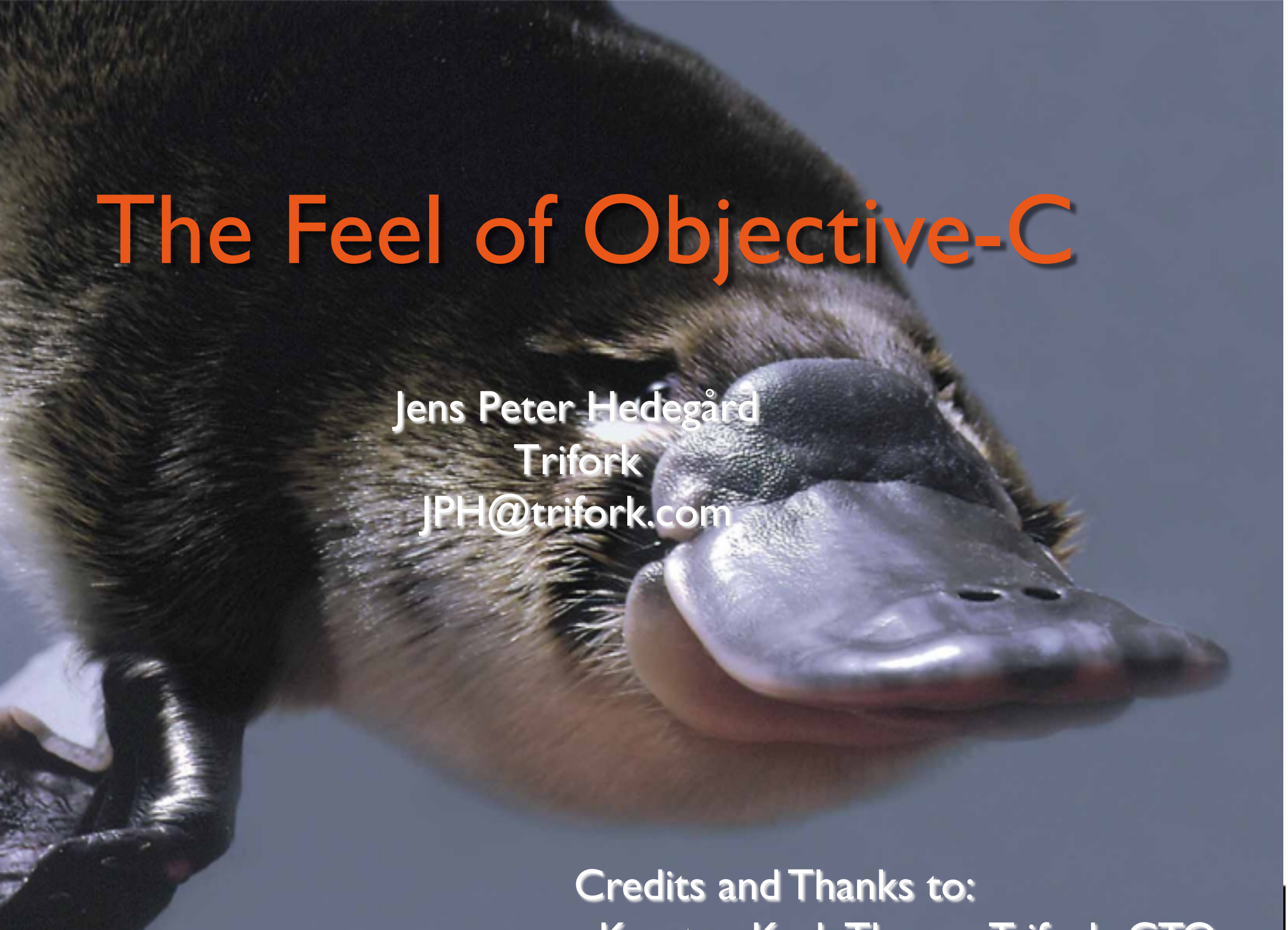

The Feel of Objective-C

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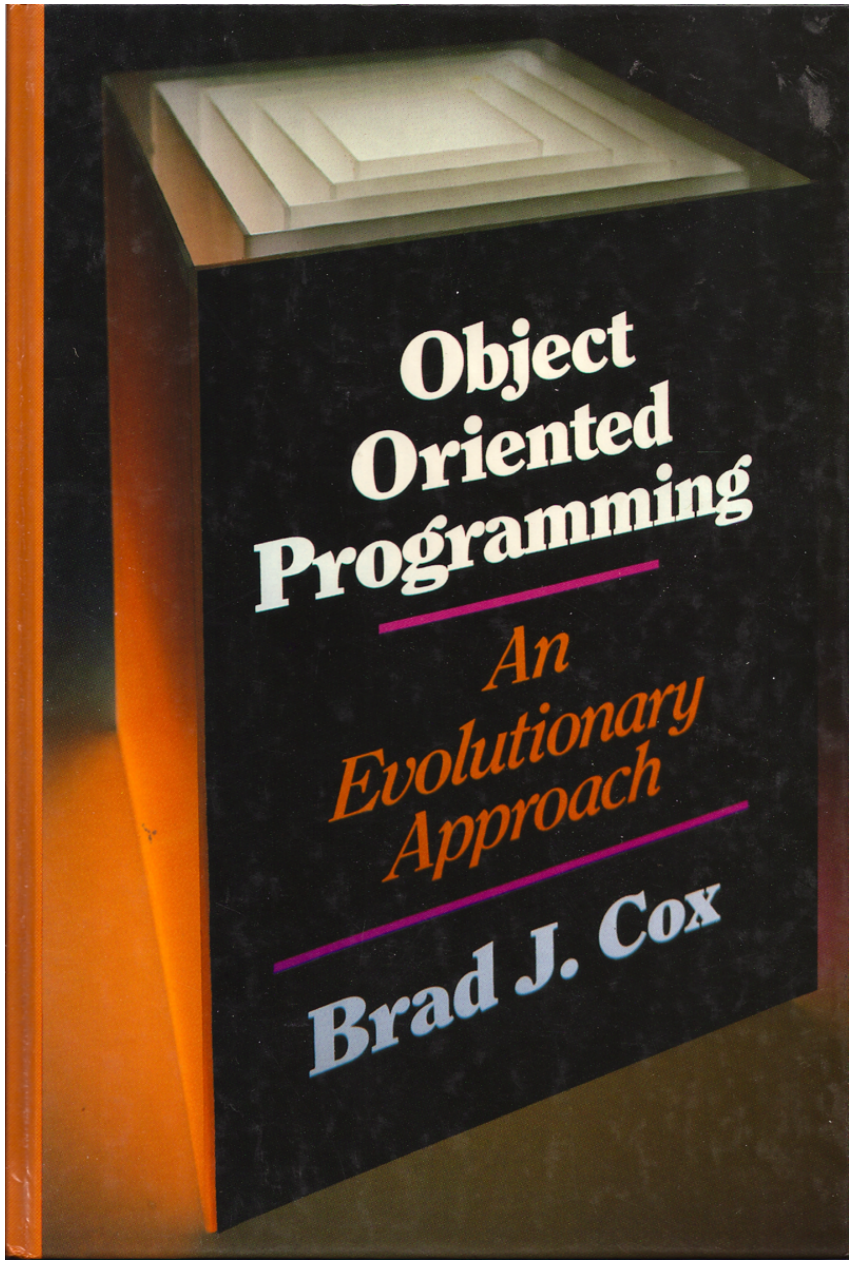
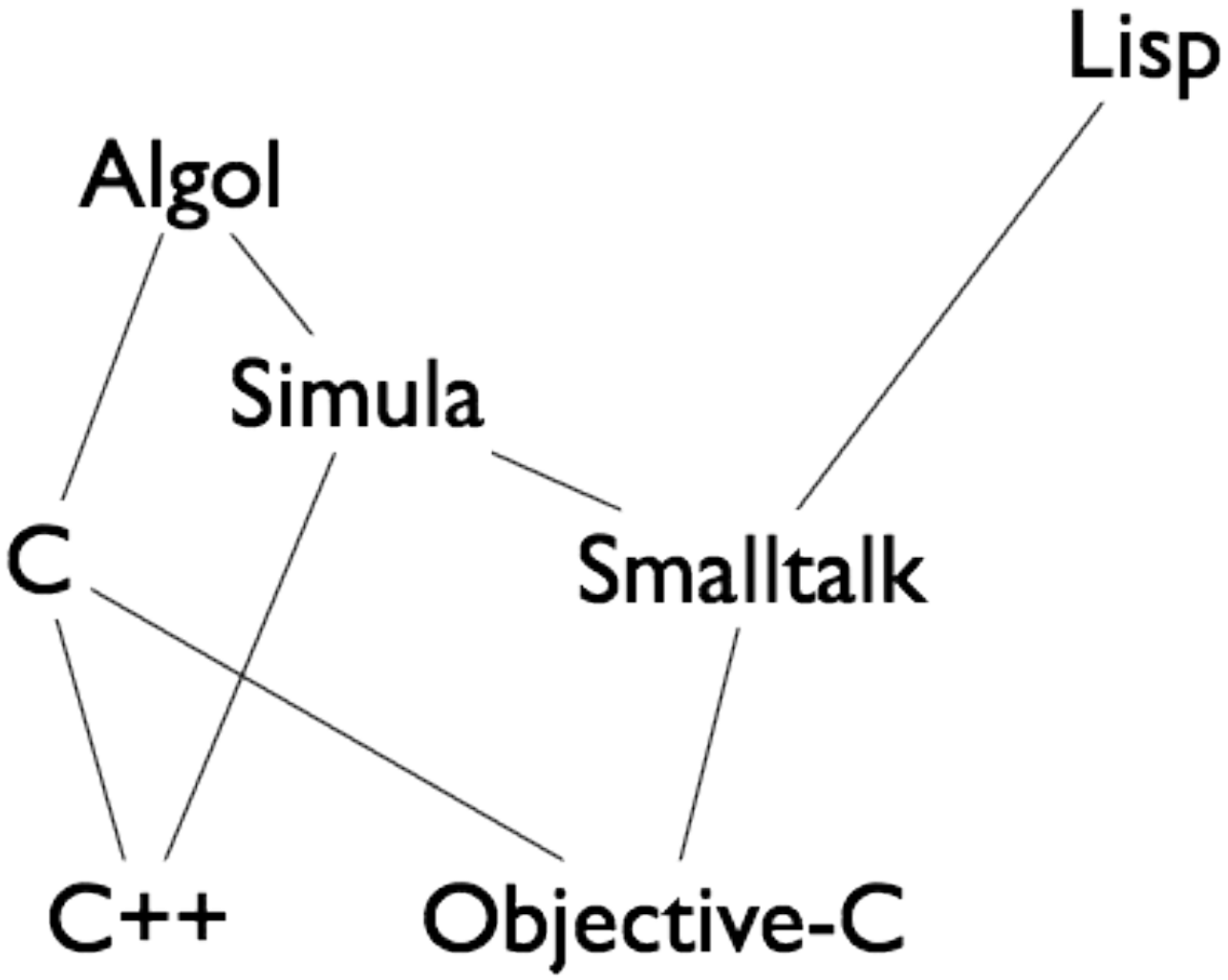
Credits and Thanks to:

Objective-C

- Start with C
- Add the Smalltalk object model as a library
- Add a little syntax for
  - Class and method definition
  - Method calls
  - A few object literals

Objective-C


Object
Oriented
Programming
An
Evolutionary
Approach
Brad J. Cox


Lisp
Algol
Simula
C
Smalltalk
C++
Objective-C

Objective-C

- A mashup of two languages
- Smalltalk grafted onto C
- The boundaries are obvious:
  - Non-C-like syntax in special “zones”
  - Flag characters to mark Objective-C zones
  - In C code, objects are opaque

Objective-C:
The Language

Calling Methods

Brackets indicate Objective-C call

Java equivalent:

```
netService.stop()
```

Variable containing target object

Message selector

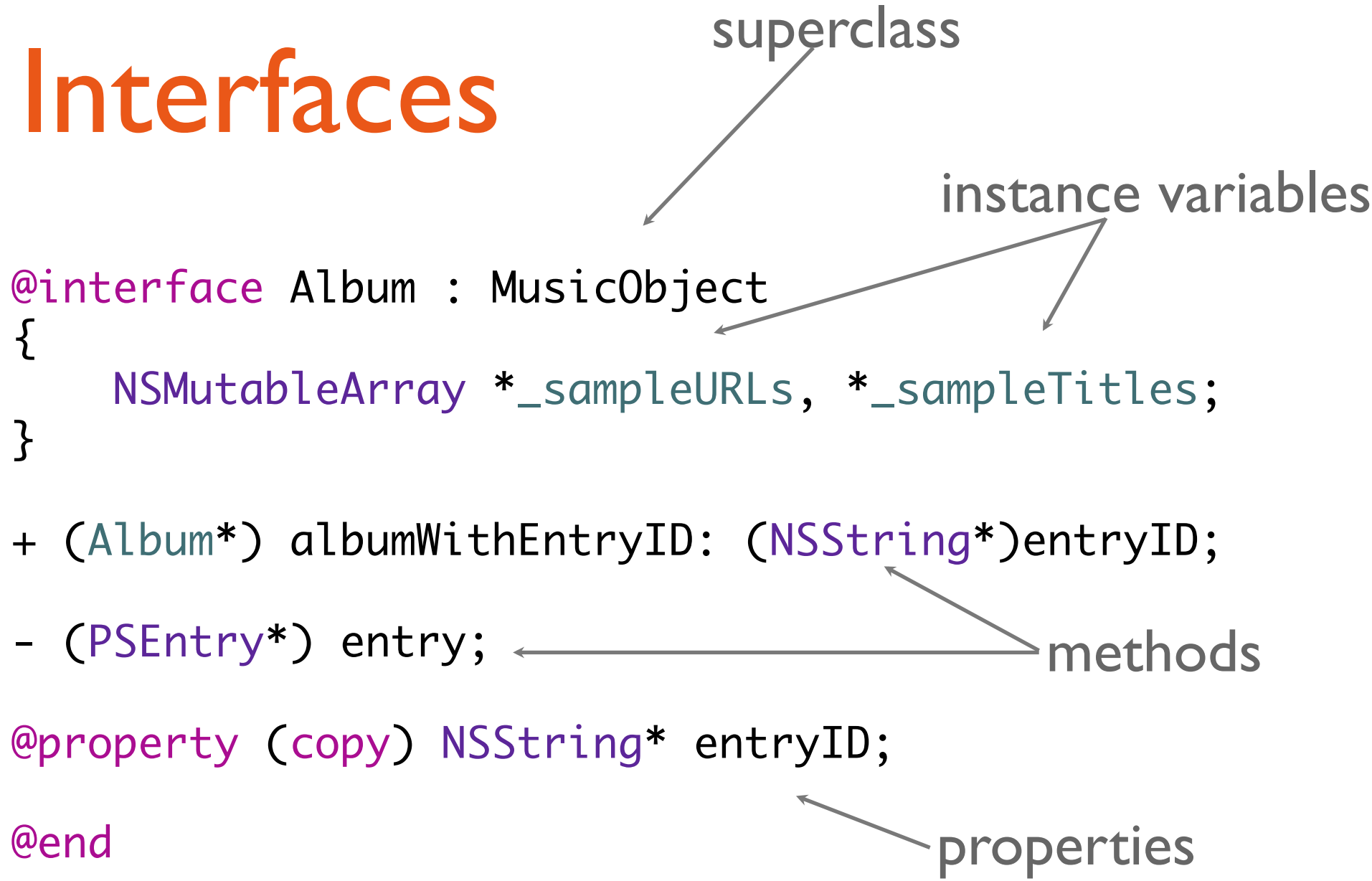
Methods With Arguments

```
[serviceNameField setEnabled:YES]
```

```
[in_stream read:readBuffer maxLength:4096]
```

(Yes, that method name is “read:maxLength:”)

Interfaces


superclass
instance variables
@interface Album : MusicObject
{
NSMutableArray *_sampleURLs, *_sampleTitles;
}
+ (Album*) albumWithEntryID: (NSString*)entryID;
- (PSEntry*) entry;
@property (copy) NSString* entryID;
@end
methods
properties

NSWhat?

- Objective-C has no namespaces
- Libraries (and apps) use prefixes instead
- Many type names begin with “NS” — for NeXTStep

Implementations

```
// Album.m

@implementation Album

// method definitions go here

@end
```

Types

- Object variables are usually pointers
  - e.g., NSString *
- Methods can return any C type
  - including object pointers
  - use Objective-C method call anywhere an expression is valid
- Parameters can also be any C type

Basic Types

- NSNumber, NSInteger
- NSString
  - special literal syntax: @"foo"
- NSMutableString
- NSArray and NSMutableArray
- NSDictionary and NSMutableDictionary

Allocation

`[NSAlert alloc]`	Allocates unitialized object
`[new_object init]`	Performs default initialization
`[[NSAlert alloc] init]`	Standard init pattern
`[NSAlert new]`	Rarely used equivalent

```
NSAlert *alertSheet;
alertSheet = [[NSAlert alloc] init];
```

Initialization

```
[[NSString alloc] init ]

[[NSString alloc] initWithString: username]

[[NSString alloc] initWithFormat:@"%@/%@",
                  parentAbsPath, relativePath]

[[NSString alloc] initWithBytes:value length:strlen(value)]

[[NSString alloc] initWithBytes:value length:strlen(value)
                  encoding:NSASCIIStringEncoding]

[[NSString alloc] initWithData: data
                  encoding: NSUTF8StringEncoding]

[[NSString alloc] initWithContentsOfFile: path]
```

Special values

- self
- super
- nil

Memory Management

- Objective-C v4 supports garbage collection
  - (but not on the iPhone, yet...)
- Manual reference counting

```
[obj retain]

[obj release]
```

Autorelease Example

```
// At the beginning of a block, do this:
NSAutoreleasePool* pool=[[NSAutoreleasePool alloc] init];

// Then, within the block and also in methods
// *called* from that block, do things like this:
return [[time retain] autorelease];

// Then, at the end of the block, release the pool:
[pool release];
```

- There is always an autorelease pool available.
- Allows simpler division of memory management responsibility.

Incremental Typing

- Usually, Objective-C is statically typed
  - (or as static as C will allow)
- The typedef `id` represents “any Objective-C object”
- You can write methods that work on any type

Protocols

- In Smalltalk terminology, a ‘protocol’ is a set of methods that may be implemented by many classes.
- In Objective-C, this was formalized to resemble what you may know as an ‘interface’ in Java.

Protocols

```
@protocol KeyValueAccess

- valueForKey:(NSString*)key;
- setValue:(id)val forKey:(NSString*)key;

@end
```


```
id <KeyValueAccess> obj = ...;
[obj setValue:@"Peter" forKey:@"name"];
```

Protocols

```
// intersection types
id <InputStream, OutputStream> stream = ...

// or even...
NSFooBar <KeyValueAccess> foobar = ...;

// In Java, such types can be used to
// declare Class parameter constraints...
```

Slut