**Scenario Details:**

Here, the scenarios that are generated using the pyoscx Python package are discussed in detail. In total, 15 scenarios across different road locations, namely single lane, multi-lane, 3-way intersection, and 4-way intersection, have been created. The short description of the scenarios, the actor details, and the corresponding road locations are described below.

**Scenario 1: hero\_and\_adversary\_on\_the\_same\_lane**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of the road, which is randomly selected. An adversary vehicle or other vehicle will start in front of the hero vehicle on the same lane, driving for a moment and suddenly braking for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving until the end of the road.

**Actors involved:** one hero vehicle, and one adversary vehicle.

**Available Road Locations:** single lane or multi lane.

**Scenario 2: hero\_and\_pedestrian\_crossing\_in\_front**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of the road, which is randomly selected. A pedestrian will start crossing in front of the hero vehicle from the sidewalk, walking for a moment and suddenly stopping for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the pedestrian. This scenario will come to an end when the hero vehicle completes the route by driving till the end of the road.

**Actors involved:**  one hero vehicle, and one pedestrian.

**Available Road Locations:** single lane or multi lane.

**Scenario 3: hero\_and\_bicycle\_crossing\_in\_front**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of the road, which is randomly selected. A cyclist will start crossing in front of the hero vehicle from the sidewalk, riding for a moment and suddenly stopping for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the cyclist. This scenario will come to an end when the hero vehicle completes the route by driving till the end of the road.

**Actors involved:**  one hero vehicle, and one bicycle.

**Available Road Locations:** single lane or multi lane.

**Scenario 4: hero\_and\_bicycle\_on\_the\_same\_lane**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of the road, which is randomly selected. A cyclist will start in front of the hero vehicle on the same lane, riding at a slow pace for a moment and suddenly braking for some time before starting to ride again at a slower pace. The hero vehicle will have to act accordingly to avoid collision with the cyclist. This scenario will come to an end when the hero vehicle completes the route by driving until the end of the road.

**Actors involved:**  one hero vehicle, and one bicycle.

**Available Road Locations:** single lane or multi lane.

**Scenario 5: hero\_adversary\_and\_bicycle\_on\_the\_same\_lane**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of the road, which is randomly selected. A cyclist will start in front of the hero vehicle on the same lane, riding at a slow pace for a moment and suddenly braking for some time before starting to ride again at a slower pace. Whereas, an adversary vehicle or other vehicle will start in front of the cyclist and the hero vehicle on the same lane and will start driving away from the beginning. The hero vehicle will have to act accordingly to avoid collision with the cyclist and the adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving until the end of the road.

**Actors involved:**  one hero vehicle, one bicycle and one adversary vehicle.

**Available Road Locations:** single lane or multi lane.

**Scenario 6: hero\_and\_adversary\_same\_direction\_route**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. An adversary vehicle or other vehicle will start in the same direction as the hero vehicle on one of the incoming roads, resulting in the adversary vehicle ending up in front of or behind the hero vehicle on the same lane in one of the incoming roads. The adversary vehicle will drive for a moment and suddenly brake for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, and one adversary vehicle.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 7: hero\_and\_adversary\_different\_direction\_route**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. An adversary vehicle or other vehicle will start in a different direction adjacent to the hero vehicle on one of the incoming roads, resulting in the adversary vehicle ending up crossing the hero vehicle's path at the intersection. The adversary vehicle will drive for a moment and suddenly brake for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, and one adversary vehicle.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 8: hero\_and\_pedestrian\_crossing\_in\_front**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. A pedestrian will start in front of the hero vehicle's path from the sidewalk on the hero's starting incoming road or on the hero's route completion road, resulting in the pedestrian surely crossing the hero vehicle's path. The pedestrian will walk for a moment and suddenly stop for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the pedestrian. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, and one pedestrian.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 9: hero\_adversary\_and\_pedestrian\_crossing\_in\_front**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. A pedestrian will start in front of the hero vehicle's path from the sidewalk on the hero's starting incoming road or on the hero's route completion road, resulting in the pedestrian surely crossing the hero vehicle's path. Whereas, an adversary vehicle or other vehicle will start in a different direction adjacent to the hero vehicle on one of the incoming roads, resulting in the adversary vehicle ending up crossing the hero vehicle's path at the intersection and will start driving away from the beginning. The pedestrian will walk for a moment and suddenly stop for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the pedestrian and the adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, one adversary vehicle and one pedestrian.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 10: hero\_bicycle\_and\_pedestrian\_crossing\_in\_front**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. A pedestrian will start in front of the hero vehicle's path from the sidewalk on the hero's starting incoming road or on the hero's route completion road, resulting in the pedestrian surely crossing the hero vehicle's path. Whereas, a cyclist will start in a different direction adjacent to the hero vehicle on one of the incoming roads, resulting in the cyclist ending up crossing the hero vehicle's path at the intersection and will start riding away at a slower pace from the beginning. The pedestrian will walk for a moment and suddenly stop for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the pedestrian and the adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, one bicycle and one pedestrian.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 11: hero\_and\_2\_pedestrians\_crossing\_in\_front**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. Two pedestrians will start in front of the hero vehicle's path from the sidewalk on the hero's starting incoming road or on the hero's route completion road, resulting in both pedestrians surely crossing the hero vehicle's path at different locations. Both pedestrians will walk for a moment and suddenly stop for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the two pedestrians. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, and two pedestrians.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 12: hero\_adversary\_and\_2\_pedestrians\_crossing\_in\_front**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. Two pedestrians will start in front of the hero vehicle's path from the sidewalk on the hero's starting incoming road or on the hero's route completion road, resulting in both pedestrians surely crossing the hero vehicle's path at different locations. Whereas, an adversary vehicle or other vehicle will start in a different direction adjacent to the hero vehicle on one of the incoming roads, resulting in the adversary vehicle ending up crossing the hero vehicle's path at the intersection and will start driving away from the beginning. Both pedestrians will walk for a moment and suddenly stop for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the two pedestrians and an adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, two pedestrian and one adversary vehicle.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 13: hero\_and\_bicycle\_same\_direction\_route**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. A cyclist will start in the same direction as the hero vehicle on one of the incoming roads, resulting in the cyclist ending up in front of or behind the hero vehicle on the same lane in one of the incoming roads. The cyclist will ride for a moment and suddenly brake for some time before starting to ride away. The hero vehicle will have to act accordingly to avoid collision with the cyclist. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, and one bicycle.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 14: hero\_and\_bicycle\_opposite\_direction\_route**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. A cyclist will start in a different direction adjacent to the hero vehicle on one of the incoming roads, resulting in the cyclist ending up crossing the hero vehicle's path at the intersection. The cyclist will drive for a moment and suddenly brake for some time before starting to move away. The hero vehicle will have to act accordingly to avoid collision with the cyclist. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, and one bicycle.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.

**Scenario 15: hero\_and\_bicycle\_same\_direction\_adversary\_opposite\_route**

In this scenario, the hero vehicle or ego vehicle will start at the beginning of the left or right lane of one of the incoming roads to an intersection, depending on the driving direction of the incoming roads. A cyclist will start in the same direction as the hero vehicle on one of the incoming roads, resulting in the cyclist ending up in front of or behind the hero vehicle on the same lane in one of the incoming roads. Whereas, an adversary vehicle or other vehicle will start in a different direction adjacent to the hero vehicle on one of the incoming roads, resulting in the adversary vehicle ending up crossing the hero vehicle's path at the intersection and will start driving away from the beginning. The cyclist will ride for a moment and suddenly brake for some time before starting to ride away. The hero vehicle will have to act accordingly to avoid collision with the cyclist and the adversary vehicle. This scenario will come to an end when the hero vehicle completes the route by driving from one of the incoming roads through the intersection to the end of the other incoming road.

**Actors involved:**  one hero vehicle, one adversary vehicle and one bicycle.

**Available Road Locations:** 3-way Intersection or 4-way Intersection.