

#WWDC19

# What's New in ClassKit

John Calhoun, iOS Engineer

ClassKit introduction

New features

Best practices

ClassKit introduction

New features

Best practices

# What is ClassKit?

Introduced in iOS 11.3

# What is ClassKit?

Introduced in iOS 11.3

Part of Apple's education ecosystem

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Introduced in iOS 11.3

Part of Apple's education ecosystem

Sharing progress data with teachers

# What is ClassKit?

Introduced in iOS 11.3

Part of Apple's education ecosystem

Sharing progress data with teachers

Secure, privileged users

# An Education Scenario



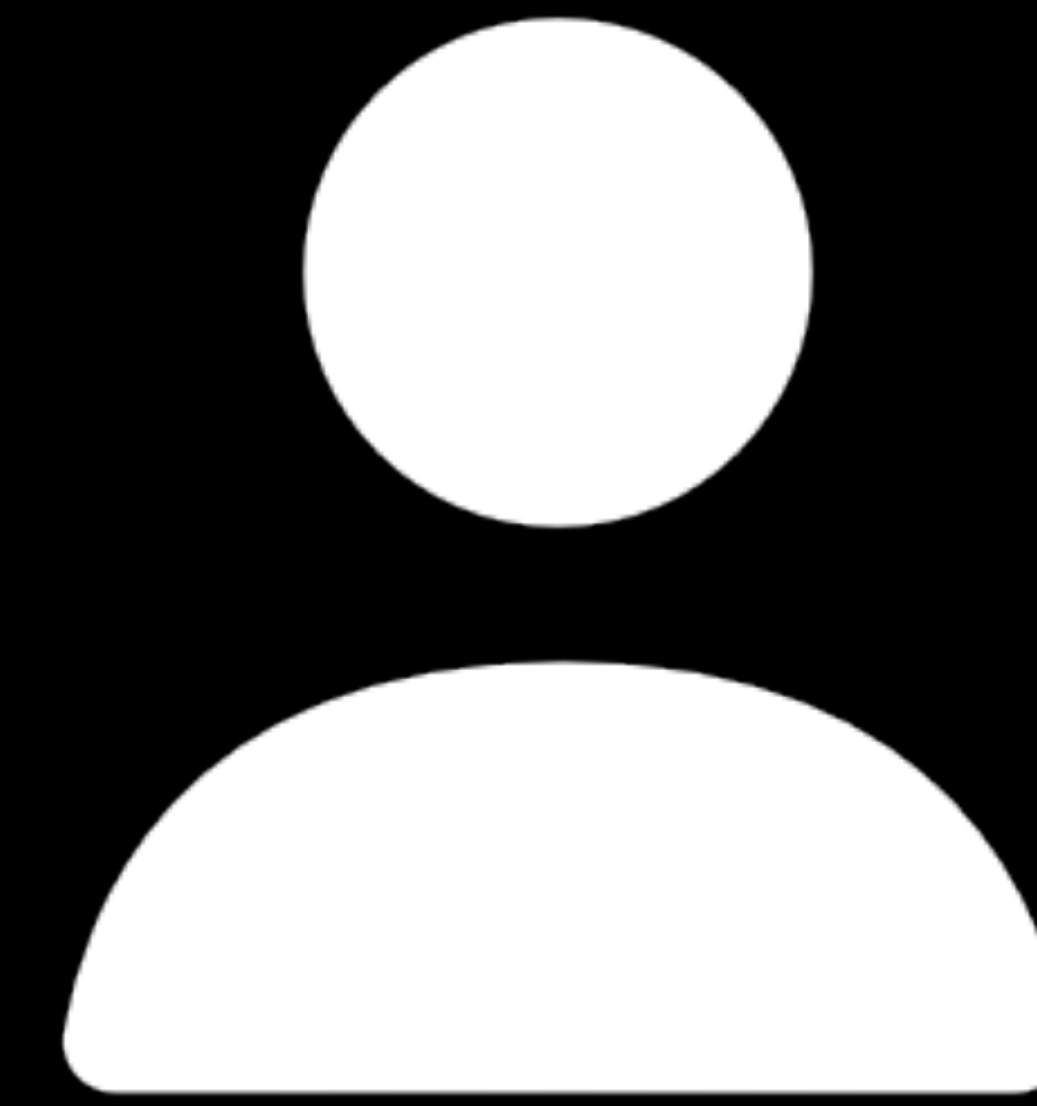
Code Klatch



# An Education Scenario



Code Klatch

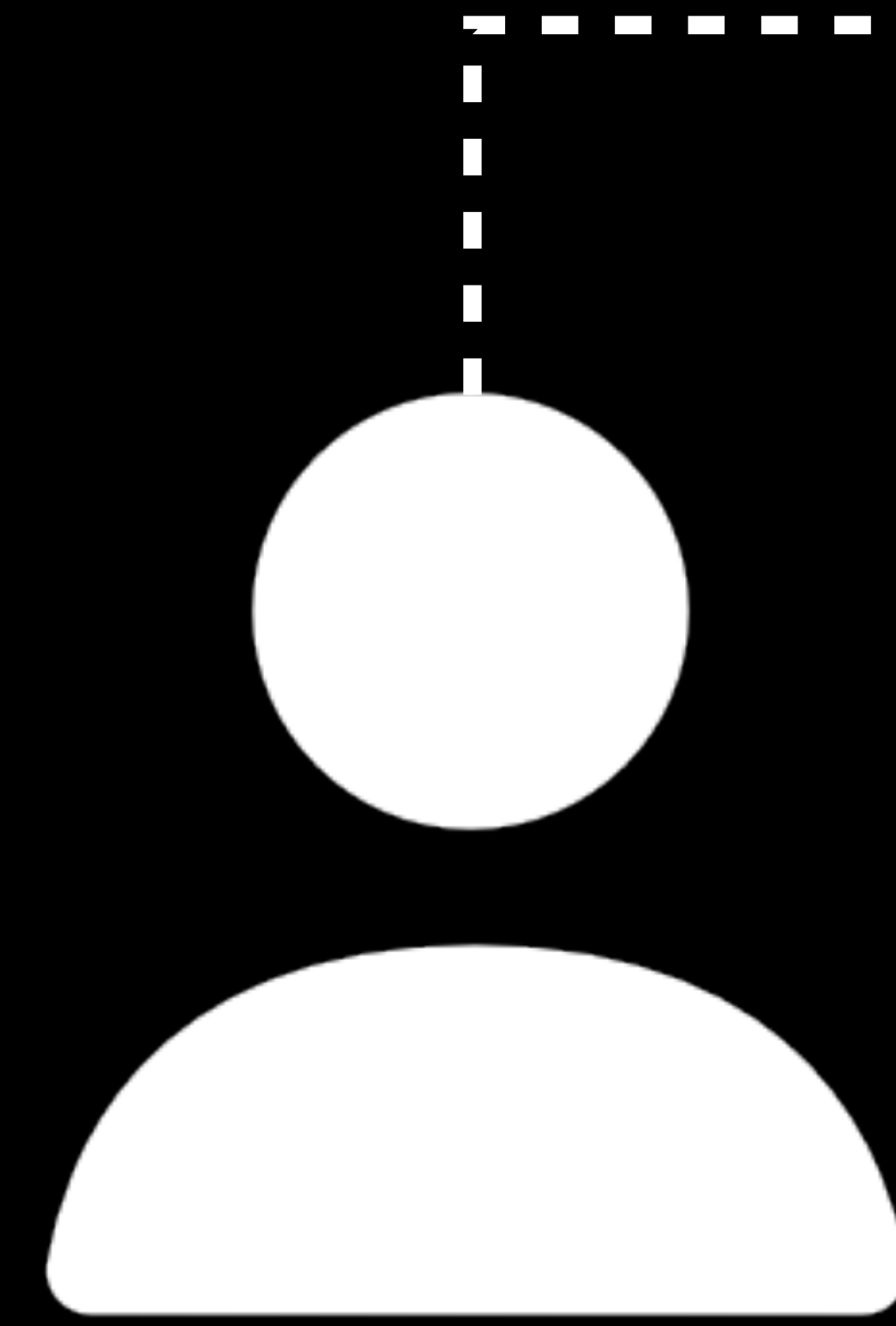


Student

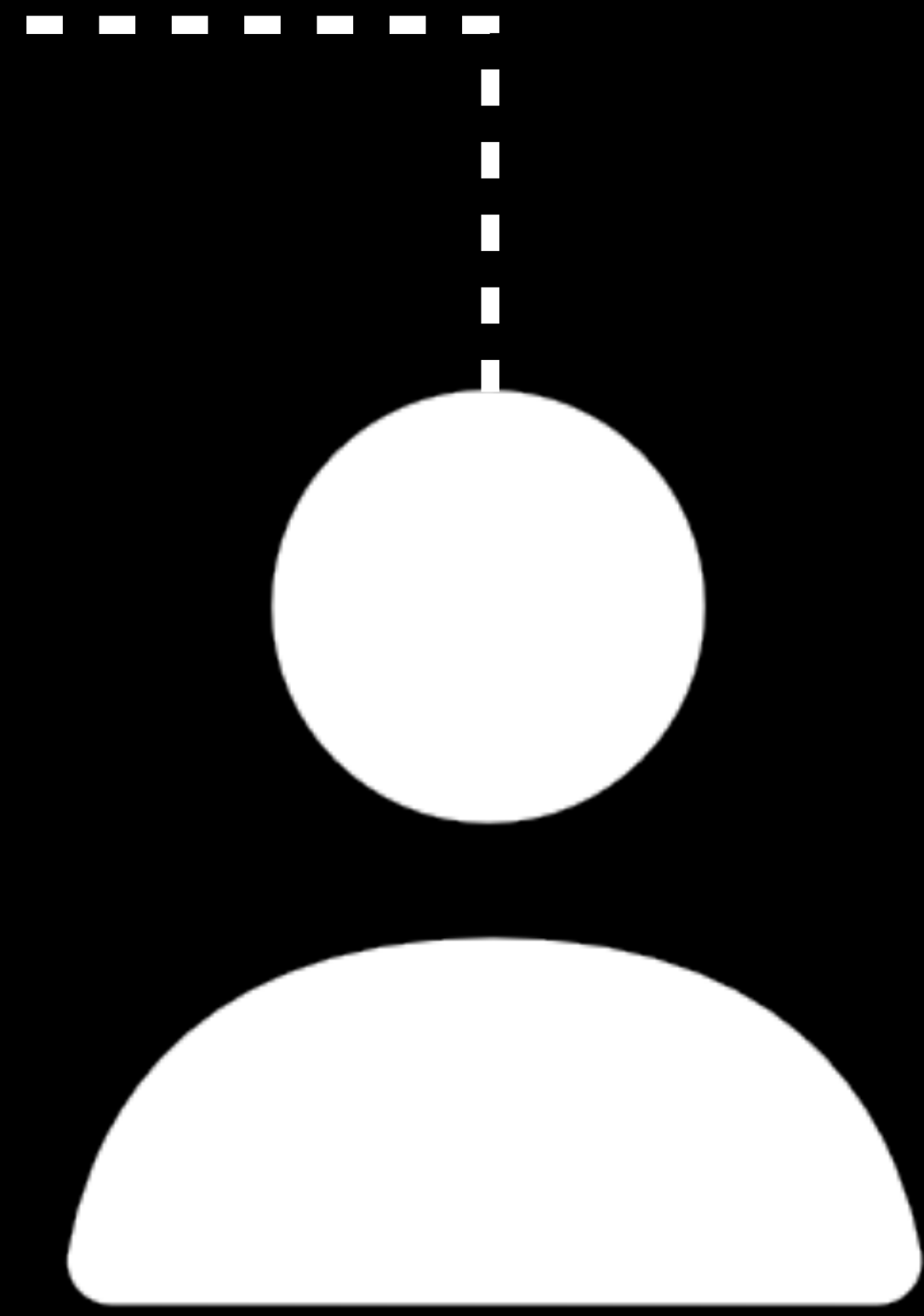
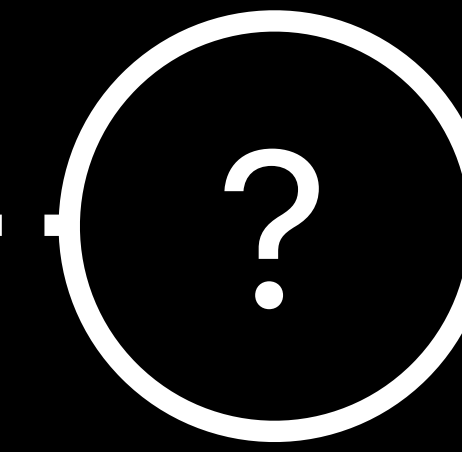
# An Education Scenario



Code Klatch



Student

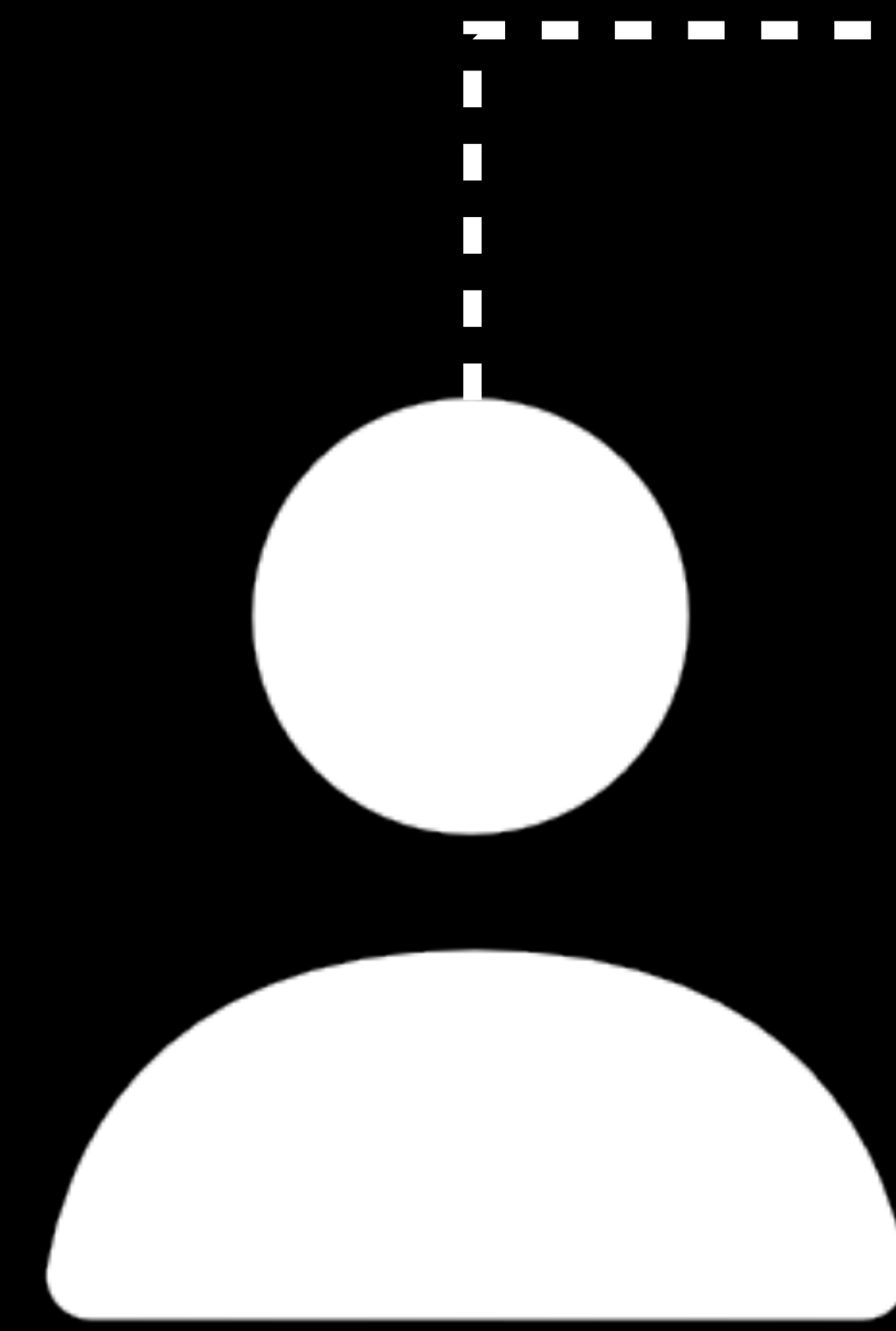


Teacher

# An Education Scenario



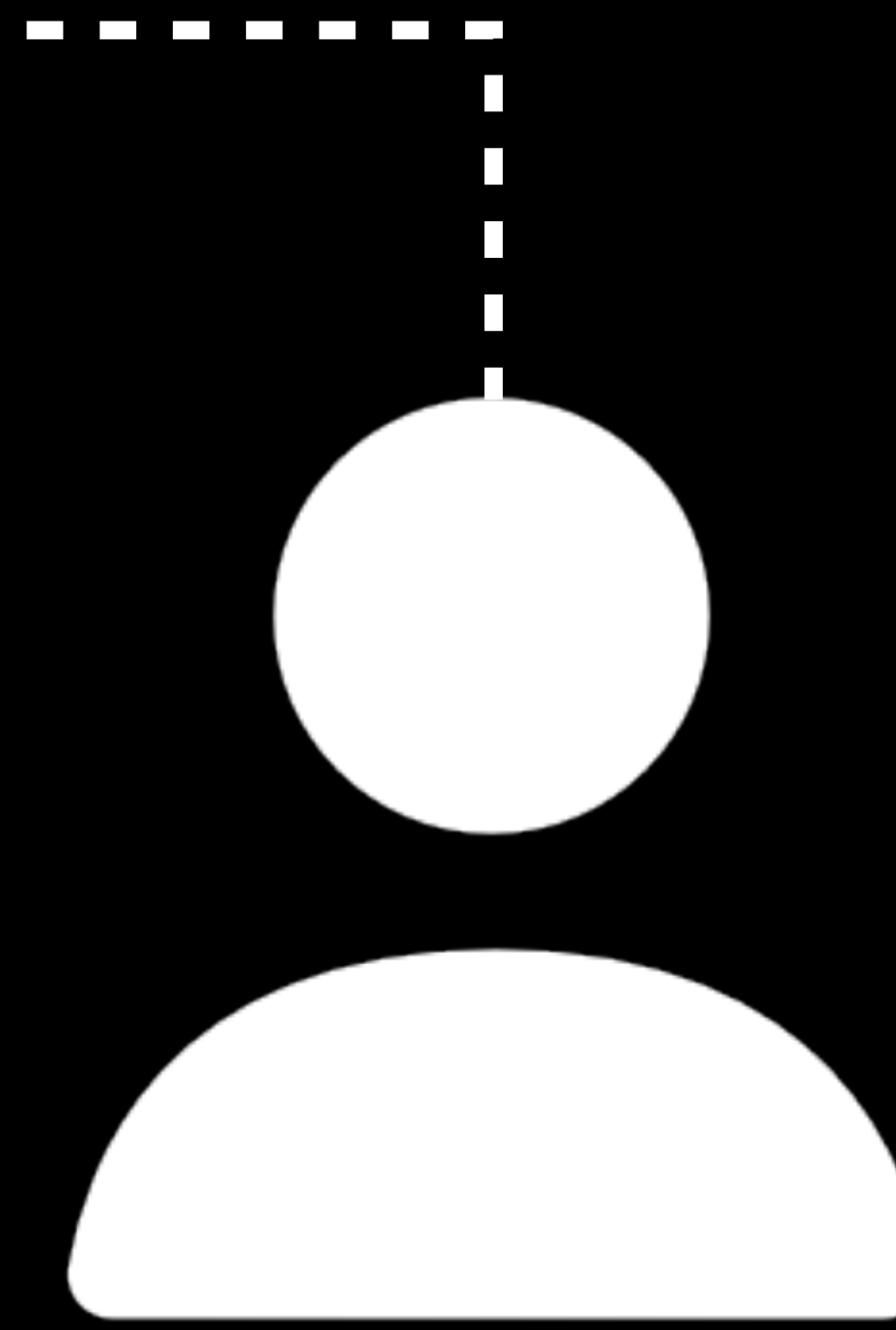
Code Klatch



Student



ClassKit



Teacher



# Schoolwork

Displays ClassKit progress





# Schoolwork

Displays ClassKit progress

Free app for iPad



# Schoolwork

Displays ClassKit progress

Free app for iPad

Used by schools worldwide



# Schoolwork

Displays ClassKit progress

Free app for iPad

Used by schools worldwide

For teachers and students both







To get started, contact your school administrator  
or make sure you're signed in with your school  
account.

[Learn about Schoolwork >](#)



### Settings

- Stocks
- Shortcuts

- Music
- TV
- Photos
- Camera
- Books
- Podcasts
- iTunes U
- Schoolwork
- Game Center

TV Provider

Developer

### Developer

ClassKit API

#### CORESPOTLIGHT TESTING

[Reindex All Items](#)

[Reindex All Items with Identifiers](#)

#### SHORTCUTS TESTING

Display Recent Shortcuts



When enabled, Siri Suggestions in Search & Siri Watch Face show the most recently provided shortcuts rather than current predictions.

Display Upcoming Media



When enabled, Siri Suggestions in Search will show Upcoming Media Intents donated via INUpcomingMediaManager.

Display Donations on Lock Screen



When enabled, the most recently donated shortcuts will be shown on the Lock Screen.

[Force Sync Shortcuts to Watch](#)

#### MIDI-CI TESTING

Enable MIDI-CI





### Settings

- Stocks
- Shortcuts

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- Developer**

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**Developer**

### < Developer

### ClassKit API

ACT AS OTHER ROLE

Off

Teacher

Student

[Reset Development Data](#)

### Settings

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Reset Development Data



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- Developer**

### < Developer

### ClassKit API

ACT AS OTHER ROLE

Off

Teacher

**Student** ✓

[Reset Development Data](#)



# Handouts

DEV CLASS

## Programming languages

Continue in Code Klatch to learn about the programming language, Swift.



2

NOT DONE

TOMORROW

DUE DATE

# Handouts

DEV CLASS

## Programming languages

Continue in Code Klatch to learn about the programming language, Swift.



2

NOT DONE

TOMORROW

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**2** **TOMORROW**

NOT DONE DUE DATE




# Handouts

DEV CLASS

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**2**  
NOT DONE

**TOMORROW**  
DUE DATE

# CLSContext

Surfaces activities for ClassKit-enabled apps



# CLSContext

Surfaces activities for ClassKit-enabled apps

Containers for progress data

# CLSContext

Surfaces activities for ClassKit-enabled apps

Containers for progress data

Your app defines tree structure of contexts

# mainAppContext

Your main app context

# mainAppContext

Your main app context

```
let ourMainContext: CLSContext = CLSDataStore.shared.mainAppContext
```

# Your App's Activities

Intro section

---

Variables and data-types section

---

Conditionals section

# Your App's Activities

Intro section

---

Variables and data-types section

---

Conditionals section

---

# Your App's Activities

Intro section

---

What is an IDE?

---

What is Swift?

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Variables and data-types section

---

What is a variable?

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Simple data types

---

Structs and other complex data types

---

Conditionals section

---

If statements

---

Switch statements

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# Your App's Activities

What is an IDE?

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What is Swift?

---

What is a variable?

---

Variables and data-types section

---

Variable quiz

---

Simple data types

---

Simple types quiz

---

Structs and other complex data types

---

Complex types quiz

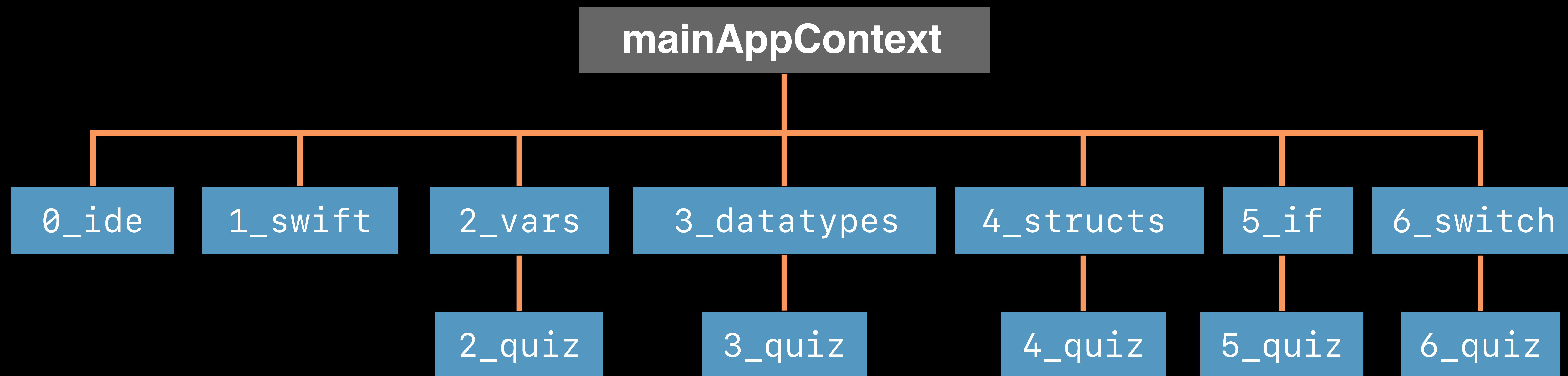
---

If statements

---

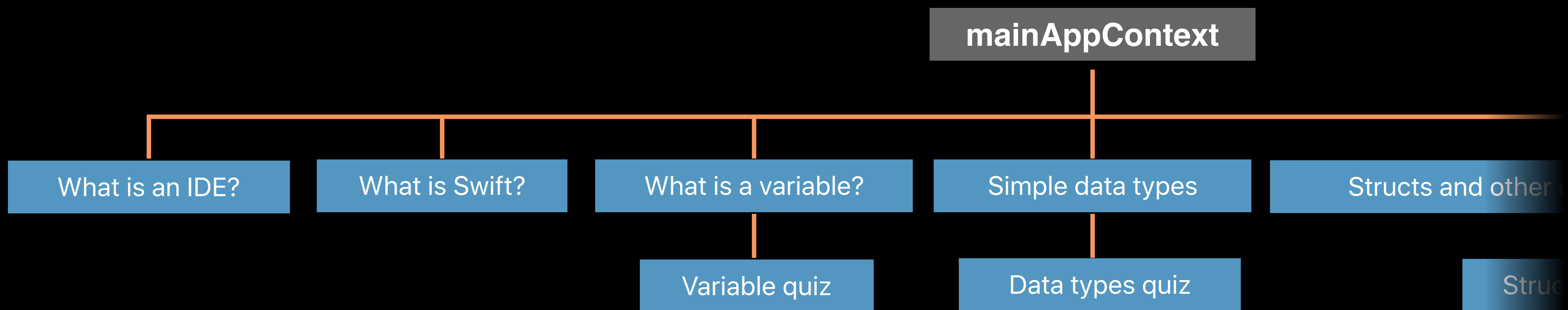
If quiz

# CLSContext.identifier

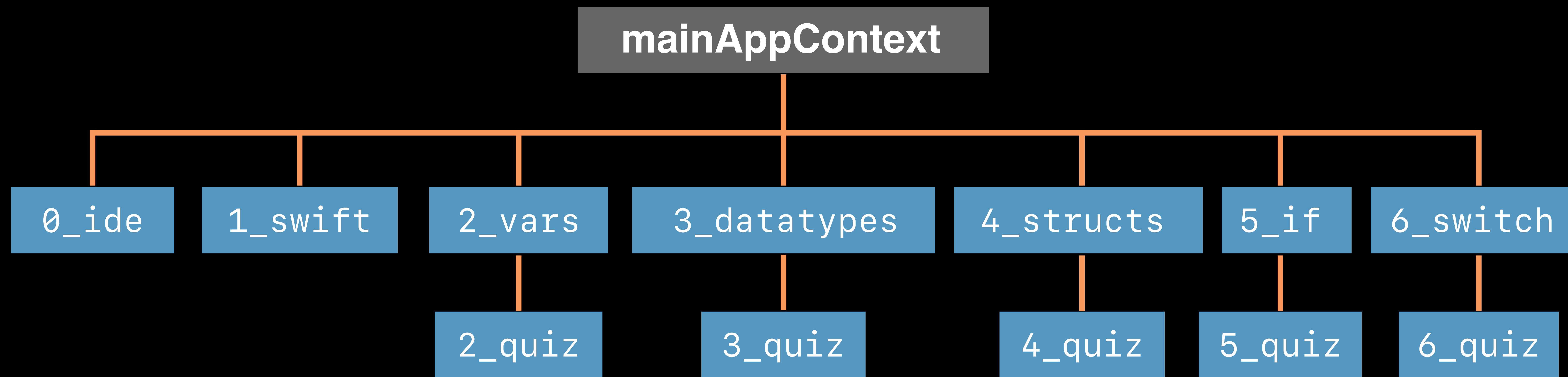




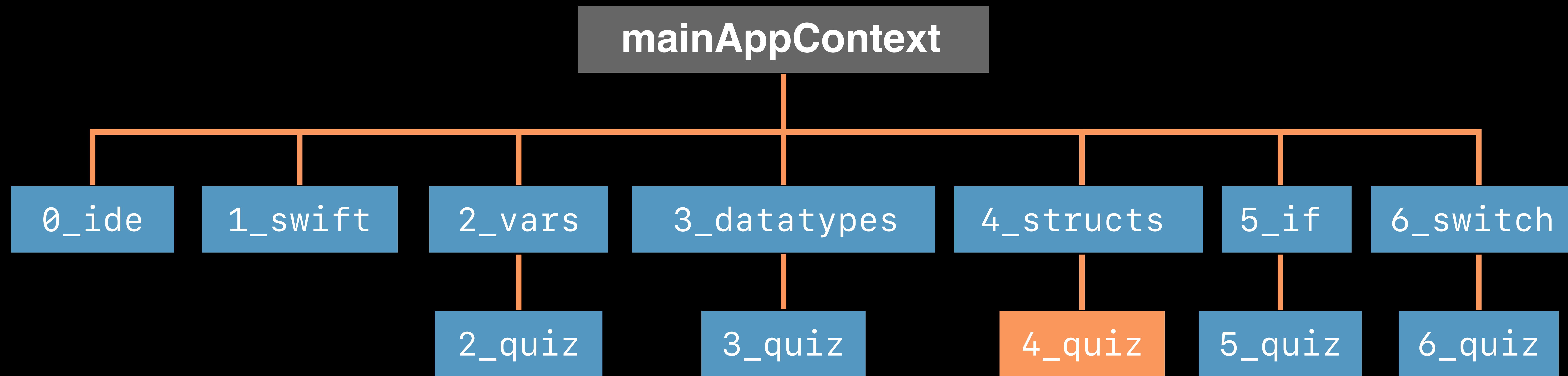
# CLSContext.title



# Context Identifier Paths

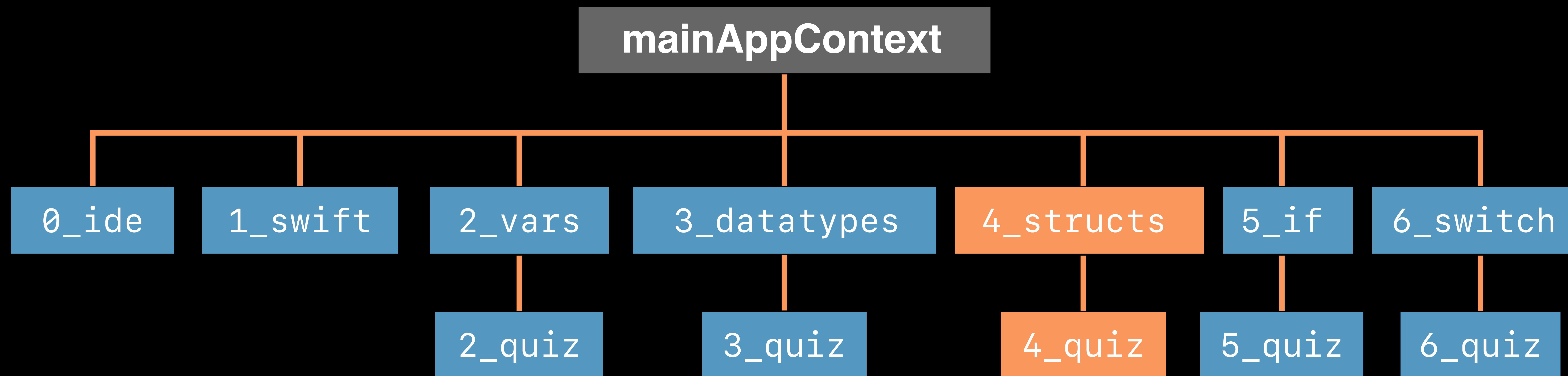


# Context Identifier Paths



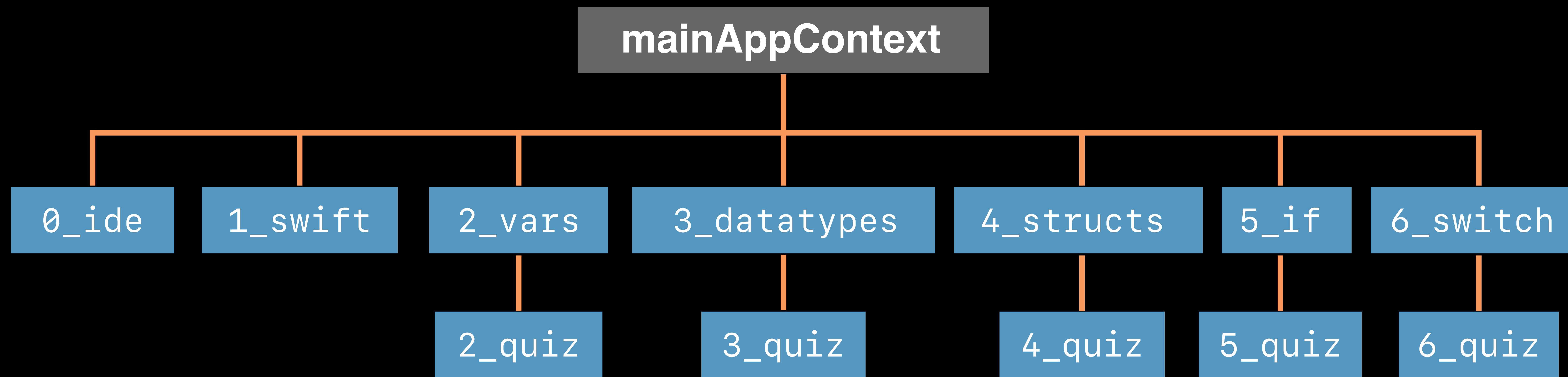


# Context Identifier Paths



```
let path = ["4_structs", "4_quiz"]
```

# Our App's Context Tree









### Classes

**Art Class**



5 Handouts due

**calculating**



2 Handouts due

**Dev Class**



13 Handouts due


### Due Next 7 Days

[Show Drafts](#)

HACKING

**Fundamentals of Physics I**

This course provides a thorough introduction to the principles and methods of physics for students who...




**10**  
NOT DONE

**MAR 7**  
PAST DUE

HACKING

**Course Introduction and Newto...**

Professor Shankar introduces the course and answers student questions about the material and the requiremen...



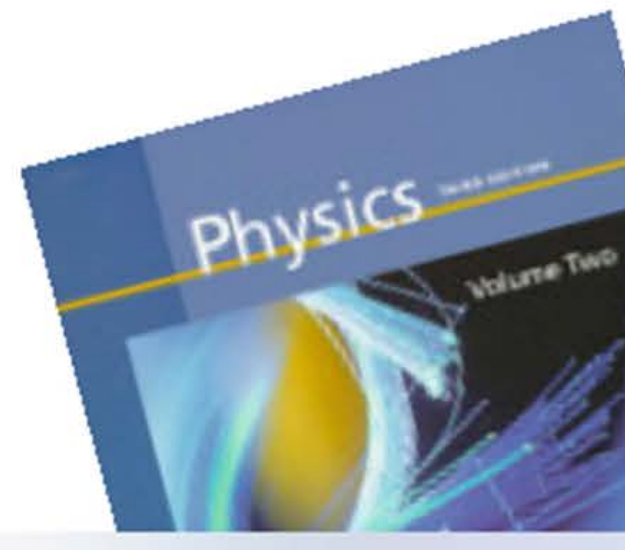
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**MAR 8**  
PAST DUE

HACKING

**Assignment**

Read Wolfson and Pasachoff, Physics with Modern Physics, chapters 1-3.




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**Introductory Essay: The Fundam...**


Read the attached essay.



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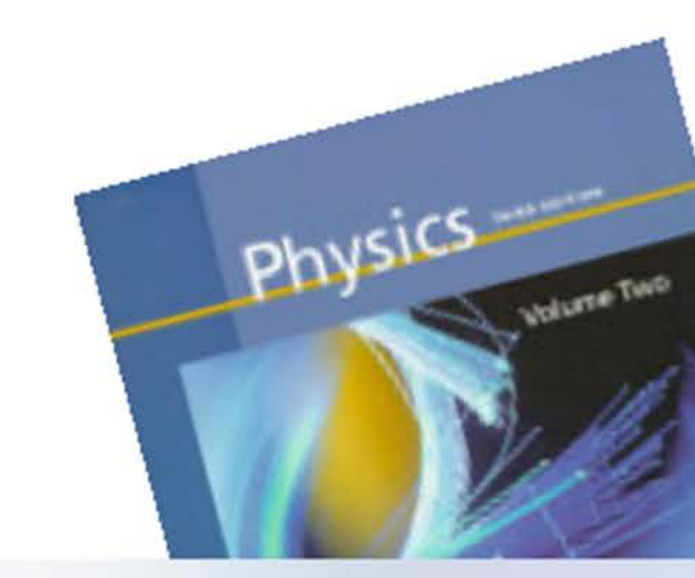
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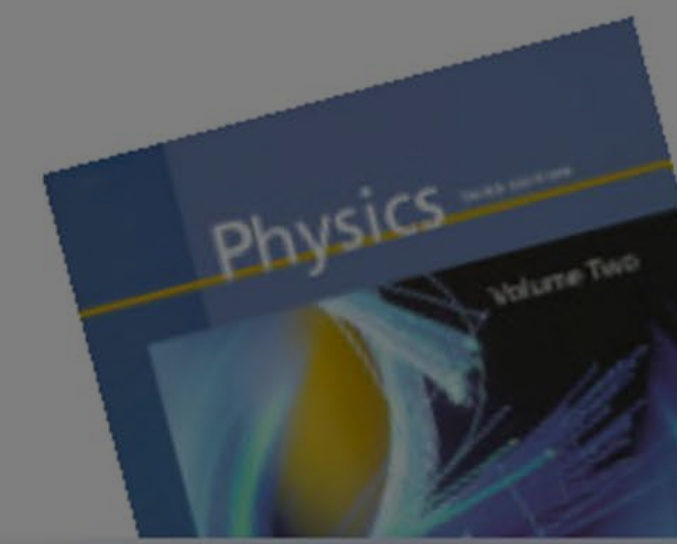


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**Introductory Essay: The Fu**  
 Read the attached essay.

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ment  
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MAR 11 PAST DUE

NG  
**actory Essay: Recent revel...**  
 attached essay.

Cancel New Handout Save Draft Post

To: Dev Class

Set a Due Date Tue, June 4, 2019 >

Title

Handout instructions (optional)

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Request Item

Add Activity





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Set a Due Date      Tue, June 4, 2019 >

### Introduction to Swift

Complete the attached activity that will introduce you to the programming language called Swift.

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#### Introductory Essay: The Fun...

Read the attached essay.

Cancel

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Set a Due Date

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### Programming languages

Conf

lang



Apps



Files



Links



Bookmarks



Photos or Videos



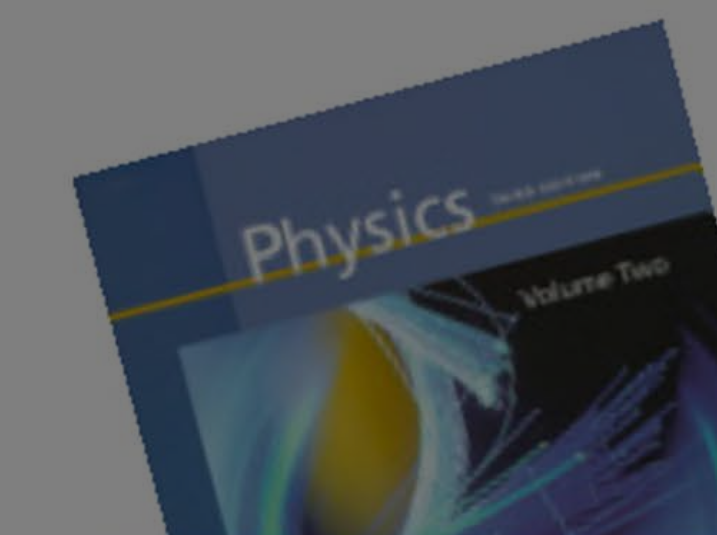
Scan Documents

programming

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To: Dev Class

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Programming languages

Conf lang Apps programming

- Apps
- Files
- Links
- Bookmarks
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Activity



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Cancel

Apps

#### Apps with Student Progress

- Books >
- Code Klatch >
- Hopscotch >
- IXL >
- Kahoot! >
- Lexia Core5 >
- ProgressReader >

Show Drafts

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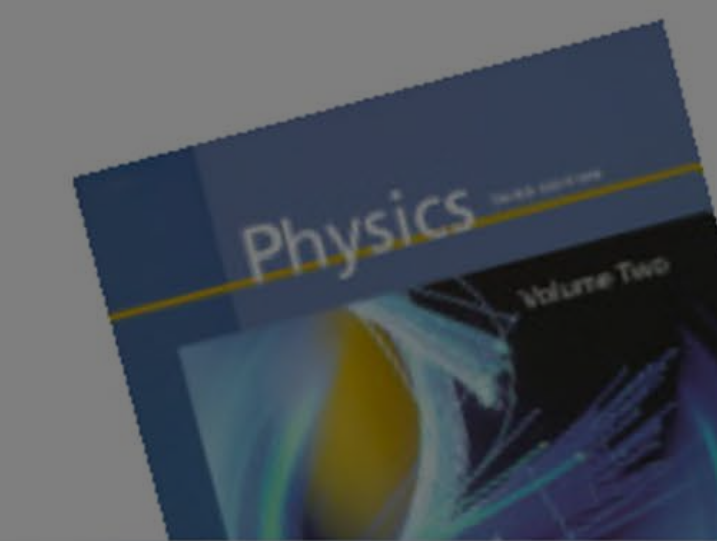
Cancel      Apps

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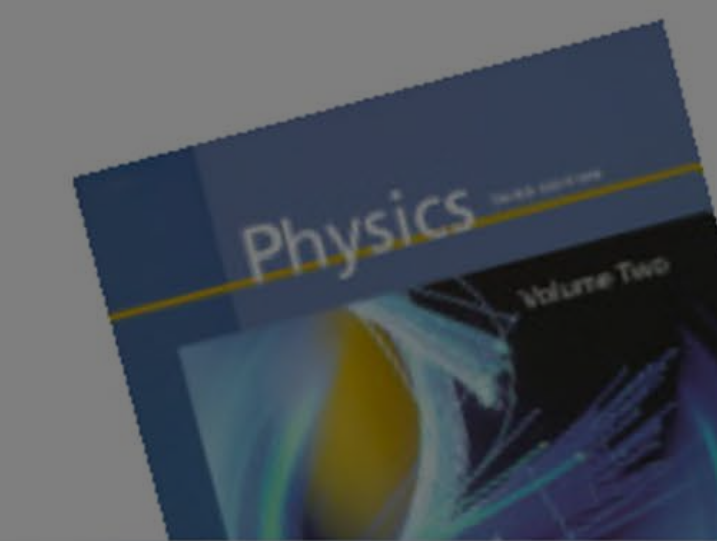
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**Assignment**  
 Tipler and Pasachoff, Physics for Scientists and Engineers, 6th Edition, chapters 1-3.



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**Introductory Essay: Recent developments in Physics**  
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**Code Klatch** Select

Search

- What is an IDE?
- What is Swift?
- What is a variable? >  
2 Activities
- Simple data types >  
2 Activities
- Structs and other complex data types >  
2 Activities
- If statements >  
2 Activities
- Switch statements >  
2 Activities
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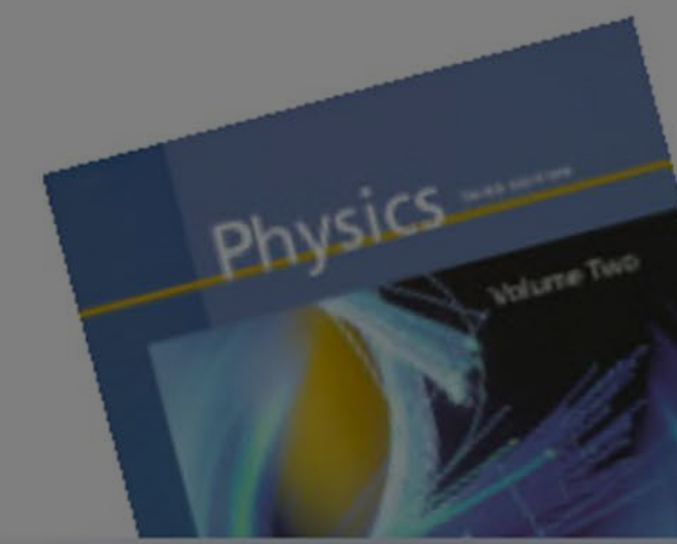
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**Introductory Essay: Recent revel...**





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Search

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- Simple data types [2 Activities](#)
- Structs and other complex data types [2 Activities](#)
- If statements [2 Activities](#)
- Switch statements [2 Activities](#)
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Code Klatch

What is a variable?

Select

Search

Variable Quiz

Due Next 7 Days

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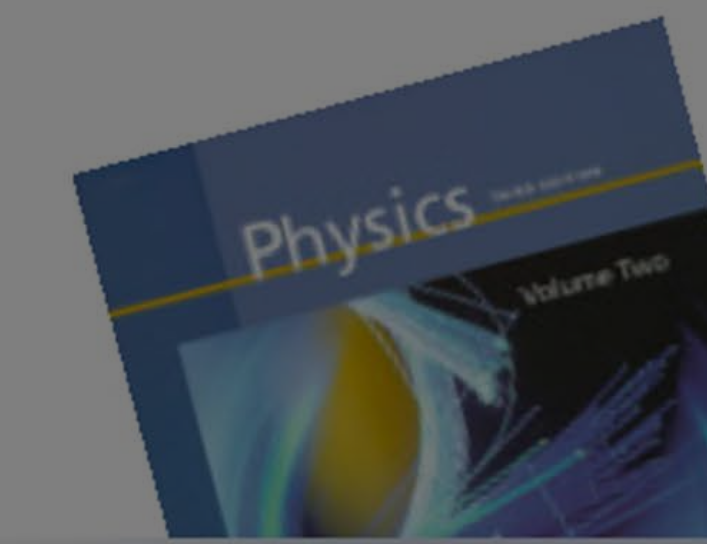


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**Introductory Essay: The Fu**  
 Read the attached essay.

[← Apps](#) **Code Klatch** [Select](#)

Search

- What is an IDE?
- What is Swift?
- What is a variable? [2 Activities](#)
- Simple data types [2 Activities](#)
- Structs and other complex data types [2 Activities](#)
- If statements [2 Activities](#)
- Switch statements [2 Activities](#)
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 ern Physics, chapters 1-3.



MAR 11 PAST DUE

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 Read the attached essay.

Prof. Shankar has only made the  
 Problem Set 1 Solutions available for  
 Open Yale Courses. Review the PDF f...





Classes

Art Class

5 Handouts due

calcul...

2 Ha...

Due Next 7 Days

HACKING

**Fundamentals of Physics I**

This course provides a thorough introduction to the principles and methods of physics for students...

10 NOT DONE

CALCULATING

**Introductory Essay: The Fu...**

Read the attached essay.

Cancel 1 Item Selected Add

Search

- What is an IDE?
- What is Swift?
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2 Activities
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Classes

**Art Class**

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10 NOT DONE

CALCULATING  
**Introductory Essay: The Fu**  
 Read the attached essay.

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Cancel      New Handout      Save Draft Post

To: Dev Class

Set a Due Date      Tue, June 4, 2019 >

**Introduction to Swift**

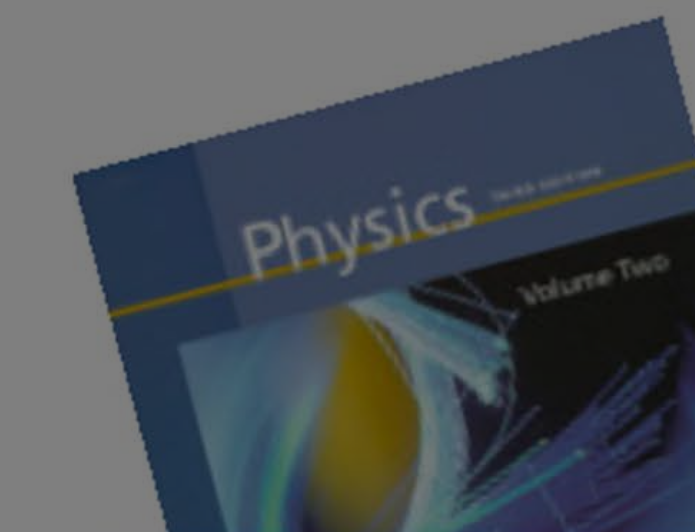
Complete the attached activity that will introduce you to the programming language called Swift.

Show Drafts

Request Item      Add Activity

**What is Swift?**

Code Klatch




MAR 11 PAST DUE

NG  
**Introductory Essay: Recent revel...**  
 attached essay.



### Due Later

HACKING  
**Introduction to Swift**  
 Complete the attached activity that will introduce you to the programming language called Swi...



**10**  
NOT DONE

**TOMORROW**  
DUE DATE

[Closed Handouts \(31\)](#)

### Students



Caden Hodkiewicz



Cecil Halvorson



Daija Rohan



Dimitri Bechtelar



Larue Upton



Lawson Erdman



Valerie Kemmer



Vinnie Mayert



Virginia Spinka



Zoe Ferry

ClassKit introduction

**New features**

Best practices



NEW

Context Provider Extension

Activity completion API

Correct/incorrect progress value

NEW

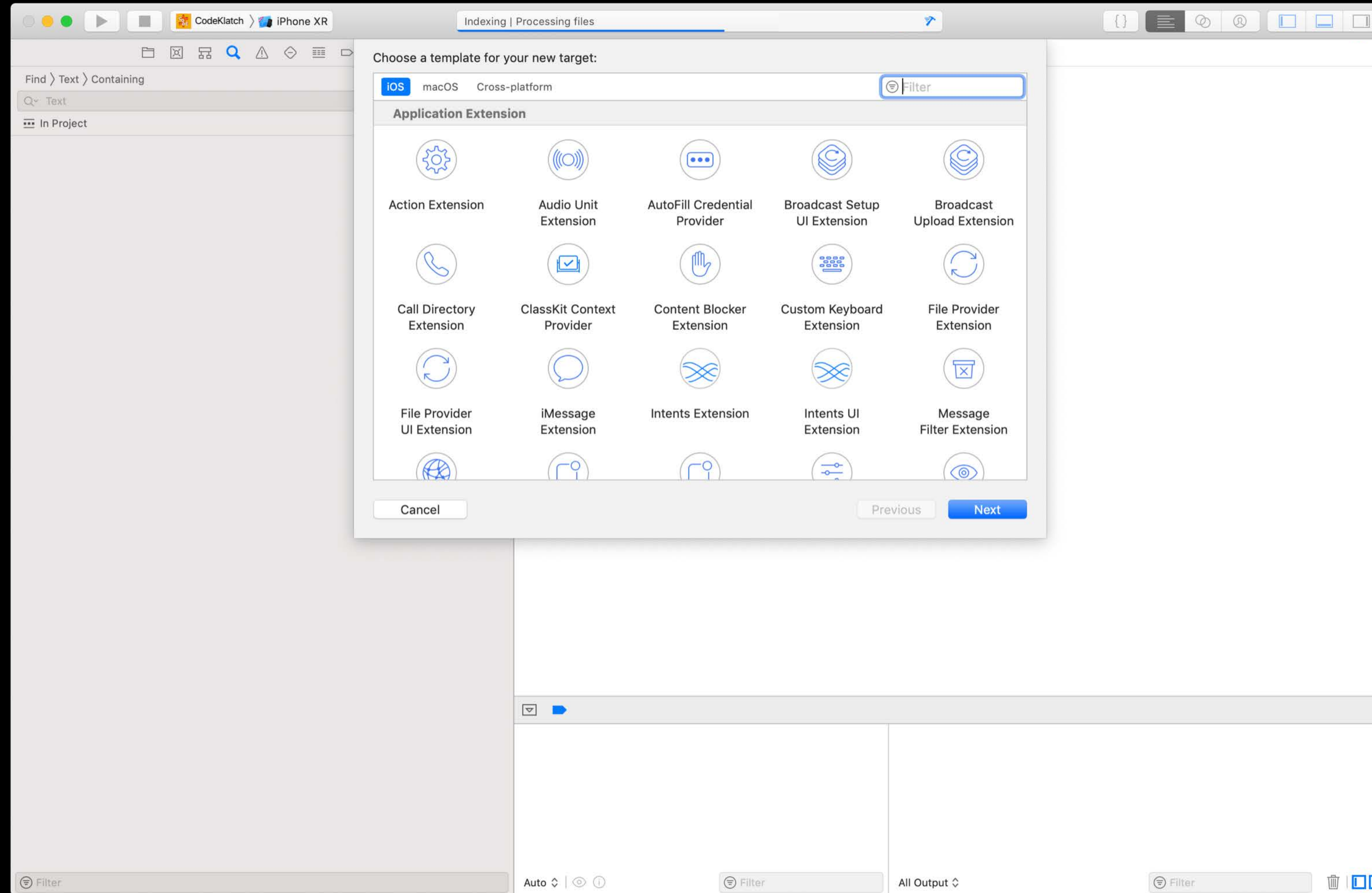
Context Provider Extension

Activity completion API

Correct/incorrect progress value

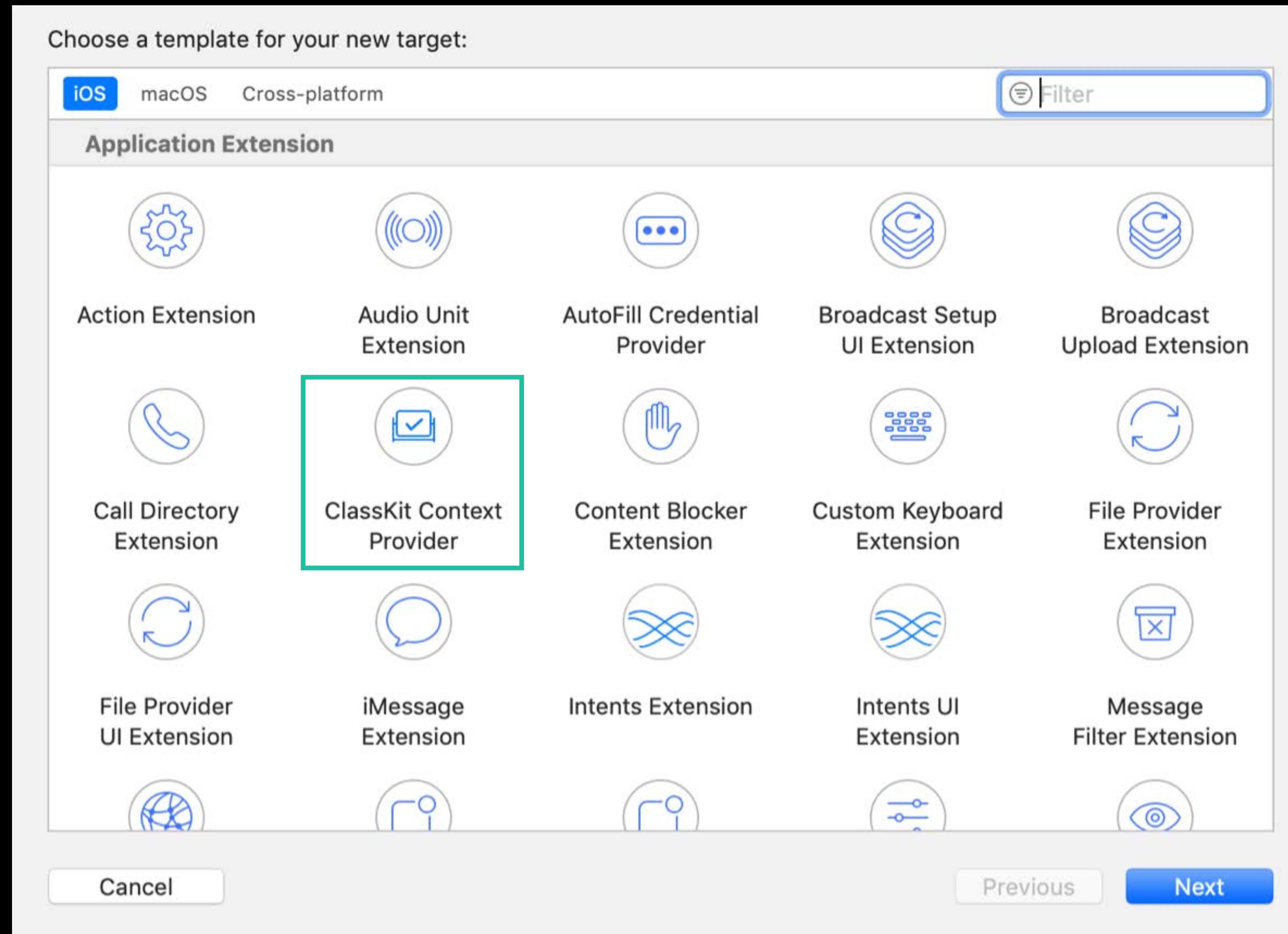


# Context Provider Extension Template





# Context Provider Extension Template





# Context Provider Extension

CLSContextProvider

# Context Provider Extension

CLSContextProvider

```
func updateDescendants(of context: CLSContext, completion: @escaping (Error?) -> Void)
```



# Context Provider Extension

```
CLSContextProvider
```

```
func updateDescendants(of context: CLSContext, completion: @escaping (Error?) -> Void)
```

```
// Code here should be performant
```

# Context Provider Extension

CLSContextProvider

```
func updateDescendants(of context: CLSContext, completion: @escaping (Error?) -> Void)
    var error: Error? = nil

    // This is where your code creates child contexts for the context passed in.
    // If there is nothing to do, call the completion (below) and you're done.
    // Otherwise, create children, add to context & -[CLSDataStore saveWithCompletion:].
    // Call completion when you are finished.

    completion(error)
}
```

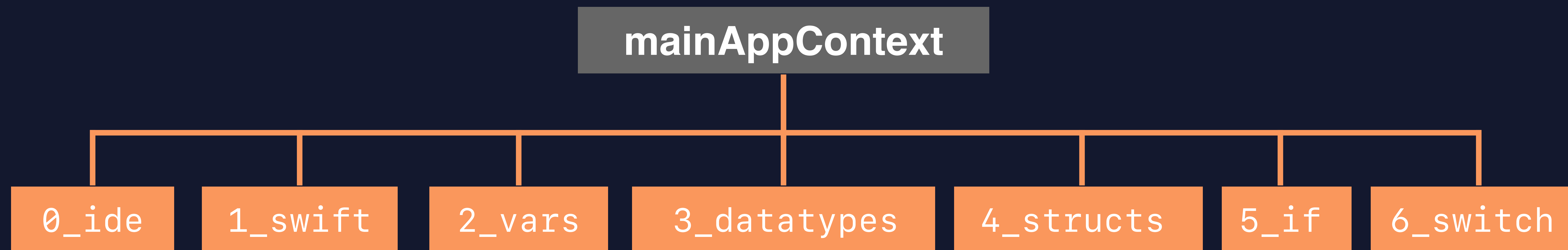
mainAppContext



# Context Provider Subclass

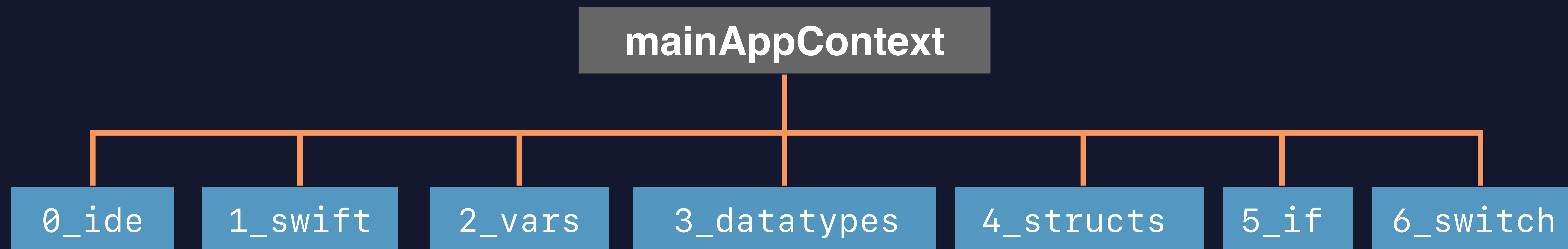
CLSContextProvider

```
func updateDescendants(of context: CLSContext, completion: @escaping (Error?) -> Void) {  
    var error: Error? = nil  
  
    // This is where your code creates child contexts for the context passed in.  
  
    completion(error)  
}
```



# Context Provider Subclass

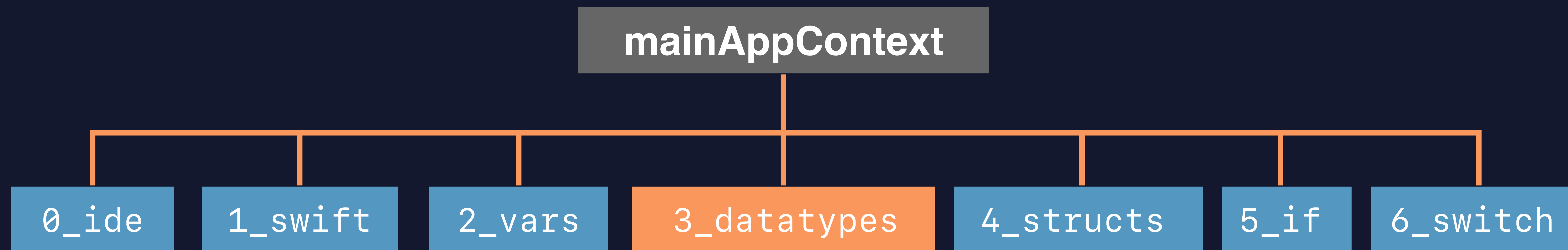
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```





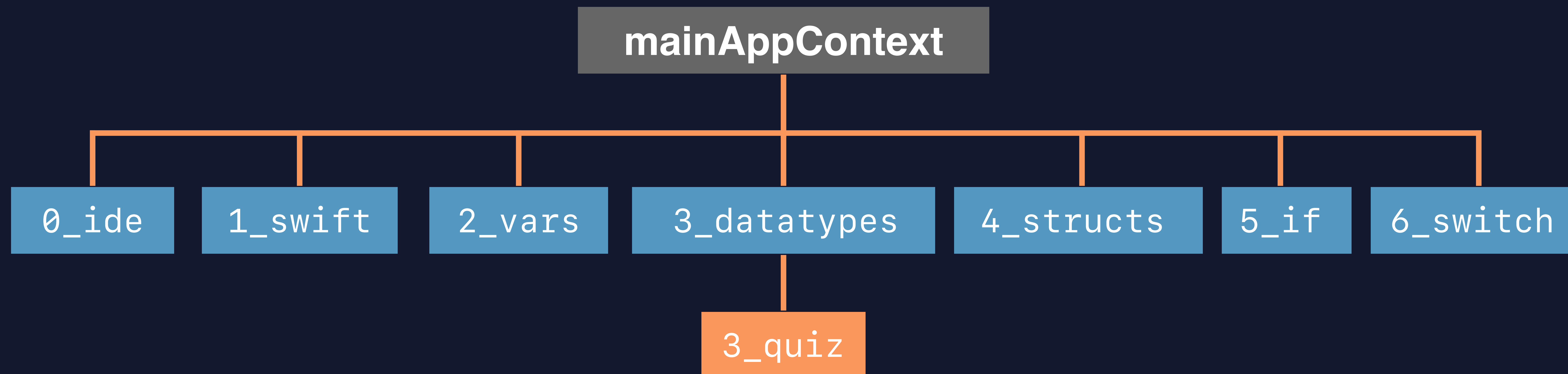
# Context Provider Subclass

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func updateDescendants(of context: CLSContext, completion: @escaping (Error?) -> Void) {  
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# Context Provider Subclass

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}
```





# Context Provider Extension Purpose

Opportunity to create your tree

# Context Provider Extension Purpose

Opportunity to create your tree

Extension registered on app download



# Context Provider Extension Purpose

Opportunity to create your tree

Extension registered on app download

Create smaller batches of CLSContexts

# Context Provider Extension Purpose

Opportunity to create your tree

Extension registered on app download

Create smaller batches of CLSContexts

Not useful for apps that require user interaction



Classes

Art Class  
4 Handouts due

calculus  
2 Handouts due

Due Next 7 Days

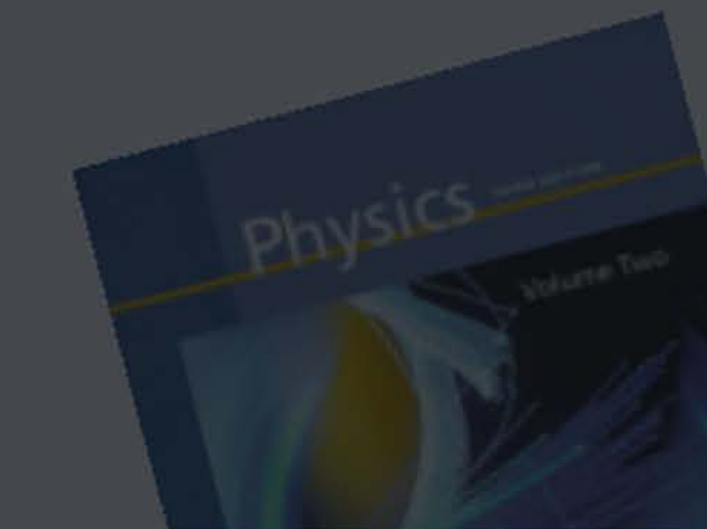
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ern Physics, chapters 1-3.










MAR 11  
PAST DUE

Cancel

Apps

Apps with Student Progress

-  Books >
-  Code Klatch >
-  Hopscotch >
-  IXL >
-  Kahoot! >
-  Lexia Core5 >
-  ProgressReader >



### Classes

Dev Class

1 Handout due

### Due Next 7 Days

DEV CLASS

**Test**

Nothing.

**1**

NOT DONE

Add Class

Show Drafts

< Apps Code Klatch Select

Search

What is an IDE?

What is Swift?

What is a variable? >

2 Activities

Simple data types >

2 Activities

Structs and other complex data types >

2 Activities

If statements >

2 Activities

Switch statements >

2 Activities

Recently Viewed



NEW

Context-provider extension

Mark activity as complete

Correct/incorrect type




# Mark Activity as Complete

DEV CLASS

## Programming languages

Continue in Code Klatch to learn about the programming language, Swift.



**1**  
NOT DONE

**TOMORROW**  
DUE DATE

Dev Class

Due  
TODAY

# What is a variable (quiz)?



Variable Quiz

Quiz  
Code Klatch



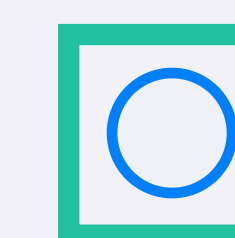
Dev Class

# What is a variable (quiz)?

Due  
TODAY



Variable Quiz  
Quiz  
Code Klatch





```
// Mark Activity as Complete
```

```
func completeAllAssignedActivities(matching contextPath: [String])
```



NEW

```
// Example function to indicate the quiz is complete

func indicateVariableQuizComplete(){
    // Call function with identifier path to quiz.
    CLSDataStore.shared.completeAllAssignedActivities(matching: ["2_vars", "2_quiz"])
}
```

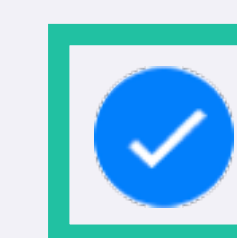
Dev Class

# What is a variable (quiz)?

Due  
TODAY



Variable Quiz  
Quiz  
Code Klatch





NEW

Context-provider extension

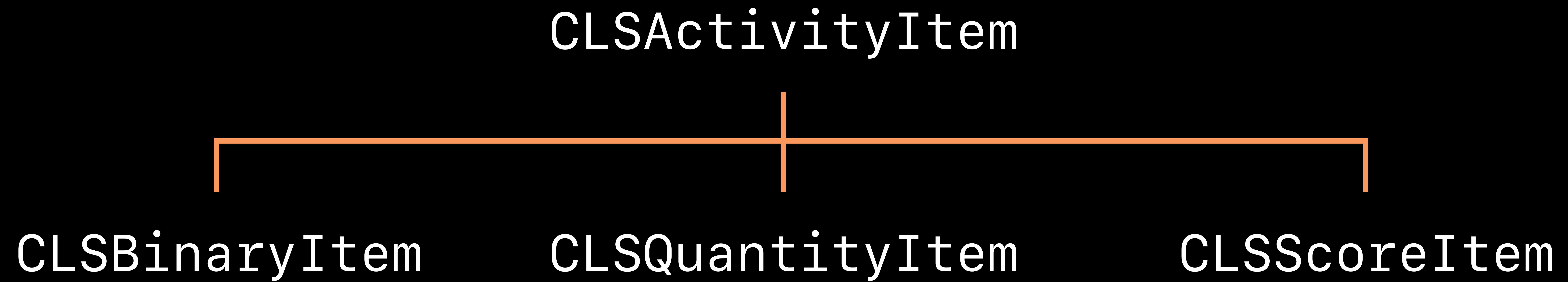
Mark activity as complete

Correct/incorrect type

**CLSActivityItems**

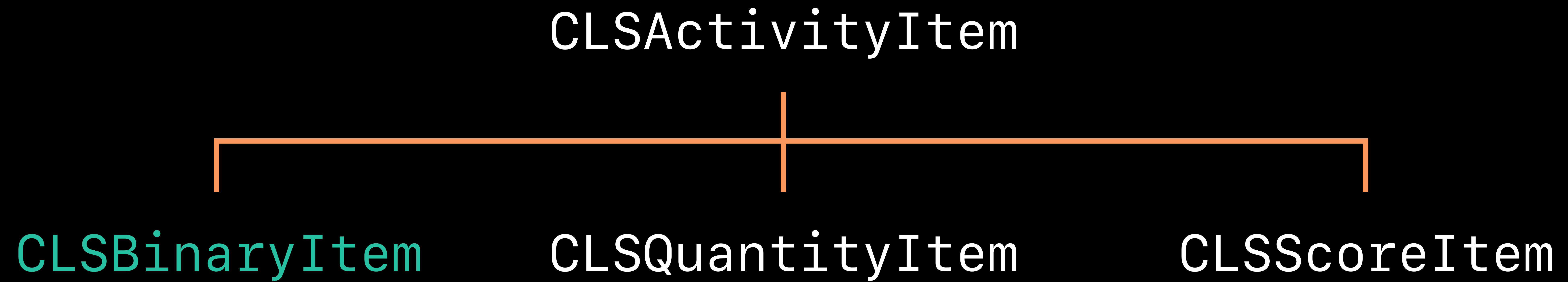
CLSActivityItem

# CLSActivityItems





# CLSActivityItems



```
// CLSBinaryItem enum value
```

```
typedef NS_ENUM(NSInteger, CLSBinaryValueType) {  
    CLSBinaryValueTypeTrueFalse = 0,  
    CLSBinaryValueTypePassFail,  
    CLSBinaryValueTypeYesNo,  
}
```

```
// CLSBinaryItem enum value
```

```
typedef NS_ENUM(NSInteger, CLSBinaryValueType) {  
    CLSBinaryValueTypeTrueFalse = 0,  
    CLSBinaryValueTypePassFail,  
    CLSBinaryValueTypeYesNo,  
    CLSBinaryValueTypeCorrectIncorrect,  
}
```



NEW



< Dev Class

Johnny Appleseed



NOT DONE

DONE

QUIZZES

1 Activity

0 Activities

1 Activity

### QUIZZES

What is a variable (quiz)? >



Variable Quiz  
Code Klatch  
Quiz

Score  
**70%**  
Class Avg.: 70%



Variable Quiz  
Quiz

Score  
TOTALSCORE **70%**  
Class Avg.: 70%

Total Time **19 sec**  
Class Avg.: 19 sec

Progress **100%**  
Class Avg.: 100%

Done **No**

Correct | Incorrect  
Question 1 **Correct**

Correct | Incorrect  
Question 2 **Correct**

Correct | Incorrect  
Question 3 **Incorrect**

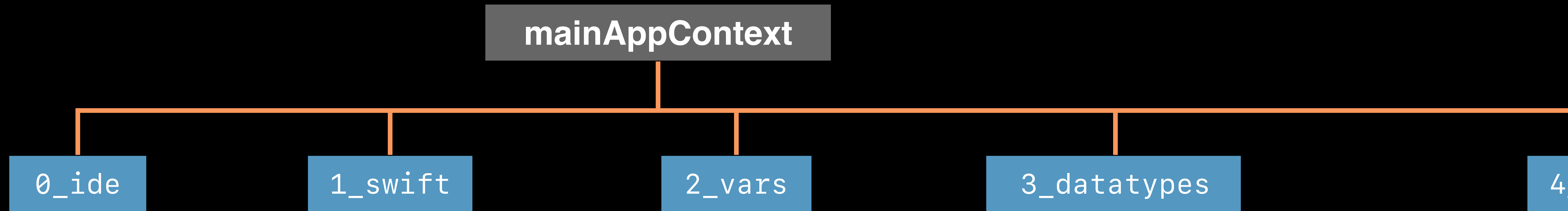
Correct | Incorrect  
Question 4 **Correct**

ClassKit introduction

New features

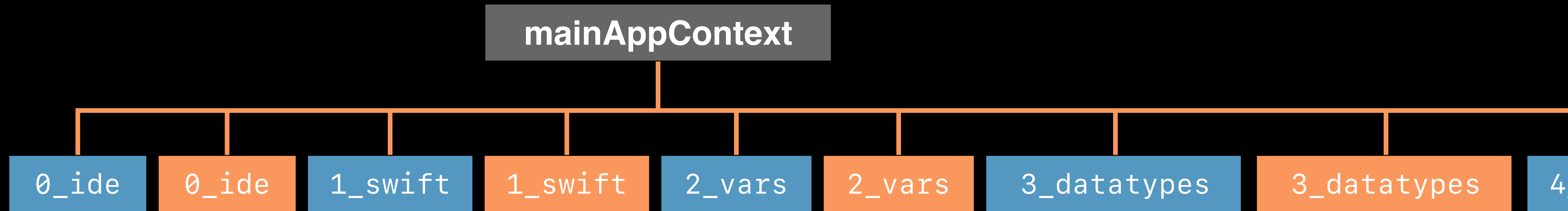
**Best practices**

# First App Launch





# Second App Launch





# CLSDataStore Delegate

```
CLSDataStore.shared.contexts(matchingIdentifierPath: ["ide_0"]) { contexts, error in
    if contexts.isEmpty {
        // No matching context with the identifier path exists, create it here.
    }
}
```



# CLSDataStore Delegate

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CLSDataStore.shared.contexts(matchingIdentifierPath: ["ide_0"]) { contexts, error in
    if contexts.isEmpty {
        // No matching context with the identifier path exists, create it here.
    }
}
```

```
CLSDataStore.shared.mainAppContext.descendant(matchingIdentifierPath: ["ide_0"]) { context,
    error in
    if context == nil {
        // No matching context with the identifier path exists, create it here.
    }
}
```

# CLSDataStore Delegate

```
func createContext (forIdentifier identifier: String, parentContext: CLSContext,  
                  parentIdentifierPath: [String]) -> CLSContext? {  
  
    // Your code here to create CLSContext  
  
    return createContext  
}
```

```
func beginActivity (_ path: [String]) {
    // Query specified context, delegate will create context if necessary.
    CLSDataStore.shared.mainAppContext.descendant(matchingIdentifierPath: path) {context, error in

        // Activate the context, add and start activity.
        context?.becomeActive()
        context?.createNewActivity()
        context?.currentActivity?.start()

        // Save.
        CLSDataStore.shared.save { error in
            guard error == nil else {
                print("Save error: \(error!.localizedDescription)")
                return
            }
        }
    }
}
```



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func beginActivity (_ path: [String]) {
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```



ClassKit introduction

New features

Best practices

Where to go from here...

# More Information

[developer.apple.com/wwdc19/247](https://developer.apple.com/wwdc19/247)



