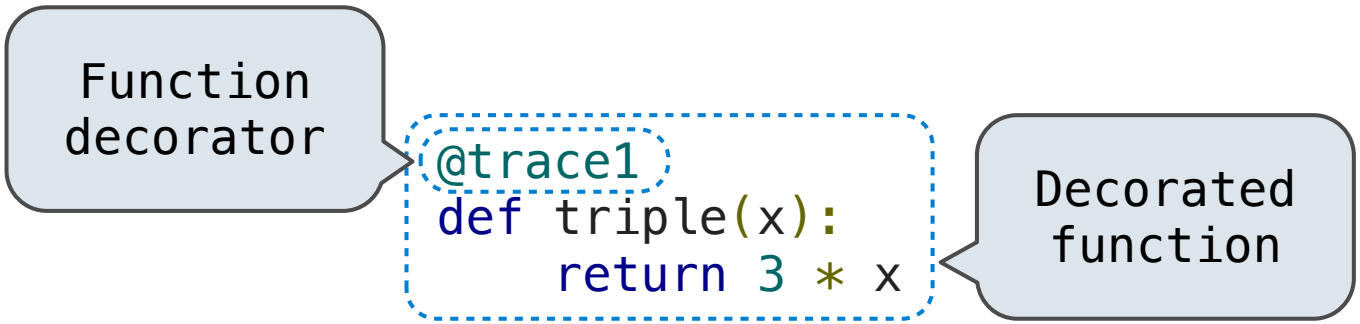

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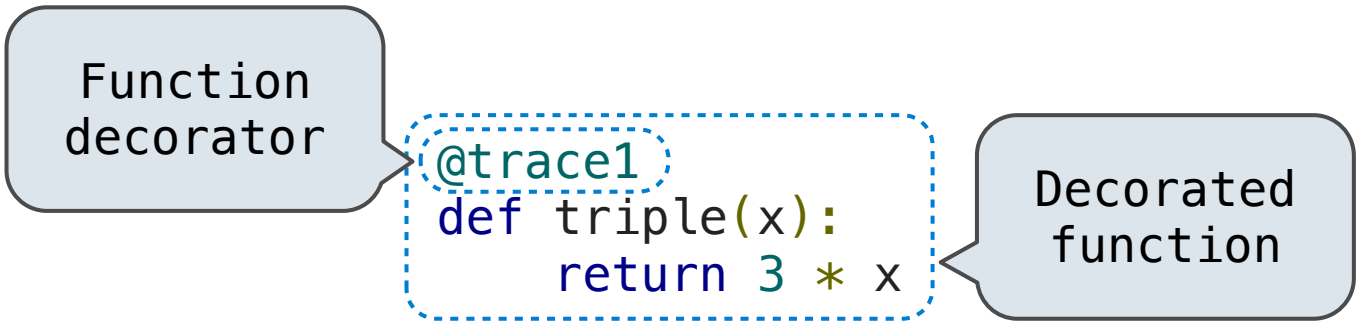

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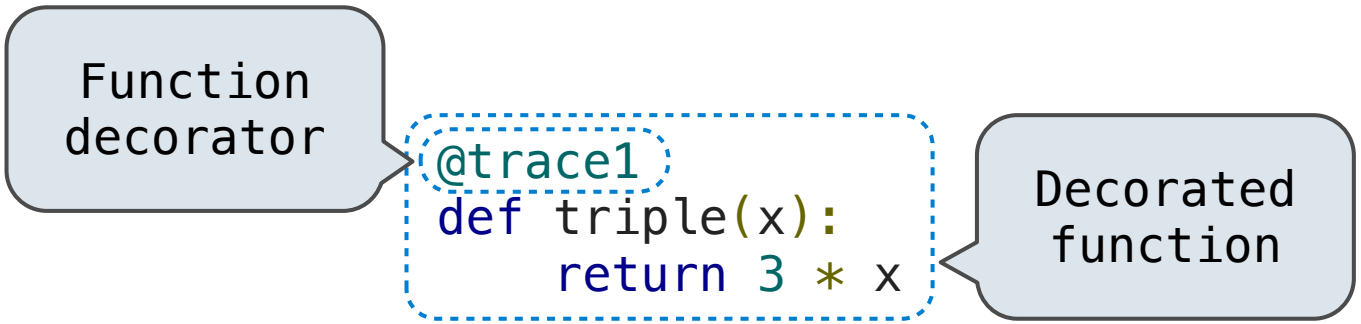

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Function Decorators

(demo)

Function decorator

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Decorated function

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Why not just use this?

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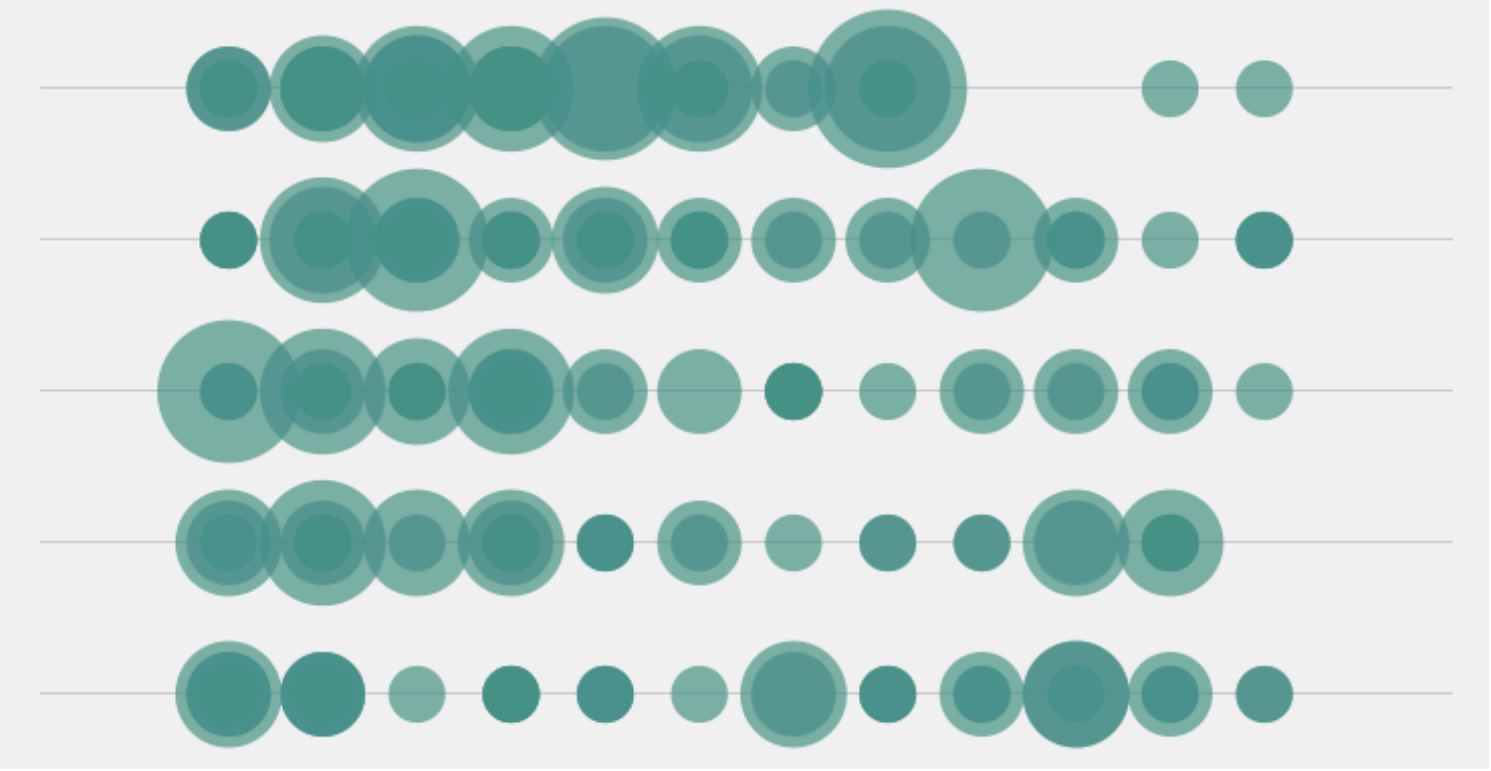
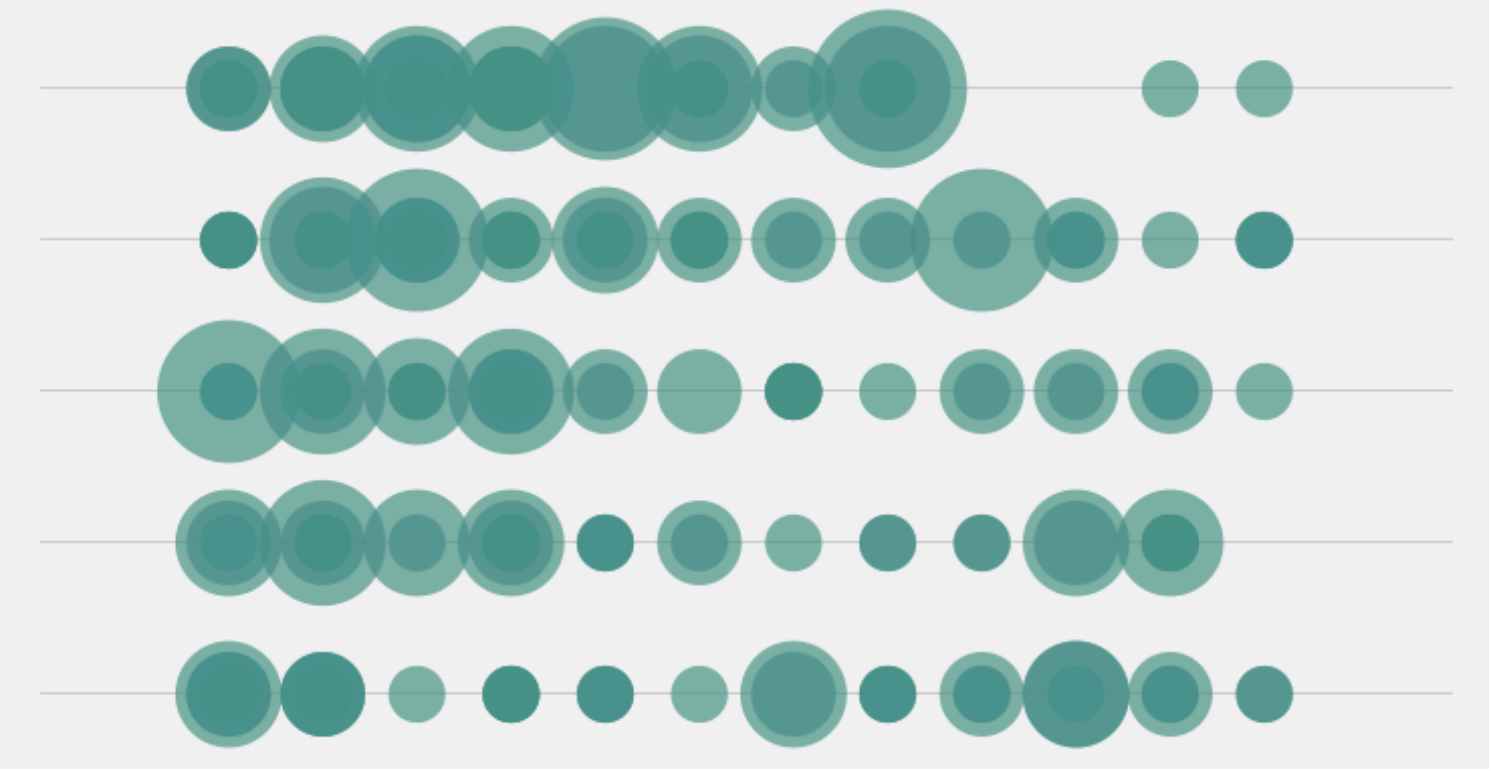
If the name "square" were bound to a built-in function, sum_squares would still work identically

Data



Data

Student seating preferences at MIT



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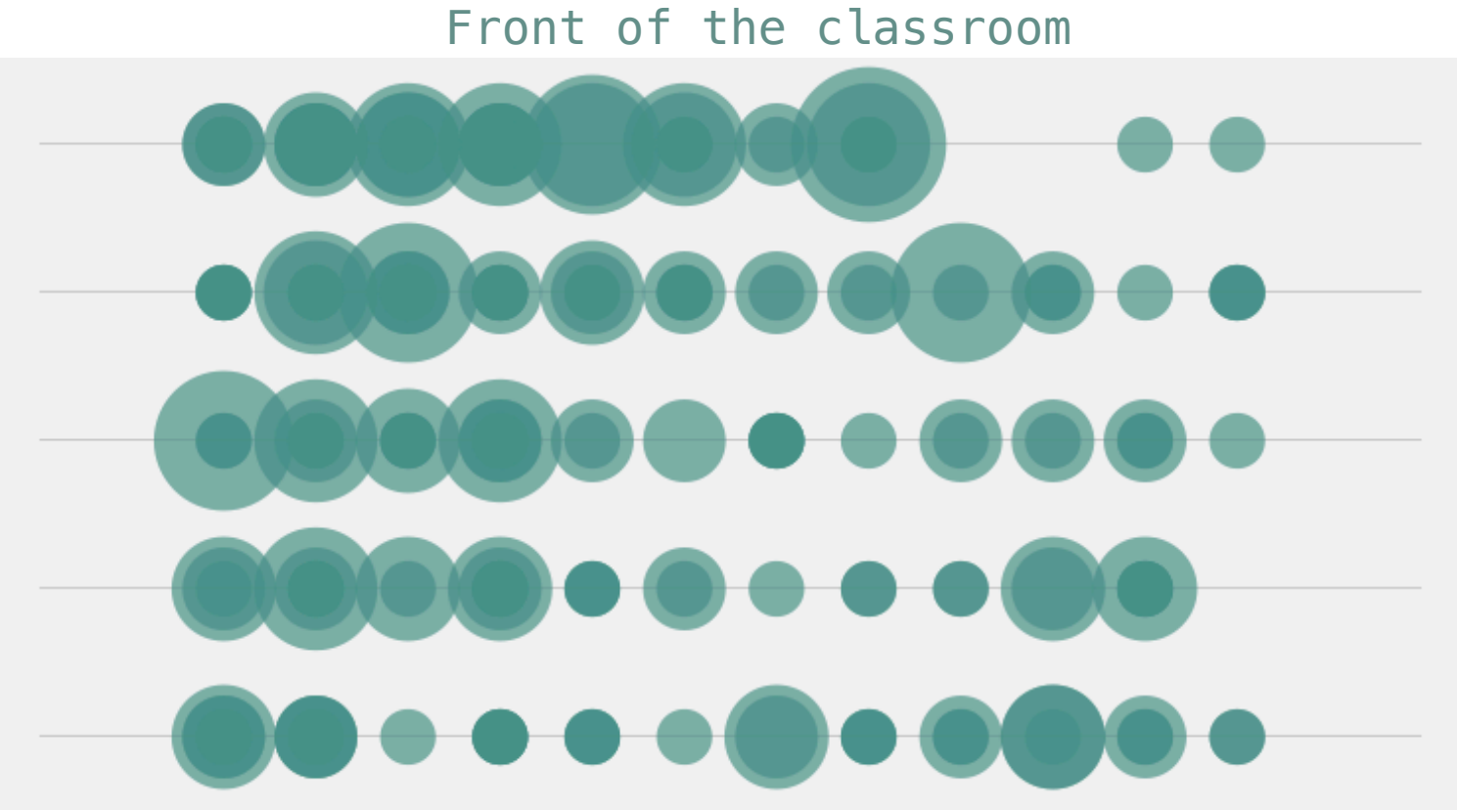

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(Demo)

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- Implement an object system using built-in objects

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Properties of native data types:

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(demo)

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Bonus Material

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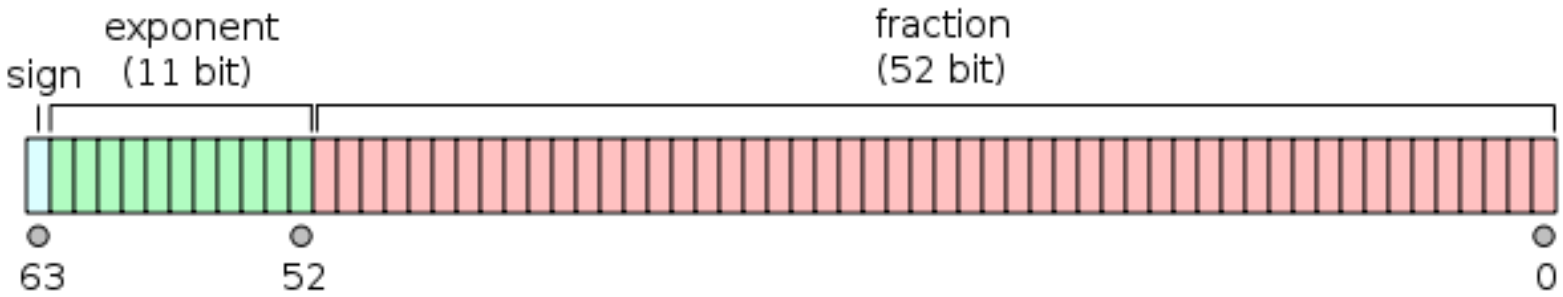

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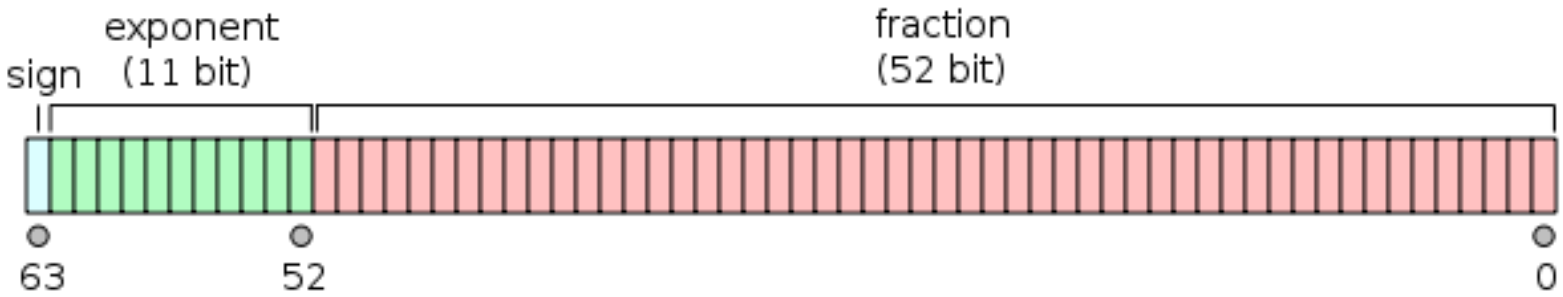

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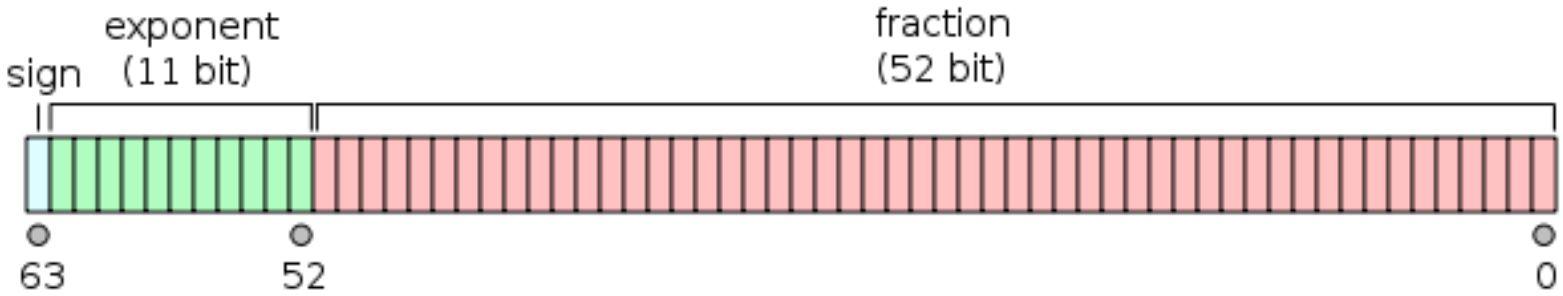

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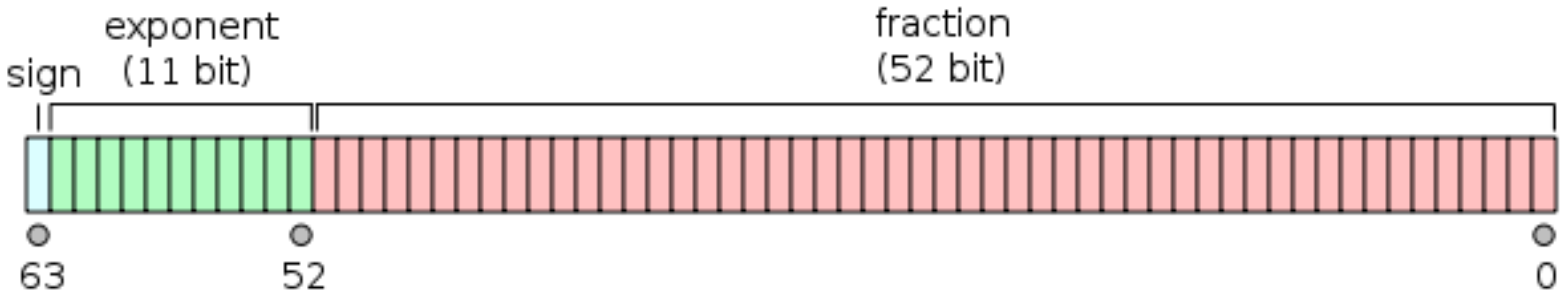

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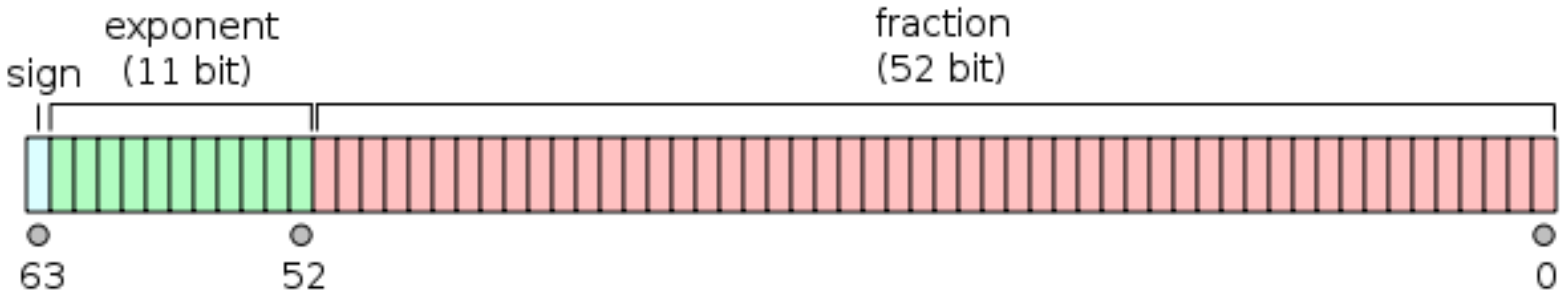

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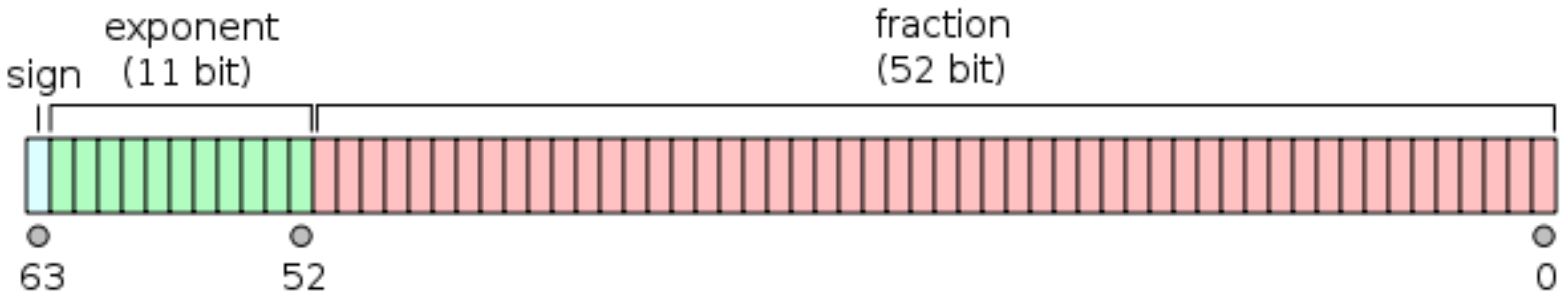
(Demo)

Representing real numbers:



1/3 = 0011 1111 1101 0101 0101 0101 0101 0101 0101 0101 0101 0101 0101 0101 0101 0101

False in a Boolean contexts:

0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

1000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000

http://en.wikipedia.org/wiki/File:IEEE_754_Double_Floating_Point_Format.svg

Working with Real Numbers

Bonus Material

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
```

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance
```

Working with Real Numbers

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>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
```

Working with Real Numbers

Bonus Material

```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance
```

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance

>>> def approx_eq(x, y):
```

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance

>>> def approx_eq(x, y):
        if x == y:
```

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance

>>> def approx_eq(x, y):
        if x == y:
            return True
```

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance

>>> def approx_eq(x, y):
        if x == y:
            return True
        return approx_eq_1(x, y) or approx_eq_2(x, y)
```

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance

>>> def approx_eq(x, y):
        if x == y:
            return True
        return approx_eq_1(x, y) or approx_eq_2(x, y)
```

or approx_eq_2(y,x)

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance

>>> def approx_eq(x, y):
        if x == y:
            return True
        return approx_eq_1(x, y) or approx_eq_2(x, y)

>>> def near(x, f, g):
```

or approx_eq_2(y,x)

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```
>>> def approx_eq_1(x, y, tolerance=1e-18):
        return abs(x - y) <= tolerance

>>> def approx_eq_2(x, y, tolerance=1e-7):
        return abs(x - y) <= abs(x) * tolerance

>>> def approx_eq(x, y):
        if x == y:
            return True
        return approx_eq_1(x, y) or approx_eq_2(x, y)

>>> def near(x, f, g):
        return approx_eq(f(x), g(x))
```

or approx_eq_2(y,x)

Moral of the Story

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```
Life was better when numbers were just numbers!
```

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Coming Soon: Data Abstraction