db analytics showcase

Sapporo 2017

# Building a Scientific Platform with Python

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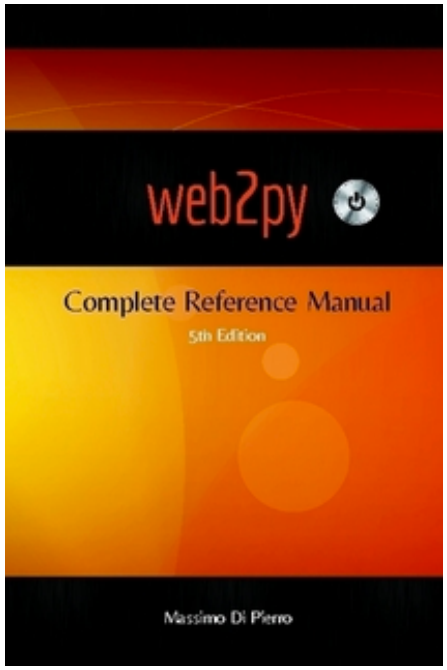
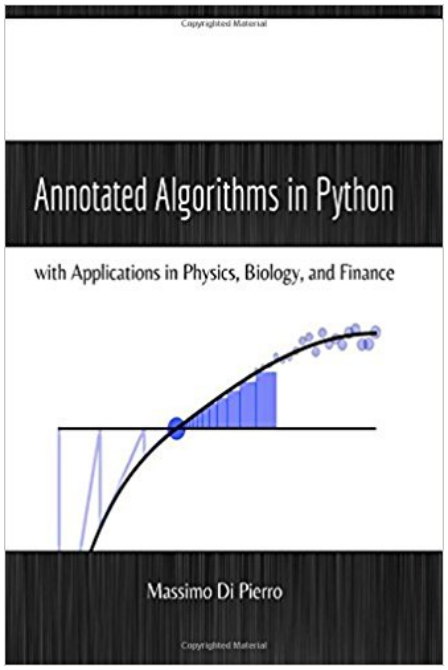
(DePaul University, Chicago)

# about me


web2py
Complete Reference Manual
5th Edition
Massimo Di Pierro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Annotated Algorithms in Python
with Applications in Physics, Biology, and Finance
Massimo Di Pierro
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# Python for Science

## Numpy (efficient arrays)

```
numpy.random.random((2,3)).reshape(6).sum()
```

## Pandas (tabular data)

```
df[db['colA']>0]['colB'].sum()
```

## Scipy (algorithms)

```
linalg.inv(numpy.array([[1,2],[3,4]]))
```

## ScikitLearn (Machine Learning fit/predict/cluster)

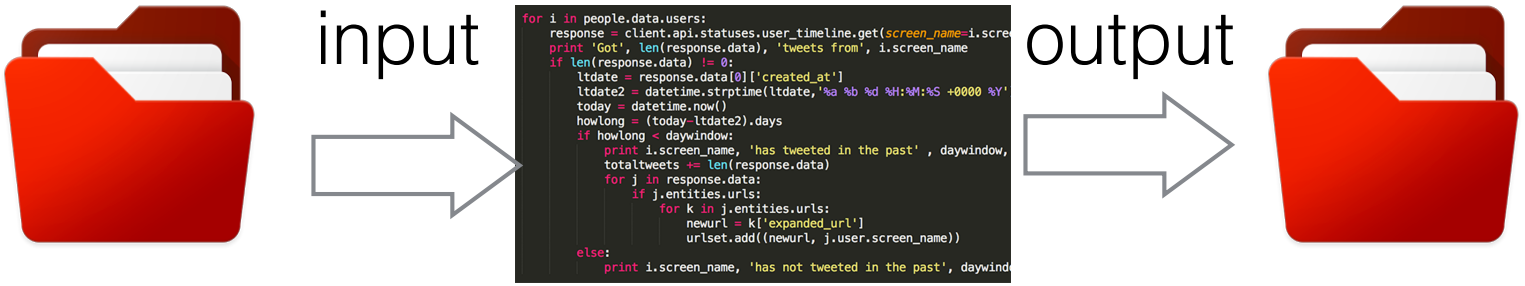
```
sklearn.svc.SVC().fit(data, target).predict(new_data)
```

## Keras / Tensorflow (Naural Network fit/predict)

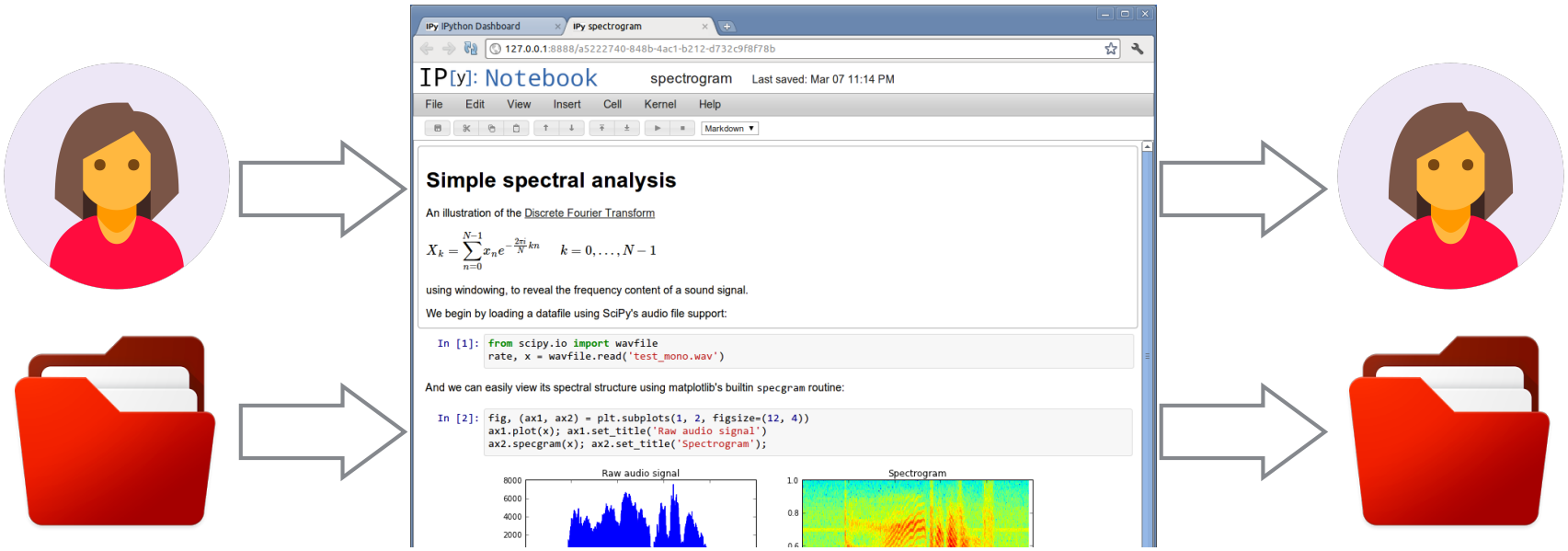
```
model = Sequential()
model.add(RNN(128, return_sequences=True))
...
model.compile(....)
model.fit(data, target)
model.predict(new_data)
```

# How to share?

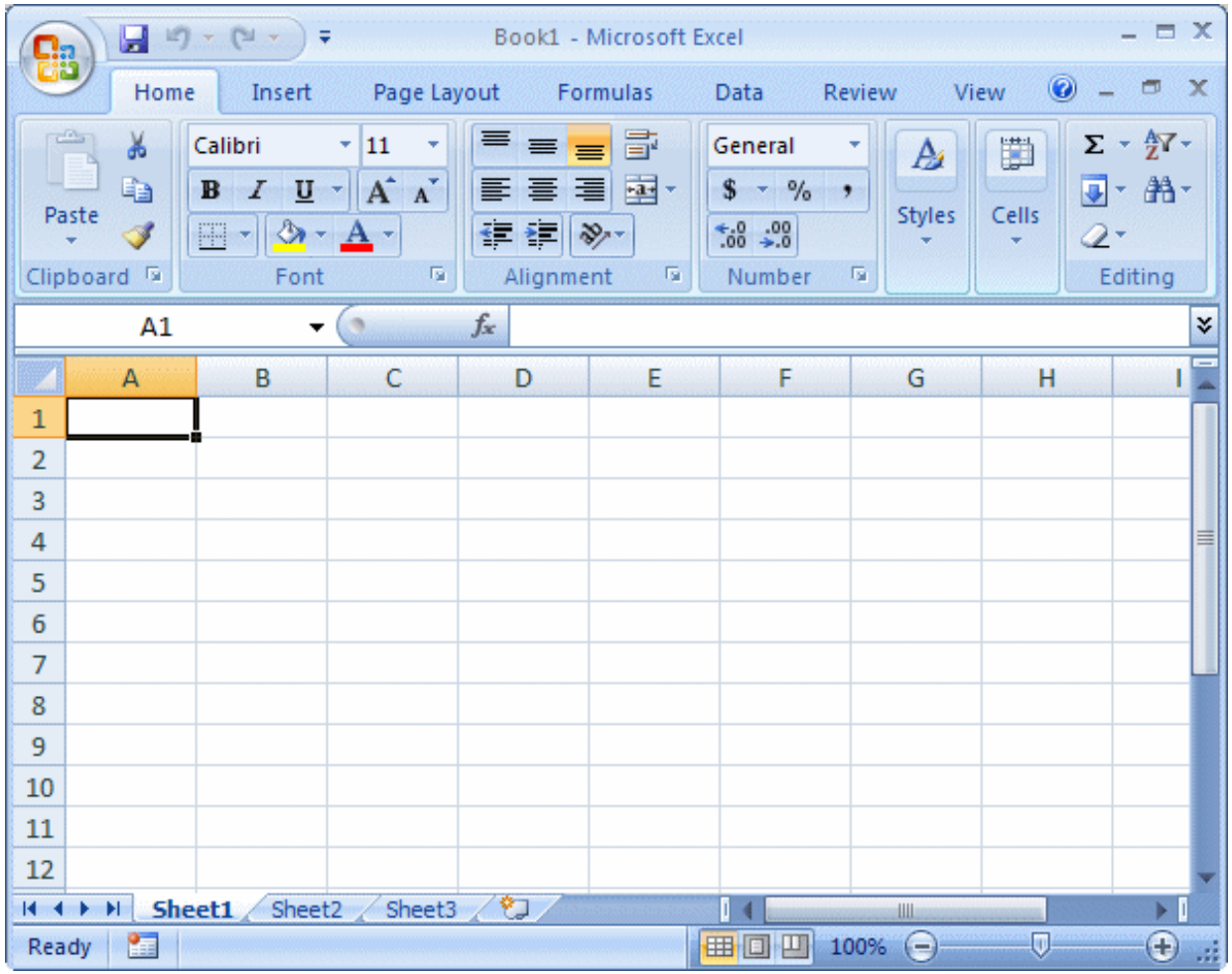
## Python Modules



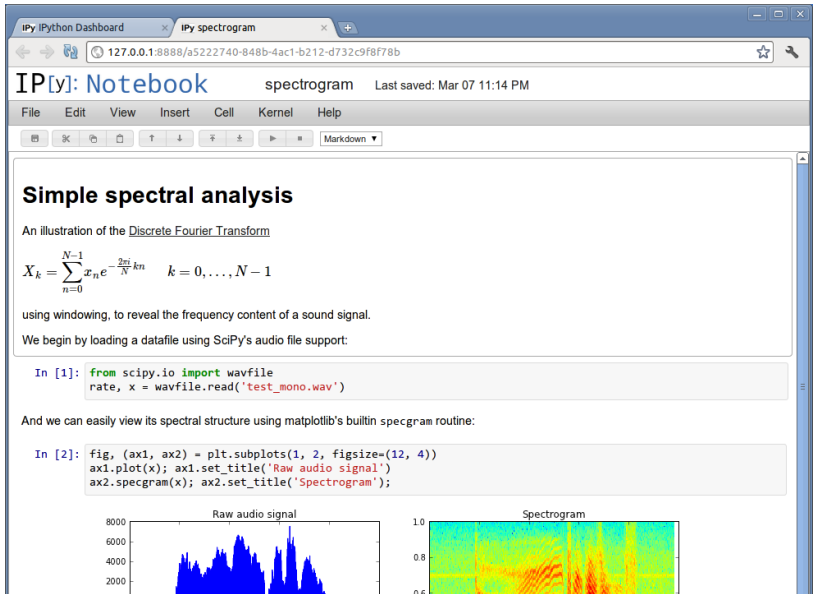

## iPython/Jupyther Notebook



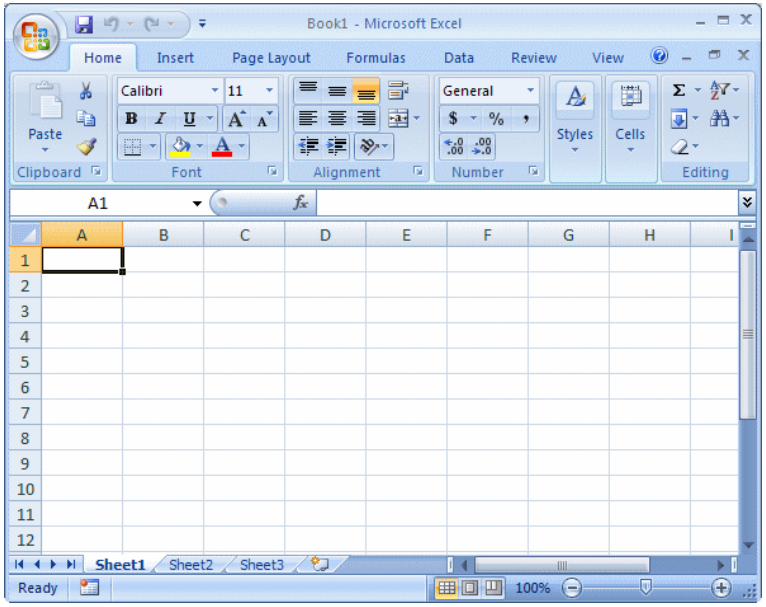
# Excel (really?)

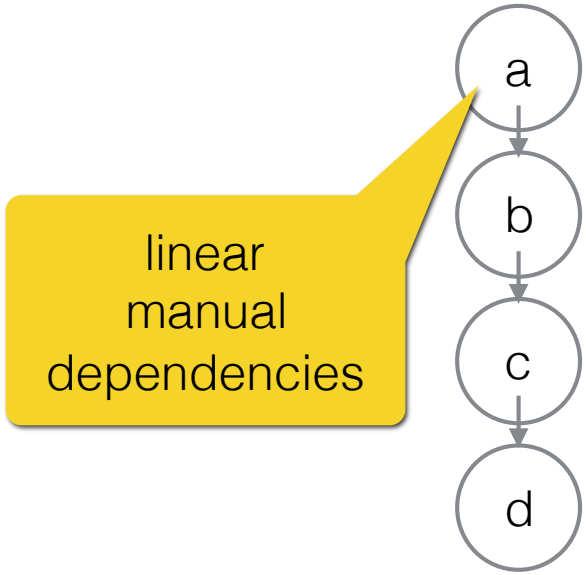


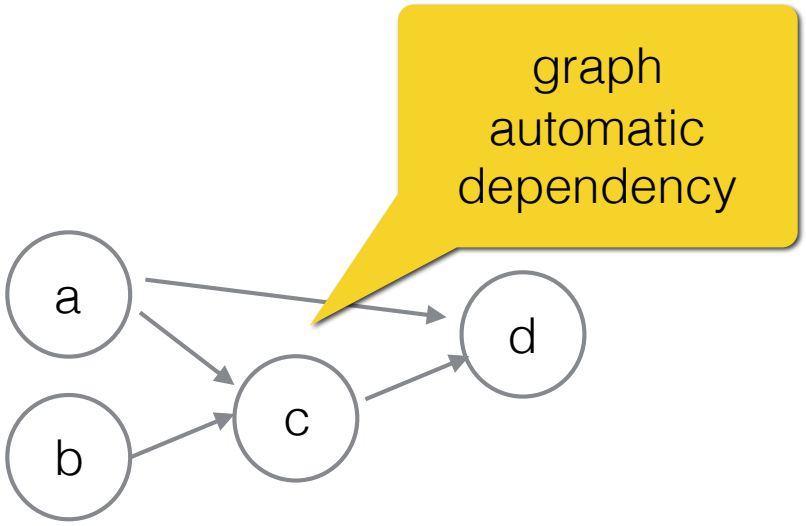
# ipython



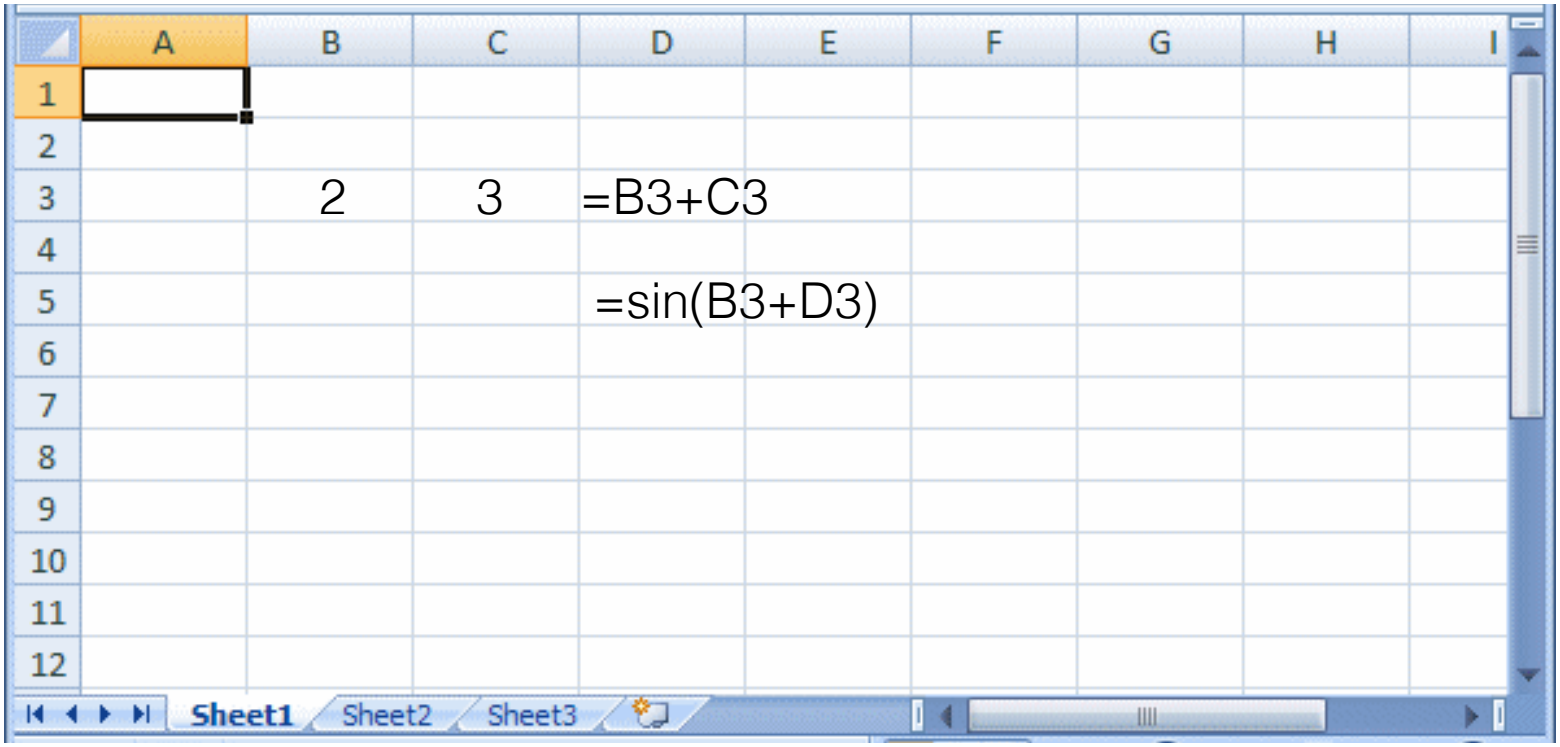

# excel



# Excel (really?)




values = {'B3': 2, 'C3': 3}

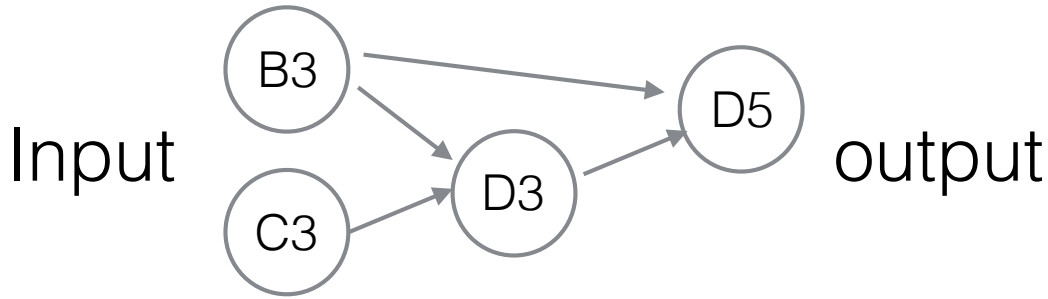
fomulas = {'D3': 'B3+C3', 'D5': 'sin(B3+D3)'}

# Excel (really?)

| | | | |
|---|---|---|---|
| 2 | 3 | 5 | =B3+C3 |
| | | 0.6569865987187891 | =sin(B3+D3) |

values = {'B3': 2, 'C3': 3}

fomulas = {'D3': 'B3+C3', 'D5': 'sin(B3+D3)'}

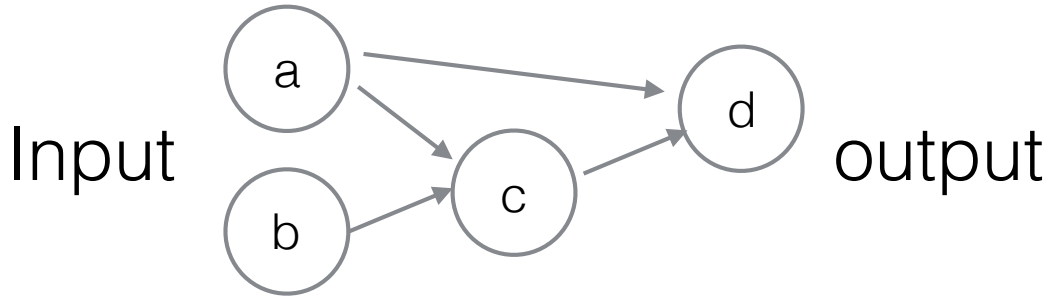


# Excel (really?)

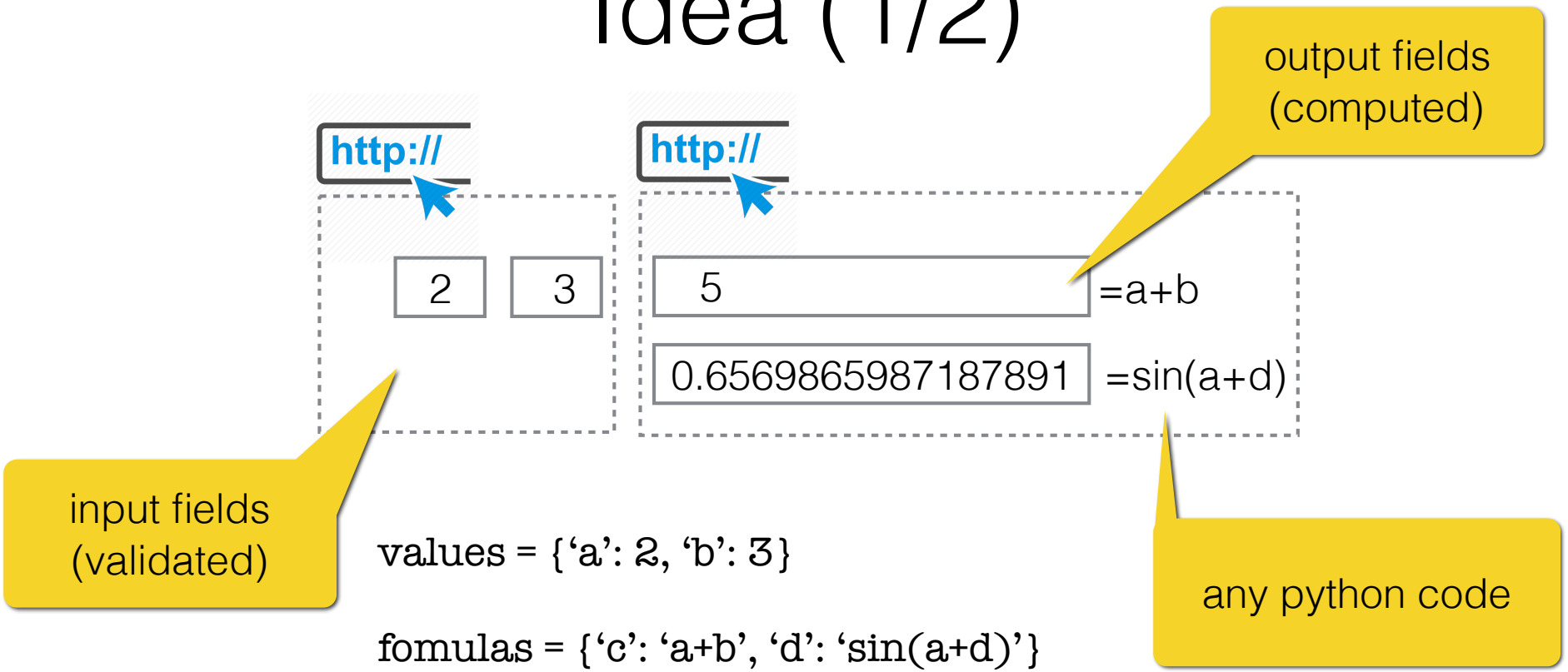
| 2 | 3 | 5 | =a+b |
|---|---|---|---|
| | | 0.6569865987187891 | =sin(a+d) |

values = {‘a’: 2, ‘b’: 3}

fomulas = {‘c’: ‘a+b’, ‘d’: ‘sin(a+d)’}

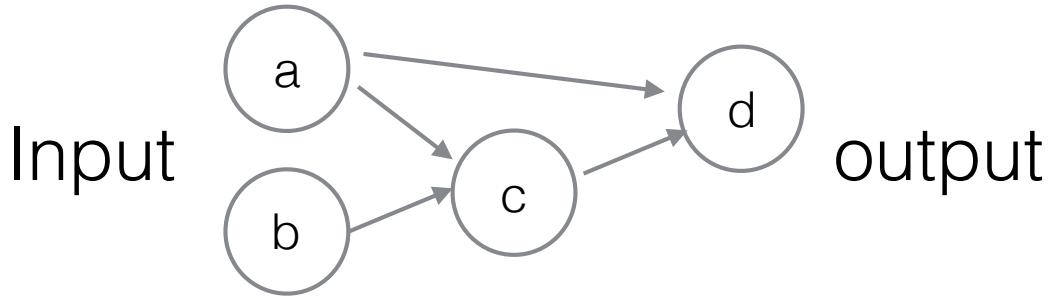


# Idea (1/2)




values = {'a': 2, 'b': 3}

fomulas = {'c': 'a+b', 'd': 'sin(a+d)'}



# Idea (2/2) - CMS


use wiki syntax to describe pages


use wiki syntax to describe forms


embed code in pages


generate interactive pages

# Example

create new page

edit

```
# Title
...
[[a]] [[b]] [[c=a+b]] [[d=sin(a+d)]]
```

```
from math import sin
```

author can change formulas and code

publish

http://

**Title**

```
...
[2] [3] 5 0.6569865987187891
```

visitors

http://

**Title**

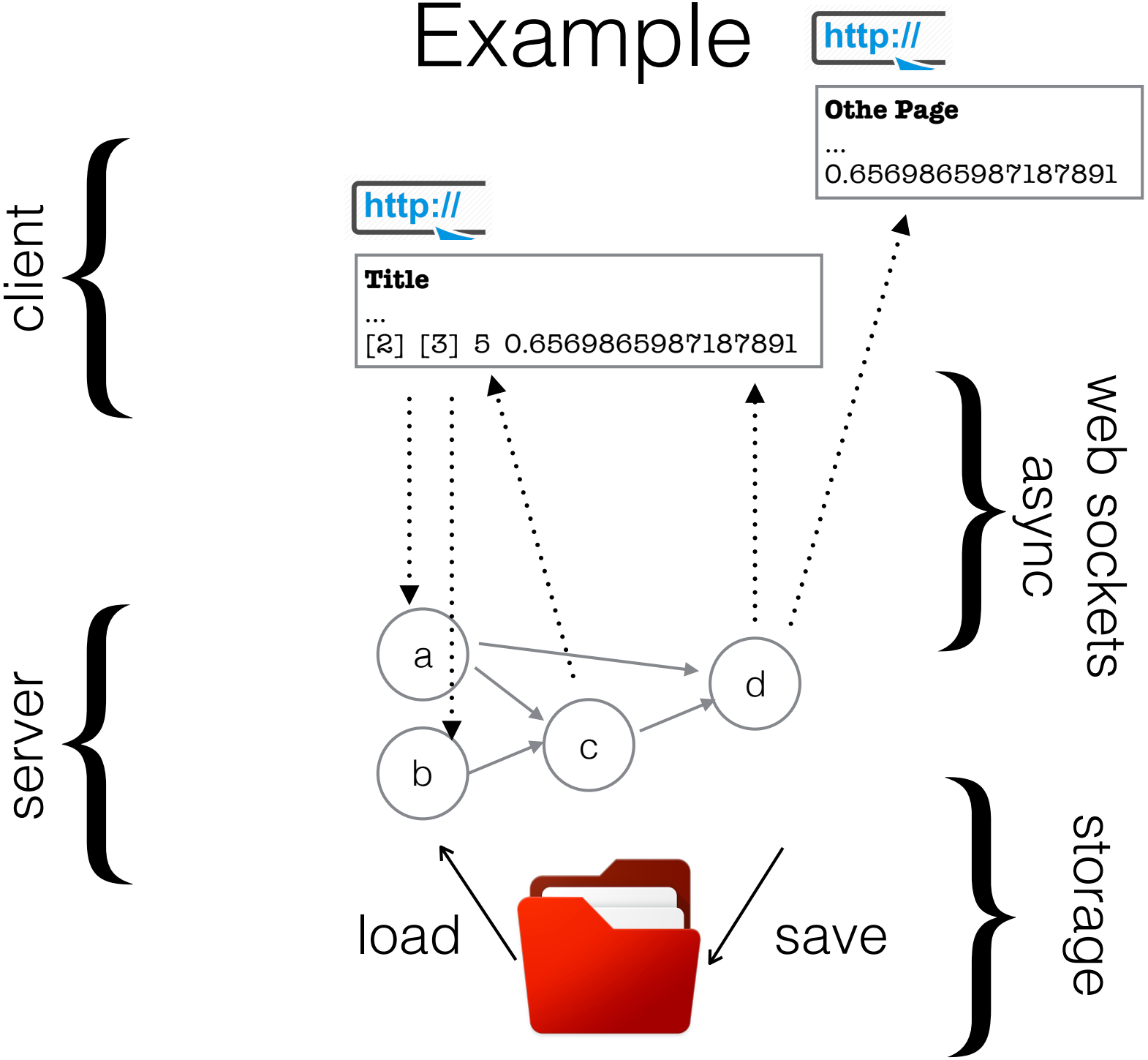
```
...
[1] [7] 8 0.41211848524175660
```

visitors can only change input

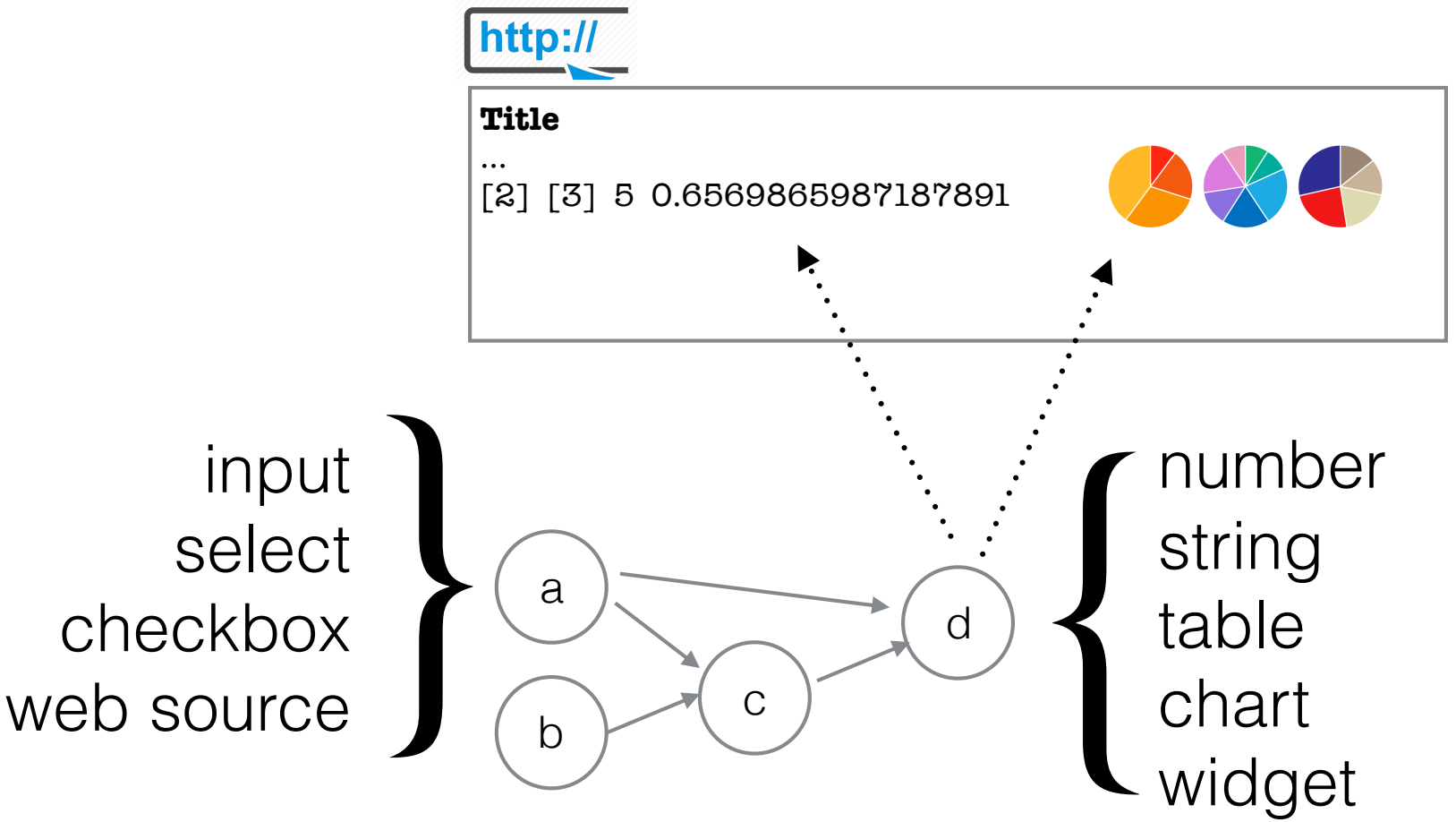
input fields (validated)

output fields (computed)

# Example


client
server
http://
Othe Page
...
0.6569865987187891
http://
Title
...
[2] [3] 5 0.6569865987187891
a
b
c
d
load
save
web sockets
async
storage

# Example


http://
Title
...
[2] [3] 5 0.6569865987187891
input
select
checkbox
web source
a
b
c
d
number
string
table
chart
widget

# Choice of Technologies

- server: bottle.py
- server: gevent websockets

- client: jquery
- client: vue.js
- client: markdown (modified)