“Shoot a Car - Turret”

Taster Day Activity

## Goals:

* A quick overview of the UE5 engine and the interface
* Load the game template (either fresh or from previous session)
* Rapid Prototyping using available assets
  + Marketplace
  + Templates

## Getting started:

Some of you will be familiar with the Epic Launcher from playing Fortnite…. But we’re going to be using the engine that is used to *make* Fortnite, Unreal Engine. It has also been used for many other games, such as Unreal Tournament, Enslaved: Odyssey to the West, Borderlands 2, Spec Ops: The Line, Gears of War 3, Batman Arkham City, XCOM: Enemy Unknown, Bioshock… and of course PUBG and Fortnite!

For those attempting this at home, to begin, download the epic launcher from [www.epicgames.com](http://www.epicgames.com) and install the client. Once loaded, find the “Unreal Engine” option on the left and install the engine. For this project, 5.4 was used, but later versions *should* still work ok. For those on campus, Unreal should already be up and running and ready to go.

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[Logo

Description automatically generated with medium confidence](https://youtu.be/CmbGUIdz7GU)Take a have a look around the interface first. If you’ve not seen it before it can be quite overwhelming. I’ve put together an introductory video showing you around the interface and what all the buttons do at <https://youtu.be/CmbGUIdz7GU> if it helps. NB: The video is for UE4 but most things are more or less the same.

## Shooting the cars:

Working with the other session (either before or after), we are going to add a turret to the racing car so we can shoot the cars chasing us… to comical effect!

If this is the first session, you will be running the project “ShootACar\_blank”. If this is the second session, you will be running either project “ShootACar\_AI” or “ShootACar\_noAI”.

**First session of the day**:

“ShootACar\_blank” – this is the starting point for the day, lacking AI NPC cars or a turret. You will develop one of these in the morning session and then after lunch develop the other half.

**For the second session of the day**:

“ShootACar\_AI” – this project has NPC cars which will chase you and your goal is to add the turret and controls so that you can shoot at them.

or

“ShootACar\_noAI” - this project includes the turret already setup to fire and your goal is to add the AI so the NPC cars chase you – you can then shoot them with the turret.

With the project loaded let’s think about a plan:

1. We’ll need a turret – thanks marketplace/Fab
2. We’ll need to be able to move the turret - using the bones in the turret
3. We’ll need a projectile – thanks first person template!
4. We’ll need to be able to fire the projectile - we need some input and the turret will need a socket
5. We want the projectile to affect the car - use the force!
6. Possible gameplay addons
   1. Effects
   2. Projectile alterations
   3. Scoring/UI
   4. Sound

### Turret

There is a folder in the project called SciFiturretasset with everything we need for this part. The turret is from the marketplace (now called Fab). This is a free asset for anyone to use - <https://www.fab.com/listings/4abb6121-4d71-4b67-8e61-b83b7b3e2d10> - sometimes in rapid prototyping, using ready made assets is key to the “rapid” part!

Discussion: use of other people work

* Legal/Ethics (making money from free assets, licencing etc)
* Commercial (cost/benefit analysis)
* Technical challenges (poly counts, working, optimised)

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In the meshes subfolder, you will see several files (note the excellent naming convention!) – we are interested today in the skeletal mesh

Screens screenshot of a video game

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We’re going to add this is a component of the main car pawn - already programmed to be driveable – this is in the VehicleTemplate/Blueprints folder called “StarterWheeledVehiclePawnBP”. We will need to use the component type “PoseableMesh” – why not skeletal mesh?

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Once the component is added, set it to the “SKM\_scifiturret” skeletal mesh, scale and position somewhere near the roof of the car. I used a uniform scaling of 0.5 with x/y/z of -33/0/116 but feel free to place as you wish… maybe even on the bonnet!

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Let’s pause here for a moment – if we test the car we can drive the car around with a turret on top – but if doesn’t move and there is no firing.

Next is moving the turret. For this we need to know the name of the bone we’re going to rotate. If you open the skeletal mesh you can see the bone names on the right… the one we want is called “bn\_head”.

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While we’re here, let’s add a socket for later. Right click “bn\_headbarrelend” and choose “add socket”. You can name it if you wish, but I left the default “bn\_headbarrelendSocket”. Move the socket slightly away from the end of the barrel… why?

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For turret rotation, we’re not going to follow best practice, we’re going to build it as quickly as possible – don’t do this in industry!

Using event tick is terrible for frame rate (not independent, running all the time). We’ll also be rotating the bone rather than animation control. Remember the mantra here though… we’re rapid prototyping so we can get this in front of a publisher – refactoring, efficient, optimisation & best practice can come later once we have the money!

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If you test the game now you should be able to see the turret rotating with the mouse, i.e. the camera spring arm and turret rotation are linked.

Next let’s think about something to fire. In the same subfolder “SciFiturretasset” I have already added 2 files from the “firstpersontemplate” called “BP\_FirstPersonProjectile” and “FirstPersonProjectileMesh”. These are almost all we need to shoot back! First though, let’s add the left mouse click as our fire button.

This is a good time to consider the ongoing changes Epic make to UE5… until recently we used the input system for keyboard/mouse control, but they’ve now implemented the Enhanced Input System. This project uses the older input system so let’s go there and add a left mouse click called “FireWeapon”.

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Back in the SterterWheeledVehiclePawnBP we can add the code to fire the projectile

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For fun, I also boosted the “impulse” effect in the BP\_FirstPersonProjectile blueprint – see what number works best for you!

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