Subway Controller Expansion Pack
User Manual v3.4

WSM GAME STUDIO

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2021

SUMMARY

1. Intro

Thank you for purchasing the “Subway Controller Expansion Pack for Train Controller”!

This package contains all that you need to build a simple and functional subway (models, scripts and SFX).

More models may be included in the future and/or sold separately as addons (Addons Available).

It’s really simple to use and customize.

This document contains information about the new features included in the expansion pack.

> **Note:** If you have never used the Train Controller (Railroad System) asset before, it’s recommended to read the **Train Controller (Railroad System) User Manual v3.4**, before reading this document.

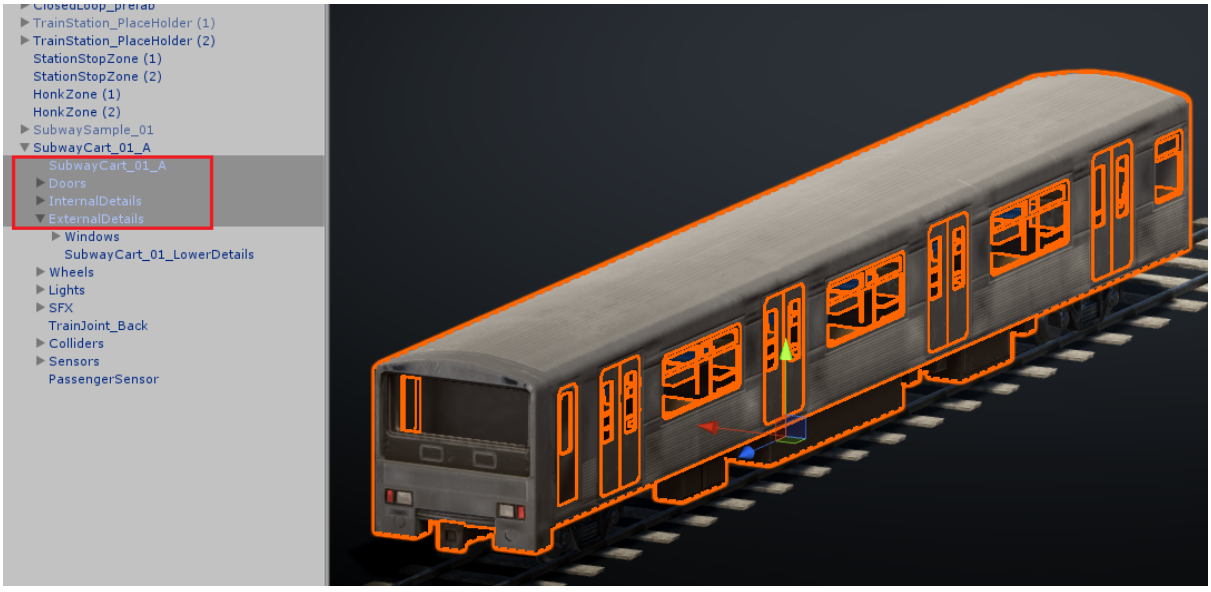
2. What 's New?

This section is about the new features included on this extension package. The main goal of this section is to give you a clear vision of what you can achieve with this package and the customization you will be able to do, if you desire so.

2.1. Modular Customizable Wagons

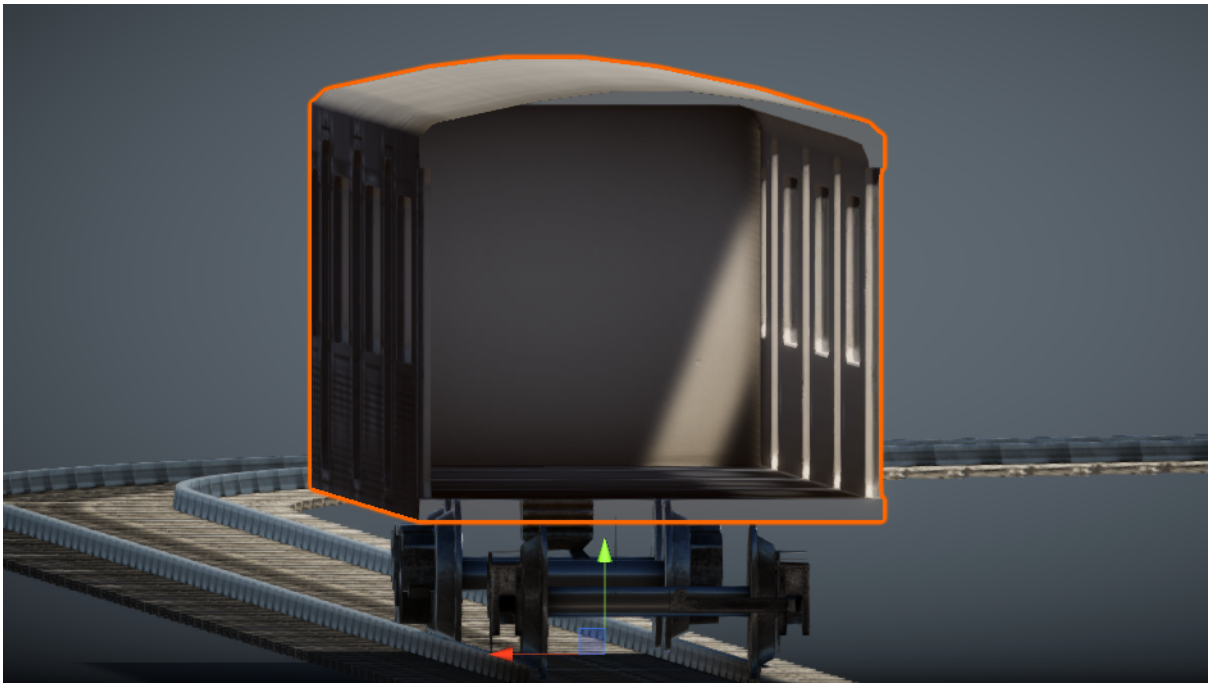
The new wagons prefabs are composed of several modular components that can be easily replaced by custom models. These components are:

- Wagon model
- Doors
- Internal Details
    - Control panel
    - Metal bars
    - Benches
    - Lamps
- External Details
    - Windows
    - Glass
    - Wagon lower details

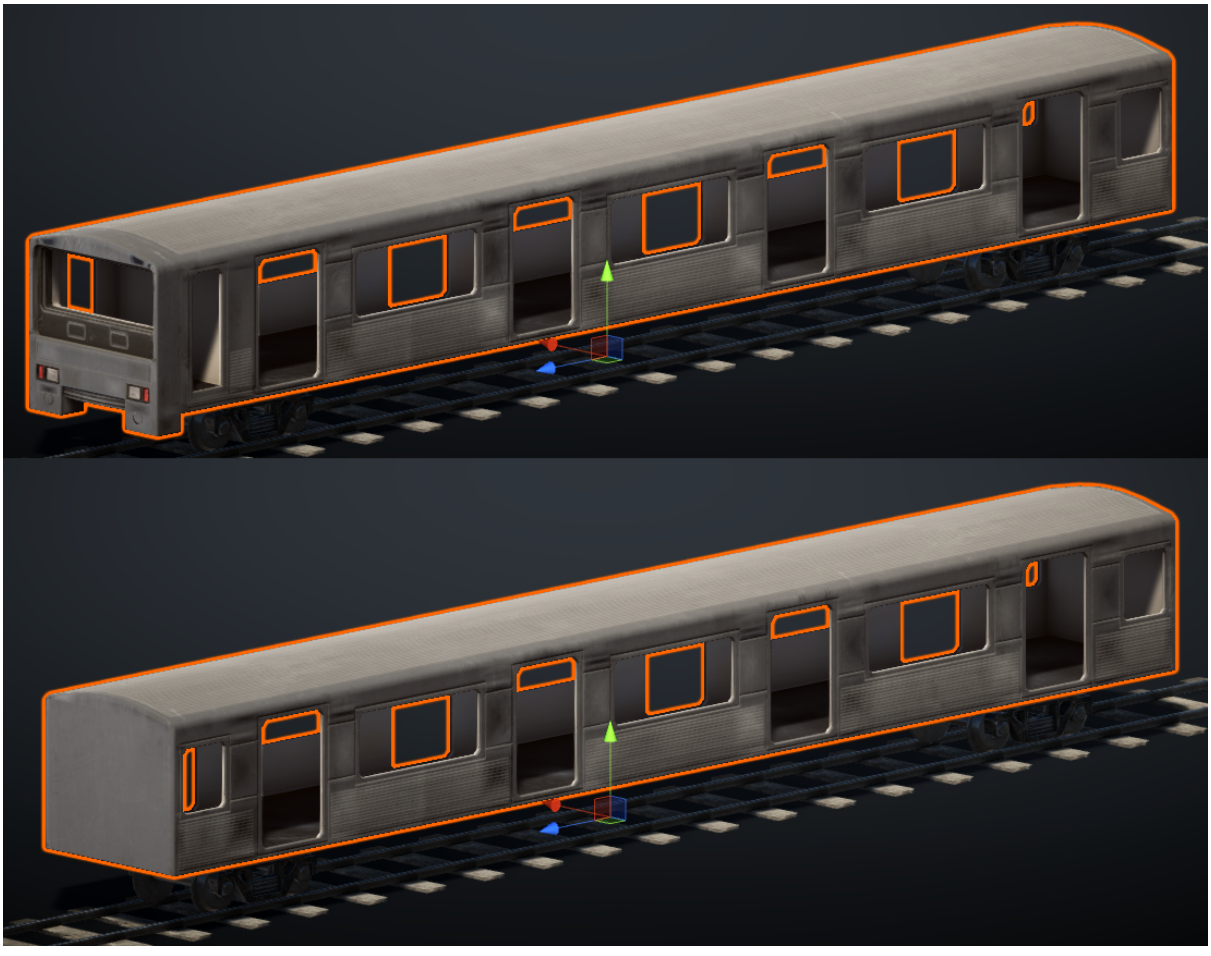


The wagon model is just a mesh with the external and internal walls of the wagon.

By keeping the wagon mesh separated from the details, it is possible for you to use your own custom wagon models if you wish.

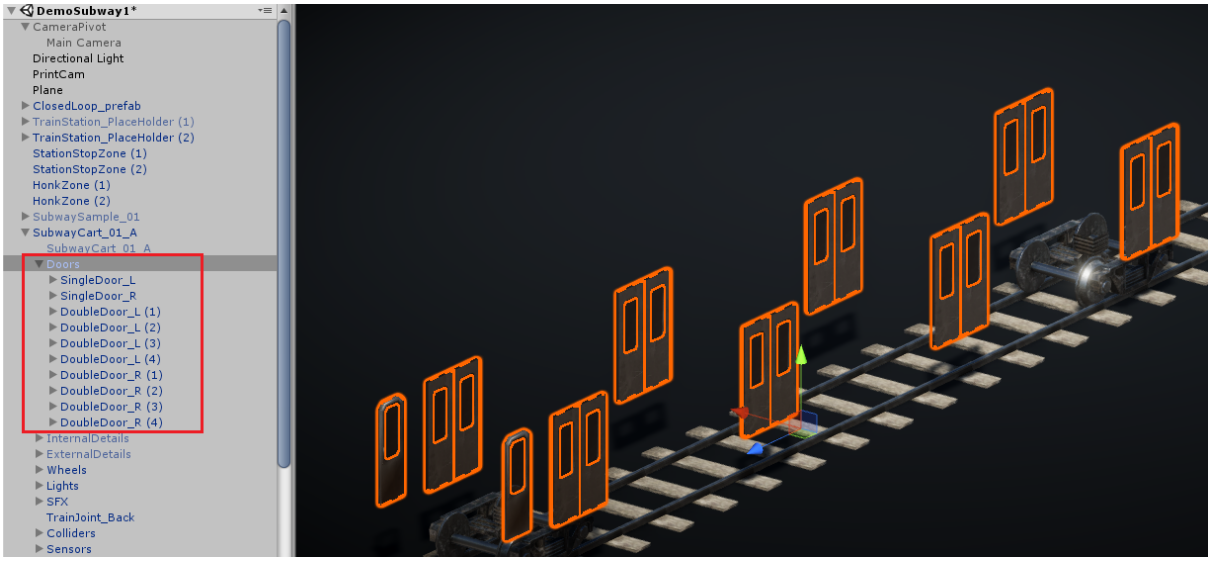


In this package, there are two wagon mesh variations: the locomotive wagon (SubwayCart_01_A) and passenger wagon (SubwayCart_01_B).



More wagon models may be included in the future and/or sold separately as extensions (Addons Available).

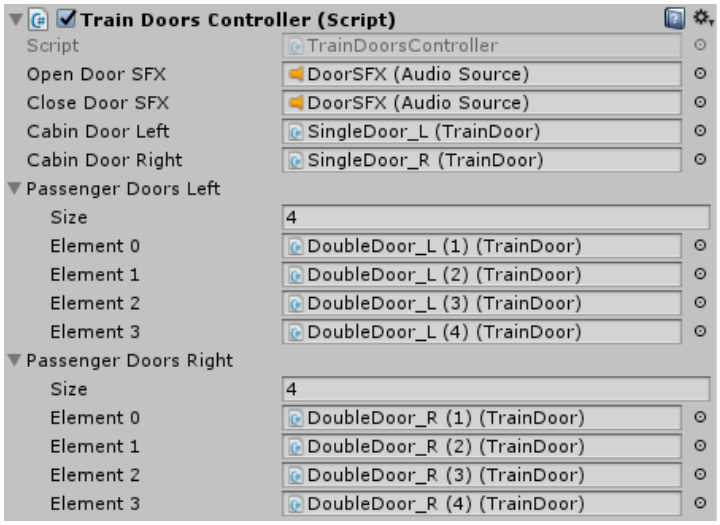
The doors are grouped under the “Doors” child object. But, each door is an individual prefab, animated and controlled by the “Train Door” script.



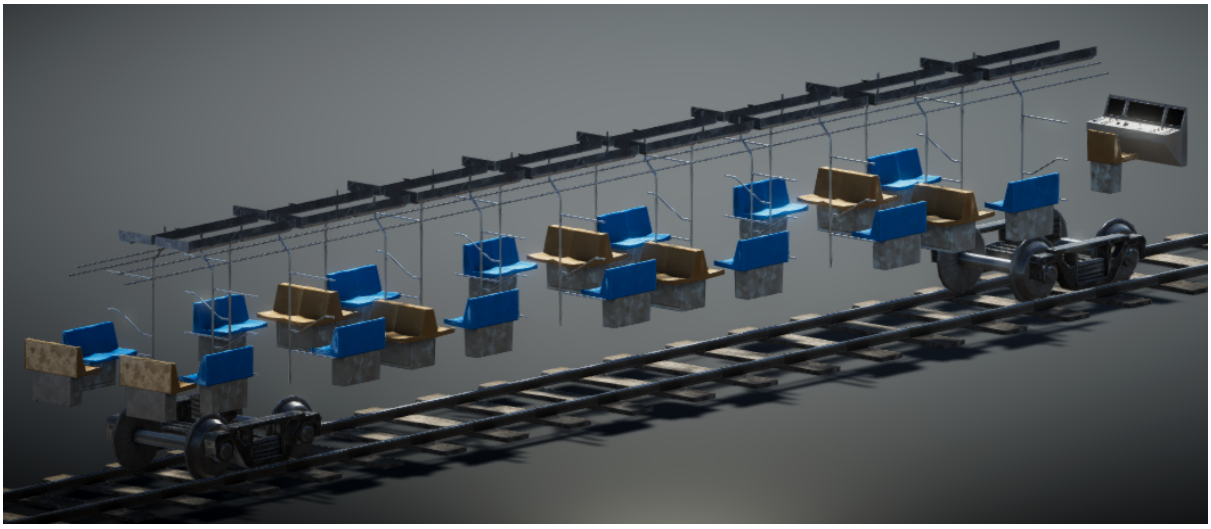
There are two types of door prefabs included in this package. Double and Single Sliding Doors.

These prefabs are in a ready to use state and can be used on custom wagons or replaced by custom door models. (Door glasses are also separated from the door mesh, so it also can be removed or replaced).

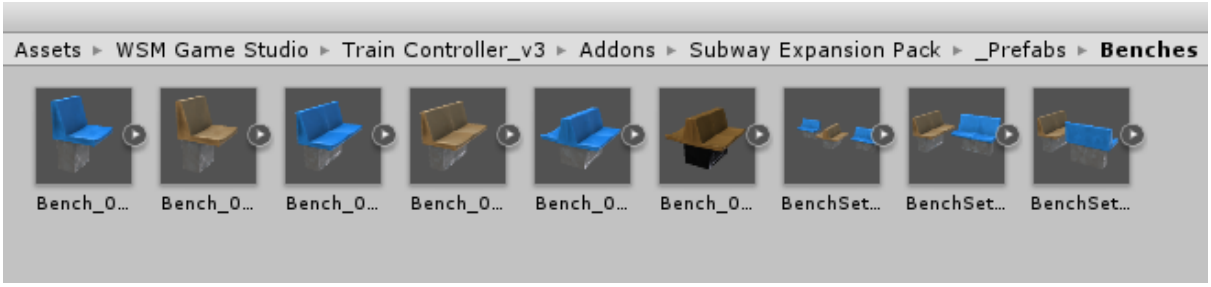
If you intend on replacing the doors, just use these prefabs as a starting point, replace the meshes and replace the doors on your wagons. Then, select your locomotive wagon and drag & drop your custom doors on the “Train Doors Controller” script.



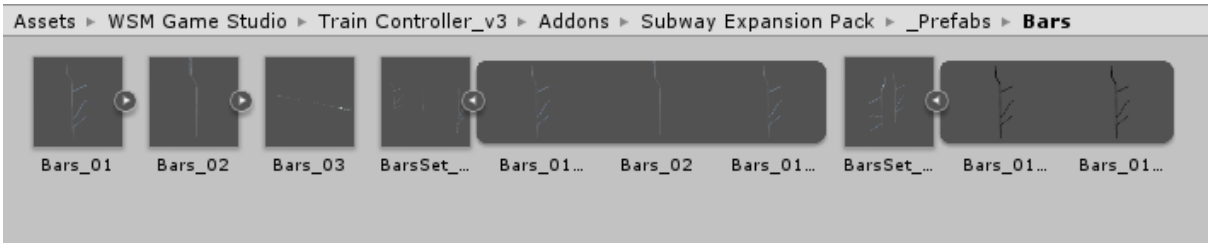
Internal details can also be customized. The default wagon includes benches, metal bars, lamps, a subway control panel and controls (buttons, levers, etc). All of them can be easily replaced by custom models if you wish.



There are several ready to use benches on the prefabs folder. Colliders are attached as child objects so you can easily disable them if you don't need them.



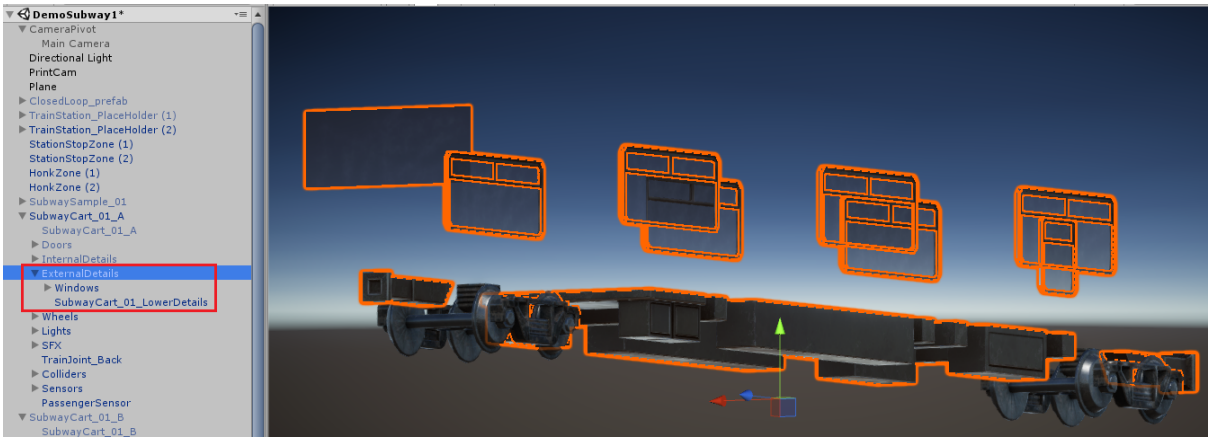
There are also metal bars prefabs.



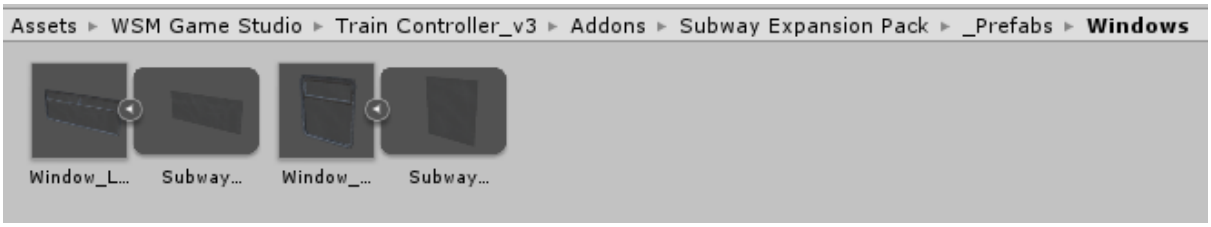
Buttons, levers, mic, switches and a control panel.

The Subway control panel can also be replaced by a custom model if you wish. Since buttons, switches and levers are modular, they can also be customized or animated.

The external details consist of the windows and train lower details.



There are two window prefabs (small and large). Windows glasses are separated from the windows frames, so they also can be replaced if you wish.



2.2. Door Animations

This package includes subway doors open and close Mecanim animations.

Since animations were made with Mecanim, this means you will be able to customize the animations in the Unity Editor if you wish.

2.3. How to Open and Close Doors

By default, when the subway reaches a station it will automatically open the passenger doors (See the Subway Stations section for more details).

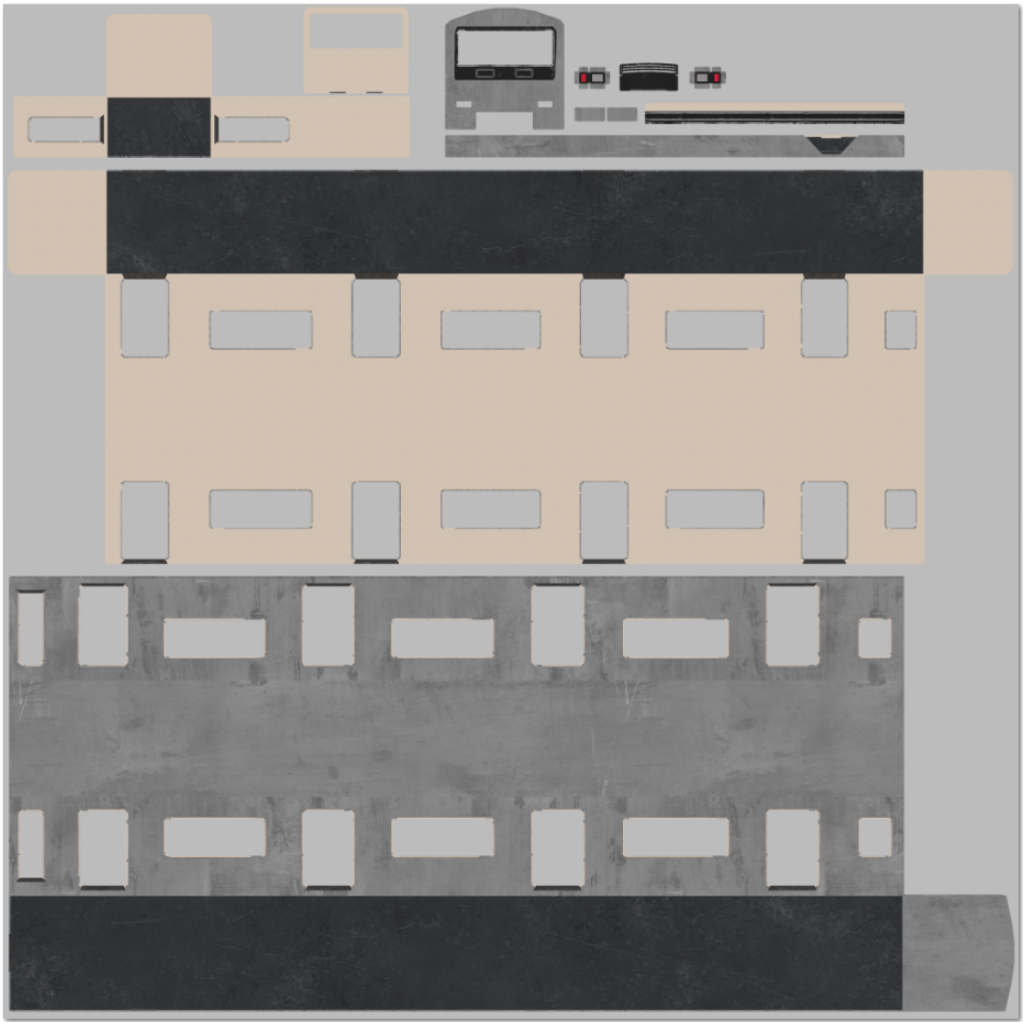
But, if you wish to open/close the doors at any other time, you can call the open/close methods directly from a button click event or from a custom script for example.

All you need to do is to call the methods from the “TrainDoorsController” script attached to your locomotive subway cart.

- “TrainDoorsController” script methods
    - Open Methods
        - OpenCabinDoorLeft()
        - OpenCabinDoorRight()
        - OpenPassengerDoors()
    - Close Methods
        - CloseCabinDoorLeft()
        - CloseCabinDoorRight()
        - ClosePassengerDoors()

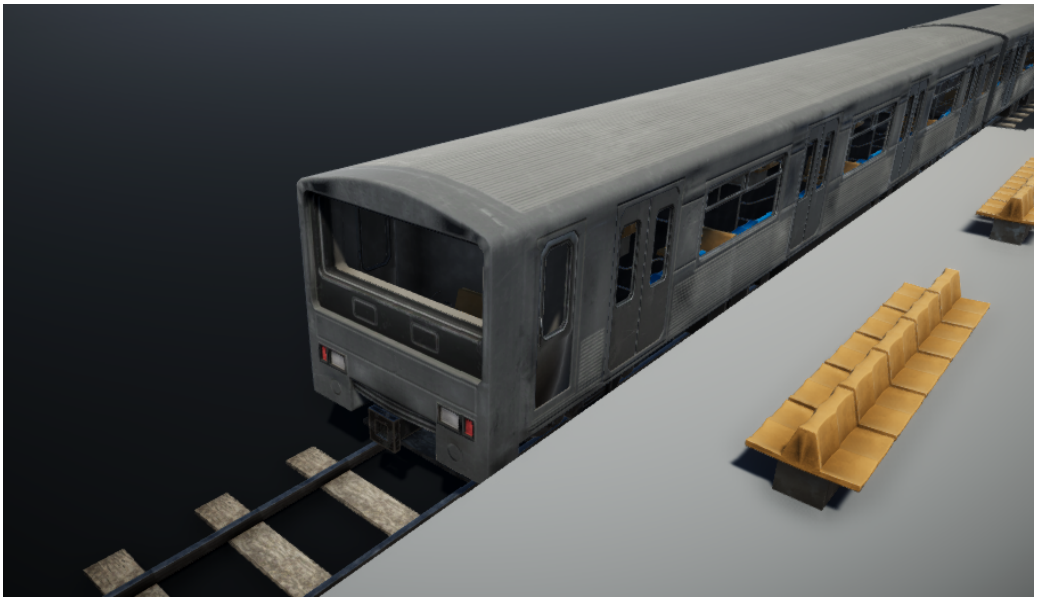
2.4. Texture Customization

All textures UV’s were carefully unwrapped to be sure they would be easy to customize on any image manipulation software (GIMP, Photoshop, etc).



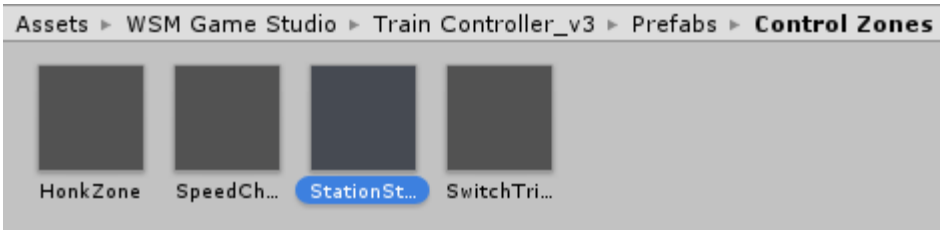
3. Subway Stations

In this section you will learn how to simulate Subway stations

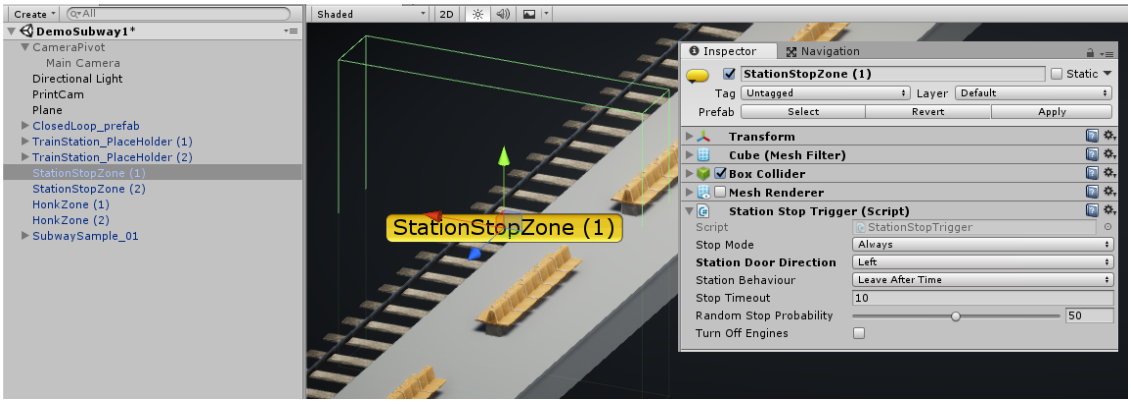


3.1 Stopping at the Station

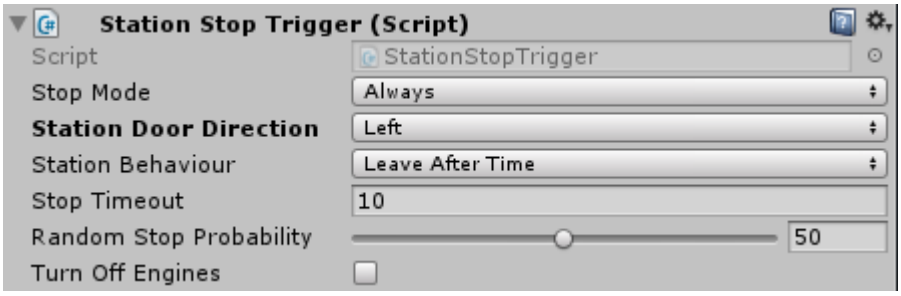
In the “Prefabs/Control Zones” folder you will find the “StationStopZone” prefab.



It can be used to simulate train station stops. Once a train hits a “StationStopZone” trigger, it will start braking until it stops.



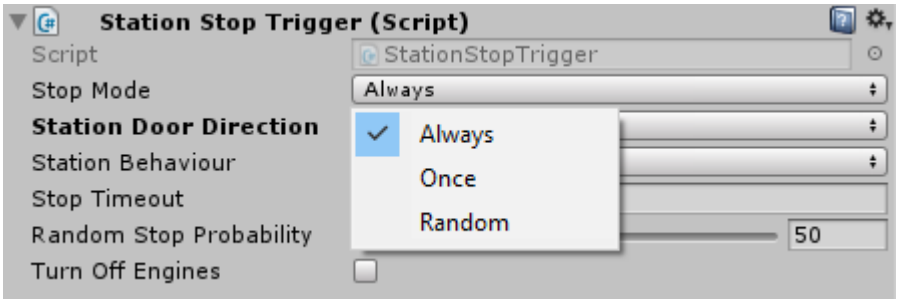
You can configure when the train should stop and how it behaves at the station after stopping.



3.1.1. Stop Mode

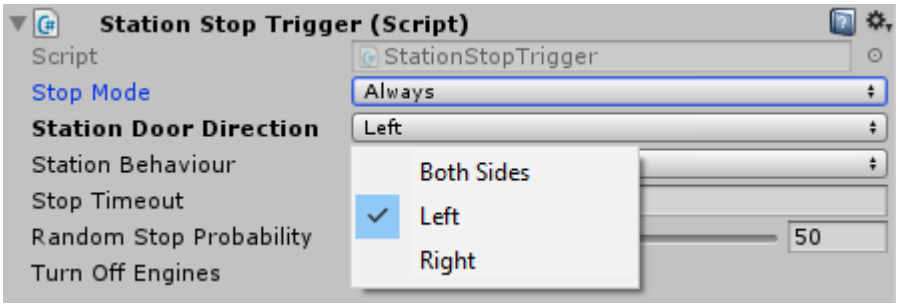
You can choose to always stop, stop only once or randomly stop at the station.

Random activation is controlled by the “Random Stop Probability” property, so you can fine tune if the train will stop more or less often.



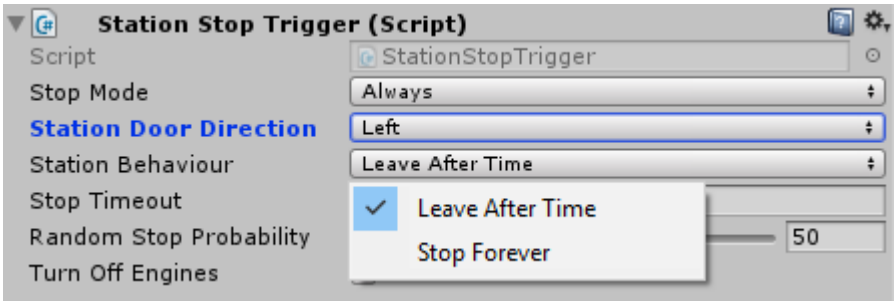
3.1.2. Station Doors Direction

Once the train reaches the station the passengers doors open automatically, Although, you need to set which direction the station is relative to the train. You can choose to open both left, right or both sides at once.



3.1.3. Stop Timeout

You can also choose to leave the station after some time or stay forever. The “Stop Timeout” property defines how many seconds the train will remain on station before leaving.

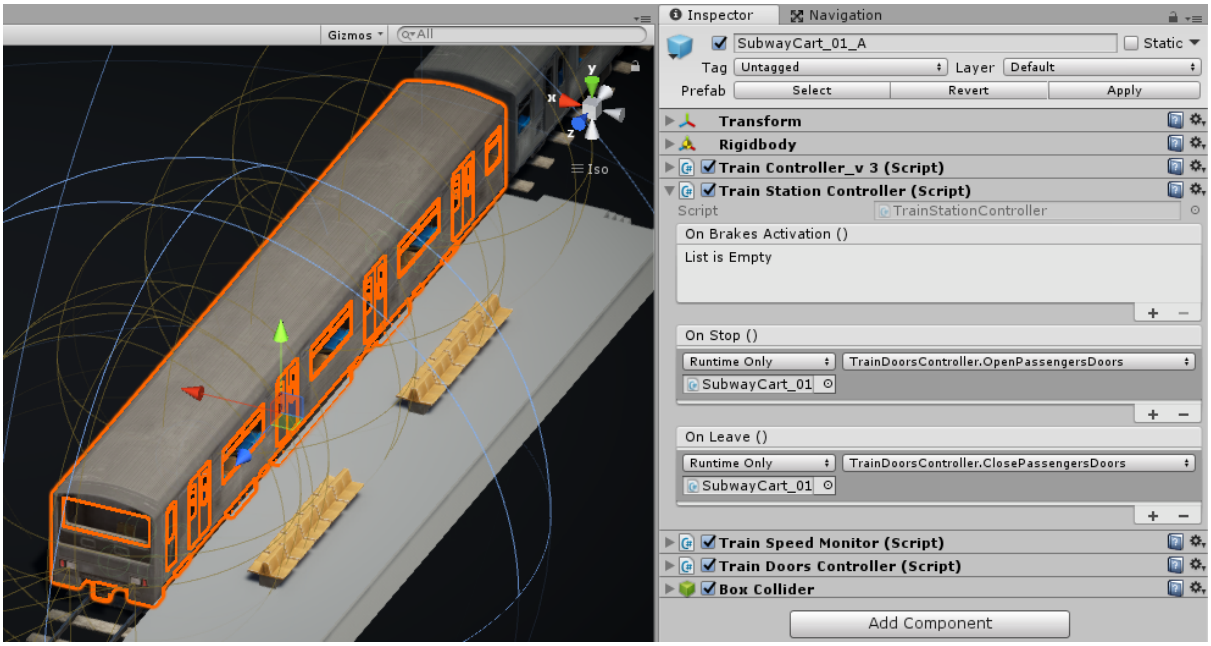


3.2. Station Custom Events

You can call a custom event stack whenever the train starts breaking, stops moving or leaves the train station.

Custom events should be set at the “Train Station Controller” script of each train. This allows each train to trigger different events at the scene if needed.

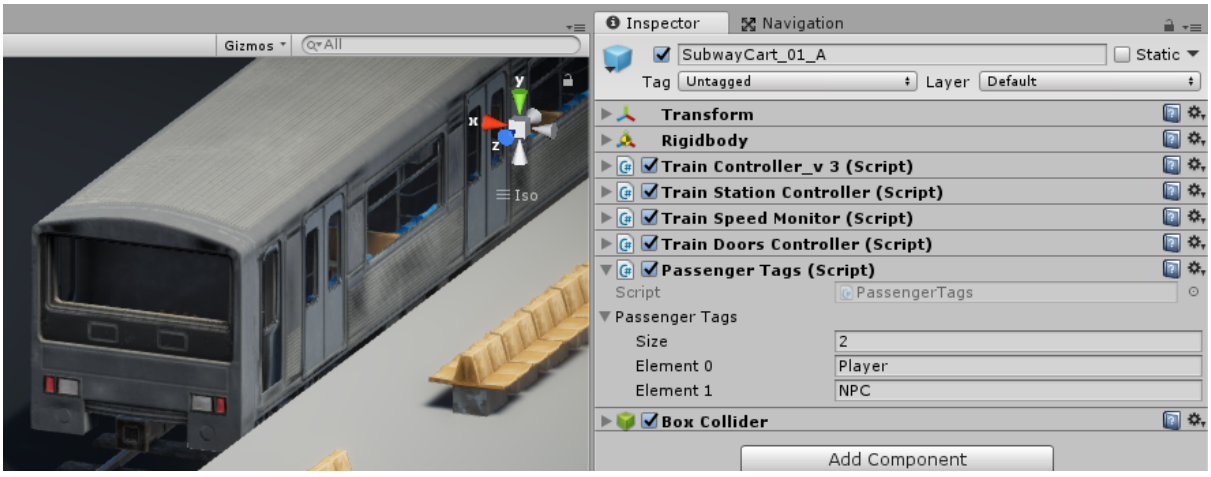
By default, the “On Stop” and “On Leave” events are used to open and close the passenger doors. But you can also include more custom methods to these events by clicking on the plus icon (+).



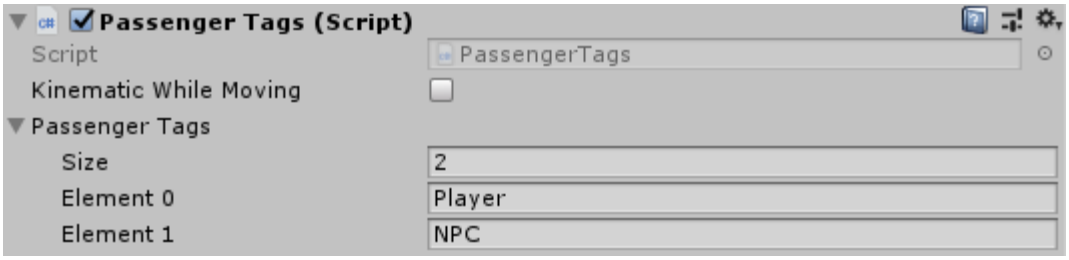
3.3. Attaching Passengers

This package includes a simple method for attaching passengers and objects to trains and carrying them as passengers or cargo.

By default, all attached objects are set as children and inherit the wagon's movement. It is the same technique used to attach characters to moving platforms.



It works by attaching automatically objects tagged as any of the configured passengers tags to the wagons, if the object is positioned inside a wagon. These tags are set at the “Passenger Tags” component attached to locomotives.



Note: If the ‘Kinematic While Moving“ property is enabled, any physics based object will be set to kinematic while the train is moving.

Since there are several character controllers available on the market, and even custom character controllers developed for singular projects, it is not possible to guarantee all character controllers will behave properly while attached to a wagon.

It all depends on how your character controller handles movement. For example, character controllers that use animation root motion, may not inherit parent objects movement, since the animation root motion can override the character position.

In general, if your character controller works properly with simple moving platforms and properly inherits position and rotation when set as children of a moving game object, it should work fine.

Note: Keep in mind that physics based trains will shake at higher speeds, just like real world trains. This could cause minor involuntary movement (sliding) on physics based character controllers, caused by the physics engine handling collisions and inertia. It may also induce motion sickness on First Person Character controllers.

If you intend to have passengers or characters riding the trains **it is highly recommended to use** spline based trains on your project.

4. Building a Subway Train

In this section you will learn how to build your custom subway train using the locomotive and wagons prefabs.

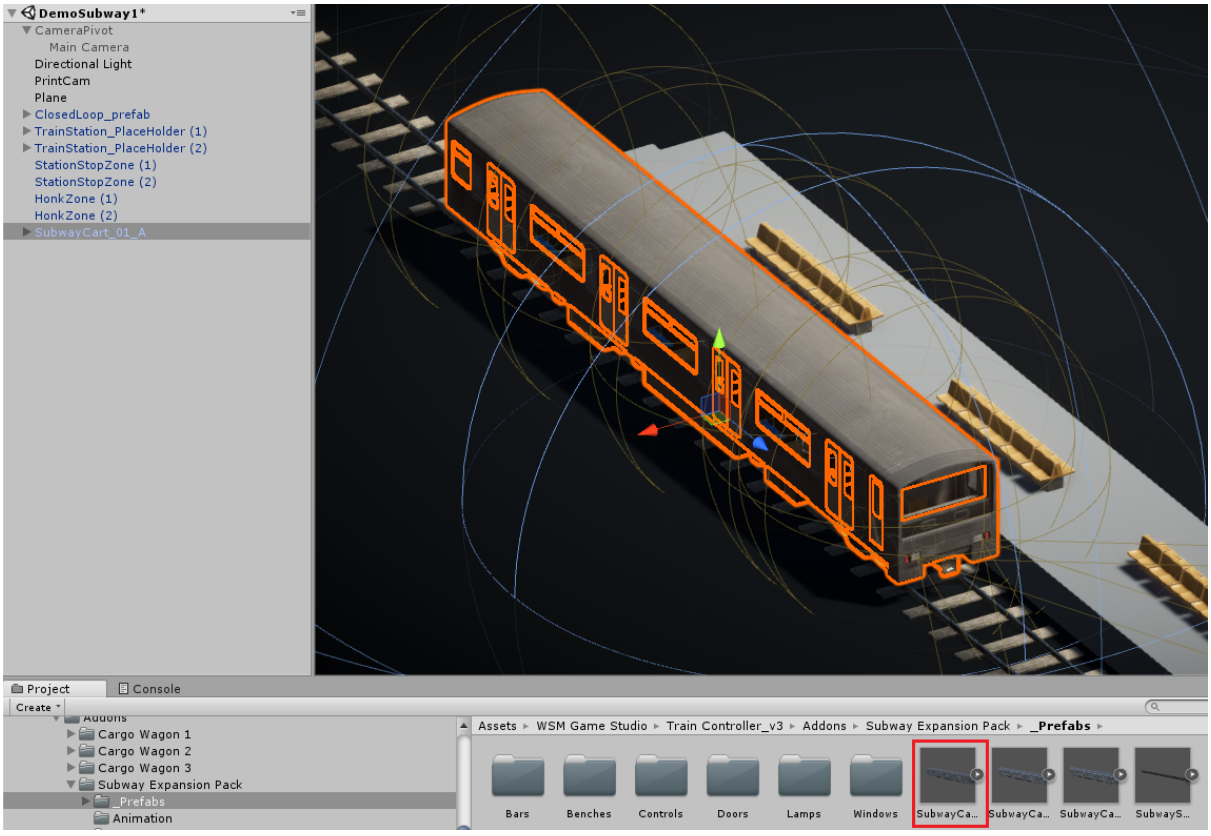
4.1. Connecting Wagons

A subway train is composed of three different types of wagons (A, B and C).

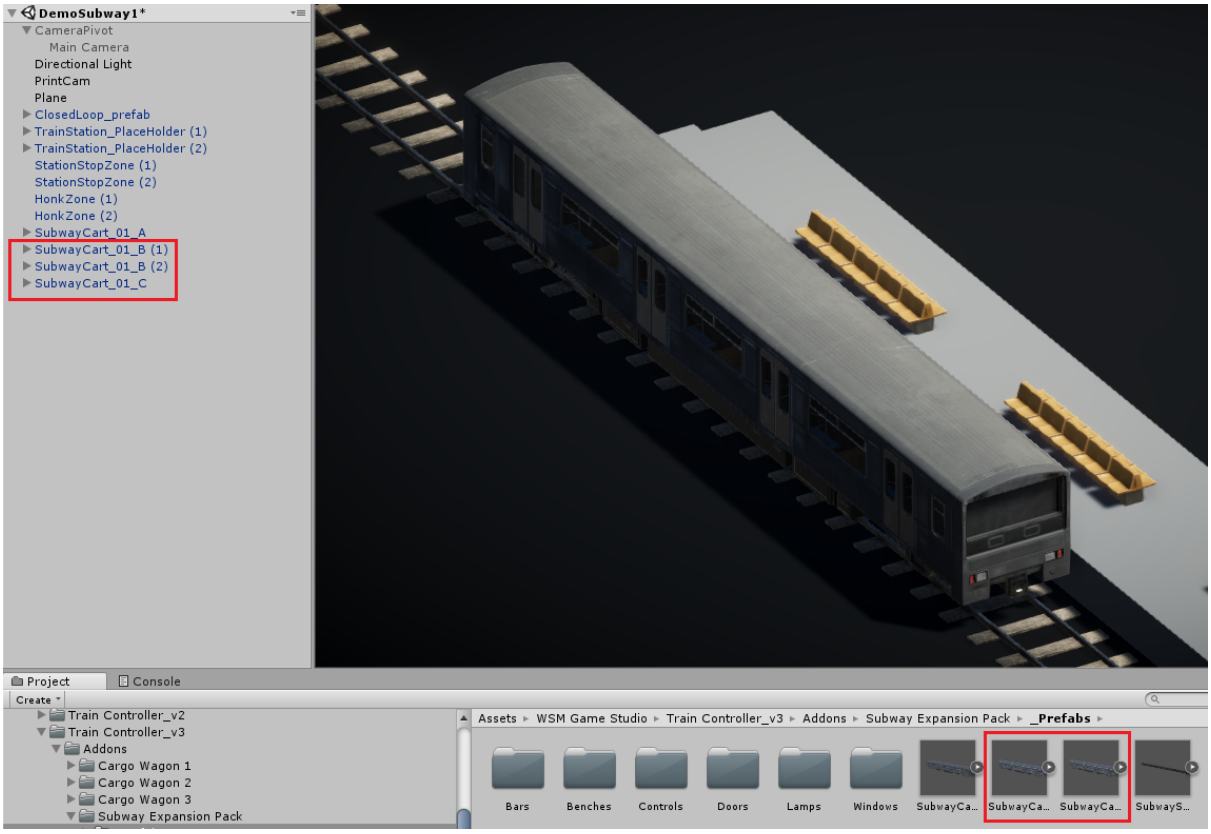
Wagon A, is the front wagon, and contains the conductor's cabin. It works as the locomotive that controls the entire subway train.

Wagon B, is the middle wagon, it contains only the passenger area. This wagon can be repeated as many times as you want to build a bigger subway train.
Wagon C, is the end of subway composition. It is optional, but it gives a right movement impression when using the reverse gear.

To start building your subway train, drag and drop the "SubwayCart_01_A" prefab on top of a straight rail segment.

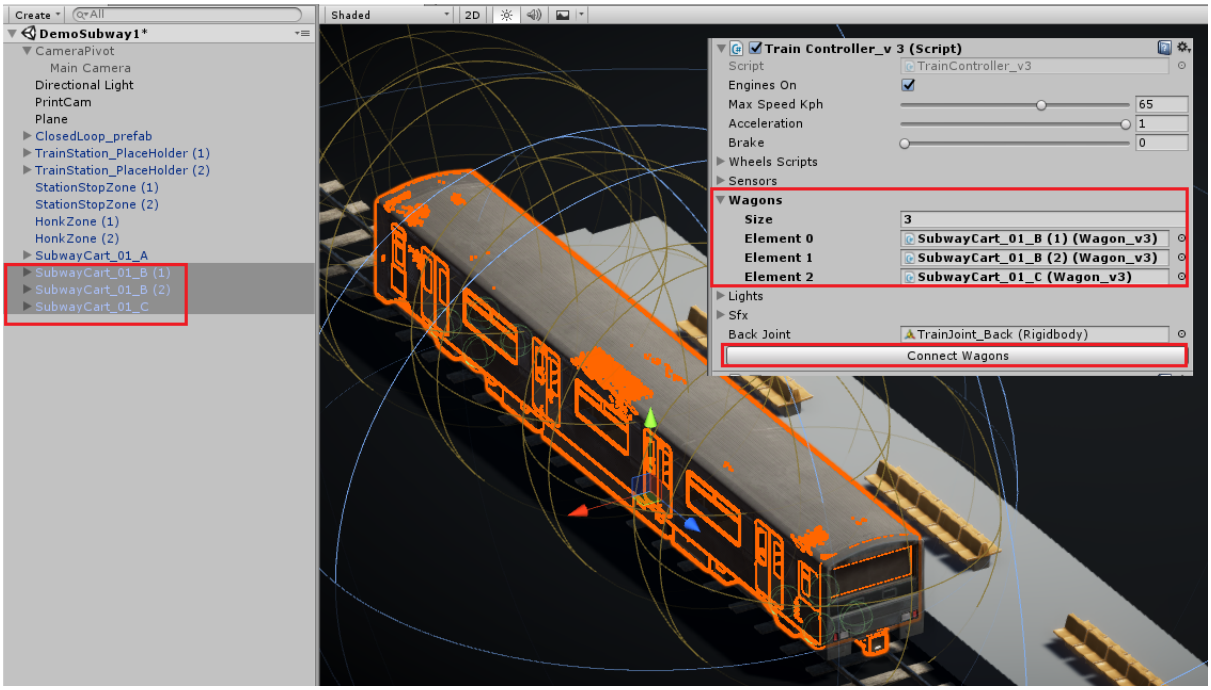


Drag & Drop "SubwayCart_01_B" wagon prefab on your scene, duplicate this wagon how many times as you want. Then, drag & drop "SubwayCart_01_C" as the last wagon (Optional).

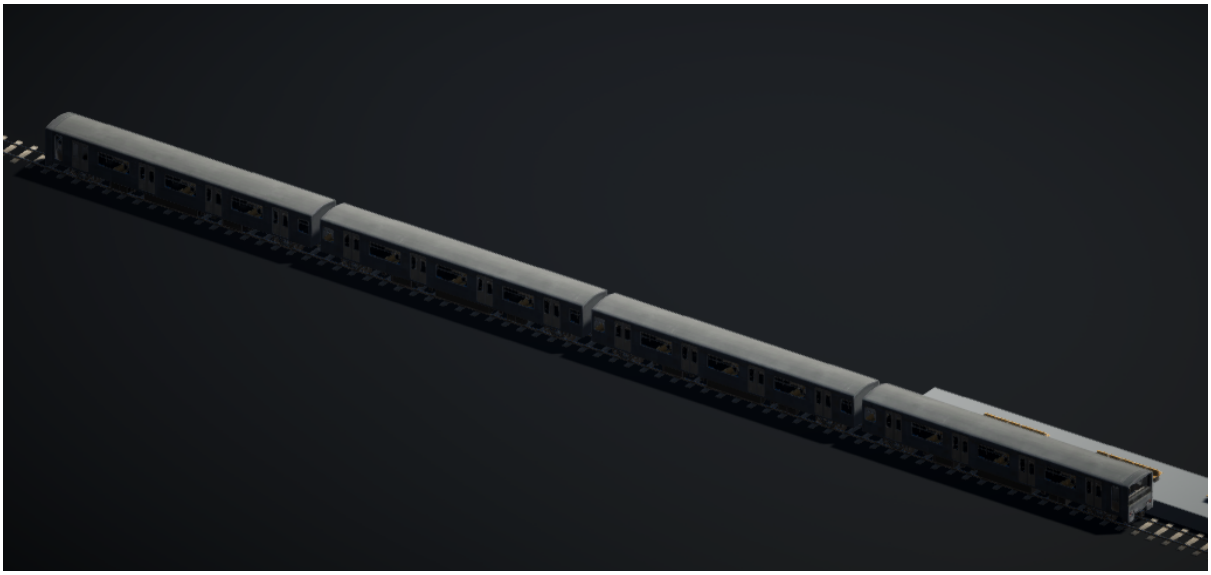


To connect the wagons, select all the B and C wagons on your scene and drag & drop them on the “Wagons” list property of the “Train Controller” script attached to the “SubwayCart_01_A” on our scene.

Then, click the “Connect Wagons” button.



All the wagons will be repositioned automatically behind the locomotive, following the wagons list order.



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- Unity editor version
- Detailed description of the issue (including screenshots if possible)

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