TEAM 1 – VR TEXTING & DRIVING

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PROJECT OVERVIEW

- Sponsored by Erie Insurance
- Android app to show dangers of texting while driving
- Google Cardboard VR
  - Immersive experience

PROJECT BACKGROUND

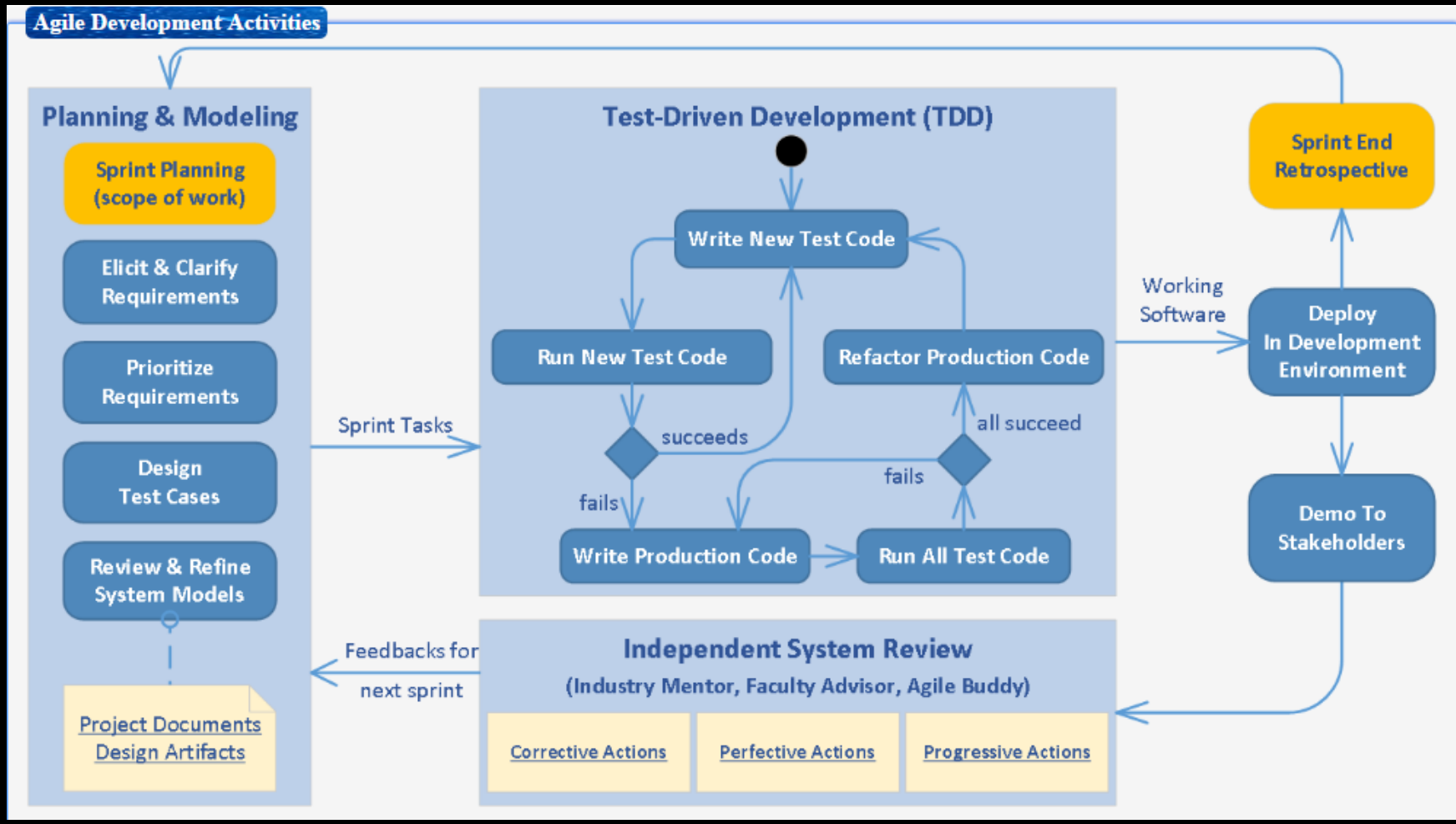
- Distracted driving is becoming more prevalent with the rise of technology. Erie Insurance is invested in increasing awareness about this issue.
- In 2014, 3,179 people were killed, and 431,000 were injured in motor vehicle crashes involving distracted drivers.
- One-third of drivers admitted to texting while driving, and three-quarters saying they've seen others do it.

Information from: http://www.distraction.gov/stats-research-laws/facts-and-statistics.html

BUSINESS PROBLEM

- **Project Needs**
  - Erie Insurance is looking for an innovative solution to engage younger audiences in learning about the dangers of distracted driving
- **Project Objective**
  - Foster engagement between agents, parents, and young drivers
  - Allow the agent a helpful way to start the conversation about distracted driving
  - Demonstrate the dangers of distracted driving to young drivers
- **Broader Impacts**
  - App will be easily distributable if ERIE desires
  - Potential to protect young drivers and those around them

DEVELOPMENT PROCESS



INITIAL USER REQUIREMENTS & ENGINEERED SYSTEM REQUIREMENTS

Project Name: Virtual Reality---Texting While Driving			
User Requirements		**System Requirements**	
Req ID	**Description**	**Req ID**	**Description**
UF-A	The application should present various scenarios that display a distracted driver, and give the user the ability to overcome the potential negative outcome.	SF-A-01	The system should provide three possible solutions for every decision presented.
UF-B	The user should control a passenger in a vehicle driven by a person engaging in dangerous activities.	SF-B-01	The user should have a first person perspective during the experience, and can use motion inputs to position the camera.
		SF-B-02	The user will use the button on the cardboard headset to interact with objects in the environment, and select choices during scenarios
UF-C	The system should feature multiple scenarios depicting distracted driving.	SF-C-01	The system should have four types of scenarios that can occur within the environment, including hitting an object, running off the road/lanes, speeding/slowing down, and missing traffic lights.

Note: These are our initial set of requirements. We may add new requirements as we progress and current requirements may change in the future.

REQUIREMENTS – CONT.

UF-D	The user should be able to interact with their environment between scenarios presented to them	SF-D-01	The user should be able to open/close glove box, interact with objects in the glove box, drink a drink in the cup holder, open/close the window, and adjust the radio.
UF-E	User should be able to modify experience settings	SF-E-01	The system will provide options to the user including changing weather effects and time of day.
UO-01	The application should be developed for modern Android devices.	SO-01-01	The system should be targeted for Android 5.1.1 "Lollipop" for phones with hardware specifications of the Samsung S5 and up

Note: These are our initial set of requirements. We may add new requirements as we progress and current requirements may change in the future.

REQUIREMENTS – CONT.

UO-02	The application should be developed for cardboard VR use.	SO-02-01	The system will utilize the Google VR SDK to display two images through the cardboard.
UO-03	The application must feature ERIE Insurance branded paraphernalia advertising the company throughout.	SO-03-01	Erie Insurance logos will be placed on buildings, billboards, bumper stickers, and air fresheners.
UP-01	The system should run at an acceptable frame rate suitable for virtual reality use.	SP-01-01	The application should run at a minimum of 30 frames per second.

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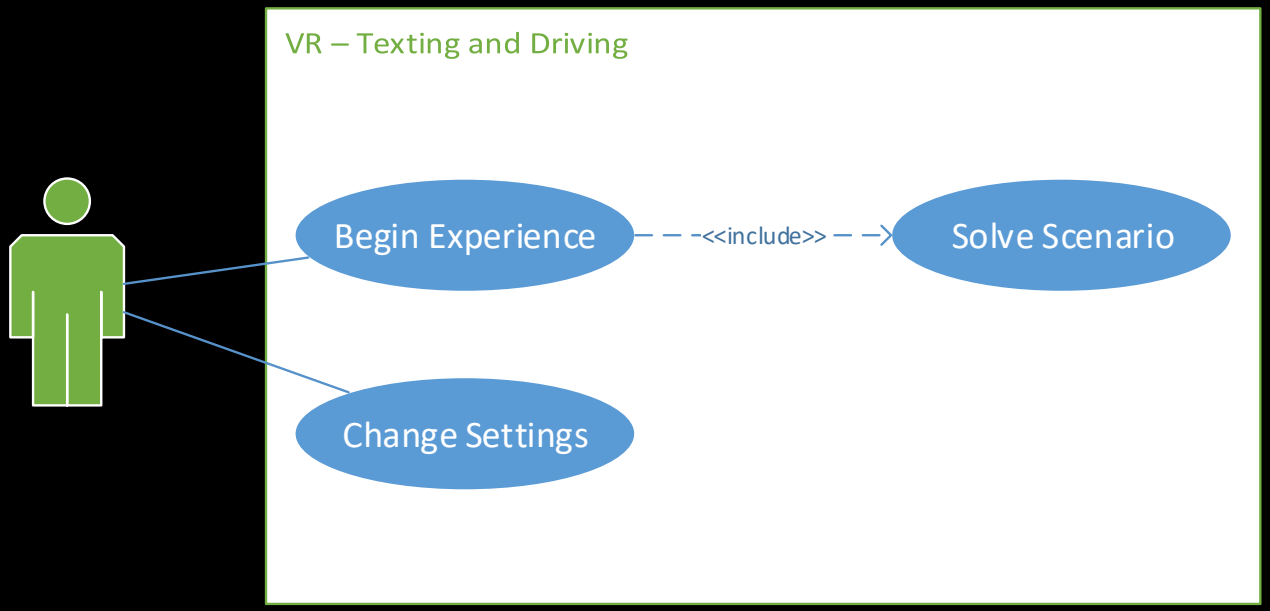
USE CASE DIAGRAM



Project Name: Virtual Reality---Texting While Driving				
Use Case ID	**Use Case Name**	**Level**	**Author**	**Version**
UC-001	Change Settings	Primary task	Nathan Christiansen	0.4
UC-002	Begin Experience	Primary task	Nathan Christiansen	0.5
UC-003	Solve Scenario	Subfunction	Nathan Christiansen	0.3
Acknowledgment: Generated from the CapStone process management system ©2015				

This is our current use case diagram to meet our industry partner's needs. These use cases may change in the future.

USE CASES – CONT.

Project Name:	Virtual Reality--Texting While Driving
Use Case ID:	UC-001
Use Case Name:	Change Settings
User Goal:	Change Experience Settings
Scope:	VR - Texting While Driving
Level:	Primary task
Relevant User Reqs:	UF-E
Relevant System Reqs:	SF-E-01
Primary Actor:	User
Precondition:	The application is running and on the main menu
Minimal Guarantee:	Setting changes do not persist
Success Guarantee:	Settings are changed to user specifications
Trigger:	User selects settings option on main menu
Success Scenario:	Step Actions 1 The user selects settings in the main menu 2 The system brings up the settings menu 3 The user changes their desired settings 4 The user saves changes 5 The system applies changes
Extensions:	Branching Scenarios
4A	**Condition:** The user does not save changes
	Step Actions 1 The user declines to make changes 2 The system returns to the main menu
Acknowledgment: Generated from the CapStone process management system ©2015	

Note: These are our initial set of use cases. We may add new use cases as we progress and current use cases may change in the future.

USE CASES – CONT.

Project Name:	Virtual Reality--Texting While Driving
Use Case ID:	UC-002
Use Case Name:	Begin Experience
User Goal:	Experience the experience
Scope:	VR - Texting while Driving
Level:	Primary task
Relevant User Reqs:	UF-B,UF-C,UF-D
Relevant System Reqs:	SF-B-01,SF-B-02,SF-C-01,SF-D-01
Primary Actor:	User
Precondition:	The application is running and on the main menu
Minimal Guarantee:	The user enters the experience
Success Guarantee:	The user finishes the experience
Trigger:	User selects start experience on the main menu
Success Scenario:	Step / Actions 1 The user selects start experience on the main menu 2 The system begins the experience 3 The user gains control of the passenger 4 The user SOLVES SCENARIO 5 The system continues until the next threshold 6 The system repeats step 4-5 until the user completes the experience 7 The system displays a results screen to the user
Extensions:	Branching Scenarios
5A	**Condition:** The user fails a scenario
	Step / Actions 1 The system ends the experience
Acknowledgment: Generated from the CapStone process management system ©2015	

Note: These are our initial set of use cases. We may add new use cases as we progress and current use cases may change in the future.

USE CASES – CONT.

Project Name:	Virtual Reality--Texting While Driving
Use Case ID:	UC-003
Use Case Name:	Solve Scenario
User Goal:	The user makes choices to solve a scenario
Scope:	VR - Texting While Driving
Level:	Subfunction
Relevant User Reqs:	UF-A
Relevant System Reqs:	SF-A-01
Primary Actor:	User
Precondition:	The user is in the experience and has not failed
Minimal Guarantee:	The default solution is chosen
Success Guarantee:	The user's solution is chosen
Trigger:	The user reaches a scenario threshold
Success Scenario:	Step / Actions 1 The user reaches a scenario threshold 2 The system presents a scenario involving a dangerous situation 3 The user selects a solution presented by the scenario 4 The system enters a success state for the scenario
Extensions:	Branching Scenarios
3A	**Condition:** The user selects an incorrect solution or does not enter within the alloted time
	Step / Actions 1 The system enters a fail state for the scenario
Acknowledgment: Generated from the CapStone process management system ©2015	

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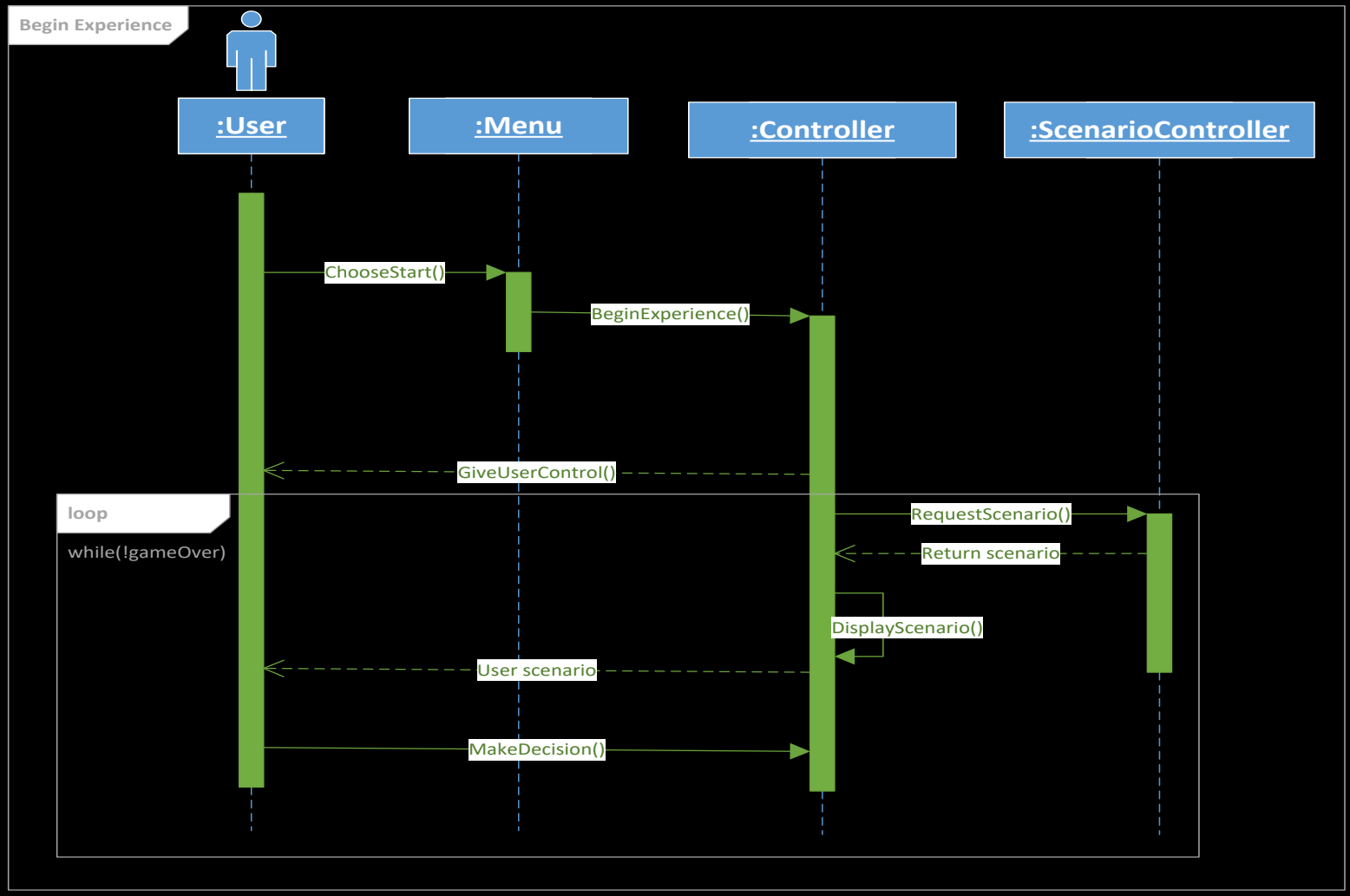
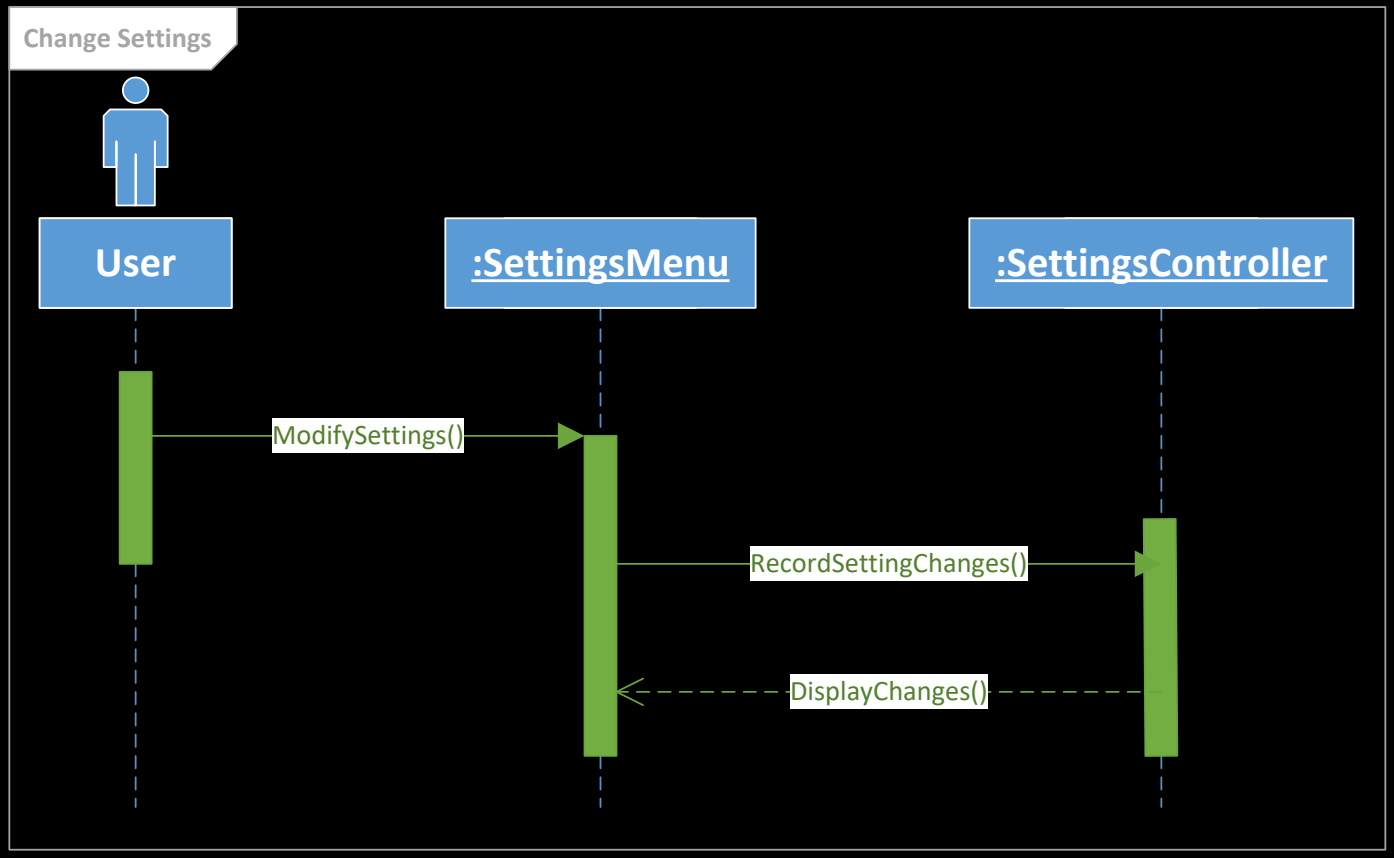
SEQUENCE DIAGRAMS



SEQUENCE DIAGRAMS – CONT.



EXPLORATORY STUDIES

- **Relevant Techniques**
  - Unity Engine – Component based design
- **Relevant packages/products**
  - Unity Asset Store
    - Models
    - Scripts
    - Animations
- **Broader Impacts**
  - Erie Insurance
  - Young drivers and their families
  - Other drivers

INITIAL CONSIDERATION OF SYSTEM ARCHITECTURE

- We are currently considering the **MVC architecture**
- As we progress with a prototype, we will reassess our architecture
- We may adapt to another architecture if it makes sense to do so

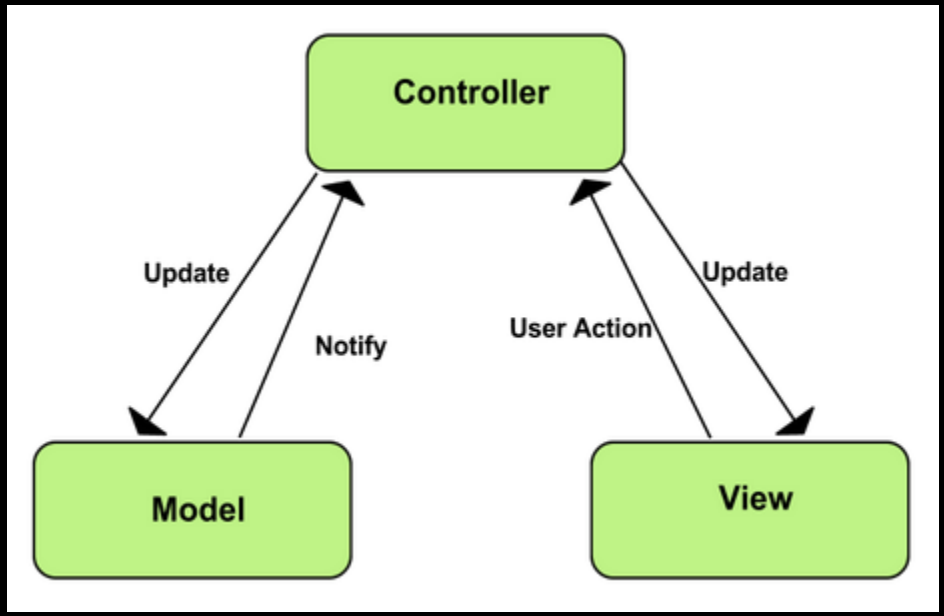
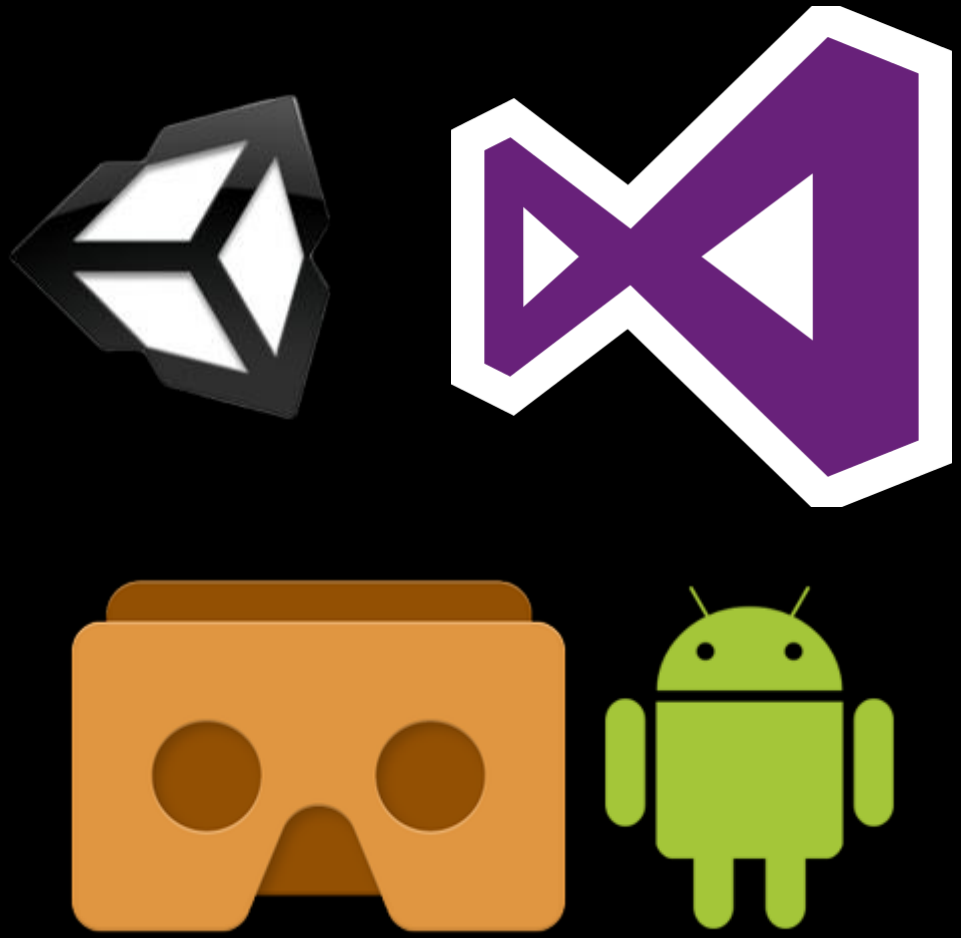


Image from: https://developer.chrome.com/apps/app_frameworks

DEVELOPMENT ENVIRONMENT

Hardware:
- Personal laptops
- Lab computers
- Home desktops

Software tools:
- C# in Visual Studio
- Versioning with Git
- Unity Test Tools package for testing



WRAP UP

Questions?