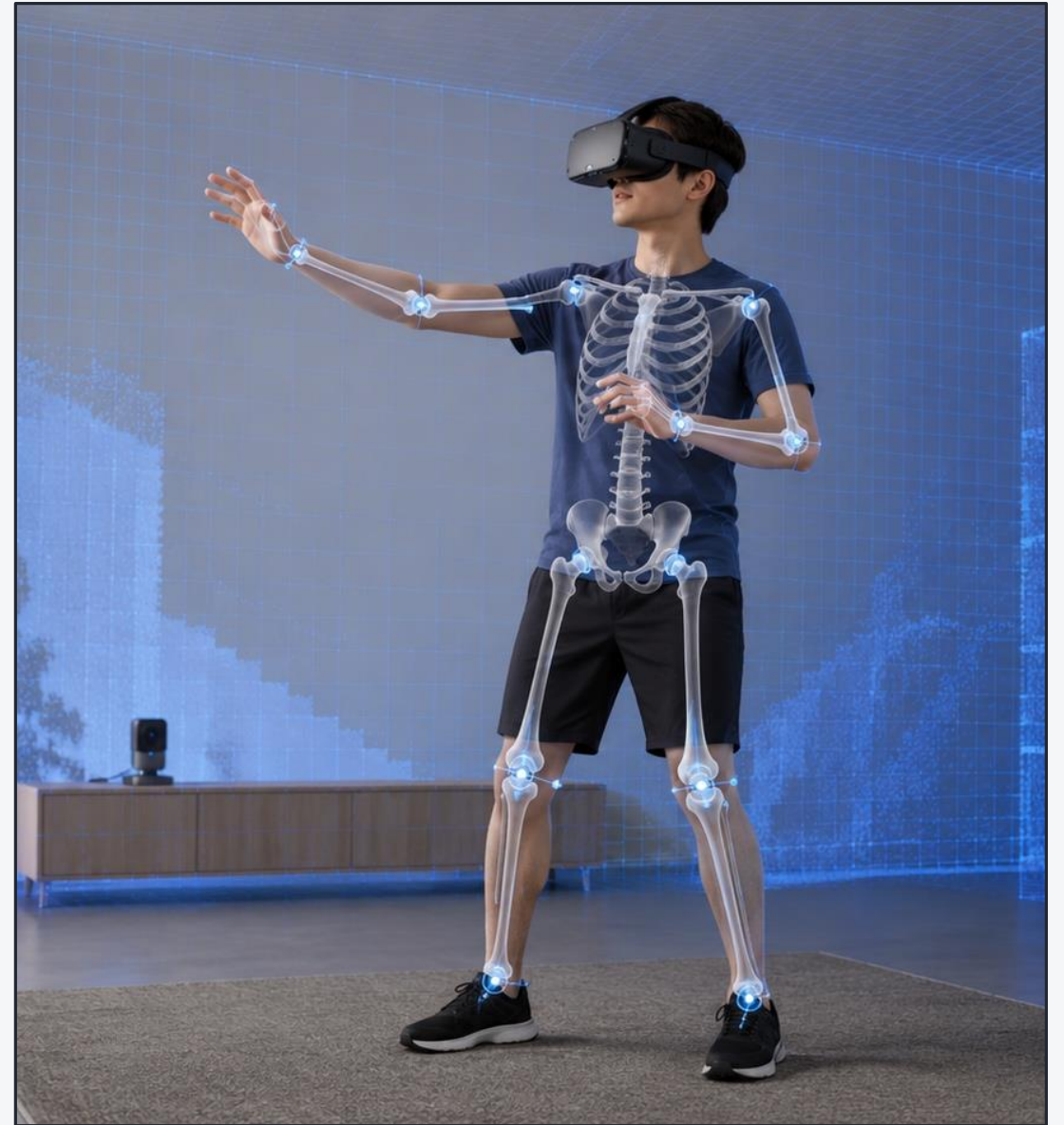


MediaPipe + Unity3D exercise

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Laboratorio Realtà Virtuale 2025/2026

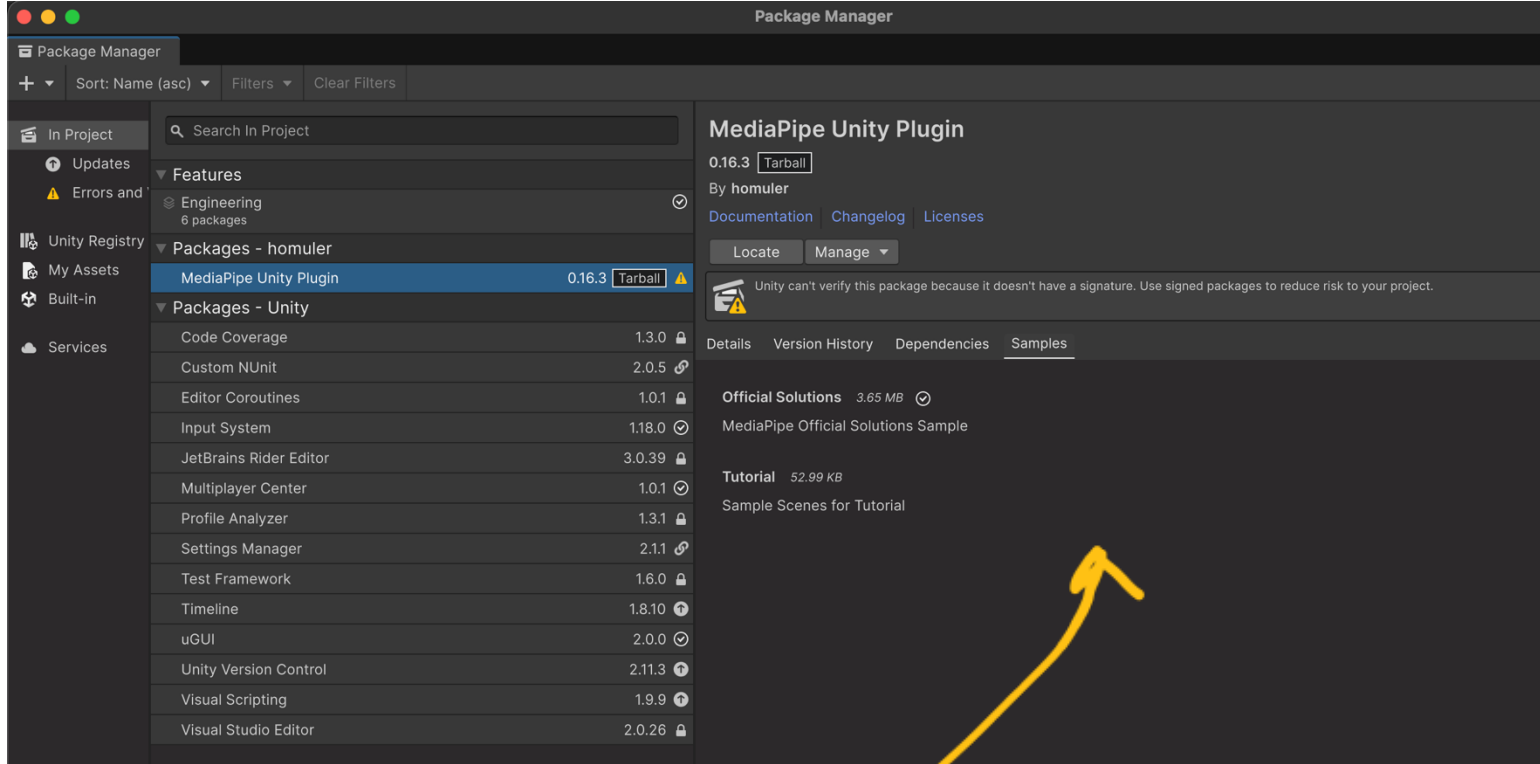


IMPORT MediaPipe



UPCOMING LABORATORY: MEDIAPIPE POSE

- Import the `com.github.homuler.mediapipe-*.tgz` tarball package from: <https://github.com/homuler/MediaPipeUnityPlugin/releases>
- Install the tgz file in Unity from the Package Manager following the instructions here: <https://docs.unity3d.com/Manual/upm-ui-tarball.html>
- Once installed, in the Package Manager go to MediaPipe > Samples and download the Official Solutions



Download MediaPipe from here: <https://github.com/homuler/MediaPipeUnityPlugin>

A Body Tracking Project with MediaPipe



Setup a New Scene with Body Tracking

Download the UnityPackage of this exercise from:

<https://github.com/aislabunimi/courses.vr2026/tree/main/MediaPipe-Exercise>

Open the Unity Project of Media-Pipe we set up last lesson and import this UnityPackage (from Edit → Import Package → Custom Package)

It may ask if you want to overwrite existing .cs scripts of Pose Landmark and Hand Landmark MediaPipe, say yes (I customized them for this exercise)

Open the Scene *FishExerciseScene*

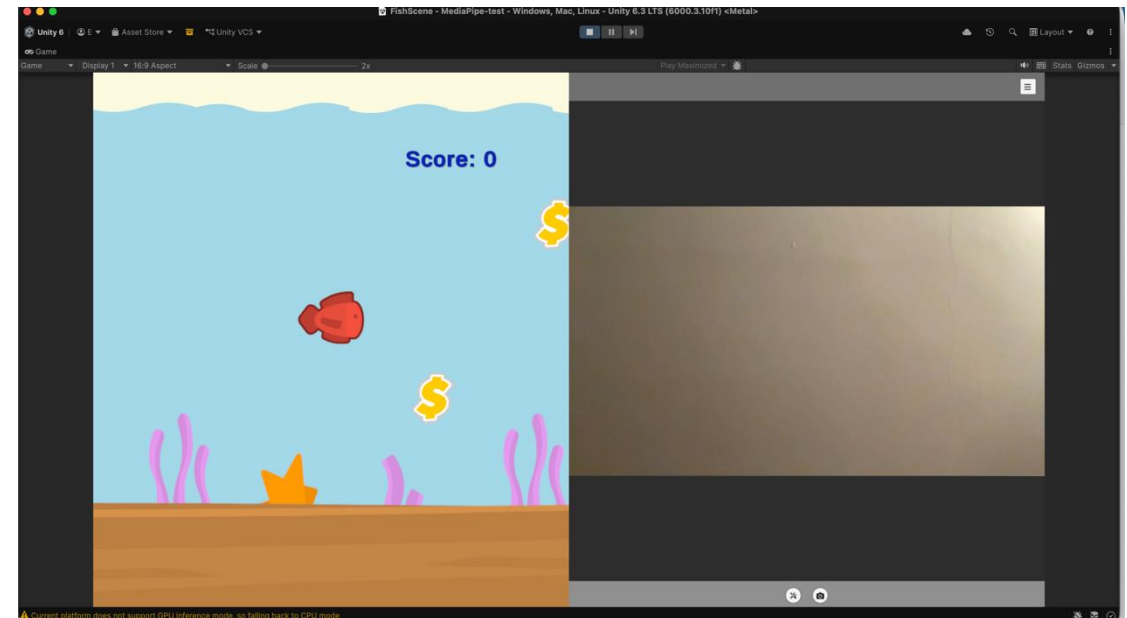
Setup a New Scene with Body Tracking

Let's Observe what is inside this scene:

- Camera with Orthographic Projection (for 2D)
- Some Sprites for the minigame
- A fish_red_outline object with tag Player
- And other traditional elements of games (collectibles, Canvas with score,...)

Our goals:

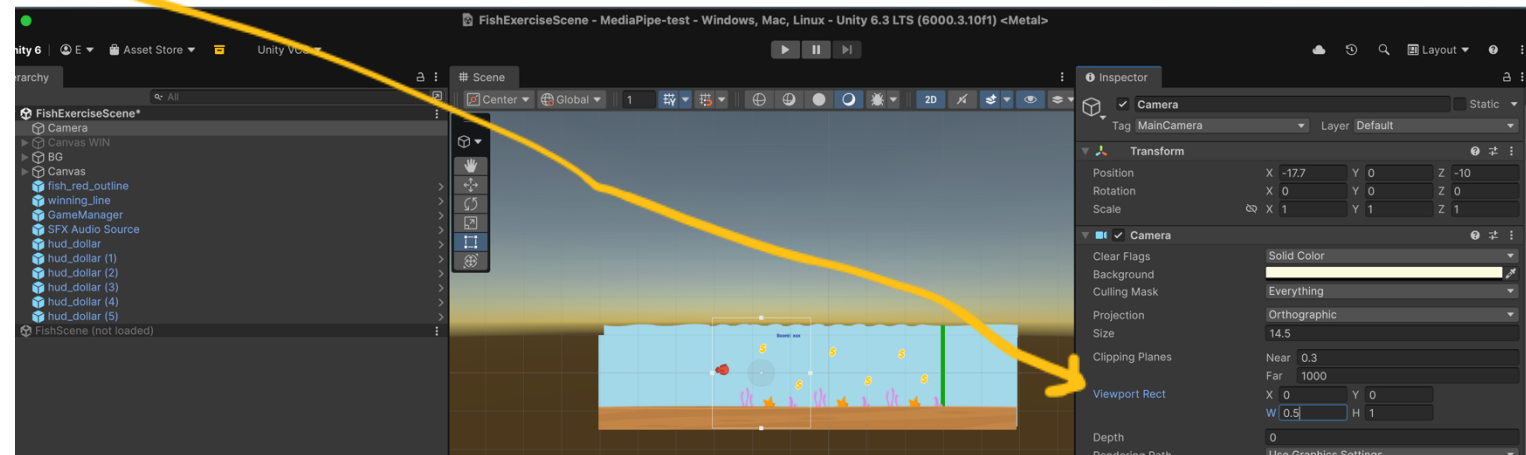
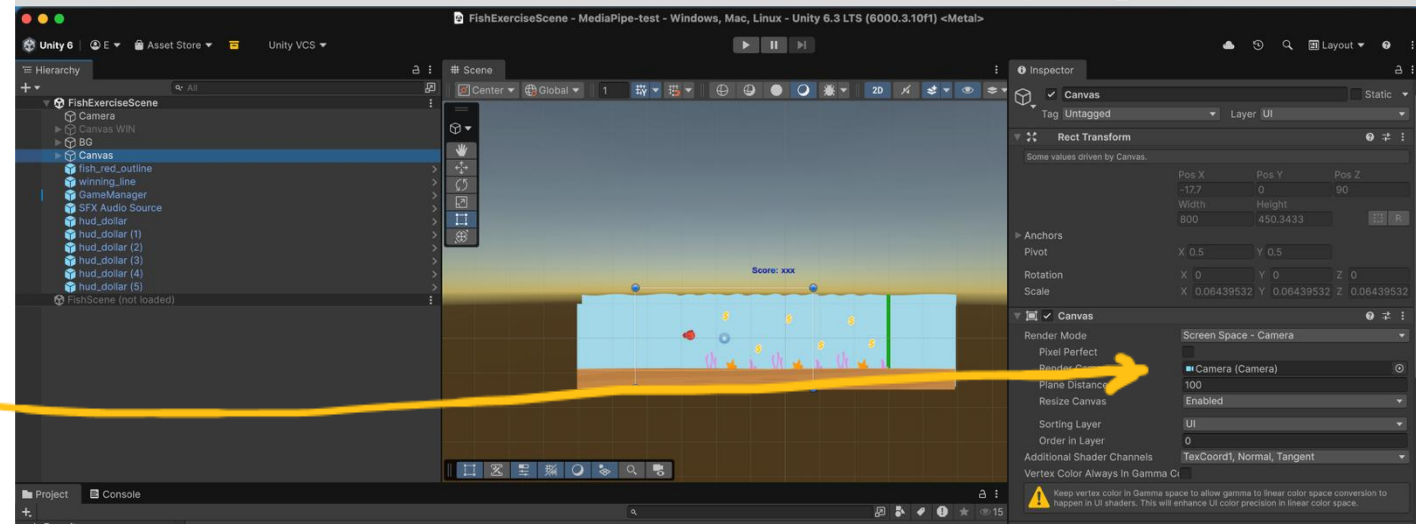
1. use MediaPipe for play interaction
2. visualize our camera stream nearby the minigame while playing



Setup a New Scene with Body Tracking

Setup First Camera:

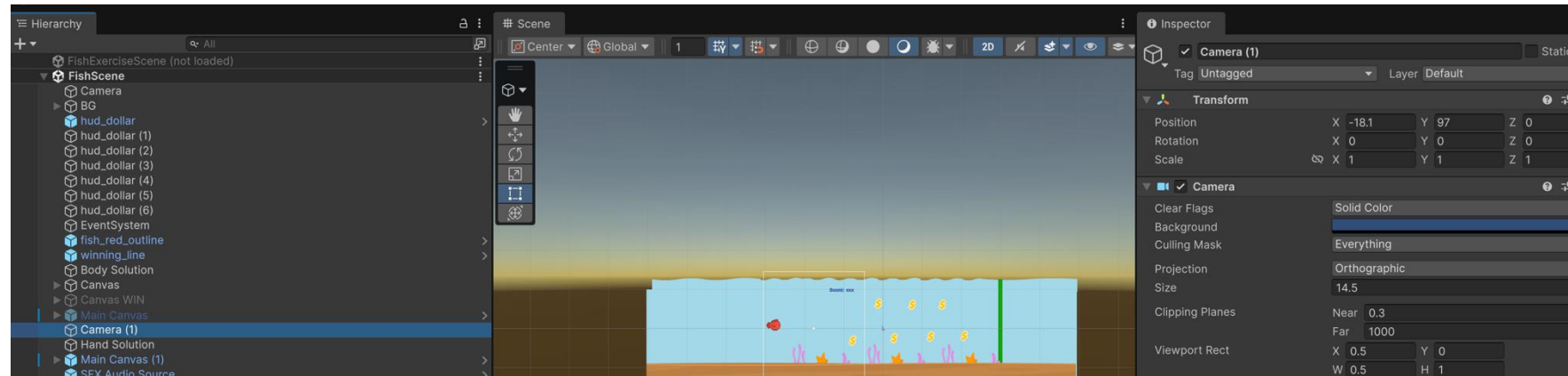
1. Choose the Canvas and switch from Screen Space Overlay to Screen Space Camera
2. Assign the Camera to the Canvas
3. Now click on the Camera and in the Inspector change the value $w = 0.5$



Setup a New Scene with Body Tracking

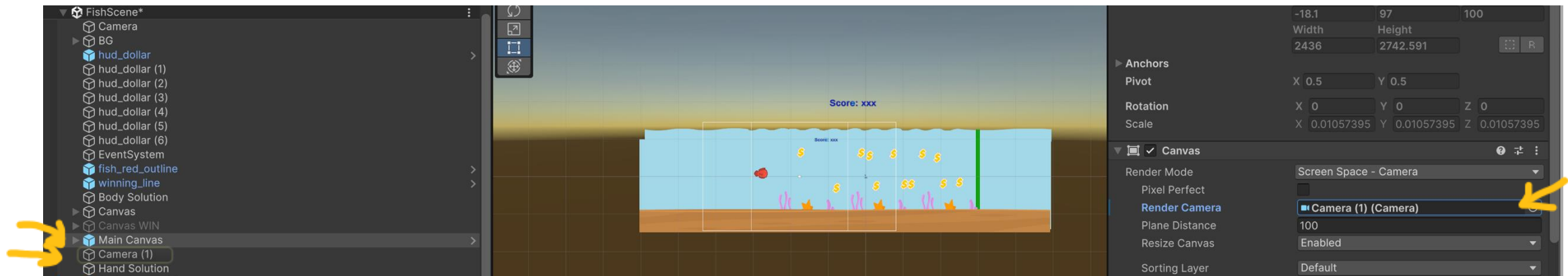
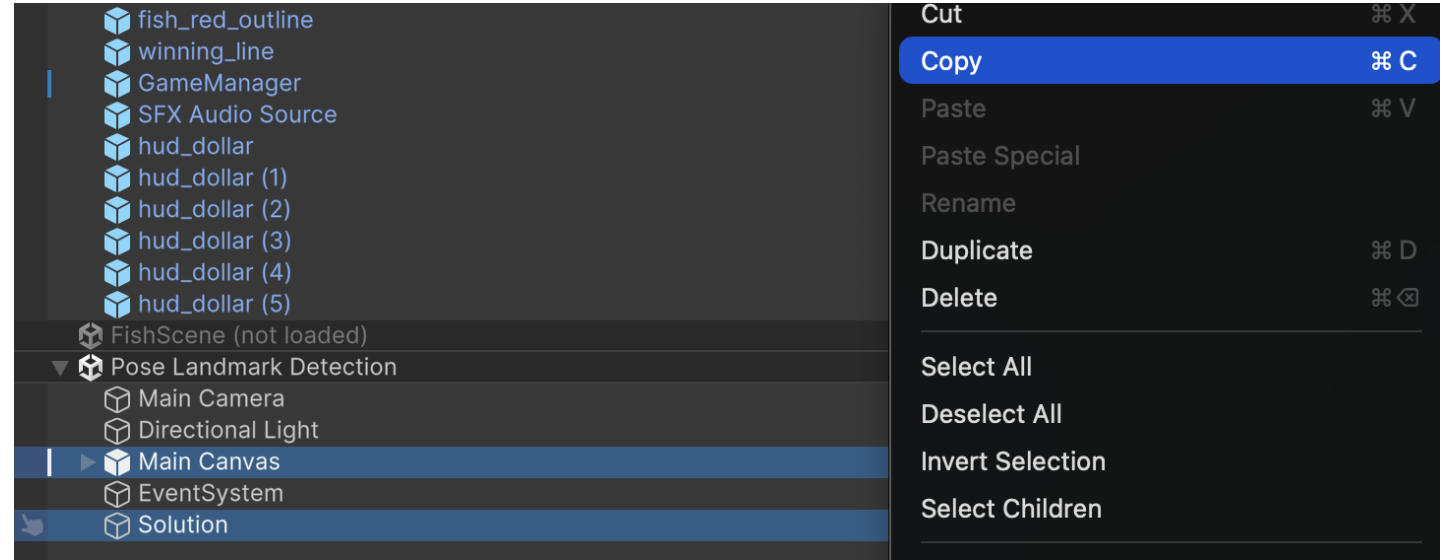
Setup Multiple Camera:

1. Add a new additional Camera to the scene
2. On the new Camera go and remove the component Audio Listener
3. On this additional Camera change values to:
 - Clear Flags = Solid Color
 - Projection = Orthographic
 - Size = 14.5
 - $x = 0.5$
 - $W = 0.5$



Setup Body Tracking part

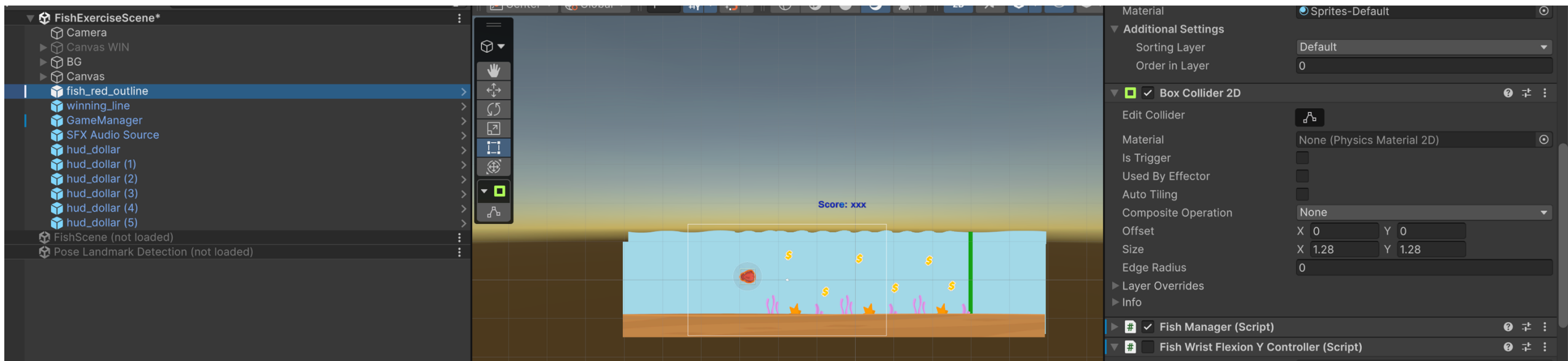
1. Search for the scene
“PoseLandmarkDetection” → right click
and choose *Open Scene Additive*
2. In the “PoseLandmarkDetection” scene
click on the Main Canvas and on the
Solution and copy them
3. Paste them in the Scene
FishExerciseScene (rename the Solution
as Body Solution)
4. Click on the Main Canvas and assign the
additional Camera to it



Setup Body Tracking part

1. Now click on the fish_red_outline object in the scene and in the Inspector Enable the script *FishManager* and disable the script *Fish Wrist Flexion Y controller*

What does the *FishManager*? It automatically moves the fish at every update on the x axis, and moves the fish on the y axis depending on the position of the arm (if raised the fish goes up, if lowered the fish goes down)



Setup Body Tracking part

FishManager public variables:

Tracked Arm (optional) select preferred arm

Min Y : minimum Y coordinate under which the fish does not move (I suggest value= -8)

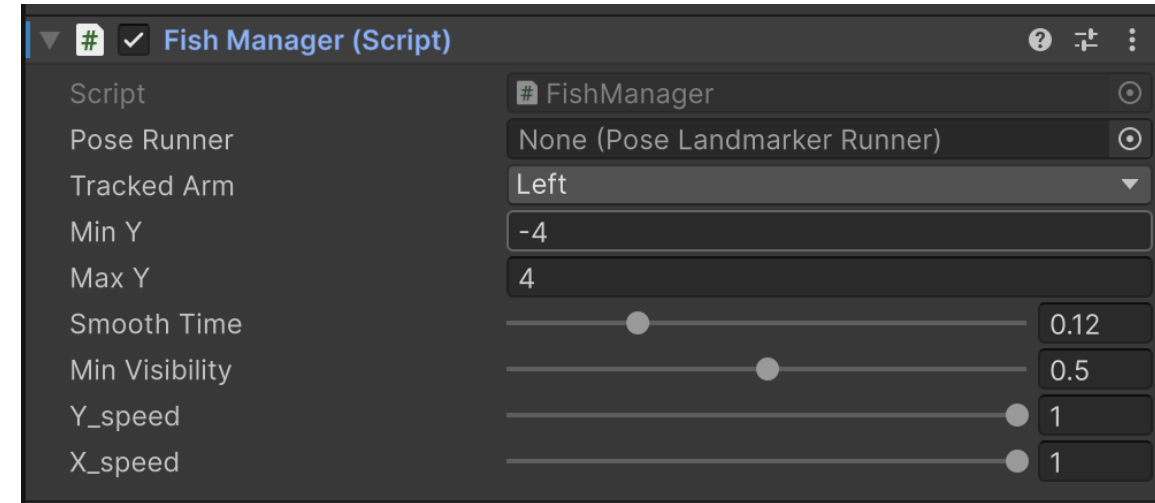
Max Y: max Y coordinate over which the fish does not move (I suggest value= 8)

SmoothTime: smoothing delta for y values between frames

MinVisibility: check if confidence of joint is at least 0.5

Y_speed: speed of fish movement over y axis

X_speed: speed of fish movement over x axis



Homework:
A Hand Tracking Project with MediaPipe



Setup a New Scene with Hand Tracking

Copy the Scene *FishExerciseScene*:

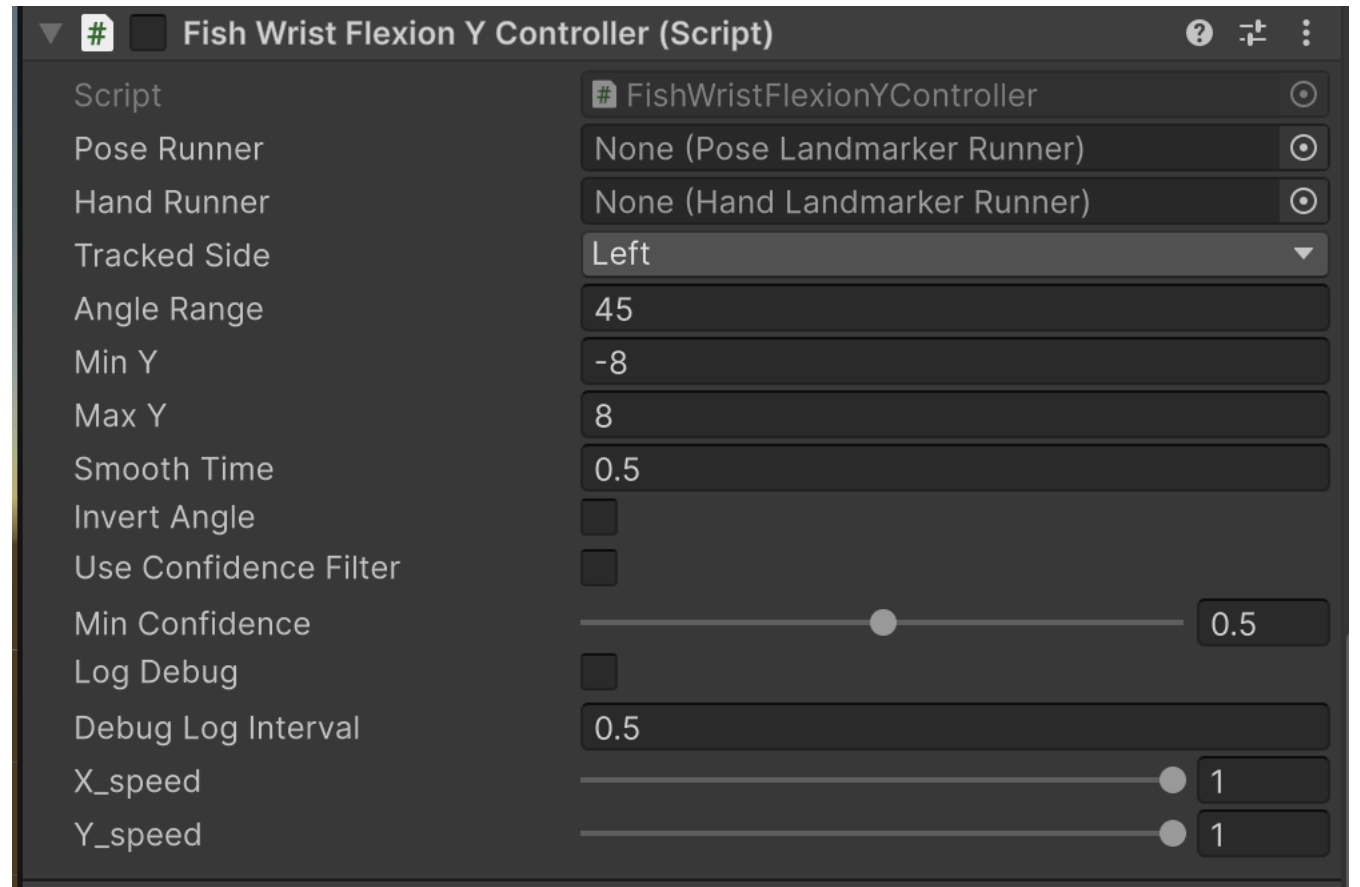
1. Create a New Scene, and save it with a name you prefer
2. Open Additive the *FishExerciseScene*
3. Copy all of the Object from the *FishExerciseScene* in the *New Scene*, with the exception:
Do not copy the:
 1. fish_red_outline

Setup a New Scene with Hand Tracking

From the Double folder choose a fish you like and drag it into the scene

To the fish add a:

1. Box Collider 2D
2. Rigidbody2D (set Body Type to Kinematic)
3. *Fish Wrist Flexion Y controller* script and set it up as follows:
 - Change Min Y = -8
 - Change Max Y = 8
 - Tune x_speed and y_speed as you desire
4. Create a Prefab of your fish



Hand Tracking script

What does the *Fish Wrist Flexion Y controller* ? It automatically moves the fish at every update on the x axis, and moves the fish on the y axis depending on the **Pitch value of the wrist** (of the detected hand)

Setup Hand Tracking part

1. Search for the scene
“HandLandmarkDetection” → right click and choose *Open Scene Additive*
2. In the “HandLandmarkDetection” scene click on the Main Canvas and on the Solution and copy them
3. Paste them in the Scene
4. *Rename the Solution as Hand Solution*
5. Click on the Main Canvas and assign the additional Camera to it

