

# Object-Oriented Programming

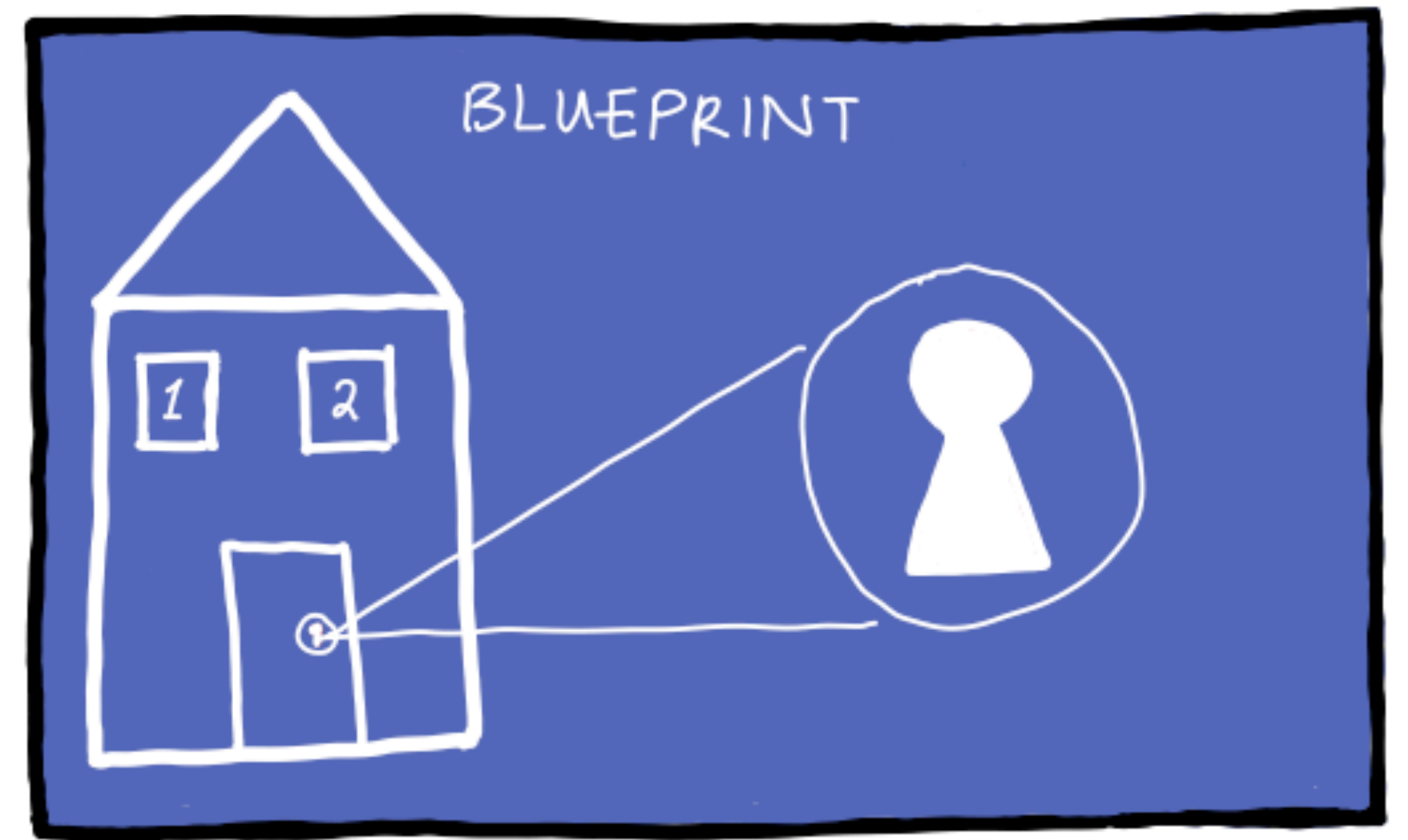
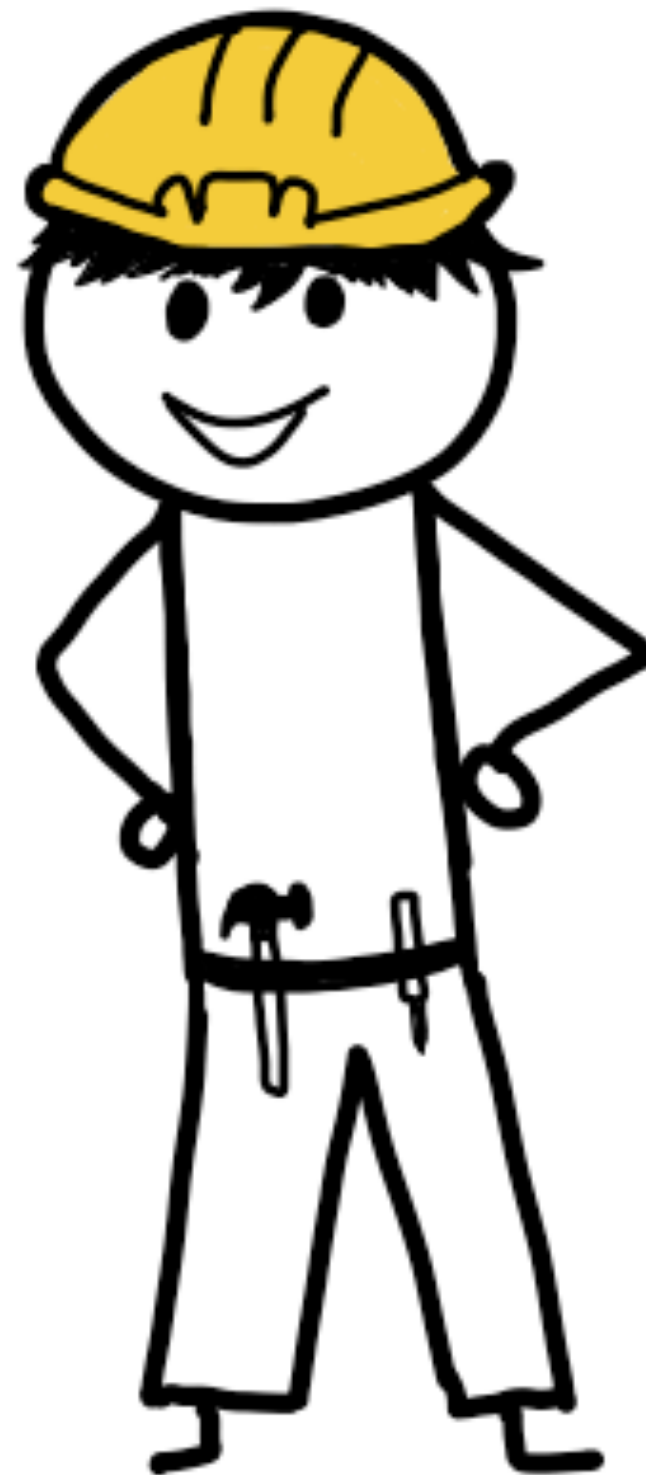
April 13, 2021

# Classes

# High-Level

Imagine I'm opening a residential construction company which is going to build several houses...

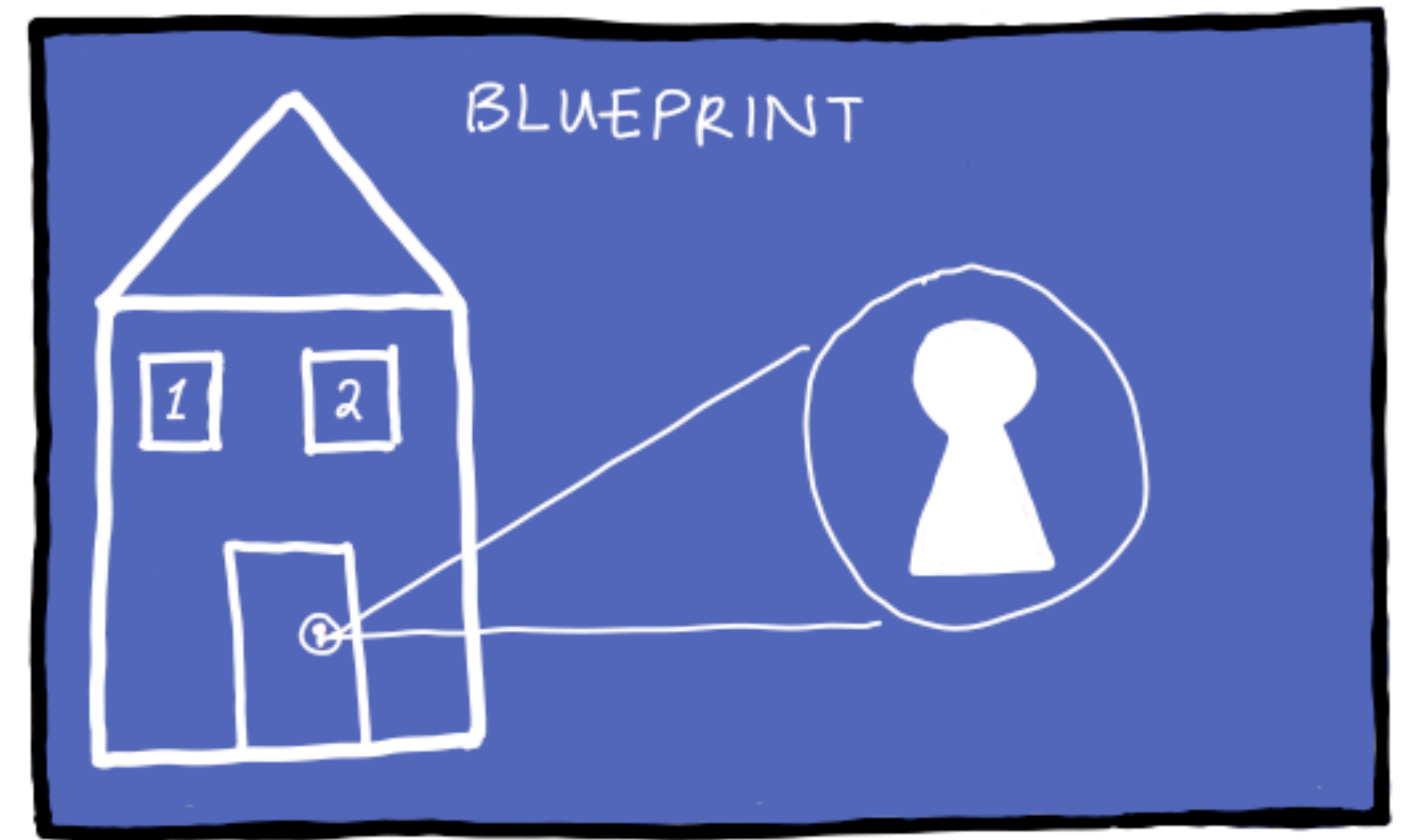
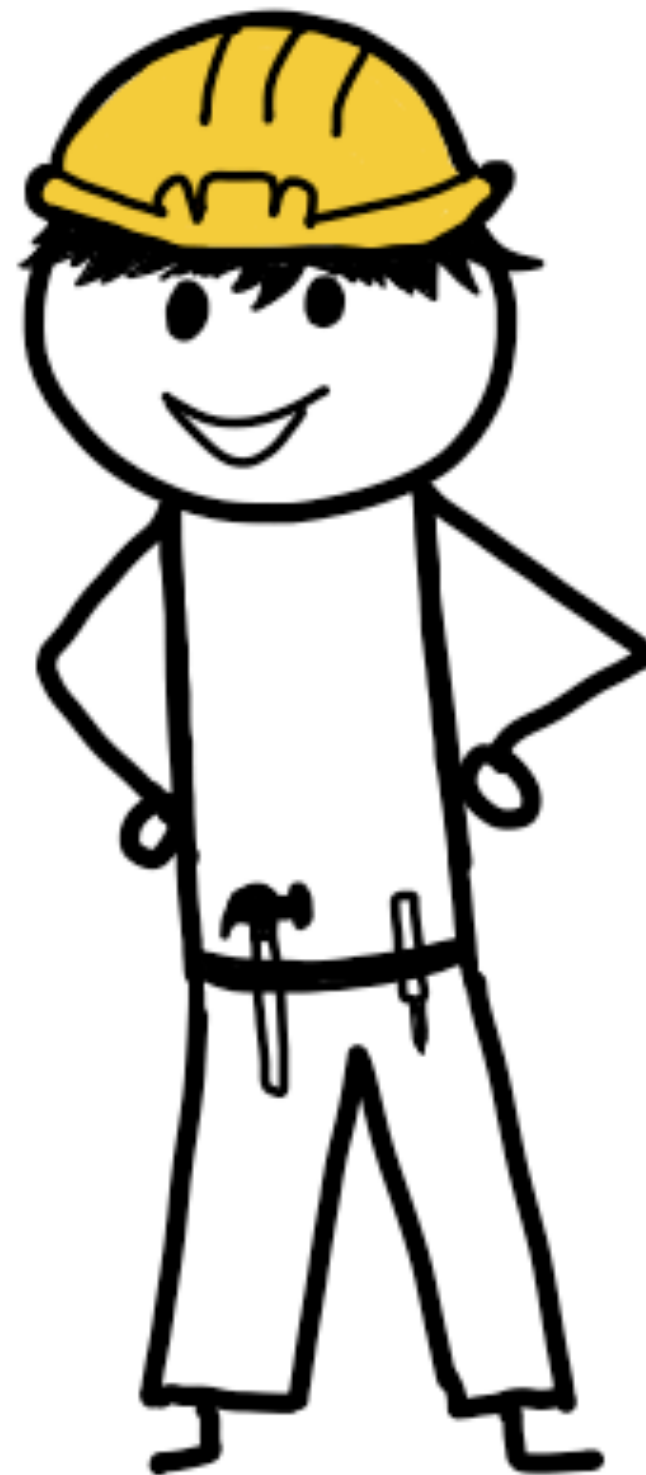
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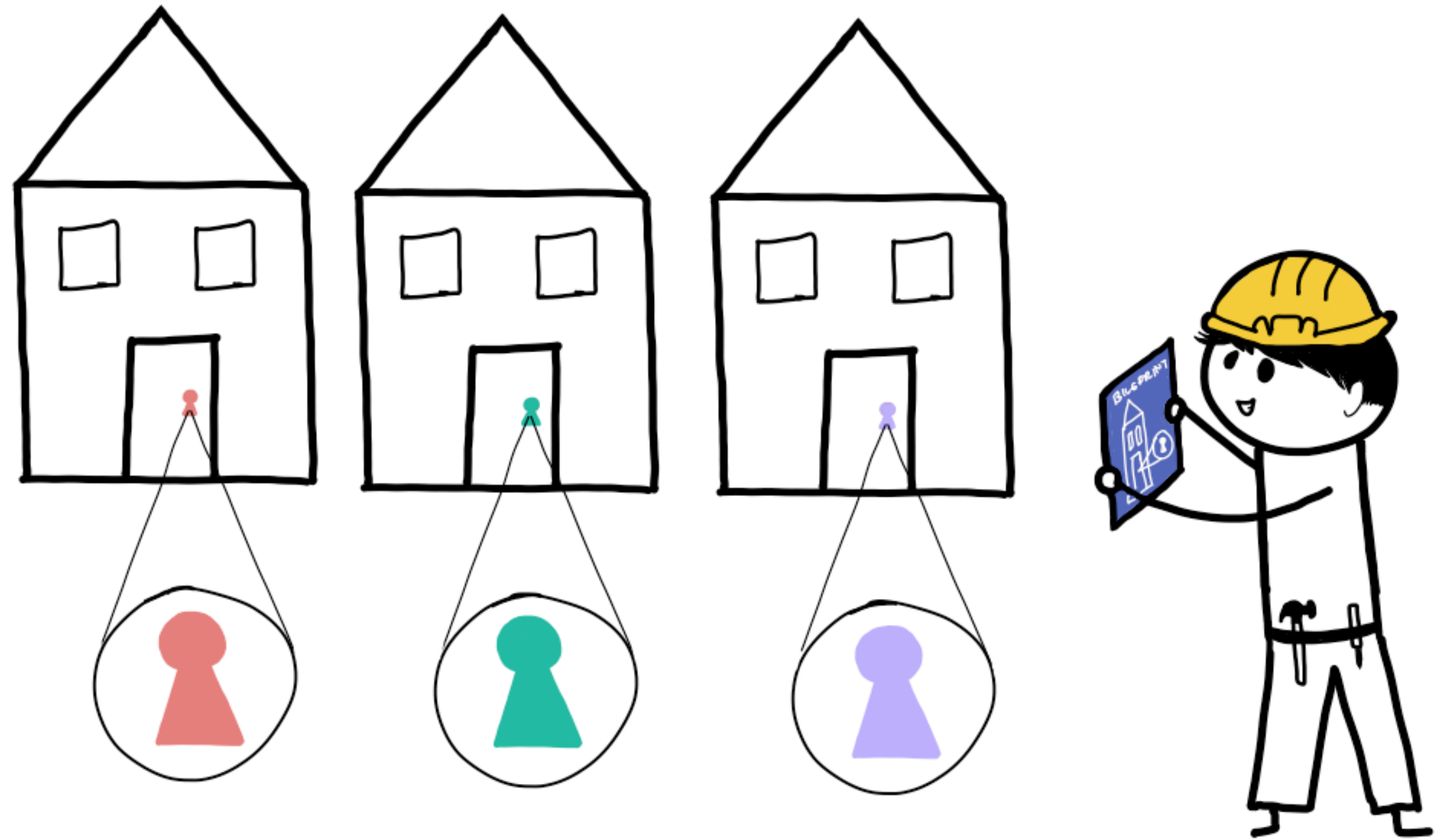


✨ btw y'all, my sister made these! 💜

# High-Level

Then, I can use that blueprint to build several houses. Some properties of the houses will be the same and others will be different.

Each house is **an instance (object)** of the class.



# High-Level

The blueprint for a house

```
class House:
    utilities = {
        'electricity': 'A&E #8675309',
        'water': 'Palo Alto Mutual #6054756961'
    }

    def __init__(self):
        self.locked = True
```

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These attributes are shared among the instances (houses)

This is run every time an instance is declared and sets up instance-specific properties (it's the "constructor")



# High-Level

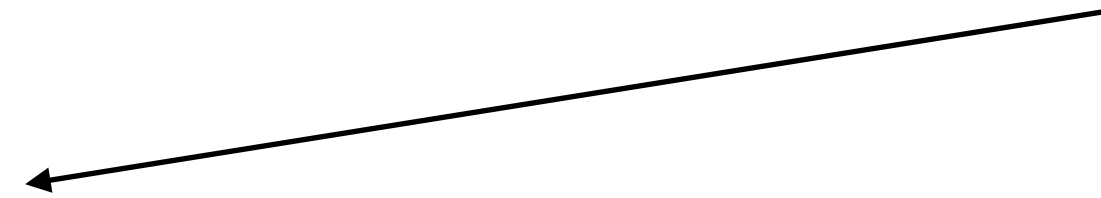
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# High-Level

The actual houses

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red = House()  
blue = House()  
green = House()
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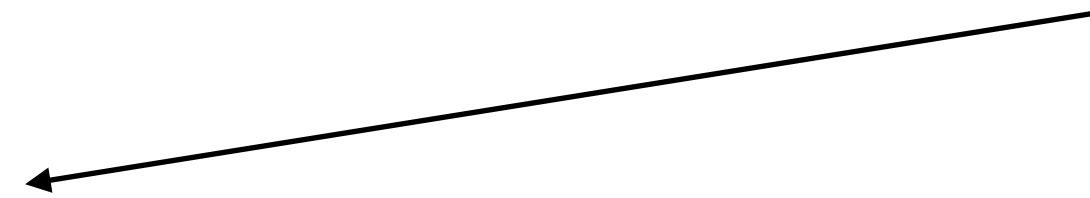


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The actual houses

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red = House()  
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```
House.utilities['electricity'] # => 'A&E #8675309'  
red.utilities['electricity']   # => 'A&E #8675309'  
green.utilities['electricity'] # => 'A&E #8675309'
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```
red.locked # => True  
blue.locked # => True
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House.utilities['electricity'] # => 'A&E #8675309'  
red.utilities['electricity']   # => 'A&E #8675309'  
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```

```
red.locked # => True  
blue.locked # => True
```

```
red.locked = False  
blue.locked # => True
```

**Note:** In Python, all attributes are public

```
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When the function is run on a class instance, the first parameter to every method is a reference to the object itself. It could be named anything, but `self` is the traditional name.

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```
House.__init__ # => <function __init__(self)>
```

```
red = House()  
red.__init__ # => <bound method House.__init__>
```



# But wait... what's `self`?

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```

```
red = House()  
red.__init__ # => <bound method House.__init__>
```

This applies to other methods as well, not just `__init__`.

`instance.method(some args) ~ function(instance, some args)`

# Custom Instantiation

```
class Student:
    def __init__(self, name, sunet):
        self.name = name.title()

        # validate the SUNet
        if not set(sunet) <= set('0123456789'):
            raise ValueError(f"Invalid SUNet: {sunet}.")
        self.sunet = sunet
```

Just like a normal function,  
\_\_init\_\_ can have  
parameters!

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parth = Student('parth sarin', 'noneya') # ValueError
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```
parth = Student('parth sarin', 'noneya') # ValueError

pop_tart = Student('pop tart', '5625165')
pop_tart.name # => 'Pop Tart'
```

# Magic Methods

# Python Uses Magic Methods!

```
str(x)    # => x.__str__()
```

```
x == y    # => x.__eq__(y)
```

```
x < y     # => x.__lt__(y)
```

```
x + y     # => x.__add__(y)
```

```
next(x)   # => x.__next__()
```

```
len(x)    # => x.__len__()
```

```
hash(x)   # => x.__hash__()
```

```
el in x   # => x.__contains__(el)
```

Full list [here!](#)