SpineEducation Documentation

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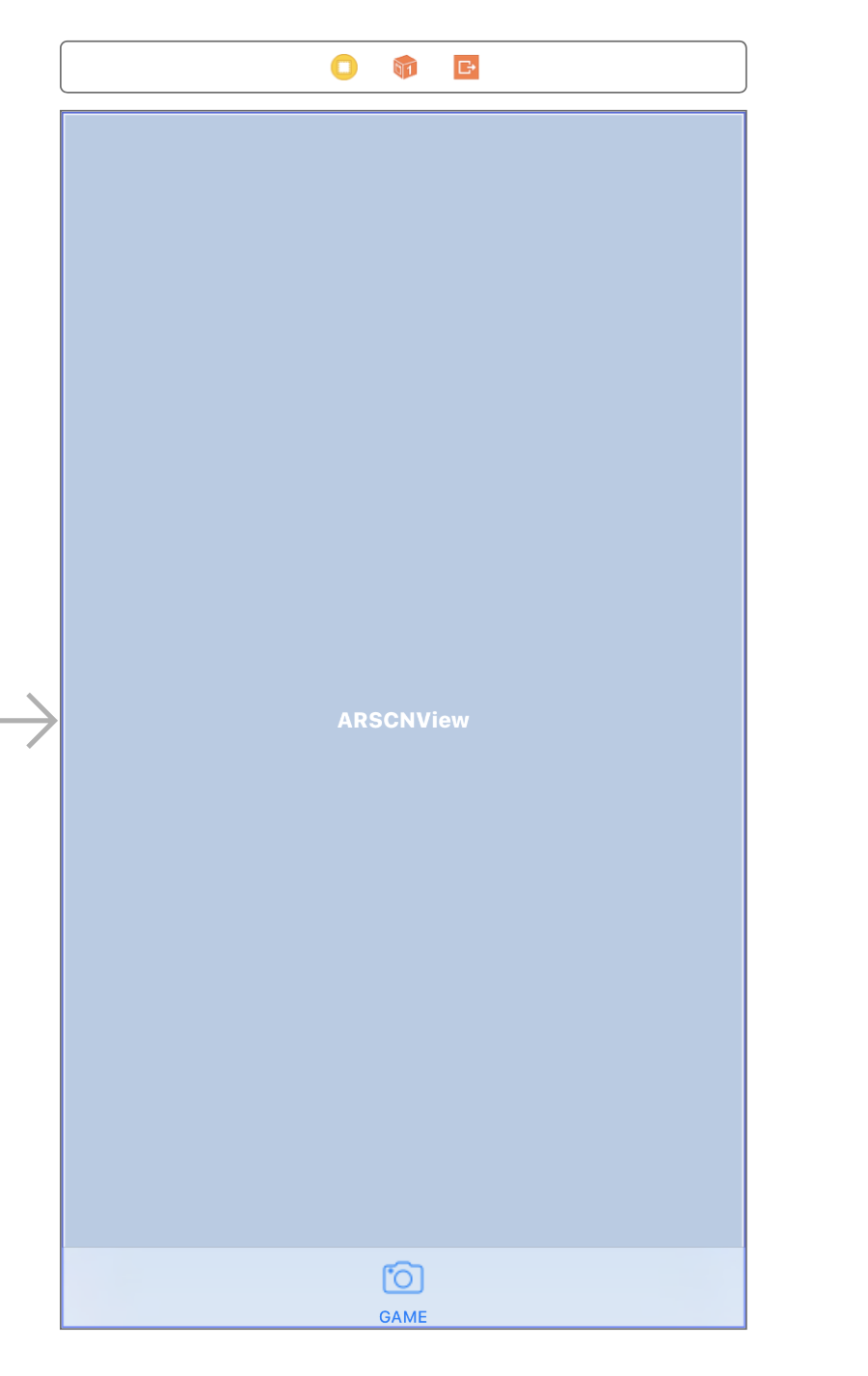
#### CS 4ZP6

# **AR Component**

## *AR Code Base:*

## **Storyboard Component:**

The Storyboard for this component is fairly simple, with just an *ARSCNView* component added into the screen to allow for the AR function to work. This part is tied into the “GAME” component of the menu options on the bottom bar.



## **ViewController.swift:**

There are several methods in this class which allow the AR component to work:

override func viewDidLoad()

This is the first function that is called upon in ViewController.swift. This function is used to set up the key components for AR, such as initializing the Scene, and adding the first user instruction “Tap to Add A Spine”

override func touchesBegan()

This function is where the majority of the AR Surgery occurs, as it is where the app checks on the user clicks and takes the appropriate steps.

if (!targetExists)

If the target does not exist already, will add the bullseye. This also

means that an initial spine does not exist, so will add the spine based

on where the user has selected, and allow them to reposition as needed.

(Calls on the createSpine() and the showTarget()functions)

if (targetExists && !targetLocked)

This means the above target has been created, however the start point for

the surgery has not yet been set. This will call upon the SCNHitTestOption

to determine if the user has selected a valid part of the spine. If not,

will allow the user to keep clicking until they do. Once they do, will lock

that point.

if (targetLocked && !trajectoryExists)

This will check if the trajectory exists, and if not, will call upon the

drawTrajectory() function to draw the trajectory.

func showTarget()

This function will make an image of a 2D bullseye (make2dNode) into a node and

attach it tosceneView.pointOfView?.addChildNode(bullseyeNode)so that it appears

on the camera position.

  func showUserInstruction ()

This function allows easy drawing of instructions on the screen by sending it an

offset value and the string of the instruction.

  func make2dNode()

Turns 2D node, 3d

  override func viewWillAppear()

Creates a session configuration for AR.

override func viewWillDisappear()

Pauses the view’s session (ie if switch screens can reload current progress)

func drawTrajectory ()

Using the current locked target position (where the user selected), will draw a

line from camera to position.

func createSpine(position : SCNVector3)

        Creates the spine node at the given position, and attaches it to the node

    override func didReceiveMemoryWarning()

      Release any cached data, images, etc that aren't in use.

    func session()

        Present an error message to the user if failed to laod session

    func sessionWasInterrupted()

        Inform the user that the session has been interrupted, for example, by

presenting an overlay

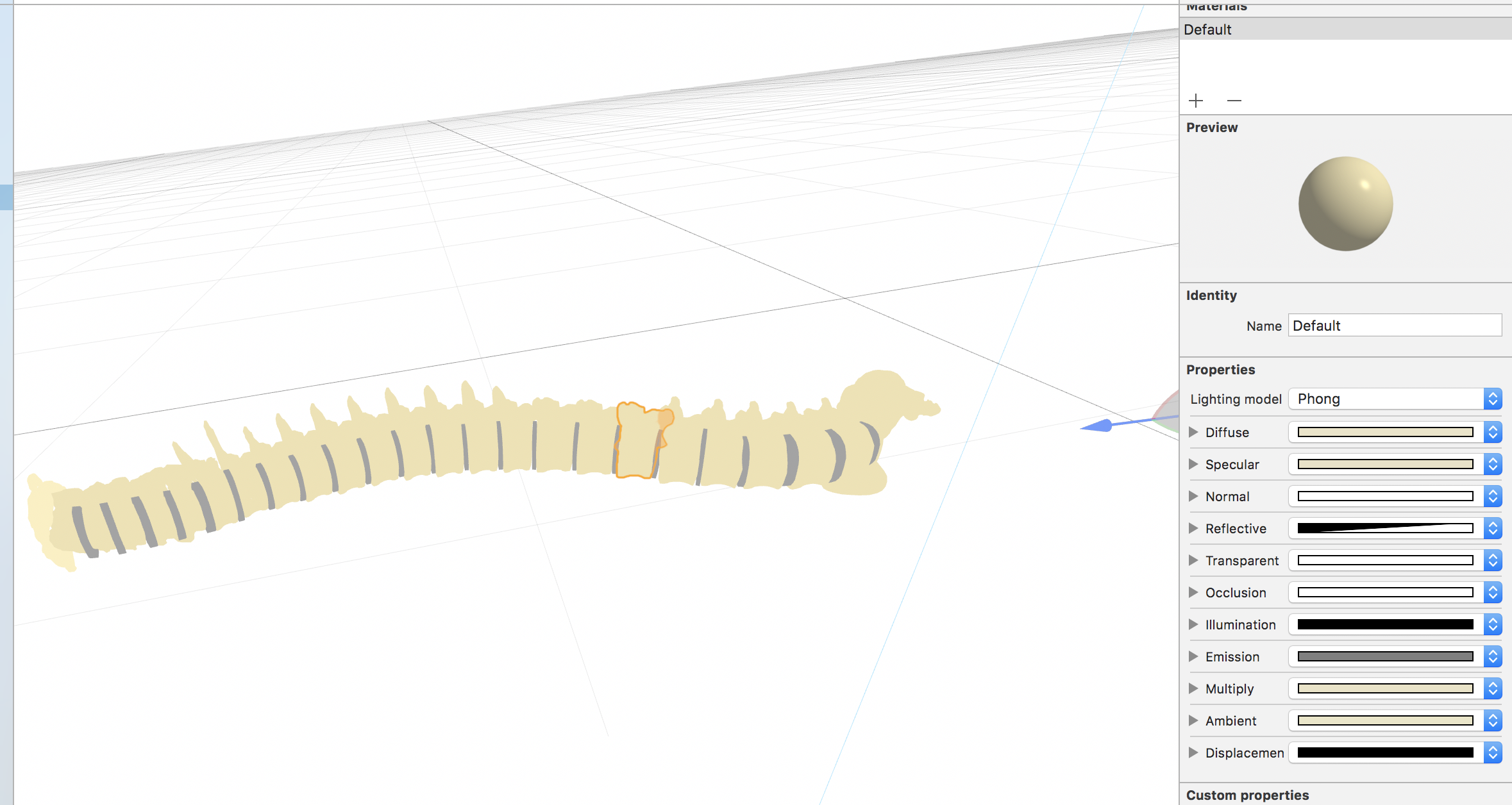
func sessionInterruptionEnded()

        Reset tracking and/or remove existing anchors if consistent tracking is

required

# *Spine Models:*

The current spine model is 4Cylinders.dae. This file has been modified in Blender to add in pedicals for the surgery components. Additionally, it has the following XCode properties attached to it in order to add textures, materials to it, and colouring. The pedicals are marked as “hidden” so that while they exist on the spine model, the user cannot see them, to add difficulty.



# *Getting Started with AR (Useful Resources)*

Learning How to set up AR Environment

* <https://lifehacker.com/how-to-get-started-using-apple-s-arkit-augmented-realit-1797690723>
* <https://blog.pusher.com/building-an-ar-app-with-arkit-and-scenekit/>
* <https://developer.apple.com/documentation/arkit/handling_3d_interaction_and_ui_controls_in_augmented_reality>

## Adding Materials/Textures in Blender:

* <https://www.wikihow.com/Apply-a-Material-or-Texture-in-Blender>
* <https://blender.stackexchange.com/questions/8697/how-do-i-put-an-image-texture-on-a-material-in-cycles>

## Open Source Spine Models

* <https://grabcad.com/library/human-spine-1>
* <https://www.thingiverse.com/thing:31845/#comments>
* <https://sketchfab.com/models/1ce94666922f48c9b68cd0e196b74a0a#>
* <https://grabcad.com/library/model-pedicle-screw-solidworks-iges>

## *AR Related Errors:*

### **Help The Spine Is Flying Away:**

Sorry. This cannot be helped. This error occurs due to the fact that AR works by configuring itself to the camera’s real-world surroundings, and as such places the object (ie the Spine) in real world configuration. However common this like moving the camera too jerkily, or switching the surroundings will cause the Spine to fly away as it is trying to figure out what is happening.

**What you can do:** Hold the camera steady, and the AR will re-configure based on the surroundings and stabilize. If this does not work, then try relaunching the app. It is very rare that the app is unable to reconfigure once the surroundings have been stabilized. Also try using a different view on the camera (ie turn a different direction) as it is possible the direction you were trying was too confusing for the AR.

# **Cases Component**

# **Common XCode Related Errors**

## *Error Message:* “Code Signing Error”

### Details:

Code Signing Error: No account for team "NWVTD7H53D". Add a new account in the Accounts preference pane or verify that your accounts have valid credentials.

Code Signing Error: No profiles for 'com.<name>.Spineducation' were found:  Xcode couldn't find any iOS App Development provisioning profiles matching 'com.<name>.Spineducation'.

Code Signing Error: Code signing is required for product type 'Application' in SDK 'iOS 11.2'

### Cause:

This error occurs due to the fact that when the Git Project was pulled from Git, the name of the team was left from the last user’s details.

### Solution:

This can be fixed in the *Spineducation.xcodeproj* file by ensuring that the proper values are in each field.



## *Error Message: “Command /usr/bin/codesign failed with exit code 1”*

Details:

CodeSign /Users/me/Library/Developer/Xcode/DerivedData/MyApp-Spineducation/Build/Products/Debug-iphonesimulator/MyApp.app

CODESIGN\_ALLOCATE=/Users/me/Downloads/Xcode.app/Contents/Developer/Toolchains/XcodeDefault.xctoolchain/usr/bin/codesign\_allocate

export PATH="/Users/me/Downloads/Xcode.app/Contents/Developer/Platforms/iPhoneSimulator.platform/Developer/usr/bin:/Users/me/Downloads/Xcode.app/Contents/Developer/usr/bin:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin"

Signing Identity: "-"

/usr/bin/codesign --force --sign - --timestamp=none /Users/me/Library/Developer/Xcode/DerivedData/MyApp-gnoiiwnelmxzdidnijaswisrwdqe/Build/Products/Debug-iphonesimulator/MyApp.app

/Users/me/Library/Developer/Xcode/DerivedData/MyApp-gnoiiwnelmxzdidnijaswisrwdqe/Build/Products/Debug-iphonesimulator/MyApp.app: resource fork, Finder information, or similar detritus not allowed

Command /usr/bin/codesign failed with exit code 1  
Cause:

This error occurs because of cached information from pulling from Git

Solution: Run the following line in Terminal:

*xattr –rc ~/Library/Developer/Xcode/DerivedData*