

Development of a Noughts and Crosses Game + Persistent Data

SE3S604

Advanced Internet & Mobile
Computing

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Game Play

O		O
	X	
		X

Needs of the Game

Need to create a game grid - could use Word to develop a 3x3 table without its external boundary lines

Screen grab the image and save it as a jpeg

Similarly have a large X and O - screen grab and save to jpegs

Single View

Need to add the images to the Storyboard

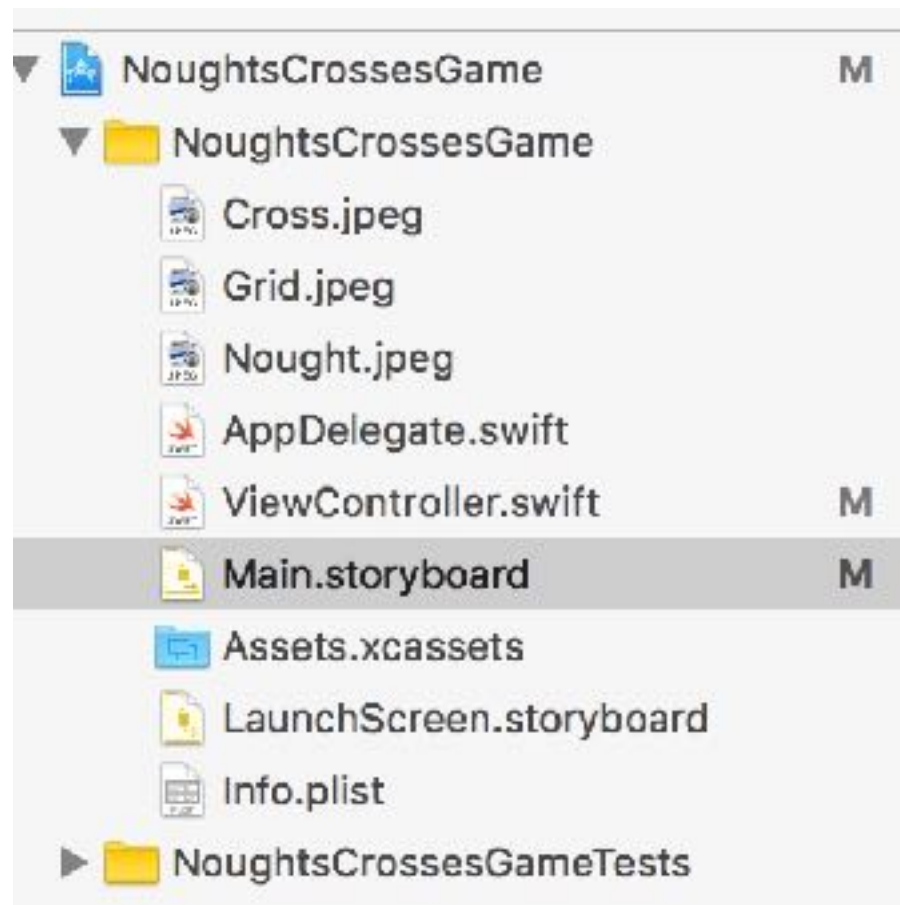
Develop some arrays in the code that will keep a record of the images inserted onto the grid

Recognise two players alternating in their goes

Keep checking for a winning line - and then show the winner

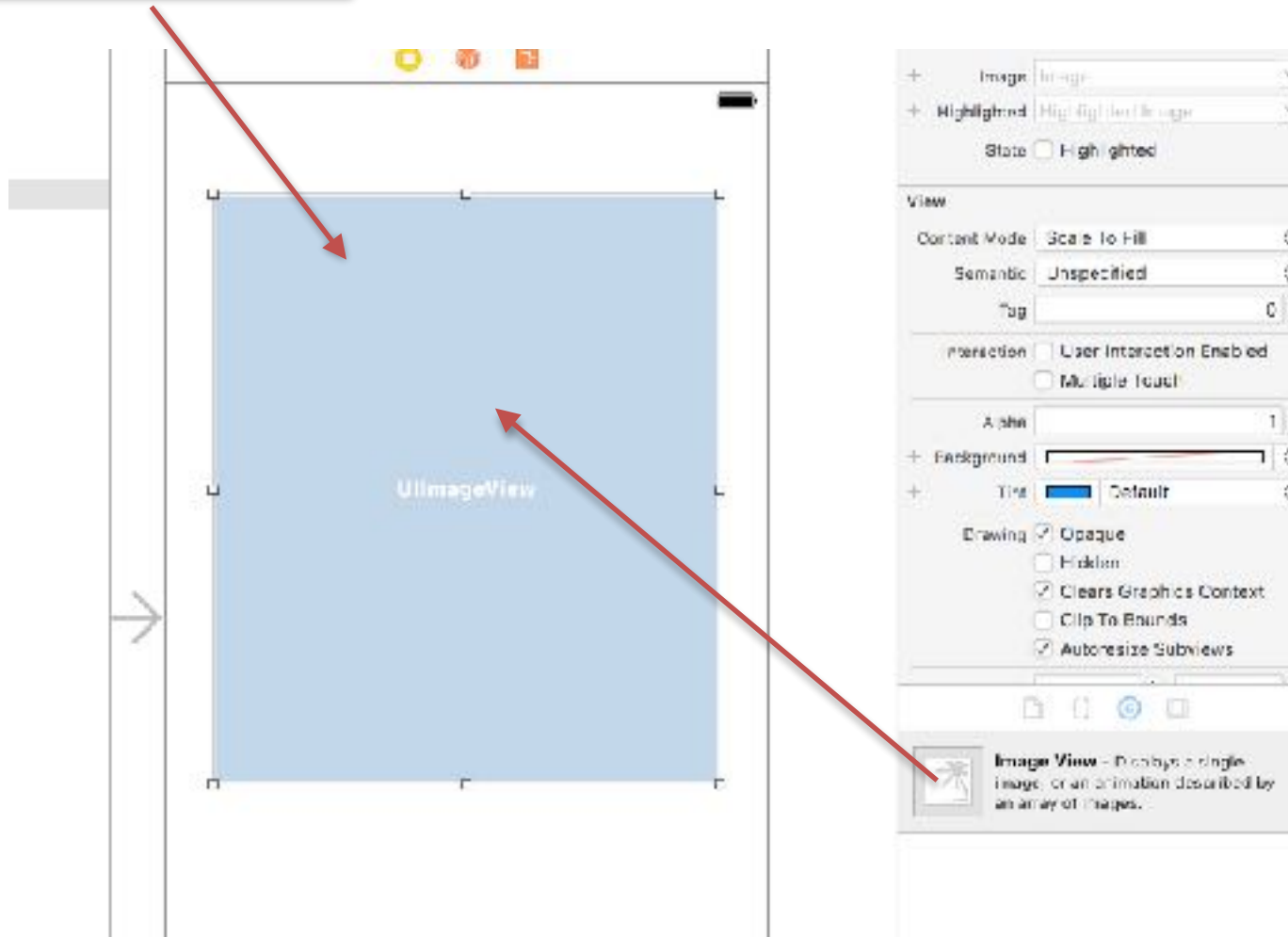
Reset the game and start again

Insert References to the Game Images

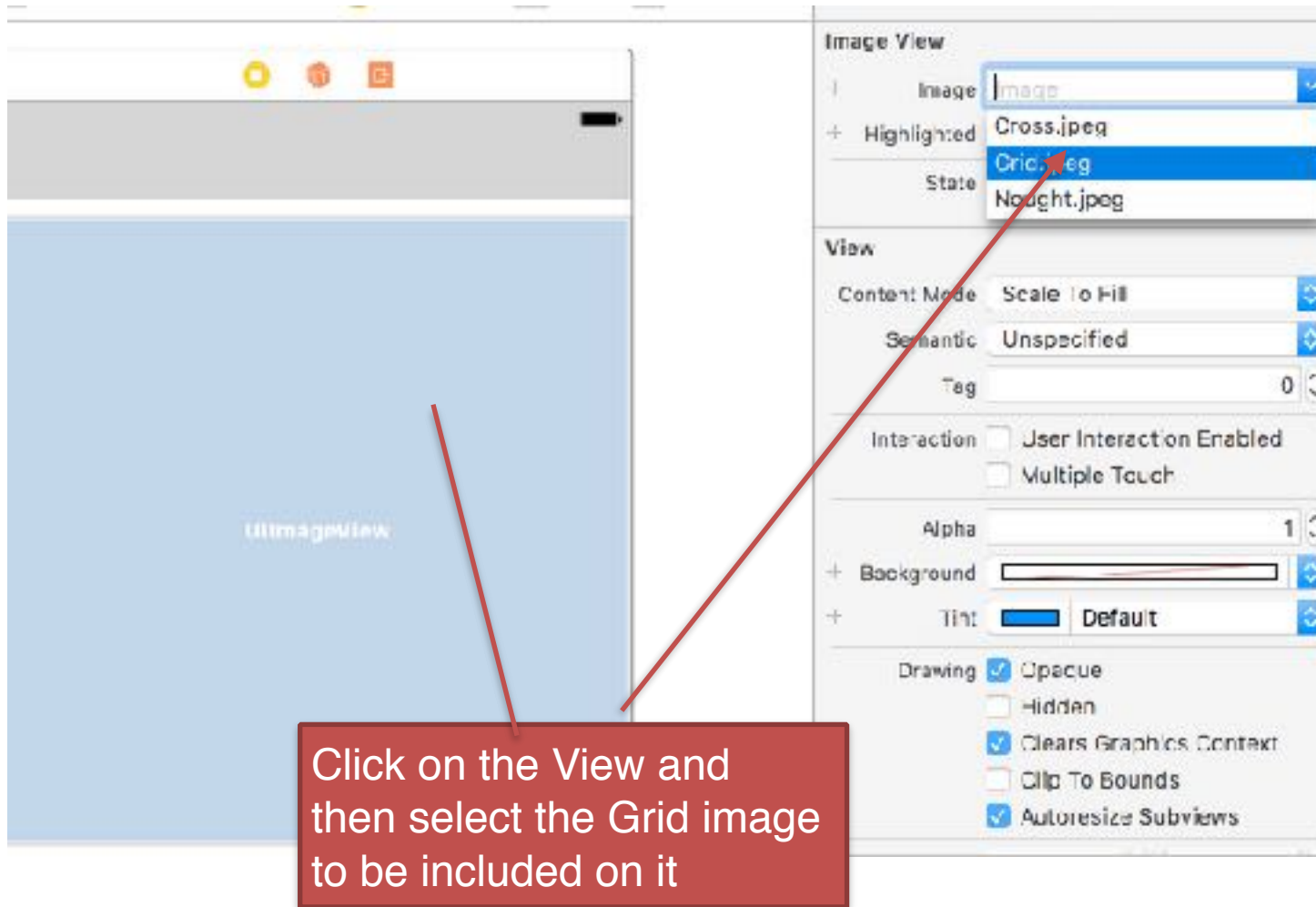


Pull an Image View on to Storyboard

Make it roughly square



Grid on View



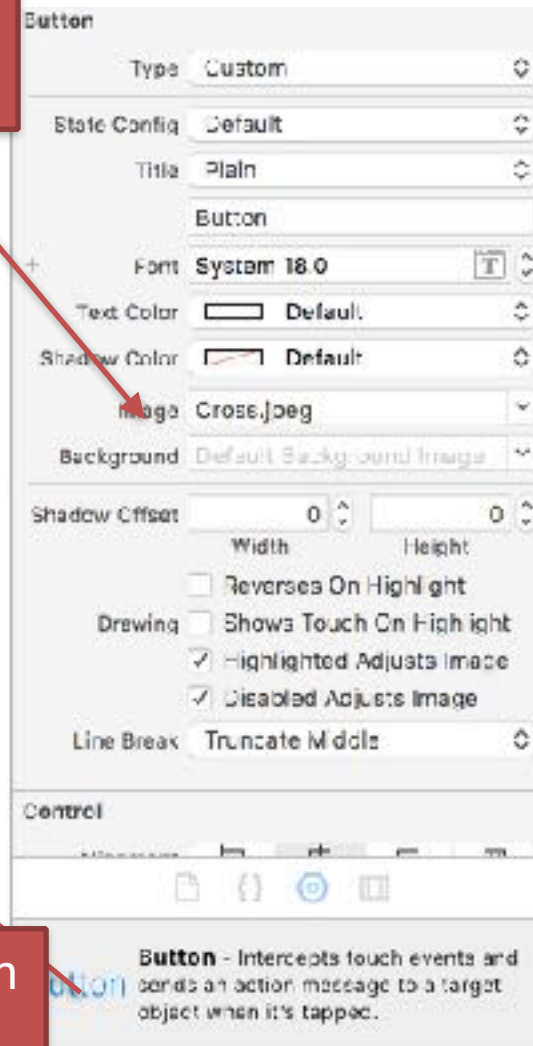
Insert a Button in the Middle of the Grid

Set the image to be a cross (resize it)

2. Set the Button to have a selected image

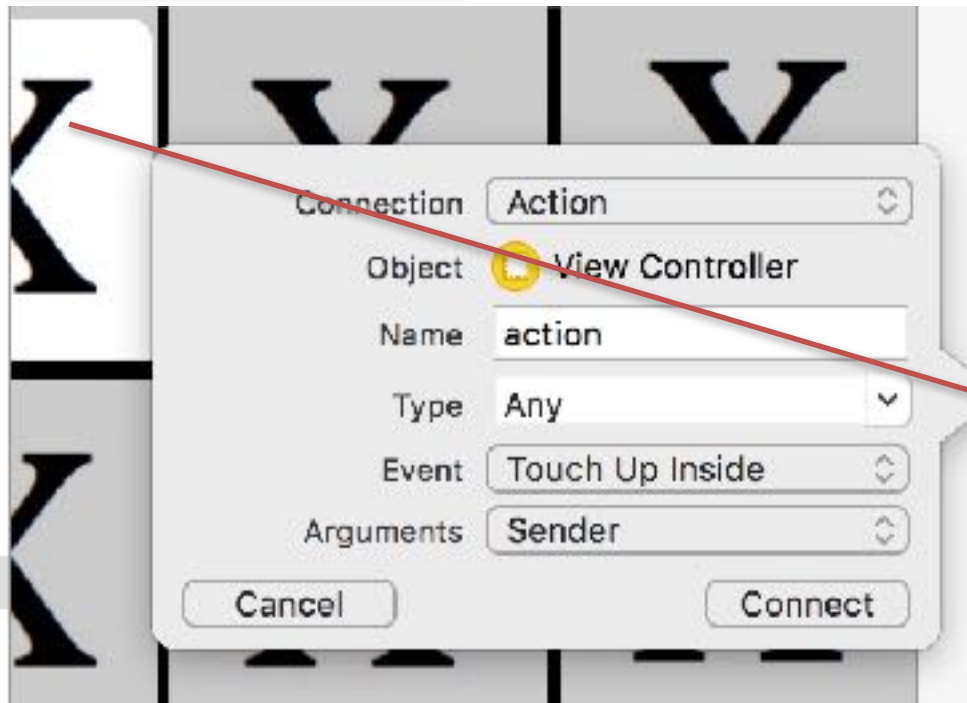
3. Then COPY and PASTE NINE BUTTONS and Insert into the grid positions

1. Pull a Button onto the grid



Link Button Action to View Controller

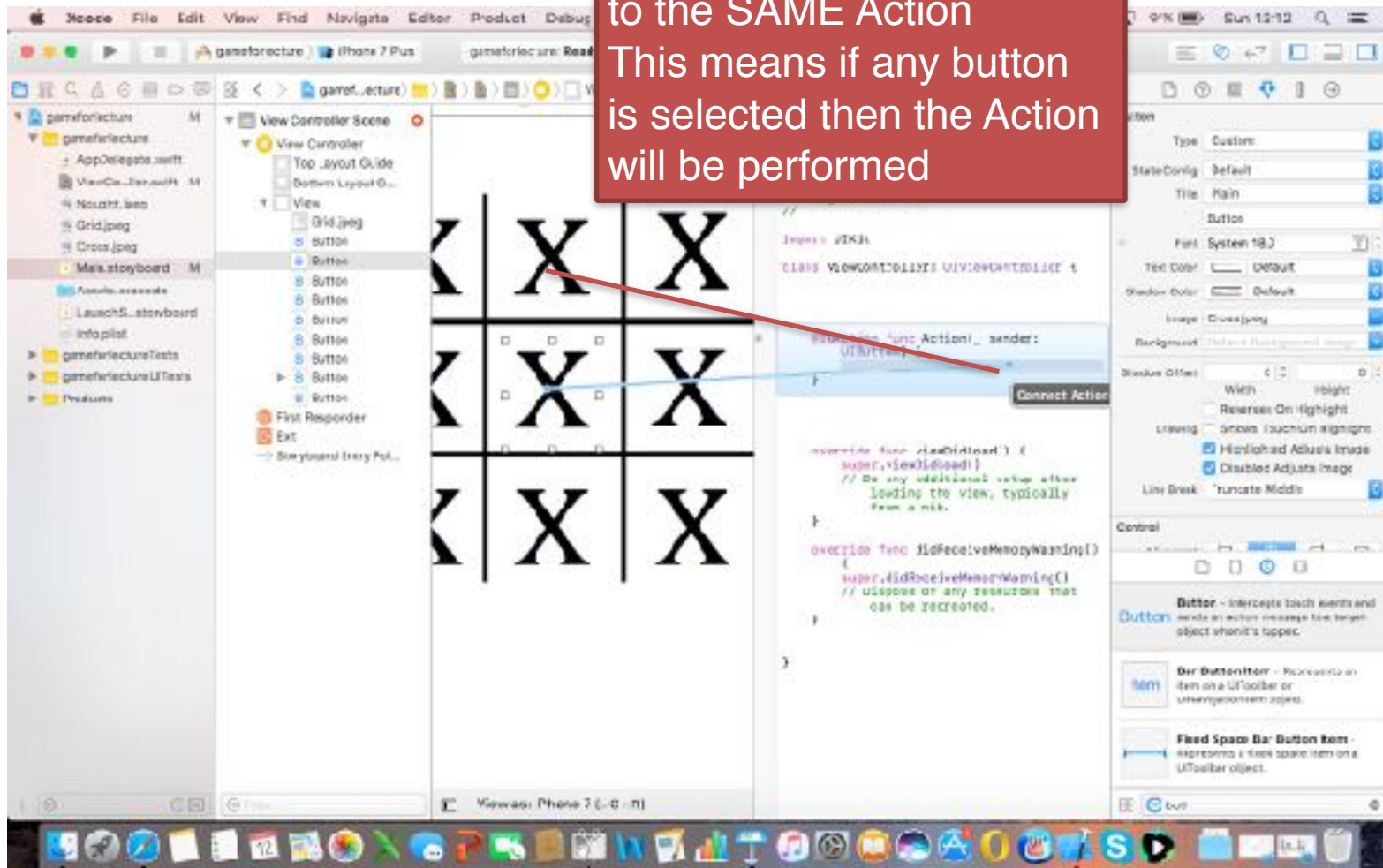
Cntrl Click a Button
and pull the Action
across to the Code



```
rights reserved.  
//  
import UIKit  
class ViewController: UIViewController {  
  
    override func viewDidLoad() {  
        super.viewDidLoad()  
        // Do any additional setup after  
        loading the view, typically
```

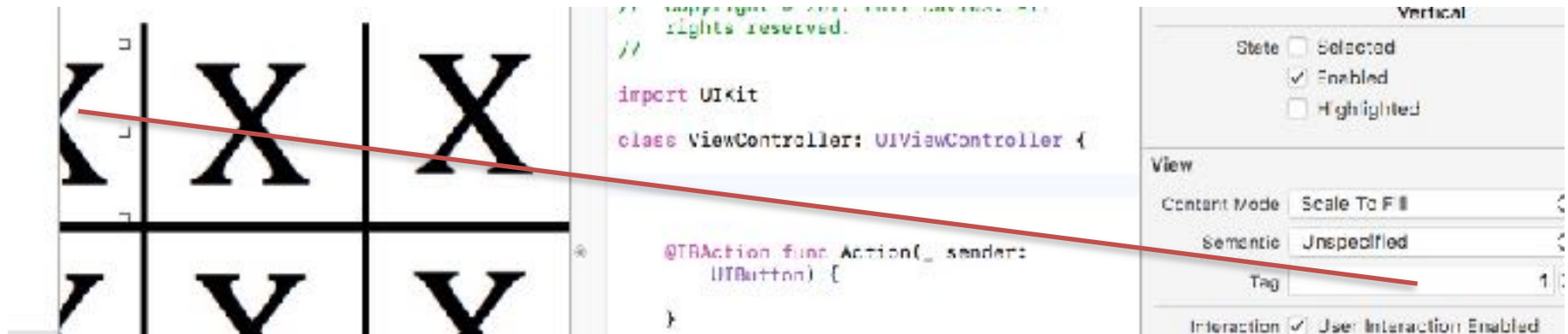

Connect each BUTTON to the Single Action

Connect ALL the buttons
to the SAME Action
This means if any button
is selected then the Action
will be performed



Set a TAG identifier for EACH button in Grid

Click on EACH button in turn
and set TAG to 19



Set Action Code for Allowing Turns and Correct Image inserted

var activePlayer = 1 // this will set the current player

▪
▪

```
@IBAction func action(_ sender: UIButton)
{
    if (activePlayer == 1){
        sender.setImage(UIImage(named:"Cross.jpeg"), for: UIControlState())
        activePlayer = 2
    }
    else{
        sender.setImage(UIImage(named:"Nought.jpeg"), for: UIControlState())
        activePlayer = 1
    }
}
```

Need to stop a grid position being used again once selected

```
var gameState = [0,0,0,0,0,0,0,0,0]
```

☐ ☐ ☐ ☐ ☐ ☐

```
if (gameState[sender.tag-1] == 0) {
```

```
gameState[sender.tag-1] = activePlayer
```

Sets up an array to represent each grid position

Within the Action Button code
check if the grid square has already
been set?

Before trying to Run it
Clear the default IMAGES on
each button in the GRID

Need to check each combination in turn through the winning combinations

e.g.

gamestate [1, 2, 1, 2, 2, 1, 2, 1, 1]

means the top line of the grid has CROSS NOUGHT CROSS

```
let winningCombinations = [[0,1,2],[3,4,5], .....
```

```
for combination in winningCombinations
{
    if gameState[combination[0]] != 0 && gameState[combination[0]] ==
gameState[combination[1]] && gameState[combination[1]] ==
gameState[combination[2]] --- then it is a winning combination
```

combination first time through looks at winningCombinations first element
i.e. combination equals [0, 1, 2]

if the first element of the combination equals zero then this grid position
has not been selected yet – can not be a win

then checks if gamestate [X] is equal to gamestate [Y] is equal to gamestate [Z]

where in our example X = 0, Y = 1, Z = 2

then in our example if not true above X = 3, Y = 4, Z = 5

Now need to decide if win has occurred

```
var gameState = [0,0,0,0,0,0,0,0,0]

let winningCombinations = [[0,1,2],[3,4,5], [6,7,8], [0,3,6],[1,4,7],
[2,5,8], [0,4,8],[2,4,6]]

var gameActive = true

.
.
.

for combination in winningCombinations
{
    if gameState[combination[0]] != 0 && gameState[combination[0]] ==
gameState[combination[1]] && gameState[combination[1]] ==
gameState[combination[2]]

        {
            gameActive = false

            if gameState[combination[0]] == 1{
                //Cross has won
            }else{
                //Nought has won
            }
        }
}
```

What else needs to be done?

```
// when game is won – playAgainbutton ishidden = true/false
// reset gameState array elements to 0
// clear the grid

// for i in 1...9
//   let button = view.viewWithTag(i) as! UIButton
//   button.setImage(nil, for: UIControlState())

// also need to check when there is a draw

// also need to keep a record of each game
// will need to check if gameactive true
// all of these things will need to act as persistent data
```

Keeping the Data safe - stop and start app - Persistent Data

```
class ViewController: UIViewController {  
    @IBOutlet weak var input: UITextField!  
    @IBOutlet weak var output: UILabel!  
  
    @IBAction func action(_ sender: AnyObject)  
    {  
        output.text = input.text  
        UserDefaults.standard.set(input.text, forKey: "myName")  
        input.text = ""  
    }  
  
    override func viewDidLoad() {  
        super.viewDidLoad()  
        // Do any additional setup after loading the view,  
    }  
  
    override func didReceiveMemoryWarning() {  
        super.didReceiveMemoryWarning()  
        // Dispose of any resources that can be recreated.  
    }  
  
    override func viewWillAppear(_ animated: Bool)  
    {  
        if let x = UserDefaults.standard.object(forKey: "myName") as? String  
        {  
            output.text = x  
        }  
    }  
}
```

Have a Text Field
Label
Button Action

When button is pressed
Store the text in the label
AND store in myName

When View is Loaded
Next time myName
is loaded into the label

Can hold various data types - integers, strings, boolean, arrays, ..

```
var Array = [1, 2, 3]
```

```
var y = [4, 5, 6]
```

```
UserDefaults.standard.set(Array, forKey: "myArray")
```

```
y = UserDefaults.standard.object(forKey: "myArray") as? Array<Int>
```

```
label.text = String(y[1])
```

Coursework

This type of game is fairly boring - i.e. the players automatically get a go
In this way a draw is the 'normal' outcome

The coursework expects you to have some form a Master/Detail type
pre-game

e.g. a list of actors - decide which film an actor is in?

If incorrect then you lose your turn

If correct then you get to go and play the noughts and crosses game

However this game would still be quite boring - think of increasing the
grid size - making it a 4 in a row type game

Include timers that will force the player to decide quickly, etc

