A hacker's guide to debugging in Python

Things break. So they should break:

- gracefully
- helpfully
- ~~silently~~

Exceptions

Some examples:

- **KeyError** - for when a key can't be found in a dictionary

- **NameError** - for problems related to variable names

- **TypeError** - for problems related to data types

- …etc. See all of the built-in ones here.

Packages also define their own exceptions
And you can too!

```python
class MissingDataError(Exception):
    """"To be raised when some non-optional
    data is missing.""""
    pass
```

Raising an exception

```
# every movie must have a title
if 'title' not in mojo_dict.keys():
    raise MissingDataError('JSON must have a'
                           'key called "title"')
```
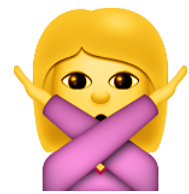
Why spend so much time making different types of errors?

1. Makes debugging easier

2. We can deal with them programmatically

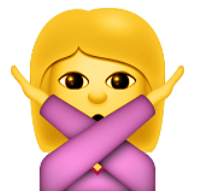# Catching an exception

```python
try:
    year = int(meta_dict.get('year'))
except ValueError:
    logging.warning("No parseable year for movie %s.",
                    title)
    movie['year'] = None
```

except **is not for making errors "go away"**

🙅‍♀️🚫 **DON'T DO THIS** 🚫🙅‍♀️

```python
try:
    process_data(thing)
except:
    logging.debug('annoying error ¯\_(ツ)_/¯')
```

Reading a traceback

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
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pandas/lib.pyx in pandas.lib.fast_unique_multiple_list_gen (pandas/lib.c:9054)()

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AttributeError: 'list' object has no attribute 'keys'
```

your function call (where the error happened)

```
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that function
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The line of code that actually caused the error

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The error itself (its type, and any message supplied)

```
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```
----> 3 pd.DataFrame(stuff)
```

Hmm, error occurs when I'm trying to make a new DataFrame…

```
AttributeError: 'list' object has no attribute 'keys'
```

Looks like somewhere deep in Pandas, it's trying to get keys from a list…

Which means it's probably expecting a dictionary and getting a list instead…

```
for thing in stuff:
    print type(thing), thing
```

```
<type 'dict'> {'a': 3, 'c': 2, 'b': 1}
<type 'dict'> {'a': 1, 'c': 3, 'b': 2}
<type 'list'> ['a', 'b', 'c']
```

Yep. Oops.

pdb

```
import pdb

pdb.set_trace()
```

Demo time!