Avoid (Null) Checks

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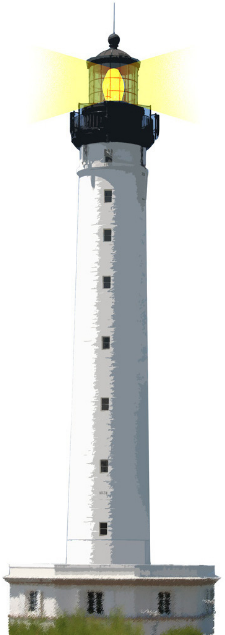

Outline

- Anti if Campaign
- Returning nil
- Null Object

Anti If Campaign

```
Main >> showHappiness: animal
  animal isDog
    ifTrue: [ animal shakeTail ].
  animal isDuck
    ifTrue: [ animal quack ].
  animal isCat ifTrue: [ ... ].
```

Anti If Campaign

```
Main >> showHappiness: animal
  animal isDog
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  animal isDuck
    ifTrue: [ animal quack ].
  animal isCat ifTrue: [ ... ].
```

Branching (with `if`) based on the type of an object is bad:

- adding a new type requires modifying all such code
- methods will become very long and full of details

Send messages instead

Anti-IF Campaign

Better Approach: Define Polymorphic Method

```
Dog >> showHappiness
  self shakeTail
Duck >> showHappiness
  self quack
Cat >> showHappiness
  ...
```

Do Not Return Nil

```
Inferencer >> rulesForFact: aFact
  self noRule ifTrue: [ ^ nil ]
  ^ self rulesAppliedTo: aFact
```

ifTrue: [^ nil] forces every client to check for nil:

```
(inferencer rulesForFact: 'a')
  ifNotNil: [ :rules |
    rules do: [ :each | ... ]
```

Return Polymorphic Objects

When possible, replace if by polymorphic objects:

- when returning a collection, return an empty one
- when returning a number, return 0

```
Inferencer >> rulesForFact: aFact
  self noRule ifTrue: [ ^ #() ]
  ^ self rulesAppliedTo: aFact
```

Your clients can just iterate and manipulate the returned value

```
(inferencer rulesForFact: 'a')
  do: [:each | ... ]
```

For Exceptional Cases, Use Exceptions

For exceptional cases, replace `nil` by exceptions:

- avoid error codes because they require `if` in clients
- exceptions may be handled by the client, or the client's client, or ...

```
FileStream >> nextPutAll: aByteArray
  canWrite ifFalse: [ self cantWriteError ].
  ...
FileStream >> cantWriteError
  (CantWriteError file: file) signal
```

Initialize Your Object State

Avoid nil checks by initializing your variables

- by default instance variables are initialized with nil

```
Archive >> initialize
  super initialize.
  members := OrderedCollection new
```

Use Lazy Initialization if Necessary

You can defer initialization of a variable to its first use:

```
FreeTypeFont >> descent
  ^ cachedDescent ifNil: [
      cachedDescent := (self face descender * self pixelSize //
                            self face unitsPerEm) negated ]
```

Sometimes you have to check...

Sometimes you have to check before doing an action

- if you can, turn the default case into an object

```
ToolPalette >> nextAction
  self selectedTool
    ifNotNil: [ :tool | tool attachHandles ]

ToolPalette >> previousAction
  self selectedTool
    ifNotNil: [ :tool | tool detachHandles ]
```

Use NullObject

```
NoTool >> attachHandles
  ^ self
NoTool >> detachHandles
  ^ self
```

```
ToolPalette >> initialize
  self selectedTool: NoTool new
ToolPalette >> nextAction
  self selectedTool attachHandles
ToolPalette >> previousAction
  self selectedTool detachHandles
```

- A null object proposes a polymorphic API and embeds default actions/values
- Woolf, Bobby (1998). "Null Object". In Pattern Languages of Program Design 3. Addison-Wesley.

Conclusion

- A message acts as a better `if`
- Avoid null checks, return polymorphic objects instead
- Initialize your variables
- If you can, create objects representing default behavior

Anti-IF Campaign

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