Simple scenarios

This file represents a simple scenario in the OpenSCENARIO XML format that can be called by another modular scenario file to create complex simulation setups. The provided code represents a basic maneuver sequence scenario where a vehicle follows specific actions based on triggers and conditions.

File Structure

The file has the following primary sections:

- <ManeuverGroup>: Defines a sequence of maneuvers that an entity follows to complete the simple scenario. For more details about the details of this tag and all the other tags, the following link can be checked: [Overview UML OpenSCENARIO (asam.net)]

- <Actors>: Specifies the entities (vehicles) involved in the maneuver group.
- <Maneuver>: Describes a specific maneuver within the maneuver group.
- <Event>: Represents an event occurring within the maneuver.
- <Action>: Defines an action taking place as part of the event. It encapsulates a specific action that will be executed as part of the scenario. It represents a behavior or task that an actor should perform. The <action> tag is composed of some components:
- <PrivateAction>: This tag is a container for the specific action that will be executed. It contains a tag.
- <LongitudinalAction>: specifies a longitudinal action that deals with setting the longitudinal characteristics of the actor.
- <SpeedActionDynamics>: It defines dynamics related to the longitudinal action. It has show the parameter attributes that are going to be used in this tag.
- <SpeedActionTarget>: It defines a target speed for an action. The target speed can either be relative or absolute, depending on which element is used in the instance.
- <StartTrigger>: Specifies the conditions triggering the event's initiation.
- <ParameterTag> tag is used to provide parameters or settings that will be used when executing the simple scenario . It has a key-value pair.

All the tags introduced previously are all standard tags for the OpenSCENARIO format, the only difference residing in the simple file is inside the tags containing parameters that need to be changed according to the main modular scenario.

For example We have the following lines in the modular scenario:

```
Example<ScenarioReference scenarioFileName="simple_1.xosc">
  <ParameterReference key="value" value="20"/>
  <ParameterReference key="delay" value="10.0"/>
  <ParameterReference key="conditionEdge" value="10.555"/>
</ScenarioReference>
```

These lines mean that the parameters declared here are going to be assigned new values from the modular scenario file.

So, these parameters should be declared in a different way inside the simple scenario file. This way consists of having the two attributes, one is for parameterAttributes and one is for their value.

```
<SpeedActionTarget>
  <AbsoluteTargetSpeed parameterAttributes="value" value="10"/>
</SpeedActionTarget>
```

Usage in Modular scenarios

This simple scenario, encapsulated in the provided XML code, can be incorporated into a larger modular scenario within the CARLA simulator. By combining various components like this one, complex simulation scenarios can be built and evaluated.

Using simple scenarios

To utilize this simple scenario in CARLA simulator, follow these steps:

- Save the provided code as an xosc file (e.g., "simple_scenario.xosc").
- Load CARLA simulator.
- Integrate the simple scenario into a larger modular scenario's Xosc file using scenario reference tag.
- Use the program modular2simple to generate a runable scenario from the modular scenario.
- Run the resulting scenario using Carla scenario runner.