Using and Extending the Xcode Source Editor

Session 414

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Overview

Using

- New features in Xcode 8
- Other not so new, but useful features

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Using

- New features in Xcode 8
- Other not so new, but useful features

Extending

- How to add your own features
- …and share them!

Demo

New features in the Xcode 8 source editor

Xcode Source Editor Extensions

Enhancing Xcode

Extending Xcode

What you can do

Extending Xcode

What you can do

Add commands to the source editor

Extending Xcode

What you can do

Add commands to the source editor

Edit text

Extending Xcode

What you can do

Add commands to the source editor

Edit text

Change selections

Extending Xcode

What you can do

Add commands to the source editor

Edit text

Change selections

One extension, several commands

Extending Xcode

How it works

Xcode Extensions are Application Extensions

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- Each runs in its own process

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Xcode Extensions are Application Extensions

- Each runs in its own process
- Sandboxed and uses entitlements

Extending Xcode

How it works

Xcode Extensions are Application Extensions

- Each runs in its own process
- Sandboxed and uses entitlements
- Gets access to text at invocation

Stability,

Stability, Security,

Stability, Security, Speed

App Store

Delivering Xcode Extensions

Getting them into users' hands

An Xcode Extension is embedded in an application

Delivering Xcode Extensions

Getting them into users' hands

An Xcode Extension is embedded in an application

- Your App is a great place to put your extension's preferences

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Delivering Xcode Extensions

Getting them into users' hands

An Xcode Extension is embedded in an application

- Your App is a great place to put your extension's preferences
- Any other UI you want to provide—no UI in extensions
- Distribute via the Mac App Store

Delivering Xcode Extensions

Getting them into users' hands

An Xcode Extension is embedded in an application

- Your App is a great place to put your extension's preferences
- Any other UI you want to provide—no UI in extensions
- Distribute via the Mac App Store
- Distribute on your own via Developer ID

The Xcode Extension Lifecycle

Startup

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Xcode automatically finds and starts extensions

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- Extensions are kept alive while the user is likely to need them

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Extensions sent `extensionDidFinishLaunching`

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- Do any needed startup as fast as possible

The Xcode Extension Lifecycle

Startup

Xcode automatically finds and starts extensions

- Extensions are kept alive while the user is likely to need them

Extensions sent `extensionDidFinishLaunching`

- Do any needed startup as fast as possible
- Asynchronous with Xcode and other extensions

The Xcode Extension Lifecycle

Providing commands

Xcode asks each extension for its commands, which can come from:

The Xcode Extension Lifecycle

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Xcode asks each extension for its commands, which can come from:

- Your extension's Info.plist

```
<key>NSExtensionAttributes</key>
<dict>
 <key>XCSourceEditorCommandDefinitions</key>
 <array>
  <dict>
   <key>XCSourceEditorCommandClassName</key>
   <string>ChrisFormat.WrapText</string>
   <key>XCSourceEditorCommandIdentifier</key>
   <string>com.example.ChrisFormat.WrapText</string>
   <key>XCSourceEditorCommandName</key>
   <string>Wrap Text</string>
  </dict>
 </array>
 <key>XCSourceEditorExtensionPrincipalClass</key>
 <string>ChrisFormat.ChrisFormatExtension</string>
</dict>
```

The Xcode Extension Lifecycle

Providing commands

Xcode asks each extension for its commands, which can come from:

- Your extension's Info.plist
- Your extension's `commandDefinitions` property, overriding the Info.plist

```
var commandDefinitions {
 return [[
    .classNameKey:
       "ChrisFormat.WrapText",
    .identifierKey:
       "com.apple.ChrisFormat.WrapText",
    .nameKey:
       "Wrap Text" ]]
}
```

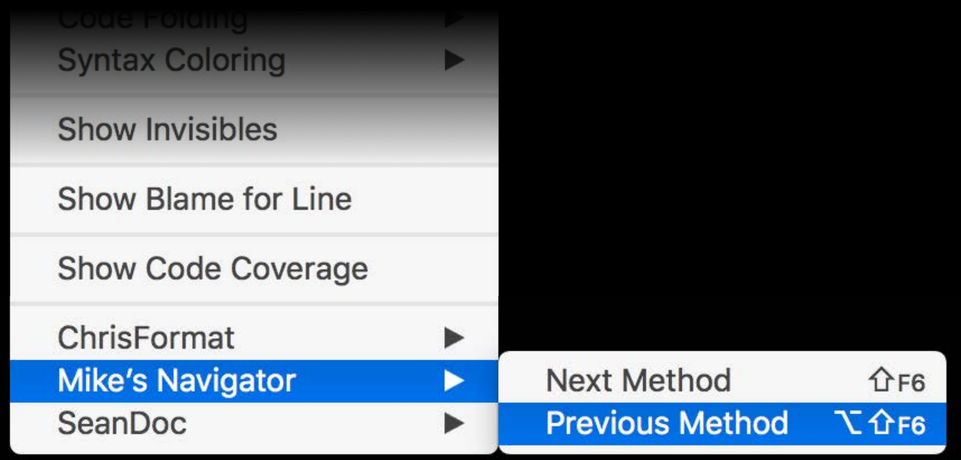
The Xcode Extension Lifecycle

Where commands live

The Xcode Extension Lifecycle

Where commands live

Each extension gets a submenu of the Editor menu for its commands

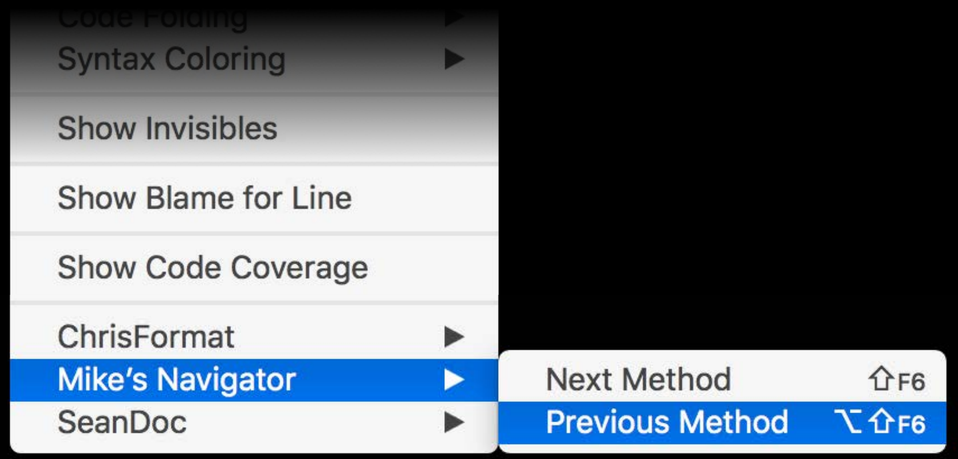


The Xcode Extension Lifecycle

Where commands live

Each extension gets a submenu of the Editor menu for its commands

- Extensions listed in Finder sort order

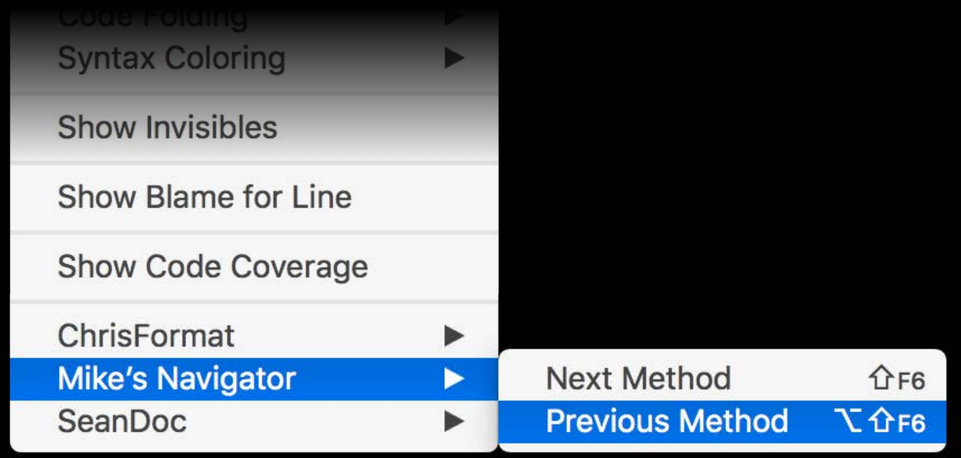


The Xcode Extension Lifecycle

Where commands live

Each extension gets a submenu of the Editor menu for its commands

- Extensions listed in Finder sort order
- Commands are in the order the extension provides



The Xcode Extension Lifecycle

Invoking commands

User chooses a command

The Xcode Extension Lifecycle

Invoking commands

User chooses a command

- Selecting menu item

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User chooses a command

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- Pressing keyboard equivalent

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Your command is sent an invocation and a callback

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Your command is sent an invocation and a callback

- The invocation contains a text buffer and metadata to operate on

The Xcode Extension Lifecycle

Invoking commands

User chooses a command

- Selecting menu item
- Pressing keyboard equivalent

Your command is sent an invocation and a callback

- The invocation contains a text buffer and metadata to operate on
- The command uses the callback to tell Xcode it's done

```
// Commands

public protocol XCSourceEditorCommand : NSObjectProtocol {

    public func perform(with invocation: XCSourceEditorCommandInvocation,
                        completionHandler: (NSError?) -> Void) -> Void

}
```

```swift
// Commands

public protocol XCSourceEditorCommand : NSObjectProtocol {

    public func perform(with invocation: XCSourceEditorCommandInvocation,
                        completionHandler: (NSError?) -> Void) -> Void

}

public class XCSourceEditorCommandInvocation : NSObject {

    public let commandIdentifier: String

    public var cancellationHandler: () -> Void

    public let buffer: XCSourceTextBuffer

}
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// Text Buffer

public class XCSourceTextBuffer : NSObject {

    public let contentUTI: String

    public let tabWidth: Int
    public let indentationWidth: Int
    public let usesTabsForIndentation: Bool

    public var completeBuffer: String

    public let lines: NSMutableArray<String>
    public let selections: NSMutableArray<XCSourceTextRange>

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```

Declaration `var usesTabsForIndentation: Bool { get }`

Description Whether tabs are used for indentation, or just spaces. When tabs are used for indentation, indented text is effectively padded to the indentation width using space characters, and then every tab width space characters is replaced with a tab character.

For example, say an XCSourceTextBuffer instance has a tabWith of 8, an indentationWidth of 4, and its usesTabsForIndentation is true. The first indentation level will be represented by four space characters, the second by a tab character, the third by a tab followed by four space characters, the fourth by two tab characters, and so on.

Declared In XcodeKit

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}
```

```
// Positions and Ranges

public class XCSourceTextRange : NSObject, NSCopying {

    public var start: XCSourceTextPosition
    public var end: XCSourceTextPosition

}

public struct XCSourceTextPosition {

    public var line: Int
    public var column: Int

}
```

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public class XCSourceTextRange : NSObject, NSCopying {

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Demo

Creating an Xcode source editor extension

Speed

Text editing is “user-synchronous”

Speed

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Users will invoke your command via typing

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User changes to a document are prevented while a command is running

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Text editing is “user-synchronous”

Users will invoke your command via typing

User changes to a document are prevented while a command is running

The user can cancel your command

The command “Speed Slide” is still busy.

Cancel

Speed

Text editing is “user-synchronous”

Users will invoke your command via typing

User changes to a document are prevented while a command is running

The user can cancel your command

- A command that takes a while gets a cancellation banner

The command “Speed Slide” is still busy.

Cancel

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Text editing is “user-synchronous”

Users will invoke your command via typing

User changes to a document are prevented while a command is running

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Speed

How Xcode helps

Speed

How Xcode helps

Keeps your extension alive for fast invocation

Speed

How Xcode helps

Keeps your extension alive for fast invocation

Optimizes data transfer for performance

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How Xcode helps

Keeps your extension alive for fast invocation

Optimizes data transfer for performance

Cancellation is immediate for the user

Speed

How you can help Xcode

Speed

How you can help Xcode

Start up quickly

Speed

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Start up quickly

Use GCD and follow standard asynchronous patterns

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Use GCD and follow standard asynchronous patterns

Don’t replace the whole buffer if you don’t have to

Speed

How you can help Xcode

Start up quickly

Use GCD and follow standard asynchronous patterns

Don’t replace the whole buffer if you don’t have to

Handle cancellation quickly

Summary

New features in the source editor

- Documentation comments
- Color and image literals, with code complete

Recent features

- Fuzzy code completion

Xcode source editor extensions

- How they work
- How to make them

More Information

https://developer.apple.com/wwdc16/414

Related Sessions

Optimizing App Startup Time	Mission	Wednesday 10:00AM
Introduction to Xcode	Nob Hill	Thursday 1:40PM
Creating Extensions for iOS and OS X, Part 1	WWDC 2014	
Creating Extensions for iOS and OS X, Part 2	WWDC 2014	
App Extension Best Practices	WWDC 2015	

Labs

Xcode Open Hours	Developer Tools Lab B	Friday 9:00AM
Xcode Open Hours	Developer Tools Lab B	Friday 12:00PM
Xcode Open Hours	Developer Tools Lab B	Friday 3:00PM

WWDC16