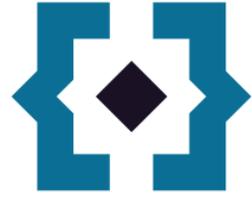




TECHNISCHE
UNIVERSITÄT
DARMSTADT



Informatik

HCI Lab

IVAR: Lab 3

Parkour challenge

Class logistic

- Who hasn't picked up Meta Quest 2?
- Who doesn't have a reverse classroom topic?
- Please vote the reverse classroom date on the moodle, thanks.

START



Part1

time
coins

[Records]

Scene



2nd banner



3rd banner

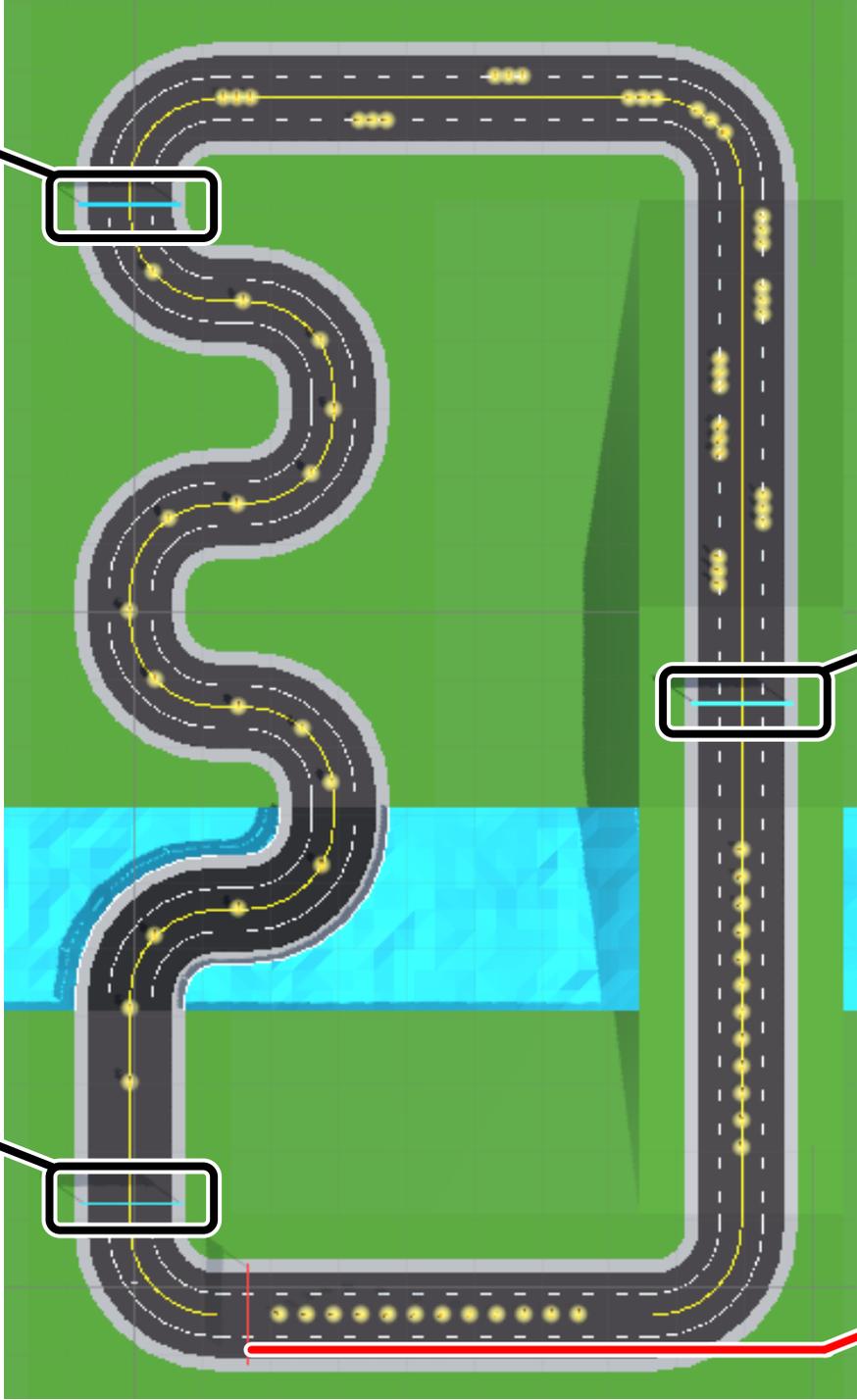


1st banner



four
banners

final



Banners

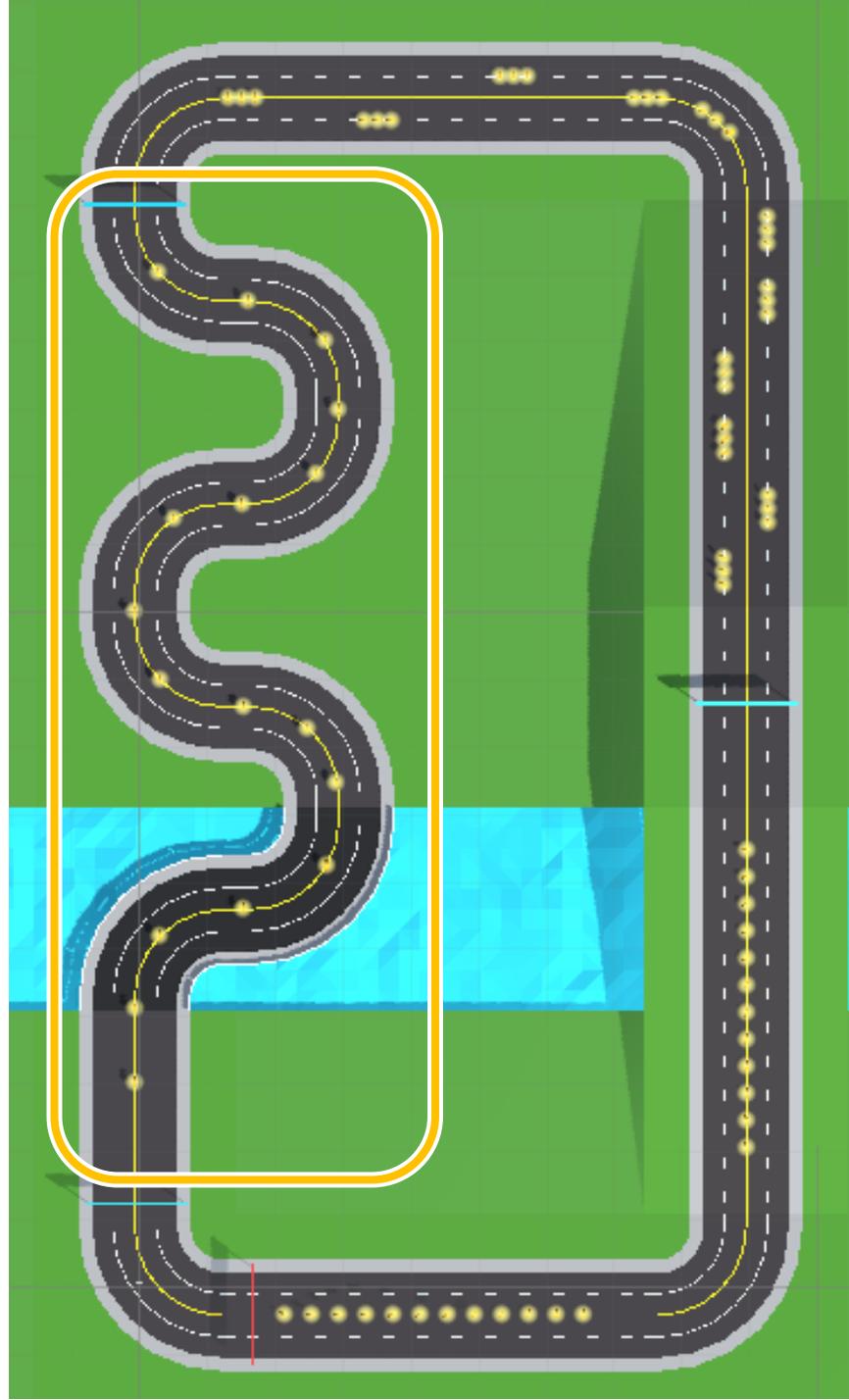
please pass through the
banner to trigger each path



[1]

continuous curves

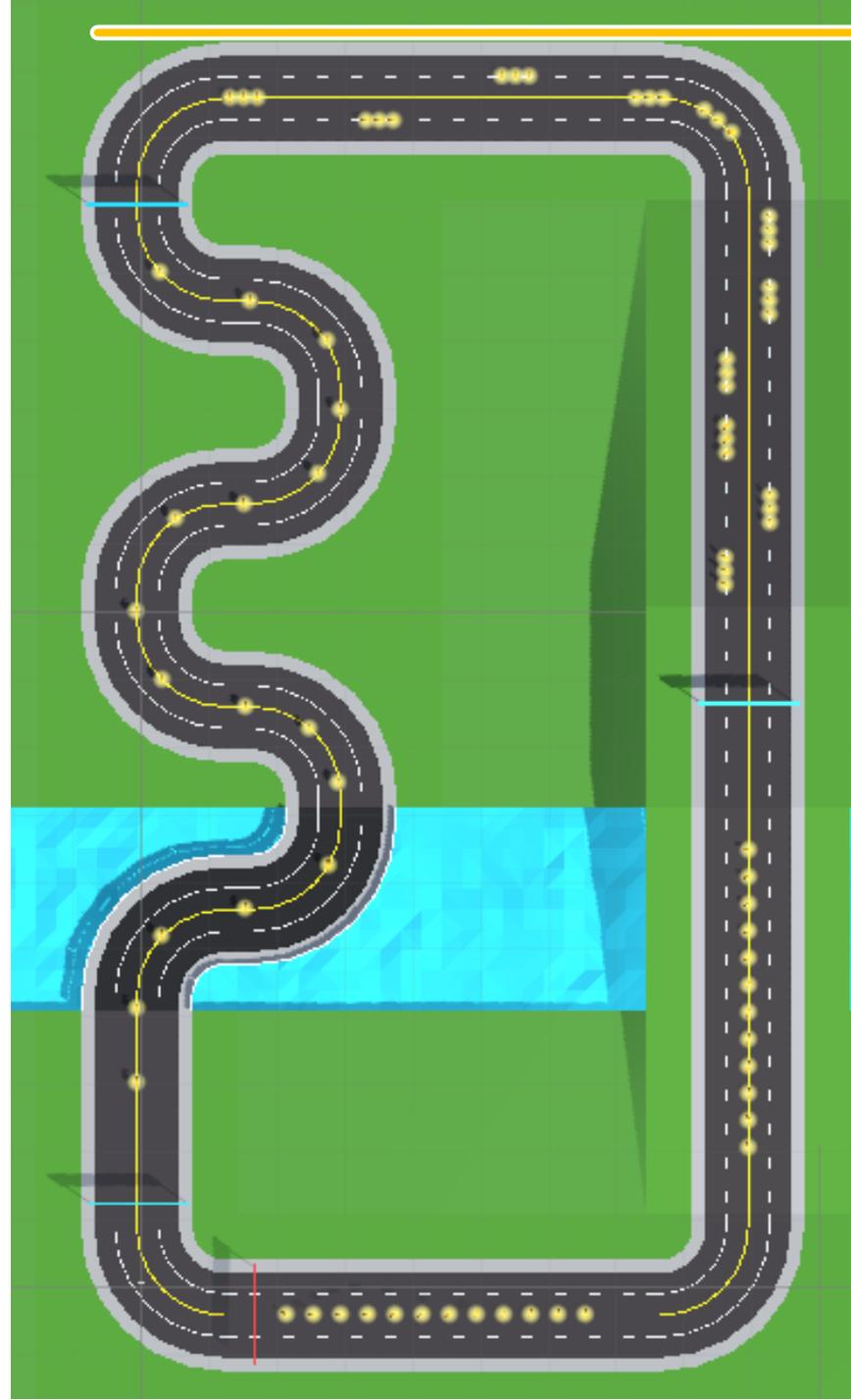
coins: 16



[2]

zig-zagging
uphill

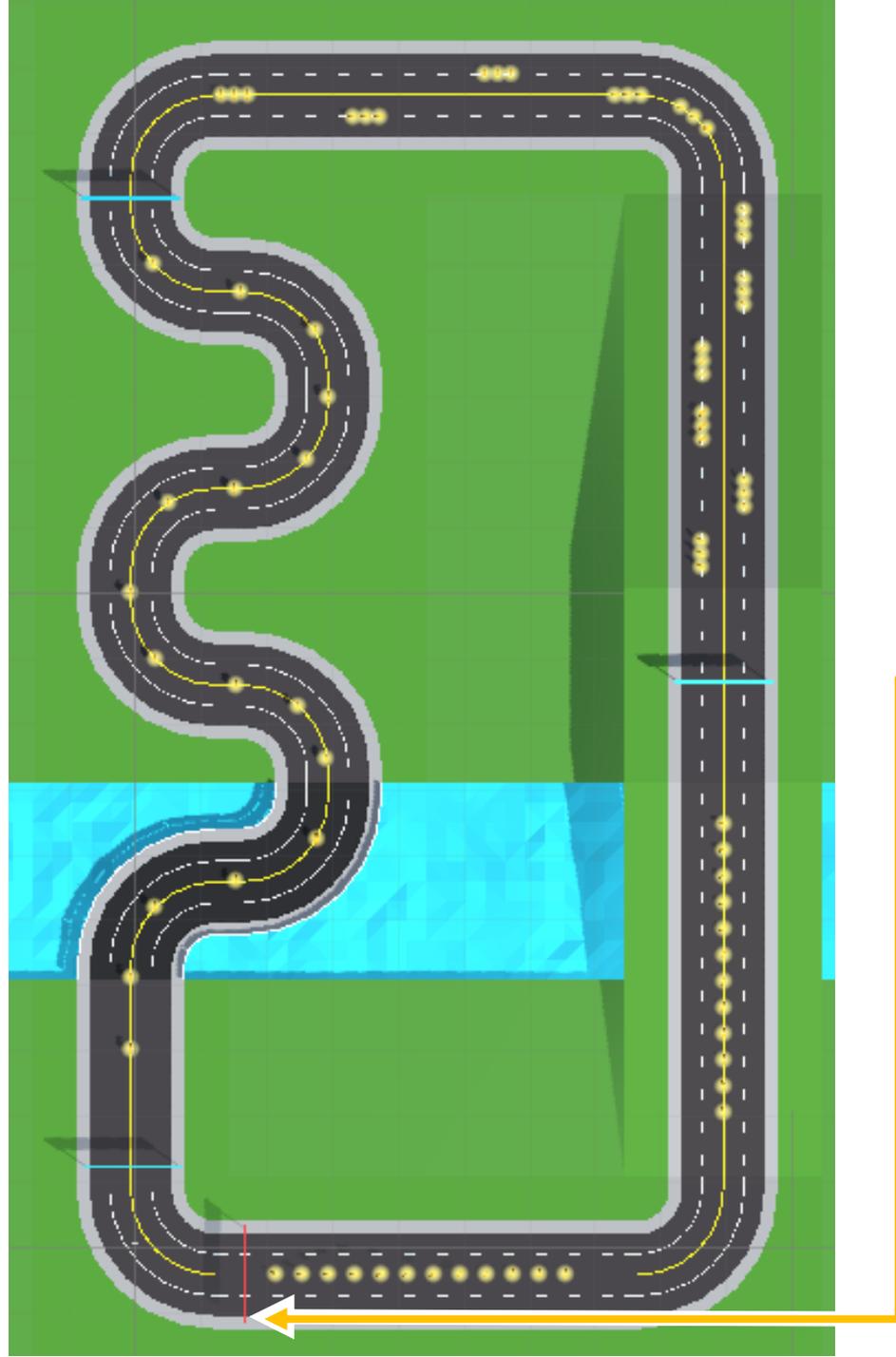
coins: 30



[3]

final
sprint

coins: 23





Records

Report the used time and collected coins in each part and in total.



Parkour Finished!
[Records]
loco1: 62.1, 11/16
obj1: 4.6, 0.06
loco2: 53.8, 25/30
obj2: 2.7, 0.06
loco3: 47.6, 15/23
obj3: 3.4, 0.07
total: 163.6, 51/69

Note

- If you got lost in the scene, press **Y** or **B** to reposition yourself to the banner position of that part.

3D interaction techniques (LaViola et al., 2017)

- Object Interaction

- **Selection**
- **Position**
- **Rotation**
- **Scaling**



- Navigation/Locomotion

- Way finding
- **Travel**



- System control

3D object interaction



selection

Acquiring or identifying a particular object or subset of objects from the entire set of objects available.

rotation

Changing the orientation of an object. E.g., what we just did in the roll-a-ball example.

positioning

Changing the 3D position of an object. E.g., moving an object from A to B.

scaling

Changing the size of an object. E.g., resize a GUI on a laptop.

3D object interaction

In our demo, we simply use controllers and trigger buttons to manipulate objects directly.

Locomotion in VR

- **Physical Locomotion**

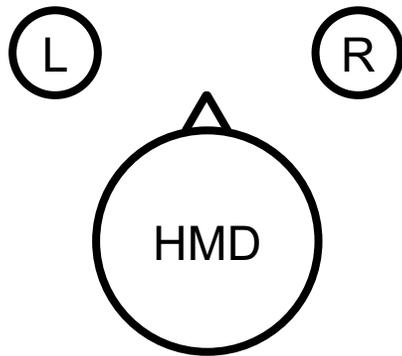
- walking in place (VR-STEP, Tregillus and Folmer, CHI '16)

- **Virtual Locomotion**

- teleportation/blink
- grabbing the air
- ...

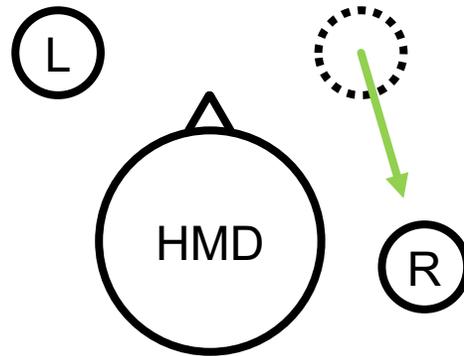
Locomotion example: grabbing the air

1)



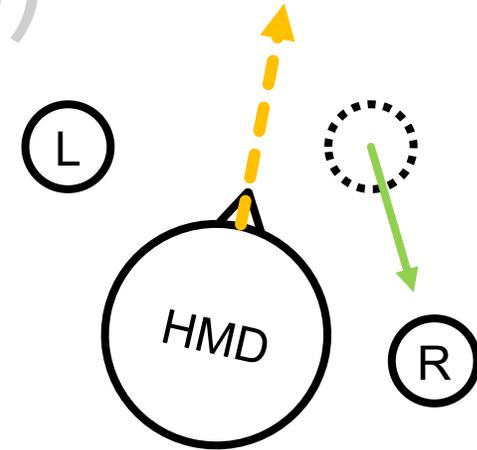
press the
index trigger

2)



compute the
offset vector

3)

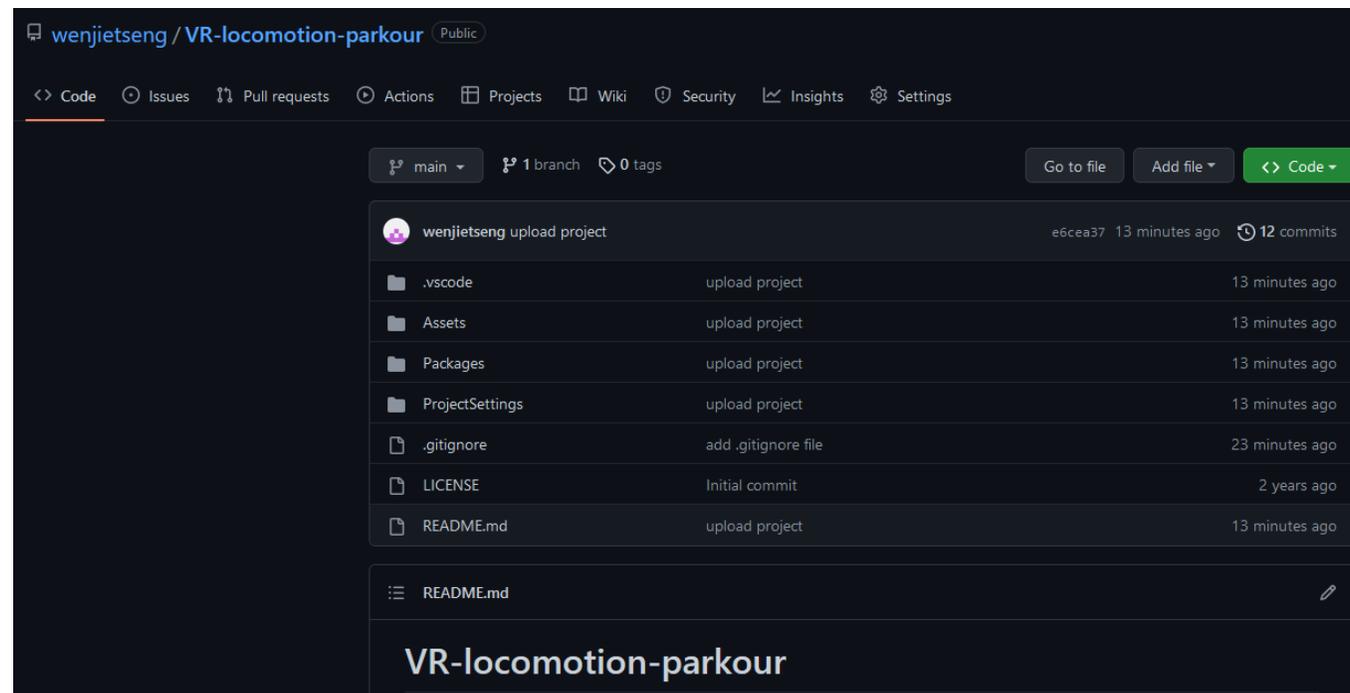


add the **offset**
along the **forward**
of the HMD

Instructions

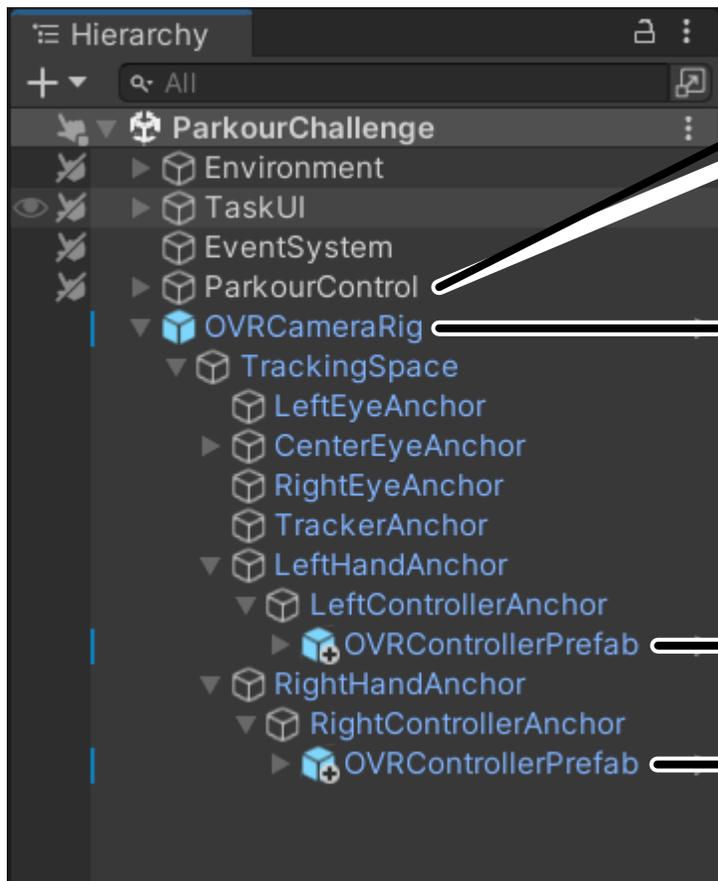
Setup (GitHub repo link)

- Please download the unity project from
- <https://github.com/wenjietseng/VR-locomotion-parkour>
- open the folder as a unity project



Guidelines

- By default, we assume the boundary is **stationary**. This means the user is sitting or standing at the same place, and there is not much space.
- Feel free to design your favorite locomotion and object interaction
- Please don't modify the size of the player's collider or develop an automatic coin collector.



Game Mechanisms

ParkourCounter.cs

SelectionTaskMeasure.cs

Locomotion

LocomotionTechnique.cs

Object Interaction

MyGrab.cs is a demo example, feel free to create what you need.

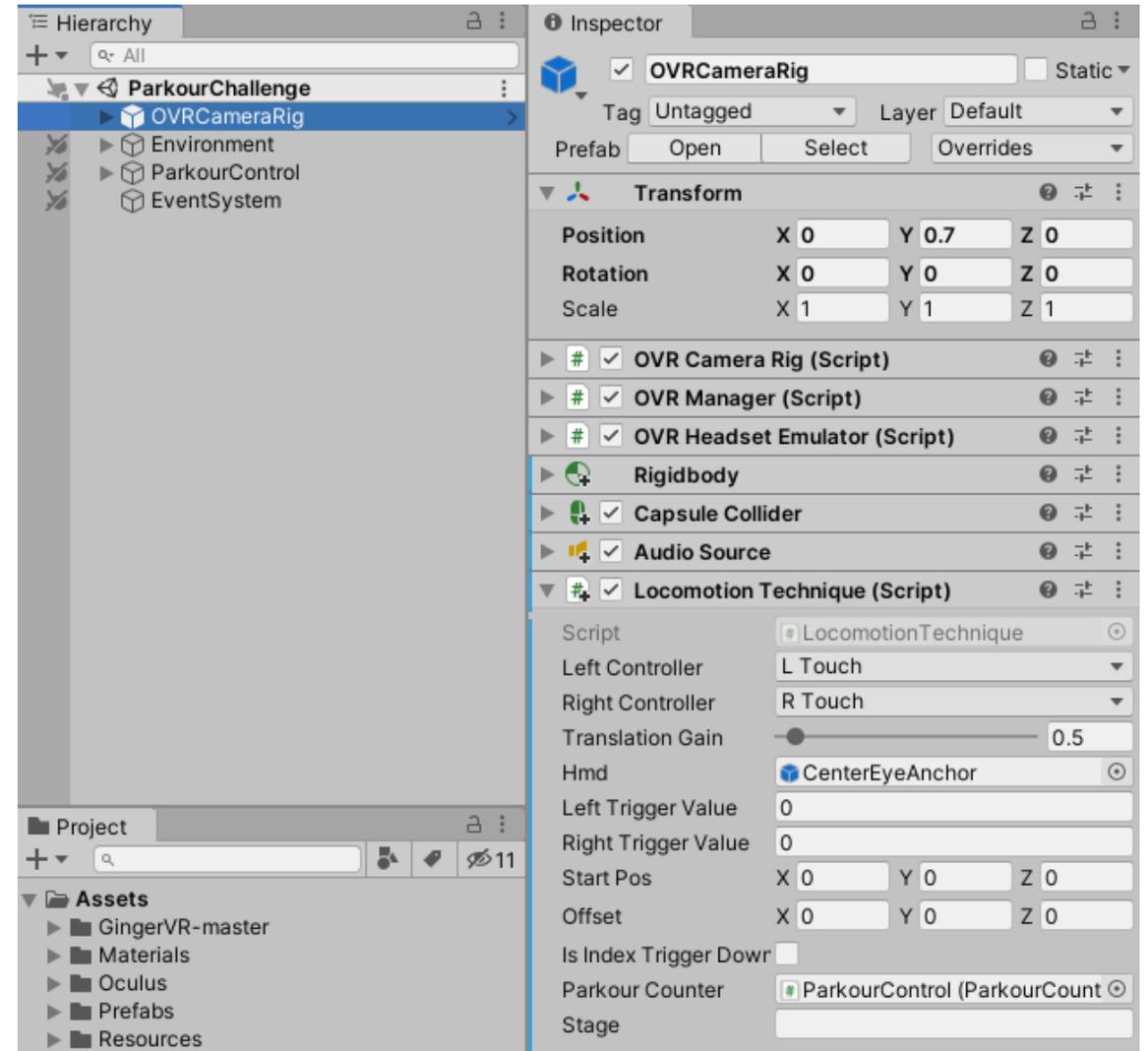
Locomotion

Speed and control

- There is a trade-off between **time, coins, and fatigue**.
 - a) *Teleport*: reduce the time of traverse, but repeat a lot while collecting coins.
 - b) *Grabbing the air*: can be quite fast, but cannot control well while very fast.
The technique also has bigger cybersickness issue.
 - c) *Walking in place*: less cybersickness, high control, but perhaps feel fatigue and take a long time.

Assets > Scripts > LocomotionTechnique.cs

- Implement your own locomotion in this script
- This script is attached to the OVRCameraRig
- Feel free to add more scripts if your needed to.



Example: grabbing the air

- Since I put the code in Update(), if the user does not release the trigger, the offset will keep adding to OVRCameraRig.
- If both hands trigger → sum up two offset vectors

Cybersickness

- Cybersickness [1] occurs when exposure to a virtual environment causes symptoms that are similar to motion sickness symptoms.
 - eye strain, nausea, fatigue, disorientation, etc.

Cybersickness

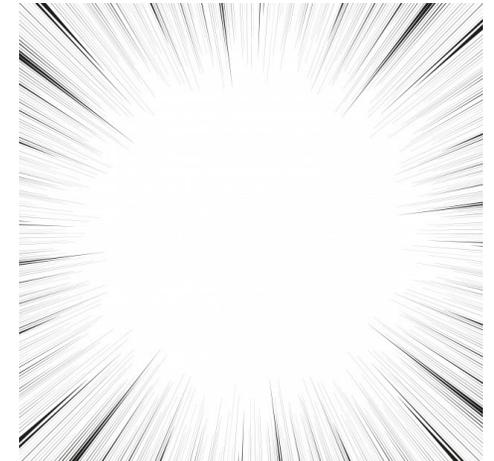
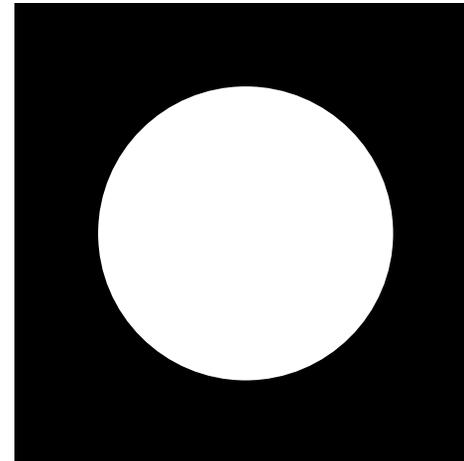
- It can be caused by the visually-induced perception of self-motion; real self-motion is not needed.
 - cybersickness, motion sickness, and simulator sickness are different constructs!
(see references below)

[1] Joseph J. LaViola. 2000. A discussion of cybersickness in virtual environments. SIGCHI Bull. 32, 1 (Jan. 2000), 47–56. <https://doi.org/10.1145/333329.333344>

[2] Stanney, K. M., Kennedy, R. S., & Drexler, J. M. (1997). Cybersickness is Not Simulator Sickness. Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 41(2), 1138–1142. <https://doi.org/10.1177/107118139704100292>

Reducing cybersickness

- Some approaches:
 - **motion:** walking-in-place, arm swinger, and so on.
 - **visual:** reducing field of view (e.g., mask, blur, motion lines)
- References: [GingerVR](#)



3D Object Interaction

Use IndexTrigger as input

Left Controller

Axis2D.PrimaryThumbstick
Button.PrimaryThumbstick (left stick press)

Button.Four

Button.Three

Button.Start

Axis1D.PrimaryHandTrigger

Axis1D.PrimaryIndexTrigger

Axis1D.SecondaryIndexTrigger

Axis1D.SecondaryHandTrigger

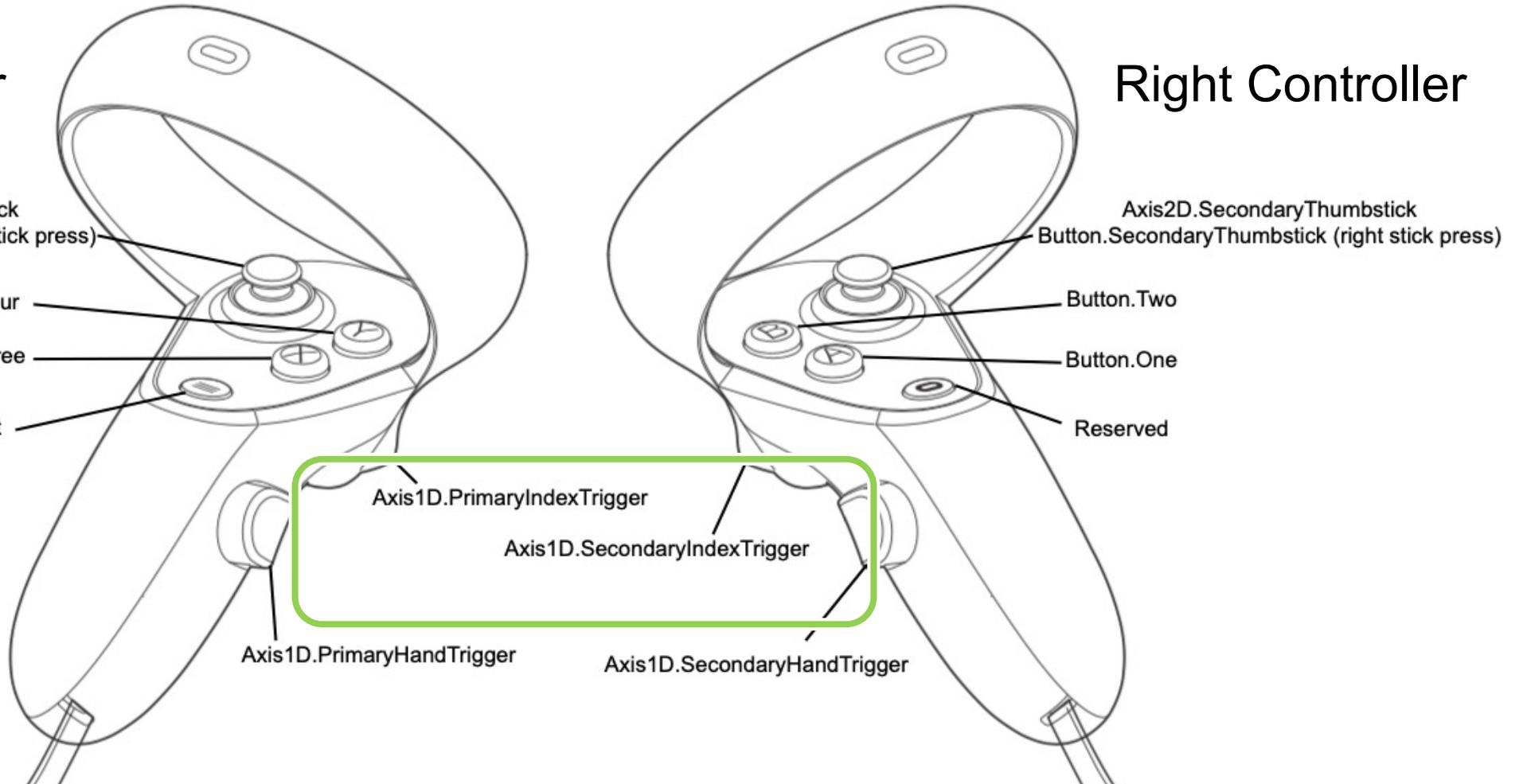
Right Controller

Axis2D.SecondaryThumbstick
Button.SecondaryThumbstick (right stick press)

Button.Two

Button.One

Reserved

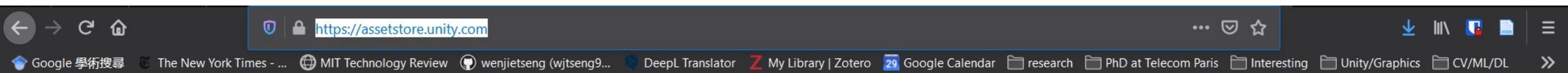


Bug report

- The game mechanism is in the script -- ParkourCounter.cs
- If you found any bugs or somewhere could be improved in our parkour challenge, please send us an email.
- contact: wen-jie.tseng@telecom-paris.fr

unity asset store

• <https://assetstore.unity.com/>



New to Unity? Checkout these top picks for all experience levels

unity Asset Store Assets Tools Services By Unity Industries



Search for assets

Over 11,000 5 star assets

Rated By: 85000+ customers

Supported by over 100,000 forum members

genvid
Revolutionize the way
games are watched
with Genvid
Learn more

The advertisement for Genvid features a dark blue background with a glowing, dotted pattern on the right side. The Genvid logo, consisting of two orange arrows pointing towards each other, is positioned above the brand name. The main text is centered and white, with an orange "Learn more" button at the bottom.

playMaker

The advertisement for playMaker shows the brand name in a white, sans-serif font against a light blue background with abstract white lines and arrows. A red square icon with the white Chinese character "玩" (to play) is located in the bottom right corner.

FINAL IK
ROOTMOTION

The advertisement for FINAL IK features a 3D rendered character, a humanoid robot with a yellow and black color scheme, standing against a dark background. The text "FINAL IK" is in white, and the "ROOTMOTION" logo is in yellow at the bottom.

Refine by [clear filters](#)

Hide Purchased Assets

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- 2D (8137) ▾
- Add-Ons (43) ▾
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- Essentials (50) ▾
- Templates (2910) ▾
- Tools (8741) ▾
- VFX (2518) ▾

I usually look for free assets here...

Refine by

[clear filters](#)

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2D (694) ▾

Add-Ons (18) ▾

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furniture



Purchased

VERTEX STUDIO
Big Furniture Pack
★★★★★ (94)
FREE



Purchased

GEST
Pack Gesta Furniture #1
★★★★★ (53)
FREE



ELCANETAY
Toon Furniture
★★★★★ (16)
FREE



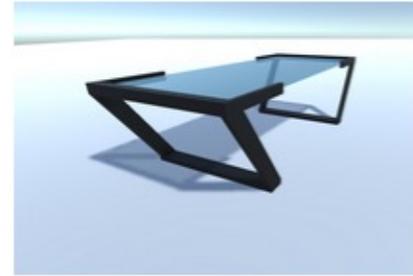
TRIDIFY
HDRP Furniture Pack
★★★★★ (5)
FREE



AMBIMESH
Raw Wooden Furniture Free
(not enough ratings)
FREE



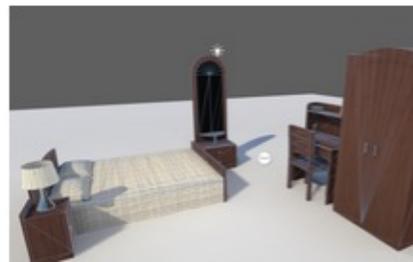
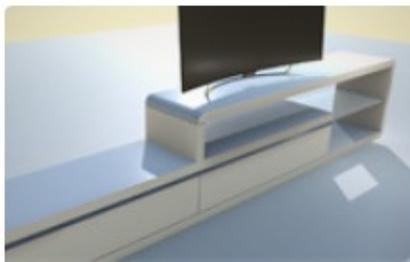
ELCANETAY
Office Room Furniture
(not enough ratings)
FREE



REYNARD DROSTE
Modern Furniture Pieces P...
★★★★★ (5)
FREE



KELHEM STORE
Voxel Functional Furniture ...
★★★★★ (5)
FREE



animal



Purchased

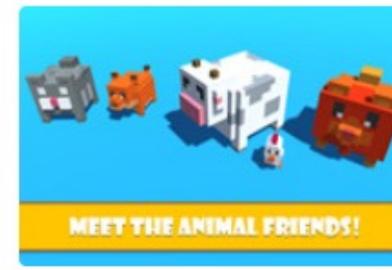
VERTEX CAT
Farm Animals Set
★★★★★ (30)
FREE



JKTIMMONS
Lovely Animals PACK
★★★★★ (27)
FREE



VOXELGUY
5 animated Voxel animals
★★★★☆ (6)
FREE

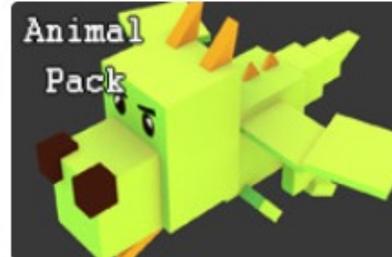


TOTAL GAME ASSETS
Voxel Animals Pack
★★★★☆ (5)
FREE



Purchased

MESHTINT STUDIO
Meshtint Free Chicken Me...
★★★★★ (17)
FREE



GLOOMY STUDIO
Free Low Polygon_Animal
★★★★★ (13)
FREE



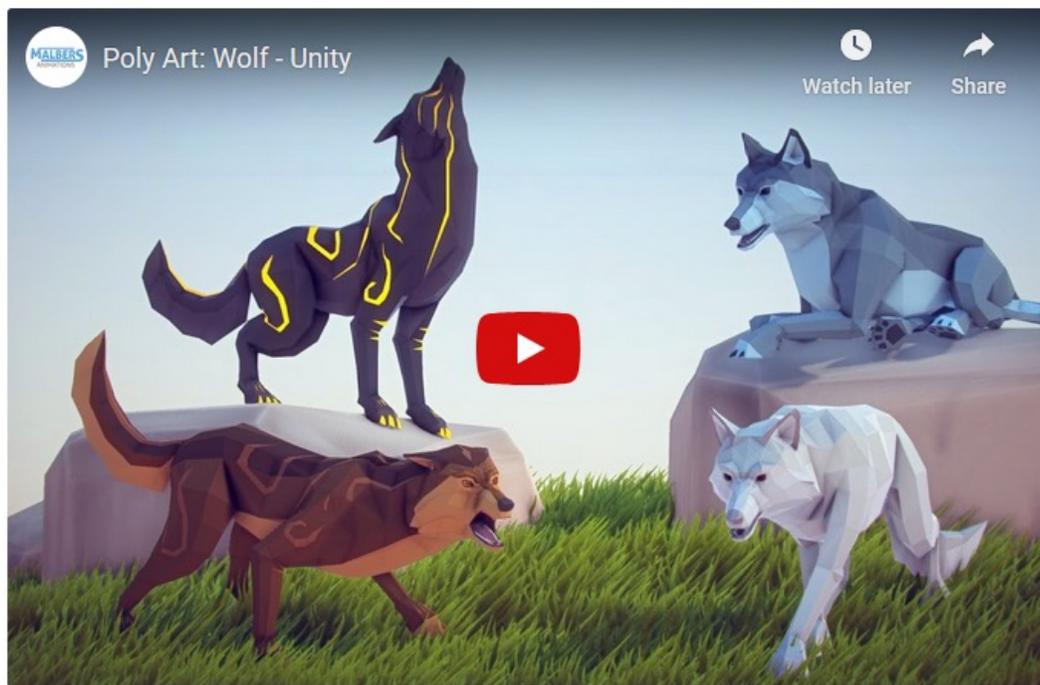
ZEALOUS INTERACTIVE
Golden Tiger
★★★★☆ (62)
FREE



DUNGEON MASON
Dog Knight PBR Polyart
★★★★★ (21)
FREE



animal low poly



RECOMMENDED BY OUR USERS

MALBERS ANIMATIONS

Poly Art: Wolf

★★★★★ (61)

\$19.99



Purchased

VERTEX CAT
Farm Animals Set

★★★★★ (30)

FREE



ACORN BRINGER

Simplistic Low Poly Nature

★★★★★ (15)

FREE

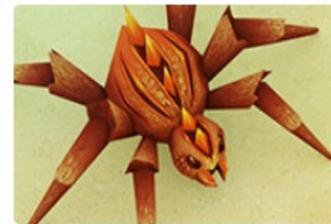


TOTAL GAME ASSETS

Voxel Animals Pack

★★★★☆ (5)

FREE

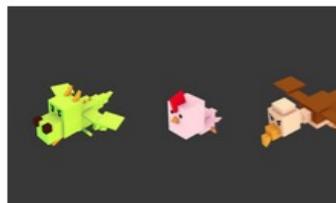


CATLEYA

Animated low poly spider

★★★★☆ (6)

FREE

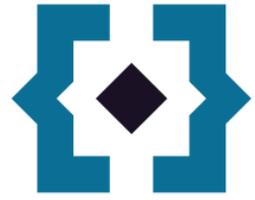




Low poly is a polygon mesh in 3D computer graphics that has a relatively small number of polygons. [\[wiki\]](#)



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Questions?