The Object Factory

OBJECT-ORIENTED PROGRAMMING WITH S3 AND R6 IN R

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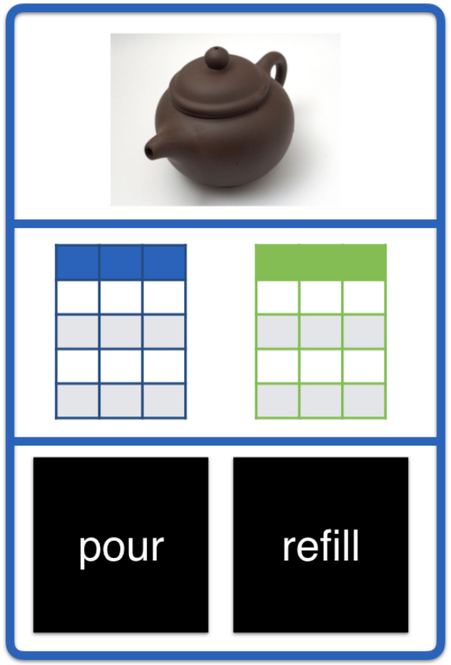
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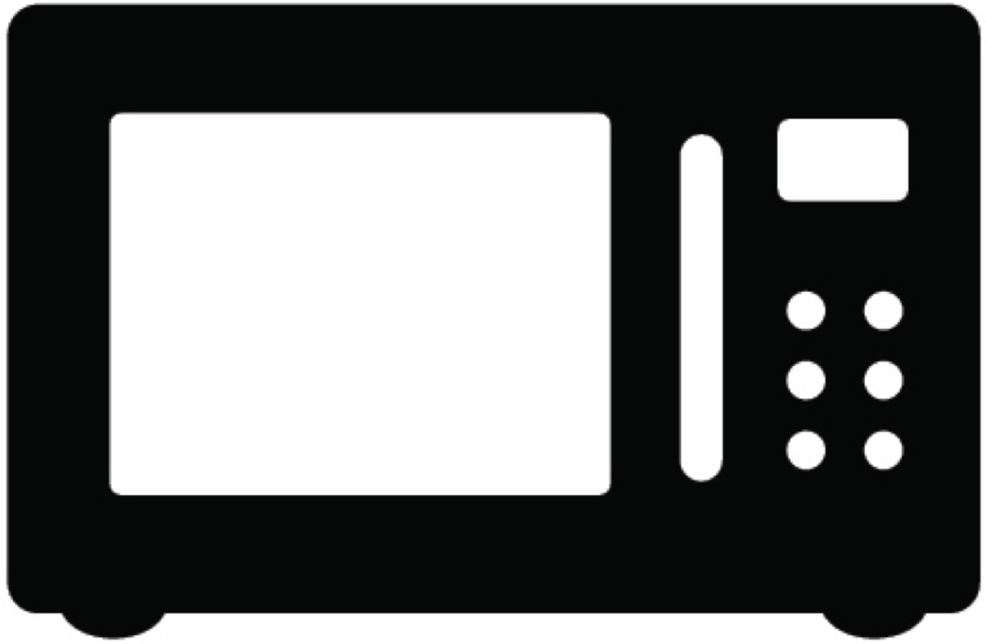
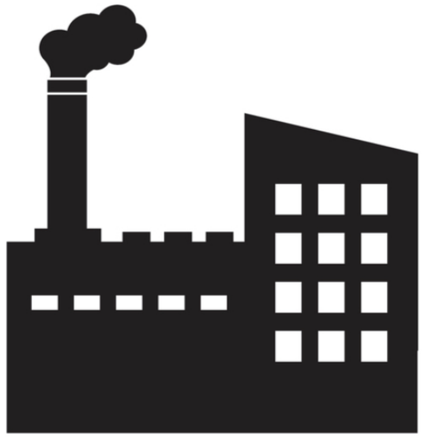
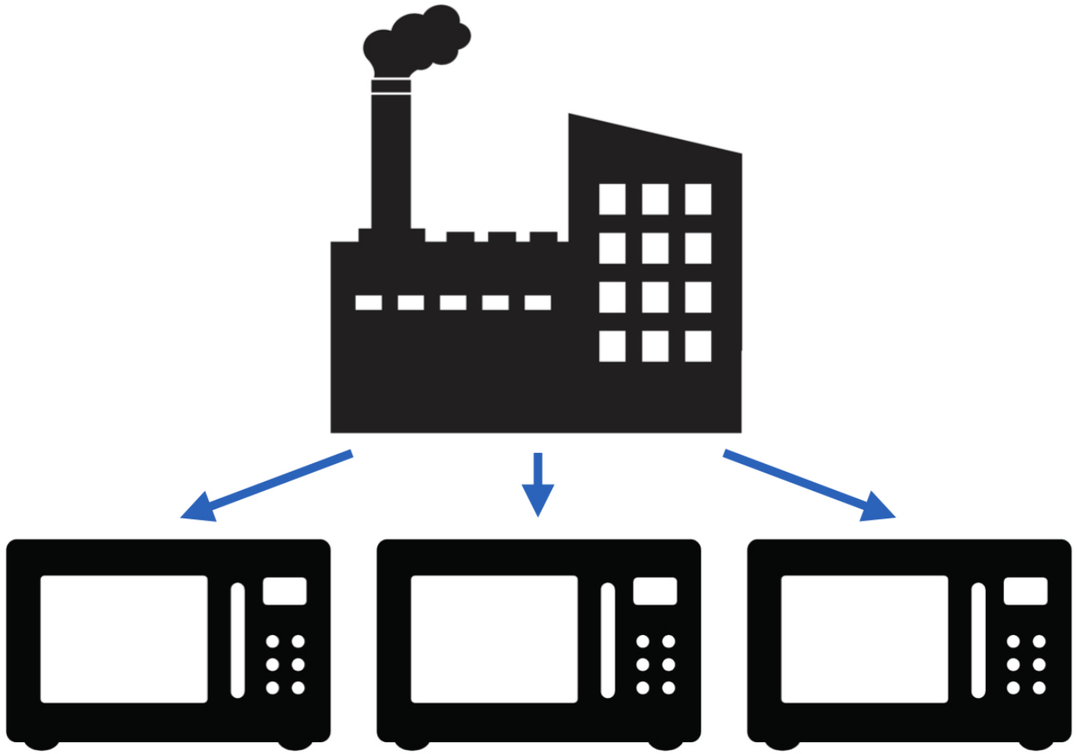
class generators are templates for objects

class generators are templates for objects a.k.a. factories







```
library(R6)
thing_factory <- R6Class(
  "Thing",
  private = list(
    a_field = "a value",
    another_field = 123
  )
)
```

Coming soon ...

public

active

```
a_thing <- thing_factory$new()
```

```
another_thing <- thing_factory$new()
```

```
yet_another_thing <- thing_factory$new()
```

Summary

- Load the **R6** package to work with R6!
- Define **class generators** with `R6Class()`
- Class names should be **UpperCamelCase**
- **Data fields** stored in `private` list
- Create objects with factory's `new()` method

Let's practice!

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Hiding Complexity with Encapsulation

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Encapsulation

Encapsulation

implementation | user interface

```
microwave_oven_factory <- R6Class(
  "MicrowaveOven",
  private = list(
    power_rating_watts = 800,
    door_is_open = FALSE
  ),
  public = list(
    open_door = function() {
      private$door_is_open <- TRUE
    }
  )
)
```

`private$` accesses **private** elements

`self$` accesses **public** elements

Summary

- **Encapsulation = separating** implementation from UI
- Store **data** in `private` list
- Store **methods** in `public` list
- Use `private$` to access **private** elements
- `...` and `self$` to access **public** elements

Let's practice!

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Getting and Setting with Active Bindings

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CONTROLLED ACCESS ZONE

getting = read the data field

setting = write the data field

Active Bindings

defined like functions

accessed like data variables

```
thing_factory <- R6Class(
  "Thing",
  private = list(
    ..a_field = "a value",
    ..another_field = 123
  ),
  active = list(
    a_field = function() {
      if(is.na(private$..a_field)) {
        return("a missing value")
      }
      private$..a_field
    },
    another_field = function(value) {
      if(missing(value)) {
        private$..another_field
      } else {
        assert_is_a_number(value)
        private$..another_field <- value
      }
    }
  )
)
```

```
a_thing <- thing_factory$new()
a_thing$a_field
```

```
"a value"
```

```
a_thing$a_field <- "a new value"
```

```
Error in (function (value)  : a_field is read-only.
```

```
a_thing$another_field <- 456
```

```
a_thing$another_field <- "456"
```

```
Error in (function (value) : is_a_number :
value is not of class 'numeric'; it has class 'character'.
```

Summary

- **Control** private access with **active bindings**
- **Defined** like **functions**
- **Accessed** like **data**

Let's practice!

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