Development Tools

Notes for the SIT-DP module: **Developing Immersive Applications**

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Unity → AR/VR project templates
common XR packages and stuff
can create various games and is cross-platform

Unreal → C++ scripting also allowed apparently

A-Frame → web-based tool, javascript library
↓
can only exist on web

cons
- ✓ limits immersion from system as you can only access web technologies and what is provided by browser developers
- ✓ different browsers different items
  - ↳ though WebXR resolves that to an extent
    - group of standards

benefits
- ✓ anyone with browser can access XR interactions and experiences
  - ↳ better accessibility
  - ↳ sketchfab
  - ↳ conducive for learning

BabylonJS → javascript library : typescript
- ↳ has a playground to test and run code
- ↳ has inspector

} web-based tools

WebXR - set of open APIs that standardize how XR apps are created on the web

✓ immersiveweb.dev

✓ immersive web working group → chairs from apple, microsoft, google

Native
- OpenXR → C++ library and Open Khronos Group
  - ↳ aims to be the underlying implement for web XR
  - normally only go this route if you need
    - ✓ unique novel features
    - ✓ ultra custom code close to the targeted platform
- BabylonJS
- A-Frame
- Unity
- Unreal

Low Code
- Cospaces → designed for low barrier entry even with ∅ coding experiences
  - ✓ a fun entry point to start learning
  - ✓ probably not for business use

which tool to use is dependent on your requirements

✓ if you know what your audience is and whether they have the equipment for it, you can target that

- medical & have access to Oculus? then choose that!
- want to crowdsource and get apps to everyone? then maybe babylonjs

✓ cost of using the tools → open source free
↳ propietrary has contracts

✓ stability of the tool

✓ customizability and extensibility → how to make your things stand out

✓ community and support

✓ learning opportunities

why are we using babylonjs to build webxr apps

✓ facilitate learning
↳ accessibility for users → since some may not have XR devices

✓ large, active dev community
↳ longevity of the tool

✓ accessibility for devs — since they are driving some of the standards
large community as well already building with XR

✓ nuanced technalities
↳ can apply knowledge and learn more technical considerations when designing the application and develop more unique & immersive experiences

✓ applied learning premise

↳ hands-on research prototype called XR author we will be contributing to

↳ allow us to apply technical learning

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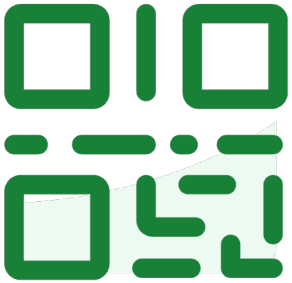

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Module Essentials

Let’s check whether you understand what to do in CSD312x...

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The deliverable for the TP is

- everything in your github repo

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The deadline for the TP is

• week of 8

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I need to use a WebXR-compliant framework for my Team Project

- we don't have to implement software for our project

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We will be assessed more favourably if we can demonstrate higher levels of immersion from our evaluation.

- no

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Which of the following content is suggested to be included in the TP report.md?

- methodology
- results
- discussion

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When is IPA1 due?

who cares

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How many participants do I need for the user study in the TP?

- as many as needed to make your study meaningful

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In CSD312x, a key learning objective is to be proficient in building WebXR applications.

- false

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In CSD312x, a key learning objective is to be proficient in implementation skills using typescript and Babylon.js API.

•false

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In CSD312x, it is important to understand the basics of how to setup a Typescript/Javascript project that interacts with Babylon.js .

- true

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For the IPAs , we will get feedback on our submission only after the deadline.

- false*

* technically only if you submit early and feedback still comes in after submission

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Team Project

- You can loan HMDs
- Submit through GitHub
- Note the dir tree
- The meat is in report.md
- Teams should be confirmed already
- Have an explicit system to delegate/manage work

IPA1

- Due next weekend
- We are available on Fri (and on GitHub discussions)

Development Tools

Let’s get acquainted with common tools for developing immersive apps

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When I run console.log("debug"), where can I see this "debug" message?

- MAC terminal
- Windows Command Prompt
- WebBrowser's Javascript Console
- ADB's logcat

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You are building a VR application that includes a novel interaction not found in current VR applications. Your lab has funding to obtain resources deemed necessary for development. Which tool(s) can likely be used for you to base your development on?

- Unity
- OpenXR SDK in C++
- Babylon.js

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- Cospaces
- Blender

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You are building a web-based VR experience and you want to focus on implementing the VR components. You need a modern open standard with a vibrant developer ecosystem that constantly updates the underlying tooling. What standard should you ideally target?

- OpenXR
- Vulkan
- WebXR
- WebGL

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- OpenGL
- OpenCL

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In your VR app, realistic graphics is the most important and you need to have fine-grained control of GPU resources. You need an open standard with a robust community that actively maintains the underlying tooling. What standard should you ideally target?

- OpenXR
- Vulkan
- WebXR
- WebGL

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- OpenGL
- OpenCL

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What is the most accessible tool for developers without coding experience?

- Babylon.js
- CoSpaces
- Unity
- OpenXR SDK in C++
- Unreal Engine

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What is/are the key advantages of building a WebXR app?

- fairly accessible XR apps for the public
- consistently strong developer community support
- easily accessible development tools for developers

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- able to exploit hardware advancements in latest XR devices
- easily create highly performant experiences native to different XR devices

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WebXR is an open-source 3D engine for building web-based XR applications

- true
- false

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Babylon.js is an open standard for programming web-based XR applications

- true
- false

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The Unity engine can be used to build WebXR applications

- true
- false

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Babylon.js can be used to build Web-based AR applications

- true
- false

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WebXR is only meant for building desktop 3D web applications

- true
- false

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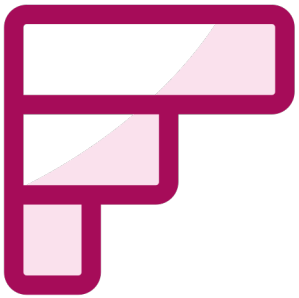

Rank from the best to worst tool ecosystem, in your perspective, for creating immersive applications

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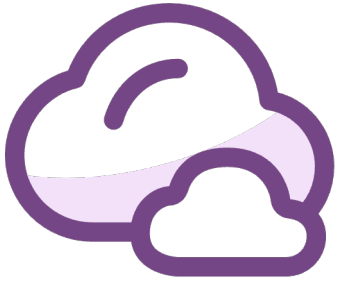

What is your personal favourite tool ecosystem for creating interactive 3D (including immersive) applications?

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Audience Q&A

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