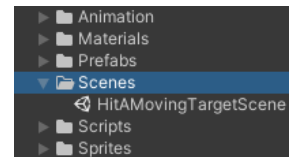


## Hit a Moving Target - Documentation

### Unity Package & Example Scene

Inside the Unity Package you will find the required scripts for the system to work, including Animations, Physics Materials, Prefabs, and sprites that can be used, and an example scene 'HitAMovingTargetScene' for demonstration.



Unity Package Contents

### Controls & Mechanics



Health Bonus

To move the player tank, the W and S, or Up and Down keys can be used to move forward and back. Using the A and D or Left and Right keys will rotate the tank clockwise or anticlockwise. To aim the gun, you can use the mouse cursor, and clicking the left mouse button will shoot a bullet.

Any bullets that hit the player or enemy tanks will result in some of their health being lost, damage dealt will be randomised between two values set in its inspector properties.

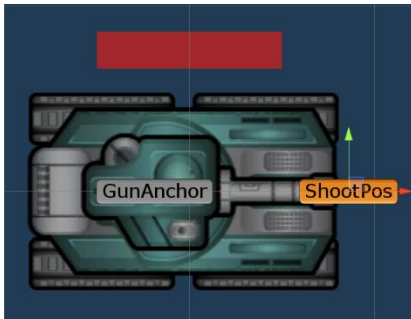
Health bonuses can be picked up by driving over them around the play area to heal the Player Tank, this will provide a health boost randomised between two values set in its inspector panel.

The Enemy Tank will only fire if it has a line of sight of the player tank, this allows the player to use obstacles to hide from enemy fire. To make sure the enemy tank hits a shot on the player it will aim ahead of the player tank's current direction if it is moving.



Obstacles

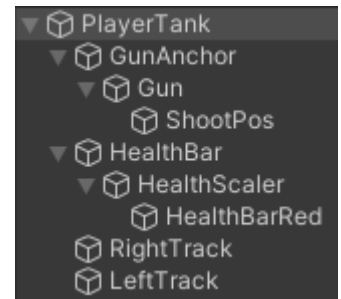
### Prefab Setup



Player Tank prefab

Under Prefabs in the Unity Package, there are pre-setup tanks 'PlayerTank' and 'EnemyTank'. These both consist of a root game object displaying a Tank Hull Sprite with a 2D collider, and a 'Health' script for its health system. Its child game objects include a 'GunAnchor' used for a pivot point of its child 'Gun' game object displaying the tank gun sprite; and a child game object of the 'Gun' called 'ShootPos' used for a shoot position, next a game object called 'HealthBar' displaying a grey health bar background; a child empty game object 'HealthScaler' placed at the left edge; used to scale its child game object 'HealthBarRed' from right to left; which displays a red bar on top to show current health, lastly, there are two child game objects used to display the tank tracks.

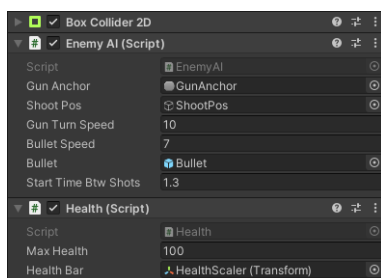
Additionally, the 'PlayerTank' prefab has a Rigidbody2D component attached set with 0 gravity and frozen rotation, along with a 'PlayerMovement' script for handling input and movement, 'TankAnim' script used to control the tank tracks animation, and 'AimShoot' script used to manage the tank gun aim and shoot functionality.



Tank Hierarchy Layout

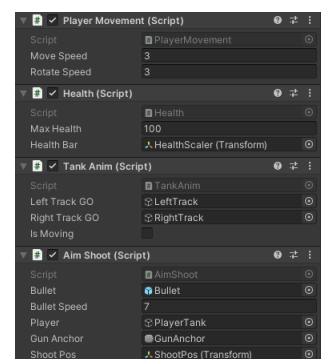


Health Bar layout

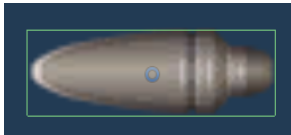


Enemy Tank Inspector Properties

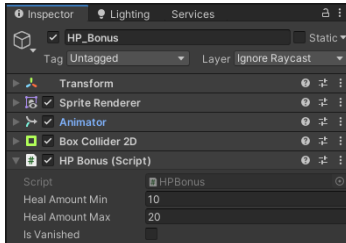
With the 'EnemyTank' prefab, there is an 'EnemyAI' script attached, this is used to handle the gun aim and shoot behaviour; with position prediction to hit moving targets using the target's velocity and its projectile speed.



Player Tank Inspector



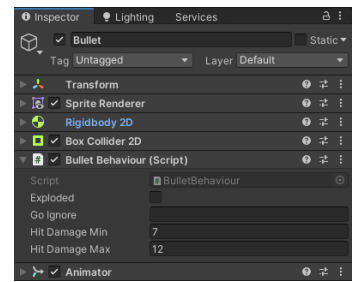
Bullet Prefab



Health Bonus Inspector Properties

Along with the tanks, there is a 'Bullet' prefab inside the 'Projectiles' folder, this consists of a game object displaying a bullet sprite, along with a Rigidbody2D with 0 gravity and frozen rotation, a box collider 2D, a bullet script used to handle its damage and animation, and an animator to control animation states.

Included within the prefab collectables folder is a health bonus consumable 'HP\_Bonus' used to heal the player tank if driven over, this consists of a game object displaying a health bonus sprite, with a box collider 2D set as a trigger, a 'HPBonus' script attached used to control its behaviour with properties managing health values to apply to the player health, and an animator component handling its animation states.



Bullet Inspector Properties



Health Bonus

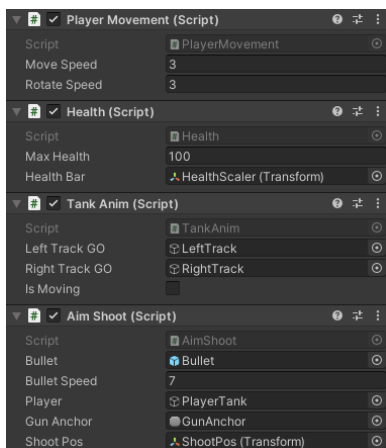


Obstacles

Also, obstacles can be found in the 'Obstacle' prefab folder, these comprise game objects displaying obstacle sprites with a box collider 2D attached.

Lastly, play area grounds and barriers can be found under prefabs to set up a play area, along with a 'Ball' prefab inside the 'Props' prefab folder which can be shot around and used to block enemy fire, this has a Rigidbody2D set to 0 gravity with a physics material to make it bouncy, and a circle collider 2D attached.

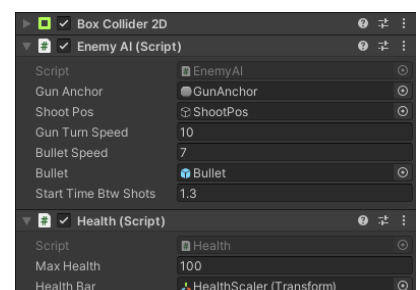
### Properties



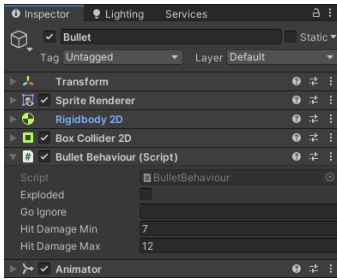
Player Tank Inspector Properties

Within the 'PlayerTank' prefab, there are many attributes that can be adjusted in its inspector properties, starting in the 'Player Movement' script section, you can change the 'Move Speed' to change how fast or slow the player can move forwards or back, and 'Rotate Speed' to control the speed the player can turn clockwise or anticlockwise. In the 'Health' script section, the starting and max health amount can be tweaked with 'Max Health' along with a reference box to connect the game object used to scale a child health bar game object. The 'Tank Anim' script section has boxes 'Left Track GO' and 'Right Track GO' to reference the tank track game objects used to manage the animations. And finally, the 'Aim Shoot' script section has properties 'Bullet' to reference the projectile prefab being shot from the tank, 'Bullet Speed' to alter the bullet projectile speed, 'Player' to reference the player tank game object, 'Gun Anchor' to reference and control the player tank's 'GunAnchor' game object, and 'Shoot Pos' to reference the transform of the 'ShootPos' game object used as a position to shoot from the player tank.

Inside the 'EnemyTank' prefab inspector panel, beginning with the 'Enemy AI' script section, the 'Gun Anchor' box is used to reference the enemy tank's gun anchor to control aim, the 'Shoot Pos' box to reference the enemy 'ShootPos' game object used for a position to shoot from, 'Gun Turn Speed' to tweak the gun turn speed; although please keep in mind setting this value lower than 10 can mess with the aim prediction, 'Bullet Speed' to manage the bullet projectile velocity, 'Bullet' to reference the projectile prefab to shoot, and 'Start Time Btw Shots' to alter the delay between shots in seconds. Under 'Health' as said previously 'Max Health' modifies the starting and maximum health of the enemy tank.

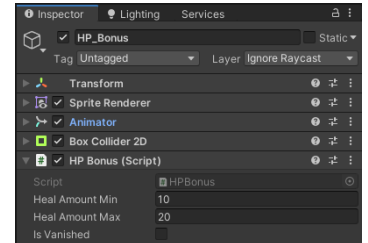


Enemy Tank Inspector Properties

*Bullet Inspector Properties*

The health bonus consumable can be tweaked using its prefab 'HP\_Bonus' inspector settings, under the 'HP Bonus' script, 'Heal Amount Min' sets the minimum health boost the consumable can provide, and 'Heal Amount Max' sets the maximum it can provide.

Using the 'Bullet' prefab inspector preferences, under 'Bullet Behaviour' you can modify the minimum and maximum damage values for the bullet to randomise between using 'Hit Damage Min' and 'Hit Damage Max'. Please keep in mind to keep the 'Exploded' check box unchecked as this will destroy the bullet as soon as it spawns, this is used for its animation, and 'Go Ignore' should be left blank as this is set by the tanks for the bullet collision to ignore the tank collider preventing them from exploding when shot inside the tank collider.

*Health Bonus Inspector Properties*