

CS 535 Object-Oriented Programming & Design
Fall Semester, 2001
Doc 20 An Example

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An Example

Here is an example which we will examine. The windowSpec for the class has been removed to save space. Read the source code and write down what you think are the problems in this class.

```
Smalltalk.CS535 defineClass: #Customer
  superclass: #{UI.ApplicationModel}
  indexedType: #none
  private: false
  instanceVariableNames: 'name phone id '
  classInstanceVariableNames: '
  imports: "
  category: 'UIApplications-New'
```

Class Method

```
name: aName phone: aNumberString id: aNumber
^self new
  setName: aName
  setPhone: aNumberString
  setID: aNumber
```

Instance methods

```
id
^id isNil
  ifTrue: [id := 0 asValue]
  ifFalse: [id]

id: anInteger
self id value: anInteger
```

name

^name isNil

ifTrue: [name := String new asValue]

ifFalse: [name]

name: aString

self name value: aString

phone

^phone isNil

ifTrue: [phone := String new asValue]

ifFalse: [phone]

phone: aString

self phone value: aString

printOn: aStream

aStream

print: 'Customer(';

print: self name;

print: ', ';

print: self phone;

print: ', ';

print: self id;

print: ')'

setName: aNameString setPhone: aPhoneString setID: aNumber

self name value: aNameString.

self phone value: aPhoneString.

self id value: aNumber

find

```
| separator dataFile stream names readingBlock |
dataFile := 'names.txt' asFilename.
stream := dataFile readStream.
separator := $;.
names := OrderedCollection new.
readingBlock :=
    [[stream atEnd] whileFalse:
        [stream next = Graphics.TextConstants.CR
            ifFalse:
                [names add: (Customer
                    name: (stream upTo: separator)
                    phone: (stream upTo: separator)
                    id: (stream upTo: Graphics.TextConstants.CR))]]].
readingBlock valueNowOrOnUnwindDo: [stream close].
names do:
    [:each |
        each name value = self name value
            ifTrue:
                [self setPhone: each phone value.
                    self setID: each id value]]
```

Comments

Before you read further write down what you think are the problems with this class.

Class as Struct

The class has very little intelligence. It is just a struct.

Lack of Information Hiding

Each instance variable has a method to get and a method to set its value

The accessor methods expose all users to the internal representation of the instance variable: value holders. So each access becomes:

aCustomer name value

rather than

aCustomer name

The Find method

A number of problems

Find is an operation on a collection of customers not a single customer. It does not belong in the customer class

The name of the data file is hard coded. This is something the commonly changes.

The method does a number of different things:

- Read a file
- Parse the file
- Create customer objects
- Search a list of customer objects
- Sets the current customer instance variables

A method should do only one conceptual thing.

Some Solutions

Class as Struct

When you have just a struct usually the data is the struct is being used somewhere. Look at those locations and see if those operation really belong in the struct-like class. Look for things that are not being done yet.

Lack of Information Hiding

Do you really need methods that set and get the value for each instance variable? Remove those that are not being used. Look at what the others are being used for. It may be those operations belong in the Customer class.

The problem with the value holders has a number of solutions. One is to provide special methods for access to the instance variable for the GUI. These methods can return either a value holder or an aspect adapter. The normal access methods return the actual instance variable, not the value holder.

The Find Method

The find method does not belong in the Customer class. It also should be broken up into a number of methods.