



# SHRI VAISHNAV VIDYAPEETH VISHWAVIDYALAYA

CLASS WORK  
SESSIONAL WORK

ASSIGNMENT NO  
EXPERIMENT

SUBMITTED ON ..... MARKS OR GRADE OBTAINED .....

NAME ...SAUHAM JASHI..... ROLL NO. 19100 BTCSema.05500

CLASS ..... CS - K ..... DEPARTMENT ..... C.S.

SUBJECT ..... Virtual & A. Reality ..... CODE NO. BT.MACS.601.....

Signature of Student

Signature of Professor

## Augmented Template AR

Augmented Reality works on by tracking the real world through a camera. By identifying solid objects in the real world such as walls, table, flower, Augmented Reality can then actually place virtual object on the scene that creates the illusion of actually being there.

AR Kit acts as a platform for you to develop your own reality apps. To help you get familiar using AR Kit X-code provide a simple AR project that you can compile.

and even on any compatible iOS device physically connected to your device / Macintosh through cable.

⇒ To Create this AR Kit Sample App (steps)

- ① Open X-code
- ② Choose File > New > Project , X-code ask you to choose template .
- ③ Click AR App icon and click the Next button . X-Code asks for a product name, organization name, organization identifiers and Content Tech.
- ④ Click on the product name text field and Enter name of your project
- ⑤ Make sure that the Content technology pop-up menu display SceneKit
- ⑥ Make sure of, Include Unit Test and Include UI Test check boxes are not checked since we won't be using these features in any of the app created!
- ⑦ Click the next button . X-code asks when you want to store / save your project .



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- (8) Choose a folder and Click the Create button X-code Create and AR project that is ready to run
- (9) Connect your ios to your Macintosh through Cable.
- (10) Click on the popup menu near the top of X-code windows that display the device
- (11) Choose your ios device
- (12) Click the Run button or Choose product . allows your project to access your ios device
- (13) Your project appears on your ios device
- (14) Click the stop button in X-code or Choose Product > Stop



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EXPERIMENT NO <u>2</u>

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NAME : SAUHAM JOSH. ROLL NO. 19100 B.T.CSE.MA 05500

CLASS CS - 1K DEPARTMENT CS

SUBJECT Virtual & A. Reality CODE NO. BTMACS. 601

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Create single View app using SceneKit

Modify the View Controller, swift file and write swift code to display AR.

① Click on ViewController.swift file in the Navigation panel of X-code

② Add the following two lines under the Import UI kit line as follows,

import SceneKit  
import ARKit

③ Modify the Class View Controller line to add the ARSCN View, Delegate as follows-

Class View Controller: UI View Controller  
ARSCN View Delegate {

(4) At the bottom of View Controller.swift file, add the view will appear, and view will disappear functions as follows.

Override func viewWillAppears( animated: Bool ) {  
super.viewWillAppears( animated )

let Configuration =

ARWorldTrackingConfiguration()

SceneView.session( Configuration )

}

Override func viewWillDisappear( animated:  
Bool ) {

super.viewWillDisappear( animated )

SceneView.session.pause()

}



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## Experiment 03-

### Add Object structure.

To Create a shape, you must start by creating a node based on SCN Node Class like this  
Let node = SCN Node()

- At this point, you need to define a shape for your node

node.geometry = SCN Sphere (radius : 0.05)

To make the sphere visible, let's give it a colour

node.geometry.firstMaterial?.diffuseContent = UI Color: yellow

Now the only remaining task is to place that node at a specific location

node.position = SCN Vector3(0, 0, 0)

The final step is to add that node to the existing scene so that it actually appears in AR view.

SceneView.scene.rootNode.addChildNode(node)

The line of code adds the node to the root of AR scene. The root node defines the hierarchy of items displayed in AR view.

### Working of Code

- ① Modify the World Tracking project on a Create new project on Create a new project identical to the world tracking project
- ② Modify View Controller.swift file

```
import UIKit
```

```
import SceneKit
```

```
import ARKit
```

```
Class ViewController: UIViewController,  
ARSCNViewDelegate {
```

- ③ FB outlet var sceneView: ARSCNView!  
Let Configuration = ARWorldTrackingConfiguration  
override func viewDelegate()



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{ Super.viewDidLoad()

Scene View.delegate = self

Scene view.shows.statistics = true

Scene view.debug options

[ARSCN Debug options.show world origin]

show shape()

3

Override func view will appear(Animated:Bool)

{ super.view will appear (Animated)}

Scene view.session.even (Configuration)

3

(3) Connect an ios device to your Mac

(4) Click the Run button or choose Product  
> Run, A yellow sphere appears at a world origin.

⑤ Move your ios device to a new location and tap the Reset button. Notice that the World Coordinates now appear in a different location

⑥ Click stop button.



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### Experiment 4

World Origin and feature Points.

Edit the View Controller.swift file

```
import UIKit
import SceneKit
import ARKit
```

Class View Controller : UI View Controller :  
ARSCN View Delegate {

@ IB outlet var SceneView: ARSCN View!

```
override func view did Load () {
    super . view did Load ()
```

Scene view . delegate = self

Scene view . shows statistics = true

Scene view . debug options =

[ARSCN Debug Options . show world origin]

3.

Override func viewWillAppears(Animated:Bool){

Super.viewWillAppears(Animated)

let Configuration =

World tracking Configuration()

Sceneview.session.event(Configuration)

3



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## Experiment 5

Change the position of object using slider in  
Scene View

The Complete View Controller swift file

```
import UIKit
import SceneKit
import ARKit
```

Class View Controller : UI View Controller

```
ARSCNViewDelegate {
```

- ① IB Outlet var sceneview: ARSCNView!
- ② IB Outlet var xSlider: UISlider!
- ③ IB Outlet var ySlider: UISlider!
- ④ IB outlet var zSlider: UISlider!

Let Configuration = ARWorldTrackingConfiguration()

```
override func viewDidLoad() {
```

```
    super.viewDidLoad()
```

```
    sceneView.delegate = self
```

```
    sceneView.showsStatistics = true
```

Scene View · Debug options

[ARSCN · Debug options · Show World Origin]

3

Override func `viewWill appear(animated:Bool)` {  
    SuperView will appear (animated)  
    Scene View · Session even (Configuration)}

3

@ IB Action func `addButton(sender: UIButton)` {  
    show shape() }

3.

@ IB Action func `reset button(sender: UIButton)` {  
    Scene View · session · pause() }

Scene View · Scene · root node · enumerated child  
nodes { (node,\_) : y

if node.name == "Sphere" {

node removeFromParentNode()

3

3

Scene View · session · run [ Configuration,  
options: [ reset Tracking ] ]

3 -

end record frame view



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func show shape () {

Let node = SCNNode()

node.geometry = SCN sphere (rad : 0.05)

node.geometry?.firstMaterial?.diffuse.contents =

UI Colour .yellow

node.position = SCNVector3(x: slider.value,  
y: slider.value, z: slider.value)

node.name = "sphere",

SceneView .scene.rootNode  
add child node (node).

3.

3.

Attach ios Device to your Mac  
through cable. Run your Project.



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### Experiment 6.

Add Different Shapes in Scene View

To Create a sphere, we just needed to define its radius like this

node.geometry = SCN sphere (radius = 0.05)

To Create a box, we need to define its height width and length.

① Click on the View Controller swift file of the current app that displays 3 sliders.

② Move the cursor to the front of the node.geometry = SCN sphere line

③ //node.geometry = SCN BOX .

④ Replace where text "sphere" with "shape" in two places like this

```
if node.name == "shape" {  
    node.removeFromParentNode()  
}
```

3

and

```
node.name == "shape"
```

⑤ Connect ios device to your Mac

⑥ Click Run button.

⑦ Adjust x, y, z slider to change the location of shape

⑧ Tap the Add button to see a yellow box appear in AR view.

⑨ Click on stop button

## Defining Different Shapes

- node.geometry = SCNSphere (radius: 0.05)

- node.geometry = SCNCube (width: 0.1, height: 0.2, length: 0.1)

Chamfer radius: 0.05)