VR Excavator Simulator
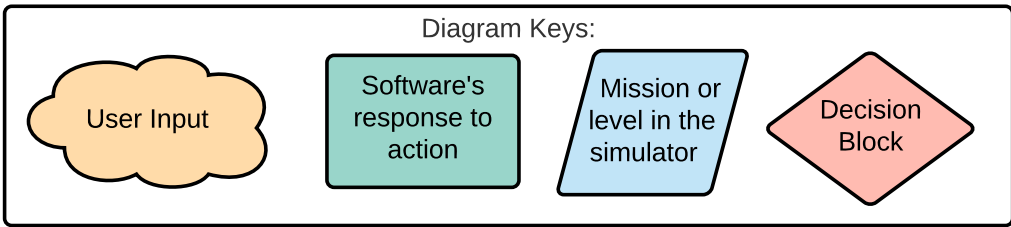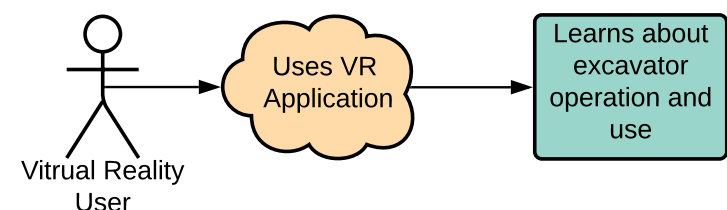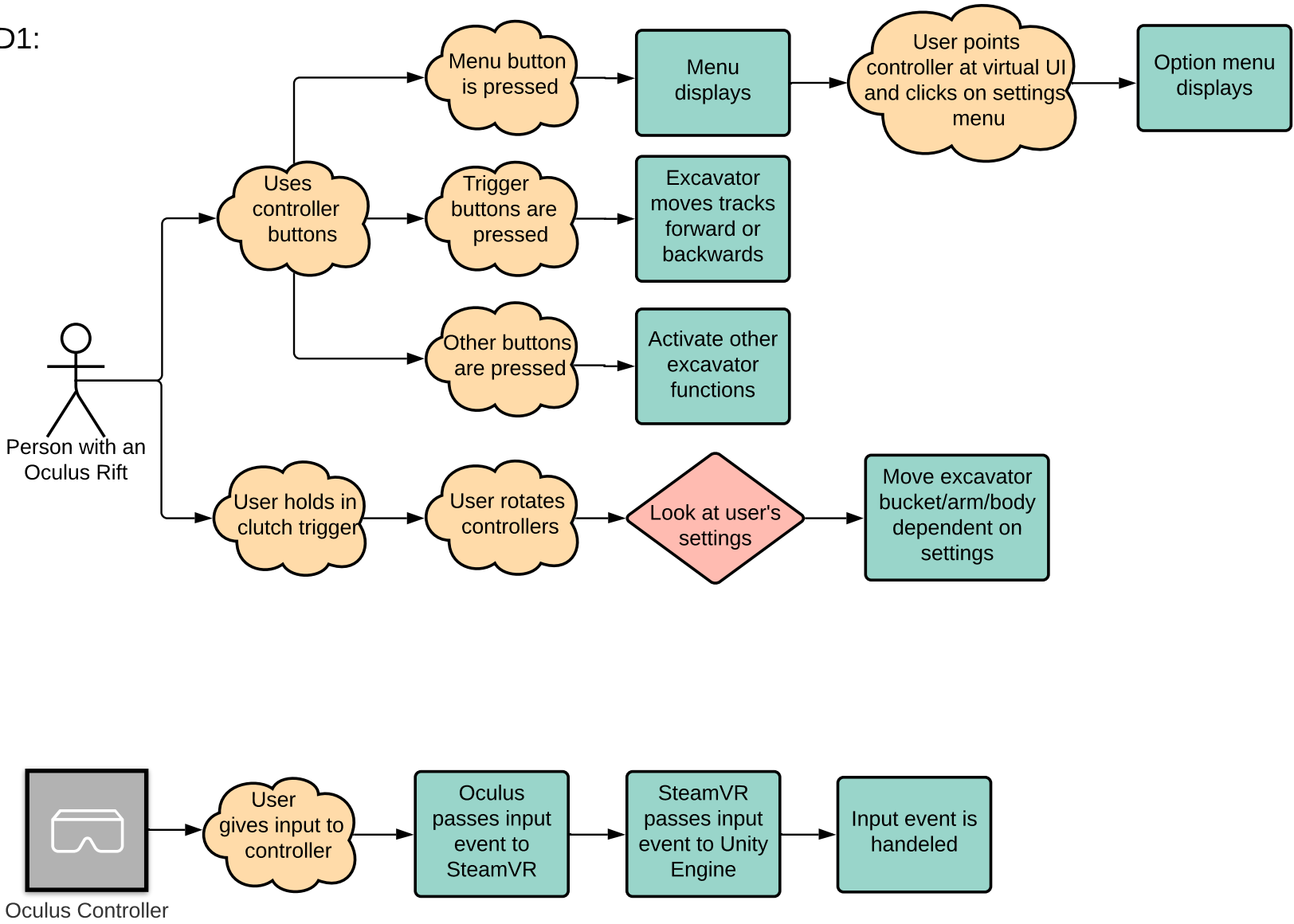
Creating a virtual reality experience, allowing users to learn how to use an excavator and to provide a virtual sandbox enviroment play in

Diagram Keys:
- User Input
- Software's response to action
- Mission or level in the simulator
- Decision Block

Design D0:

Vitrual Reality User → Uses VR Application → Learns about excavator operation and use

Design D1:

Person with an Oculus Rift

Uses controller buttons →
- Menu button is pressed → Menu displays → User points controller at virtual UI and clicks on settings menu → Option menu displays
- Trigger buttons are pressed → Excavator moves tracks forward or backwards
- Other buttons are pressed → Activate other excavator functions

User holds in clutch trigger → User rotates controllers → Look at user's settings → Move excavator bucket/arm/body dependent on settings

Oculus Controller → User gives input to controller → Oculus passes input event to SteamVR → SteamVR passes input event to Unity Engine → Input event is handeled

Design D2:

Person with an Oculus Rift and two controllers → User navigates to Excavator Simulator in steam then clicks play → Start Unity Engine → Oculus program starts up → Steam VR starts up → Unity Engine loads main menu scene → Does user have valid savedata for save 1,2,or 3? —Yes→ Enable user interaction with corresponding button slots

No

Main menu is displayed on world canvas
- User points controller at virtual UI and selects "Quit" → Shutdown Steam VR → Shutdown Oculus → Quit Unity engine
- User points controller at virtual UI and selects "Play" → Ask user which save slot to use → User chooses a save slot → Generate json file and load default save data → Unity Engine loads open world scene → Free roam mode is entered
- User points controller at virtual UI and selects "Load Save 1,2, or 3" → Read json file and load save data → Does user have valid savedata? —No— / —Yes→ Unity Engine loads open world scene

User opens menu → Menu is displayed
- User clicks "Save and Quit" → Save data to json file
- User clicks on "Settings" → Settings menu is displayed on world canvas → User changes control modes, graphic settings, and audio settings → User exits settings menu → Save data to json file → Settings menu closes
- User clicks on "Resume" → Menu is closed → Is user in free roam mode? —No— / —No→ Continue mission

Yes

- User clicks on "Missions" → Missions menu is displayed on world canvas → User clicks on "Tutorial mission" → Unity Engine loads tutorial mission → Basic controls tutorial → Excavating dirt tutorial → Pick/place objects tutorial → User completes mission

User opens menu

- User clicks on "Create a pond" mission → Unity Engine loads create a pond mission → Remove trees → Remove large bolders → Dig pond → Dig covert pipe channel → Place in covert pipe → Cover pipe with dirt → Place in riprap

Continue mission