Hot Topics

Mobile Application Development in iOS

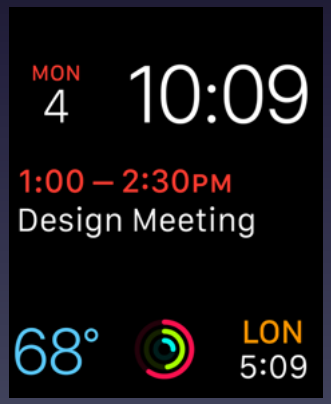
School of EECS

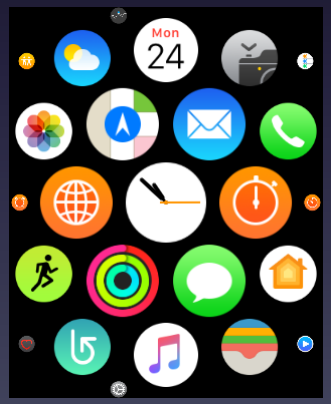
Washington State University

Instructor: Larry Holder

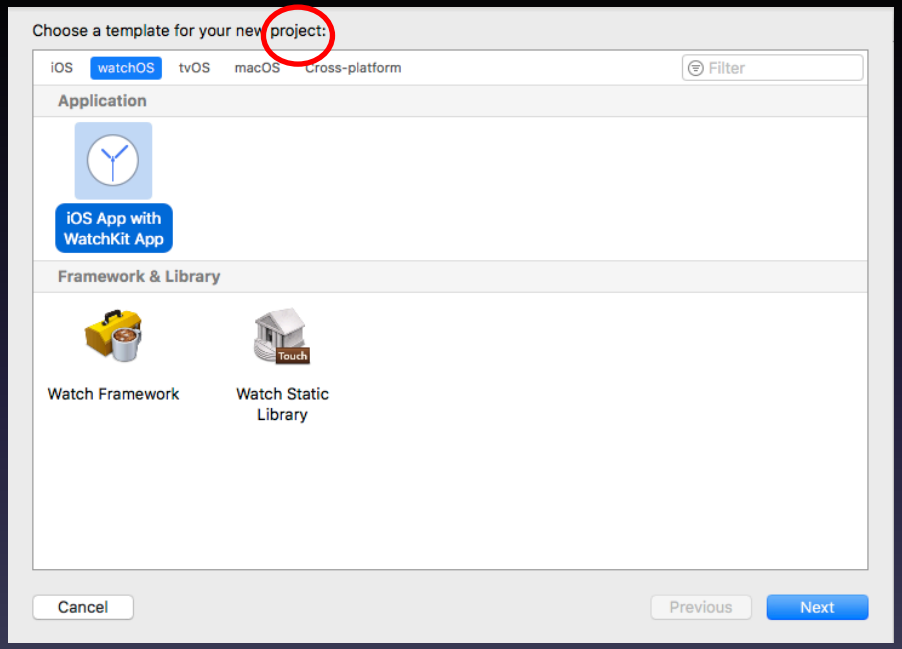
Outline

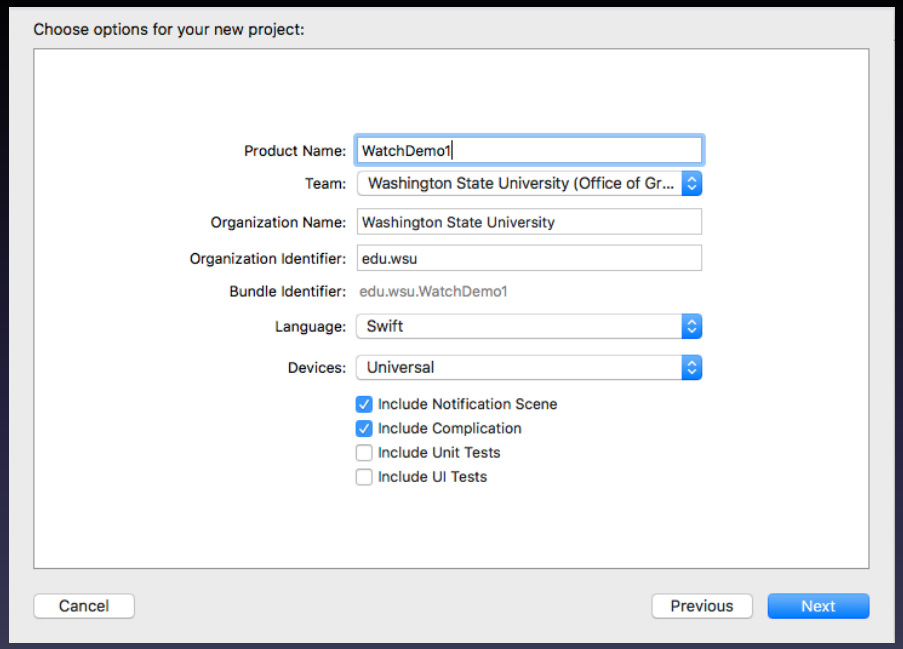
- Apple Watch
  - Xcode configuration
  - Watch App and WatchKit
  - Complications
  - Notifications
  - Communications
  - Sensors





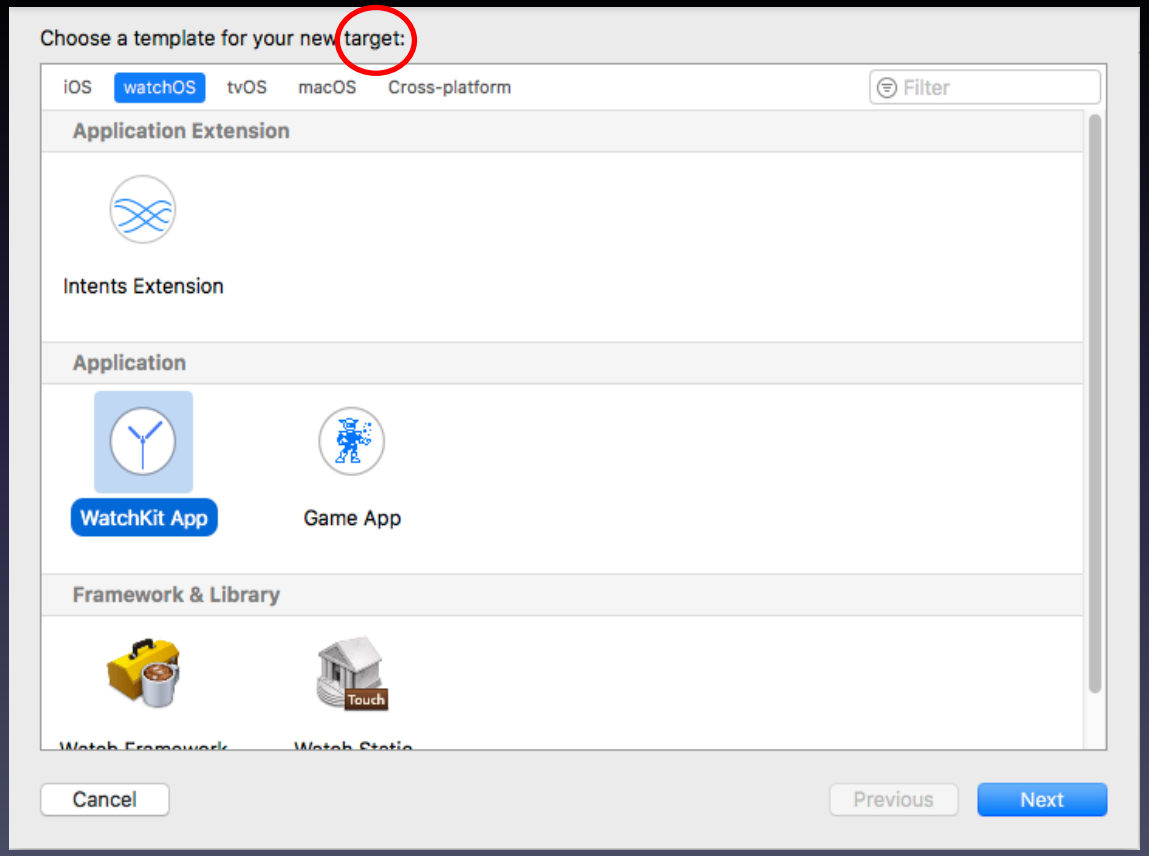
Xcode Configuration: New Project



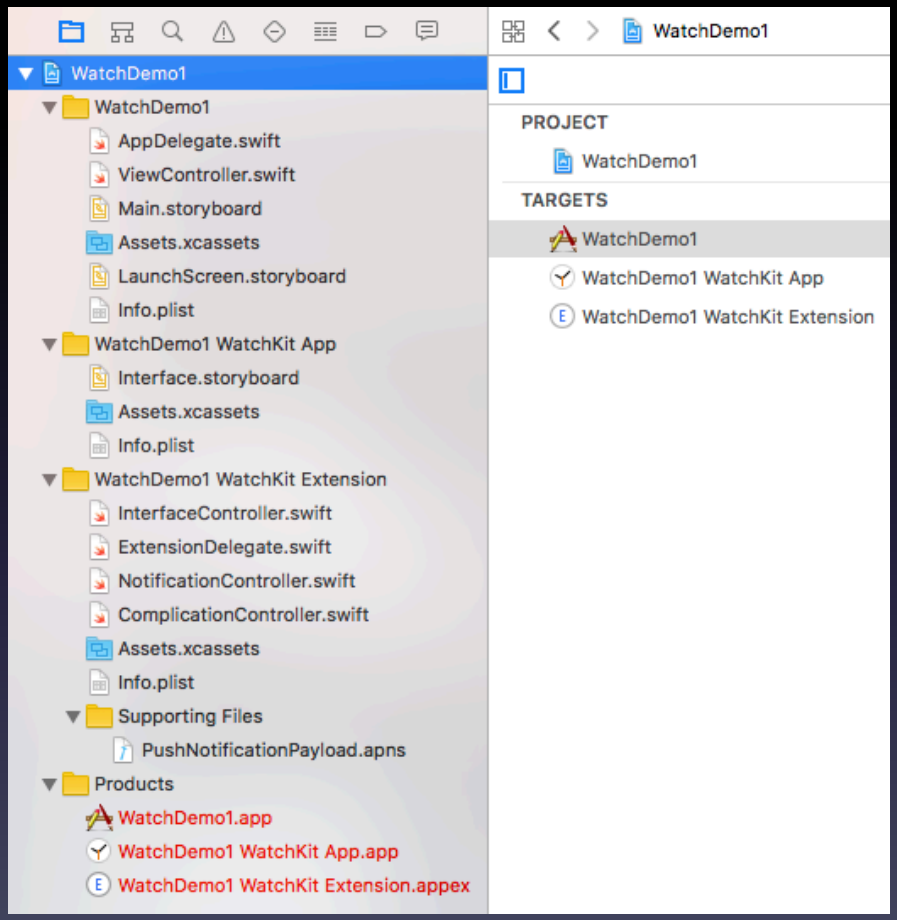


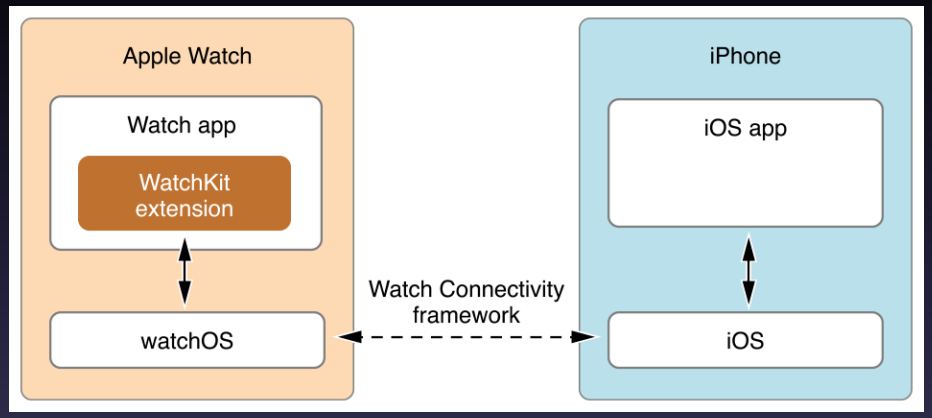
Xcode Configuration: Add to Existing Project

File → New→ Target

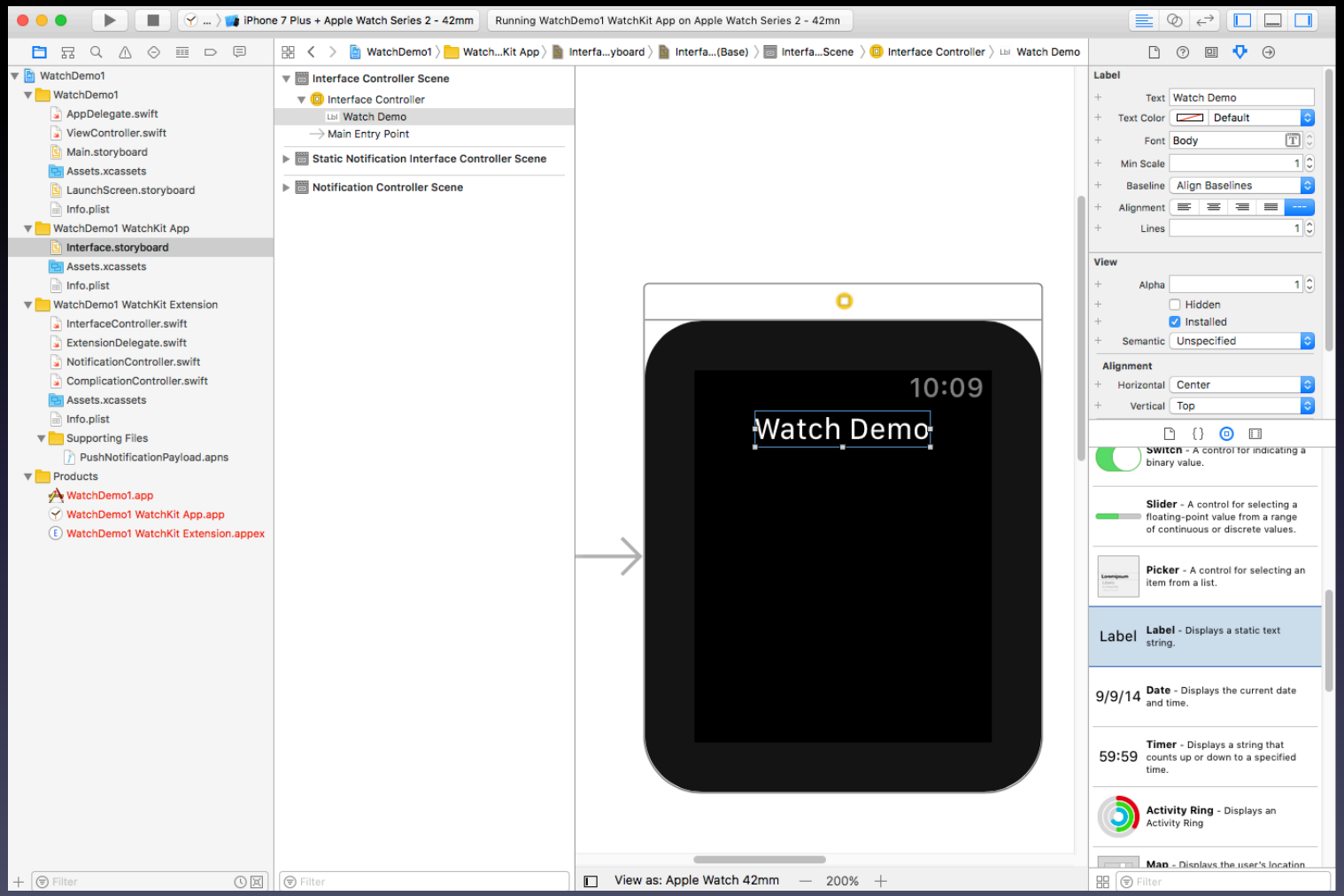


WatchKit App and Extension

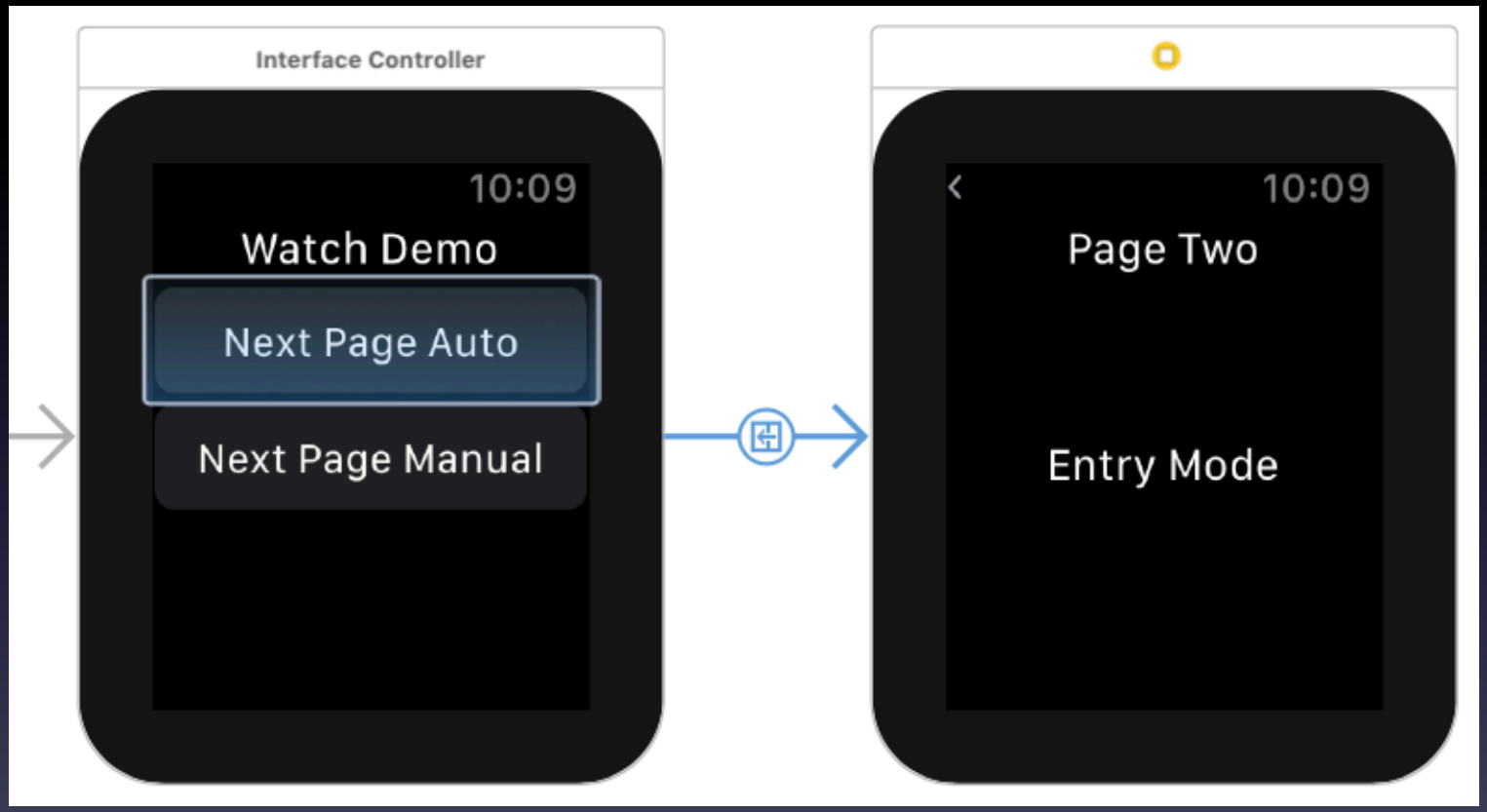




Interface Storyboard



Interface Storyboard



Interface Controller

InterfaceController.swift

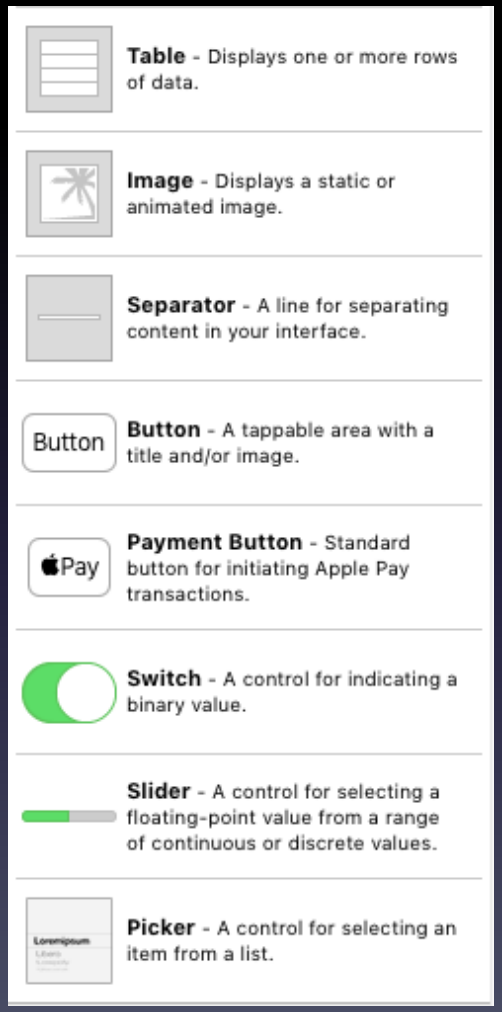
```
import WatchKit
import Foundation

enum EntryMode {
    case auto, manual
}

class InterfaceController: WKInterfaceController {

  @IBAction func nextPageManualTapped() {
    pushController(withName: "PageTwo",
                   context: EntryMode.manual)
  }

  override func contextForSegue(withIdentifier segueIdentifier:
      String) -> Any? {
    return EntryMode.auto
  }
}
```

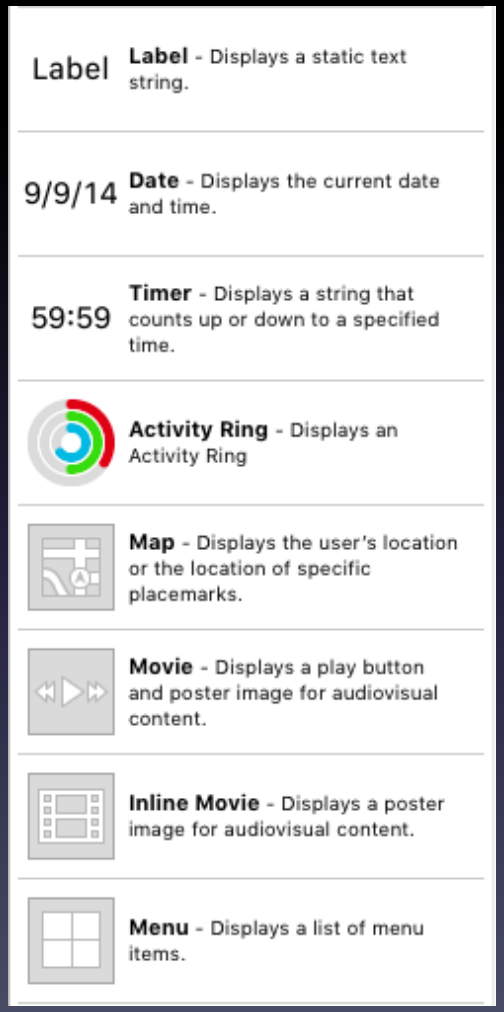
Second Interface Controller

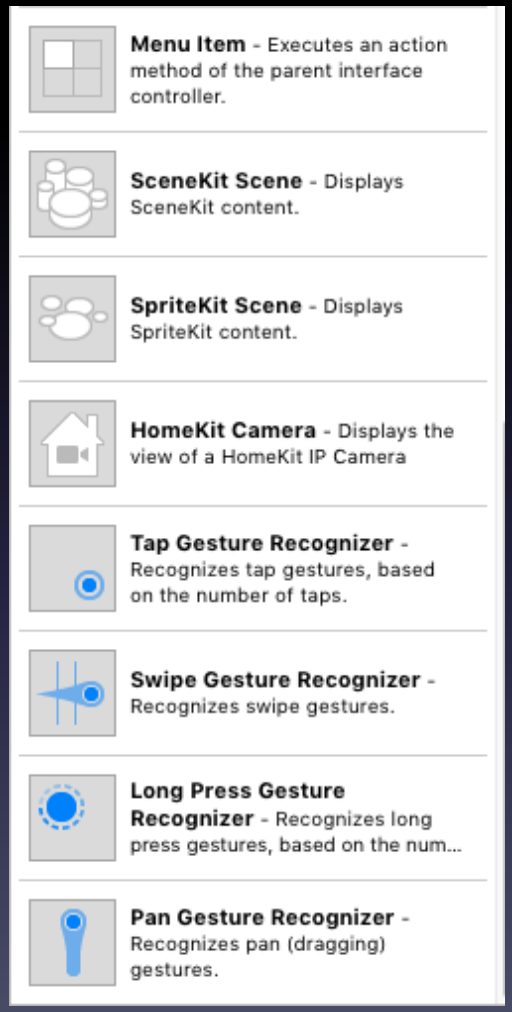
SecondInterfaceController.swift

```
import WatchKit
import Foundation

class SecondInterfaceController: WKInterfaceController {

  @IBOutlet var entryModeLabel: WKInterfaceLabel!

  override func awake(withContext context: Any?) {
    super.awake(withContext: context)
    // Configure interface objects here.
    let entryMode = context as! EntryMode
    if (entryMode == .auto) {
      self.entryModeLabel.setText("Auto")
    } else {
      self.entryModeLabel.setText("Manual")
    }
  }
}
```

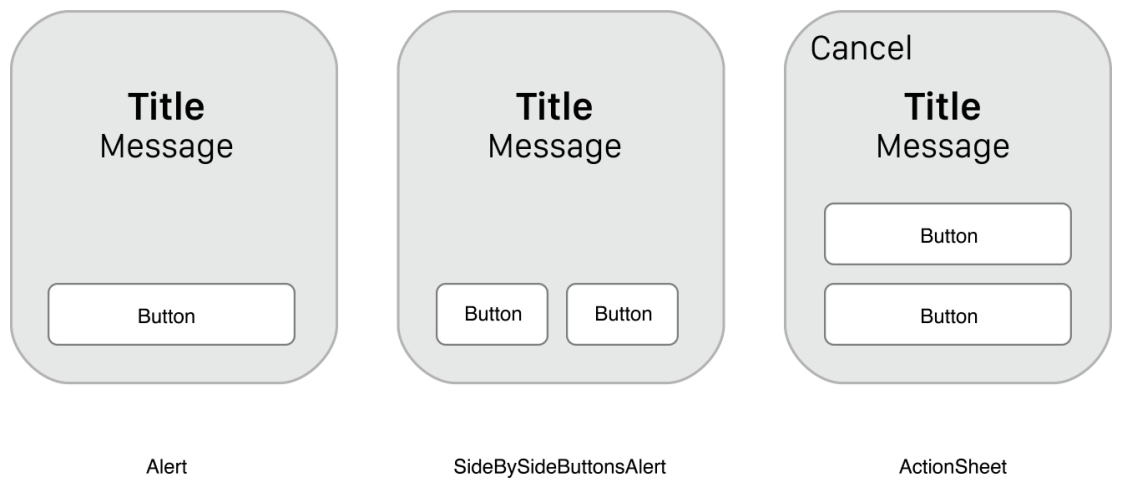
Other Interface Objects







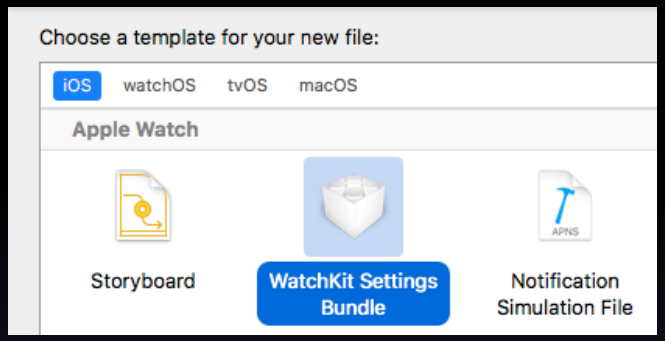
Alerts and Action Sheets




```
@IBAction func alertTapped() {
  let action1 = WKAlertAction(title: "Yes",
                              style: .default, handler: {})
  let action2 = WKAlertAction(title: "No",
                              style: .destructive, handler: {})
  presentAlert(withTitle: "Alert", message: "Are you okay?",
          preferredStyle: .sideBySideButtonsAlert,
                 actions: [action2,action1])
}
```

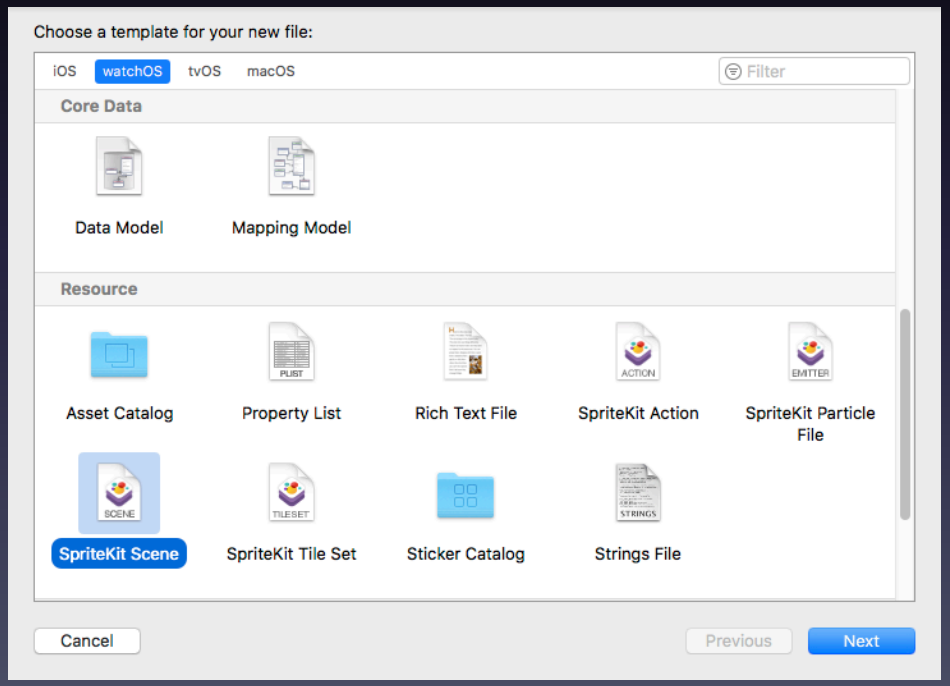
Other Elements

- Settings bundle

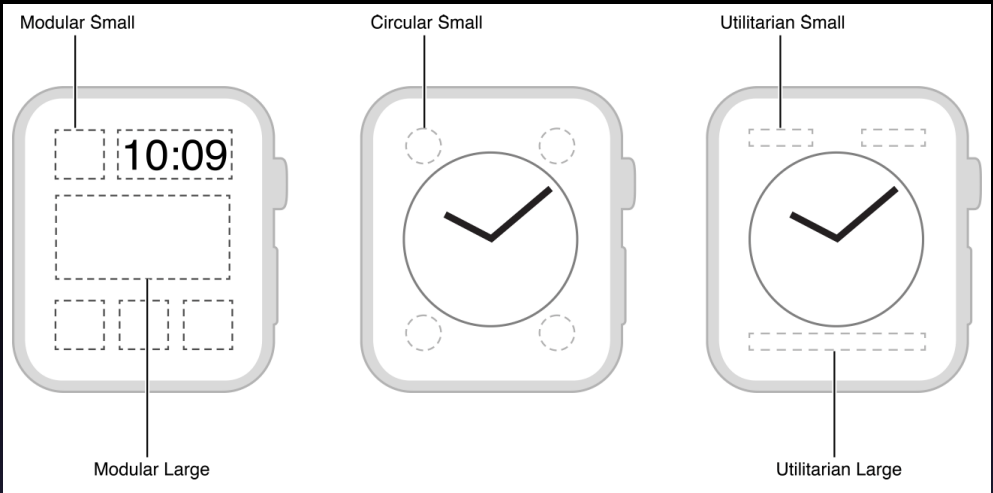


- Core data

- SpriteKit



Complications



- ClockKit framework
- CLKComplicationDataSource
- Provide data for a specific date/time
- Time Travel allows user to view past, present and future complication data (e.g., appointments)

Required Delegate Methods

- In ComplicationController.swift
  - getSupportedTimeTravelDirections(complication, handler)
    - Send .backward, .forward, neither, or both to handler
  - getLocalizableSampleTemplate(complication, handler)
    - Create and pass placeholder template to handler (or nil)
  - getCurrentTimelineEntry(complication, handler)
    - Create and pass time line entry to handler

getCurrentTimeLineEntry

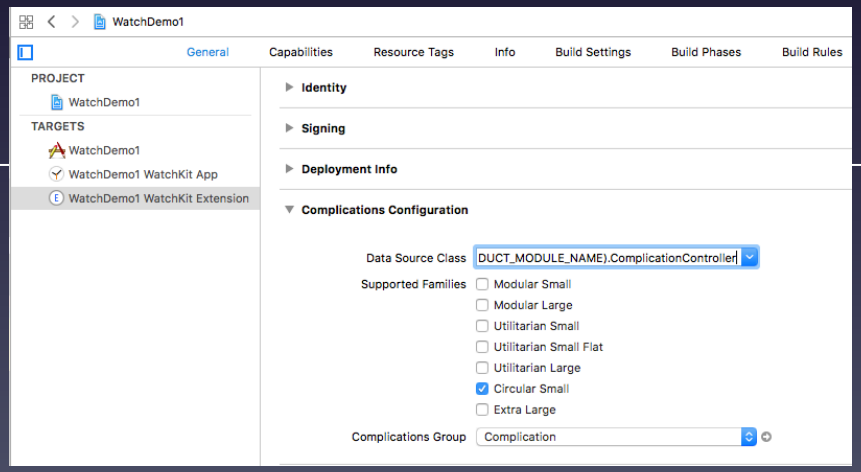
- For desired complication families (.circularSmall, etc.)
  - Create a CLKComplicationTemplate, e.g.,
    - CLKComplicationTemplateCircularSmallSimpleImage
    - CLKComplicationTemplateCircularSmallSimpleText
  - Create and set providers for template, e.g.,
    - CLKImageProvider(UIImage)
    - CLKSimpleTextProvider(String)
  - Create time line entry for template at date
    - CLKComplicationTimelineEntry(Date, CLKComplicationTemplate)
  - Send entry to handler

Complications

```
import ClockKit

class ComplicationController: NSObject, CLKComplicationDataSource {

  func getSupportedTimeTravelDirections(for complication: CLKComplication,
    withHandler handler: @escaping(CLKComplicationTimeTravelDirections) -> Void)
  {
    handler([]) // or .forward, or .backward, or [.forward, .backward]
  }

  func getLocalizableSampleTemplate(for complication: CLKComplication,
    withHandler handler: @escaping (CLKComplicationTemplate?) -> Void)
  {
    // Called once per supported complication, results will be cached
    handler(nil) // system generates default placeholder template
  }
}
```

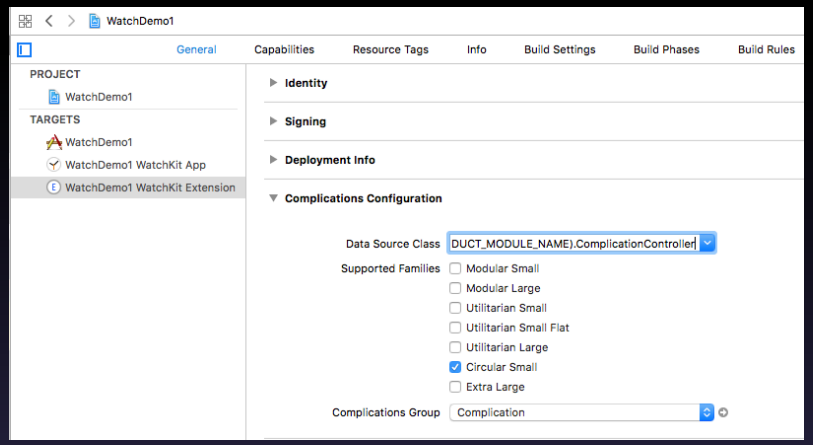
Complications

```
func getCurrentTimelineEntry(for complication: CLKComplication,
    withHandler handler: @escaping (CLKComplicationTimelineEntry?) -> Void)
{
  if (complication.family == .circularSmall) {
    let template = CLKComplicationTemplateCircularSmallSimpleImage()
    // Only alpha channel of image used; colors ignored
    let image = UIImage(named: "icon-D.png")
    template.imageProvider = CLKImageProvider(onePieceImage: image!)
    let entry = CLKComplicationTimelineEntry(date: Date(),
                                  complicationTemplate: template)
    handler(entry)
  } else {
    handler(nil)
  }
}
```

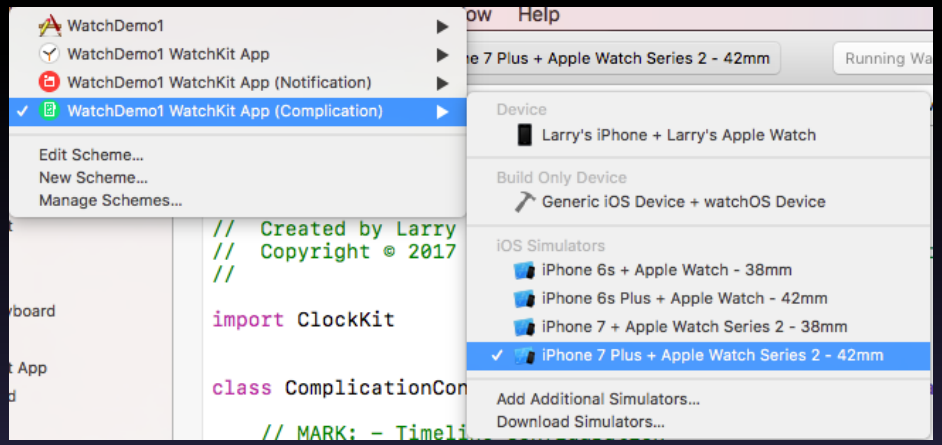


Complications: Testing

(1) Configure Complications

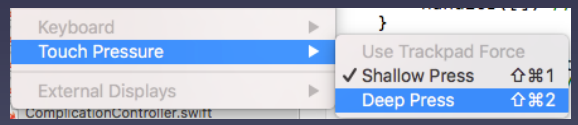


(2) Choose Complication scheme



(3) Customize clock face

Note: Shift-Command-2 for deep press on simulator.

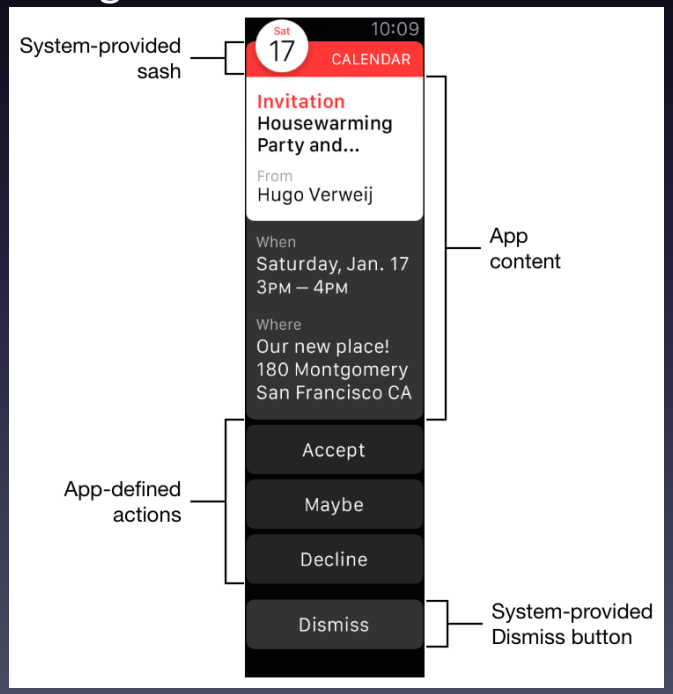


Notifications

- Uses same technique as iOS
  - Check for authorization on watch
  - Remote (push) notifications are sent first to the phone, and then from phone to watch
- Use (Notification) scheme to test notification
- First displays Short Look, then Long Look

Short Look

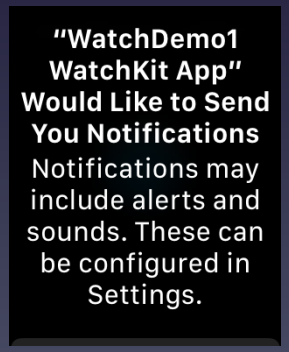
Long Look



Authorize Notifications

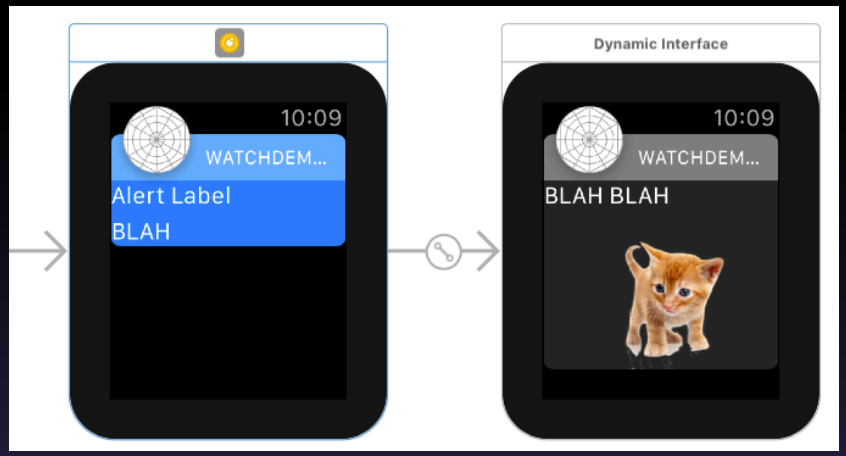
ExtensionDelegate.swift

```
import WatchKit
import UserNotifications

class ExtensionDelegate: NSObject, WKExtensionDelegate {

  func applicationDidFinishLaunching() {
    // Perform any final initialization of your application.
    let center = UNUserNotificationCenter.current()
    center.requestAuthorization(options: [.alert])
    { (granted, error) in
        if granted {
          print("notifications allowed")
        } else {
          print("notifications not allowed")
        }
    }
  }
}
```



Custom Notifications

- Static Notification
  - Simple interface (fast)
- Dynamic Notification
  - Allows custom content
  - Populate in code (not Storyboard)
  - If takes too long, uses Static



Handle Notifications

NotificationController.swift

```
import WatchKit
import Foundation
import UserNotifications

class NotificationController: WKUserNotificationInterfaceController {

  @IBOutlet var catImage: WKInterfaceImage!

  override func didReceive(_ notification: UNNotification,
         withCompletion completionHandler: @escaping
           (WKUserNotificationInterfaceType) -> Void) {
    self.catImage.setImage(UIImage(named: "cat_PNG1631.png"))
    completionHandler(.custom)
  }

}
```

Schedule Notifications

```
import UserNotifications

// Same as in Notifications lecture notes (except)
func scheduleNotification1() {
  let content = UNMutableNotificationContent()
  content.title = "Hey!”
  content.body = “What’s up?”
  content.categoryIdentifier = ”myCategory"
  // Configure trigger for 5 seconds from now
  let trigger = UNTimeIntervalNotificationTrigger(timeInterval: 5.0,
                  repeats: false)
  // Create request
  let request = UNNotificationRequest(identifier: "NowPlusFive",
                  content: content, trigger: trigger)
  // Schedule request
  let center = UNUserNotificationCenter.current()
  center.add(request) { (error : Error?) in
    if let theError = error {
      print(theError.localizedDescription)
    }
  }
}
```

Communications

- WatchConnectivity framework
- On phone and watch
  - Activate WCSession
  - Adhere to WCSessionDelegate
  - Send/receive messages

Watch Connectivity: Phone

```
import WatchConnectivity

class ViewController: UIViewController, WCSessionDelegate {

  override func viewDidLoad() {
    super.viewDidLoad()
    if WCSession.isSupported() {
      let session = WCSession.default()
      session.delegate = self
      session.activate()
    }
  }
  func session(_ session: WCSession, activationDidCompleteWith
         activationState: WCSessionActivationState, error: Error?) {
    print("session active")
  }
  func sessionDidBecomeInactive(_ session: WCSession) {
    print("session inactive")
  }
  func sessionDidDeactivate(_ session: WCSession) {
    print("session deactivated")
  }
```

Watch Connectivity: Phone

```
func session(_ session: WCSession, didReceiveMessage message: [String: Any]) {
  let msg = message["message"] as! String
  print("received message: \(msg)")
}

func sendMessage () {
  let session = WCSession.default()
  let msg = ["message": "Hello from Phone!"]
  session.sendMessage(msg, replyHandler: nil, errorHandler: nil)
}
```

Watch Connectivity: Watch

```
import WatchConnectivity

class InterfaceController: UIViewController, WCSessionDelegate {

  override func awake(withContext context: Any?) {
    super.awake(withContext: context)
    if WCSession.isSupported() {
      let session = WCSession.default()
      session.delegate = self
      session.activate()
    }
  }

  func session(_ session: WCSession, activationDidCompleteWith
         activationState: WCSessionActivationState, error: Error?) {
    print("session active")
  }

  // sessionDidBecomeActive and sessionDidDeactivate not used on Watch
}
```

Watch Connectivity: Watch

```
func session(_ session: WCSession, didReceiveMessage message: [String: Any]) {
  let msg = message["message"] as! String
  print("received message: \(msg)")
}

func sendMessage () {
  let session = WCSession.default()
  let msg = ["message": "Hello from Watch!"]
  session.sendMessage(msg, replyHandler: nil, errorHandler: nil)
}
```

Sensors

- CoreMotion framework
  - Accelerometer
  - Gyroscope
- CoreLocation framework
  - GPS
- HealthKit framework
  - Heart rate
  - developer.apple.com/reference/healthkit

Resources

- App Programming Guide for watchOS
  - developer.apple.com/library/content/documentation/General/Conceptual/WatchKitProgrammingGuide/index.html
- WatchConnectivity framework
  - developer.apple.com/reference/watchconnectivity
- HealthKit framework
  - developer.apple.com/reference/healthkit

Assets

Summary

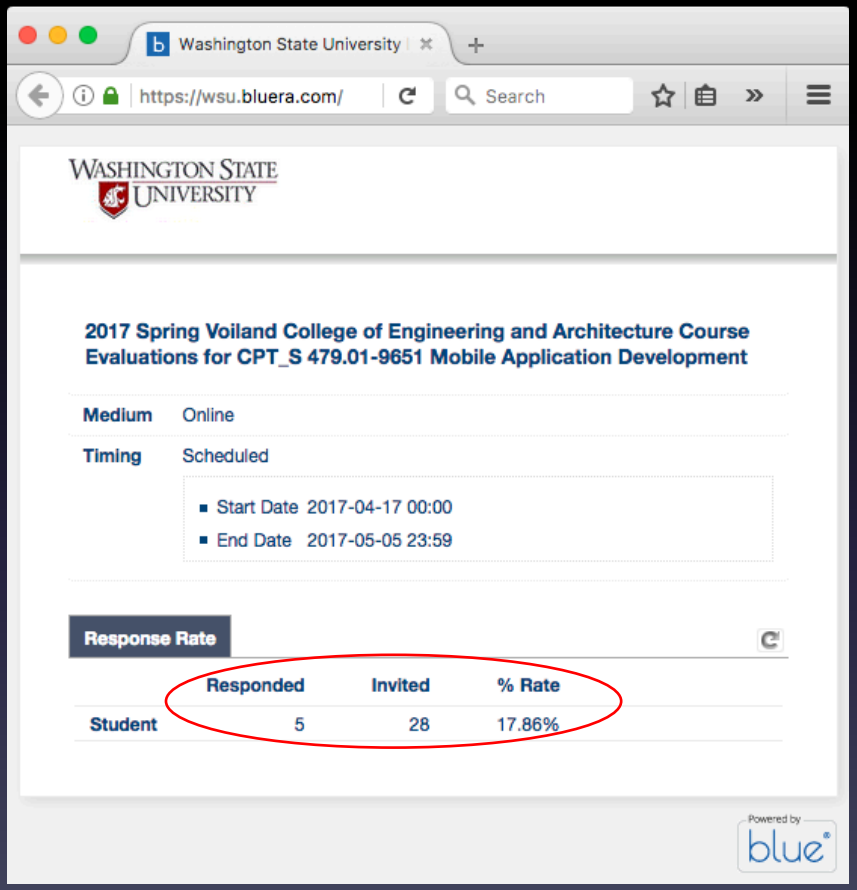
Mobile Application Development

iOS Mobile App Development

- Mobile App Development
- Swift
- UI Design and Storyboard
- Navigation and Segues
- Tables
- Settings
- Alerts and Notifications
- Gestures
- Sensors
- Communications
- Data Storage
- Graphics and Animation
- Multimedia
- Apple Watch

Thank You!

- Please fill out your Course Evaluation!
- Blue Course Evaluations on my.wsu.edu



As of 4/27/2017