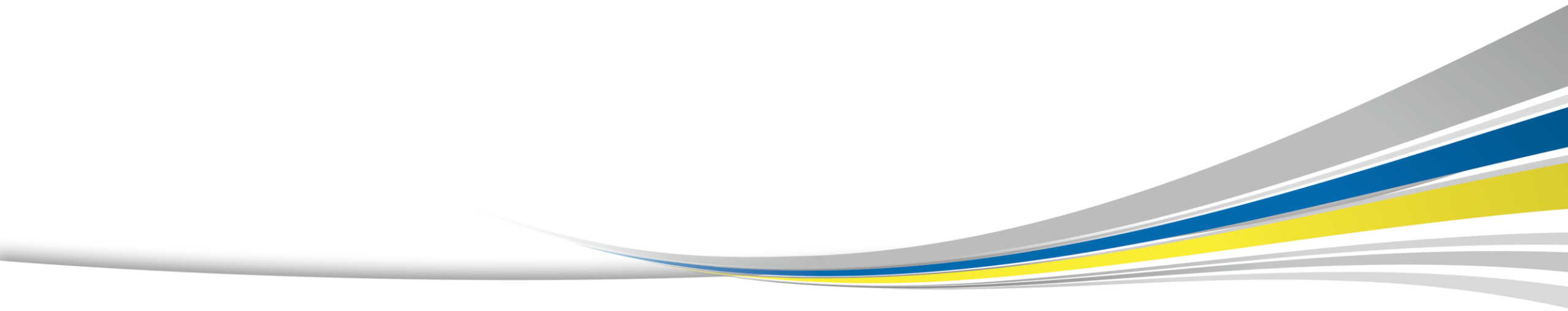
인천 대학교 자율주행 소프트웨어 챌린지

2차 소과제 – Create Road Model 모범 답안

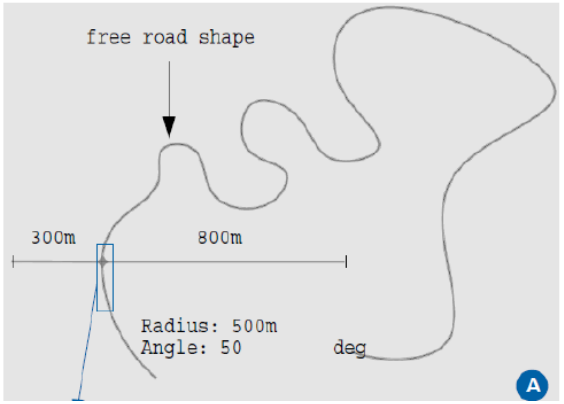


SOLUTIONS FOR VIRTUAL TEST DRIVING

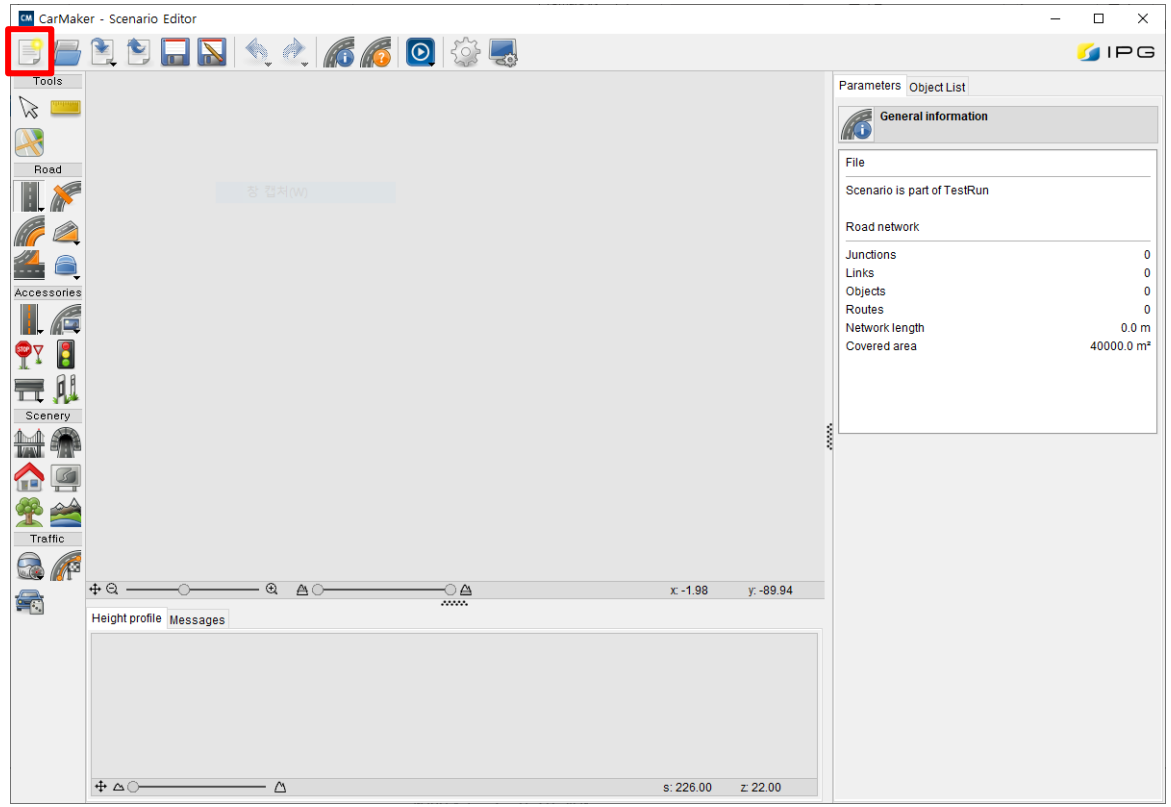
IPG AUTOMOTIVE

소과제 #2

Road Model 생성 - 기본 형상 생성



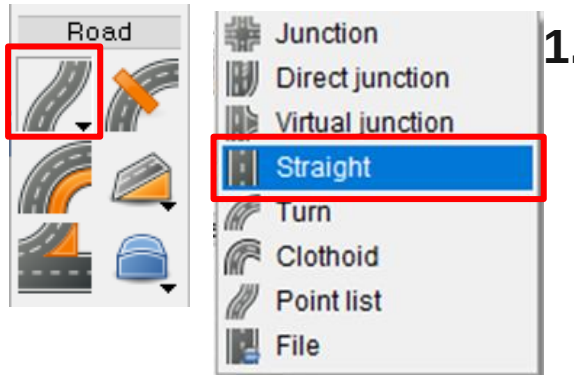
- CarMaker Main GUI > Parameters > Scenario/Road
  -  New Road definition을 이용하여 새로운 Road model 생성



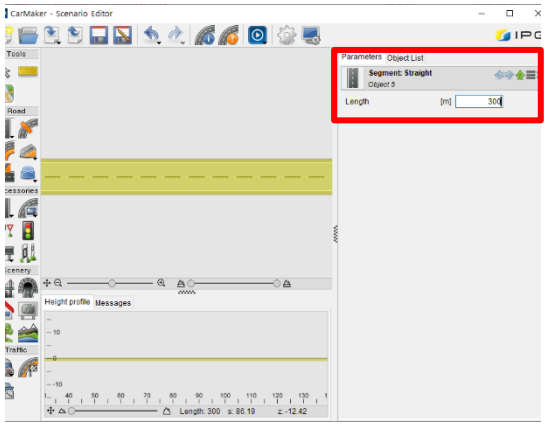
소과제 #2

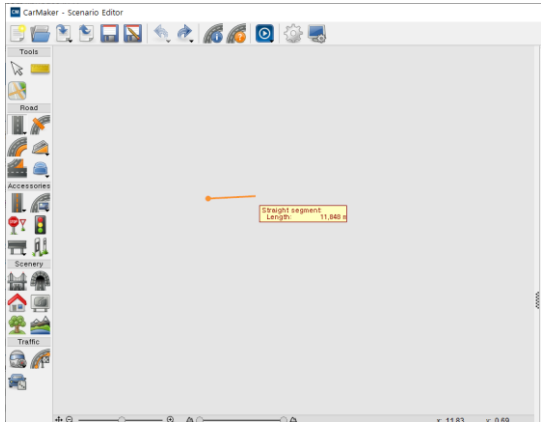
Road Model 생성 - 기본 형상 생성

- Ⓐ 직진 Segment 생성

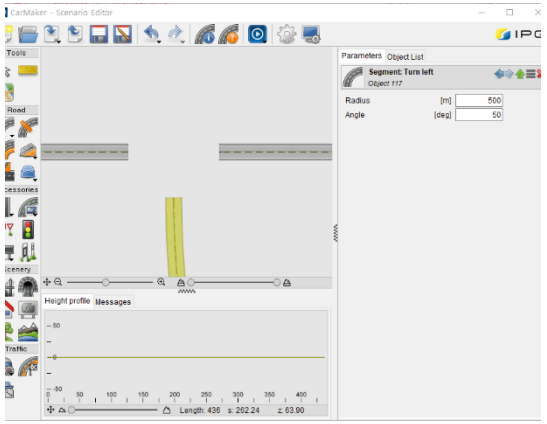


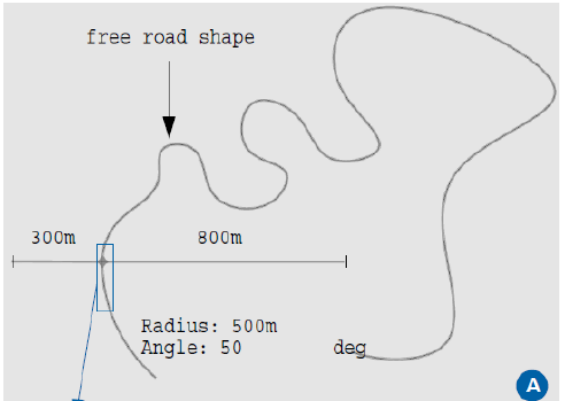
1. Road > Road segment > Straight선택





2. Segment 시작 위치에 오른쪽 마우스 클릭하여 주황색 점 생성





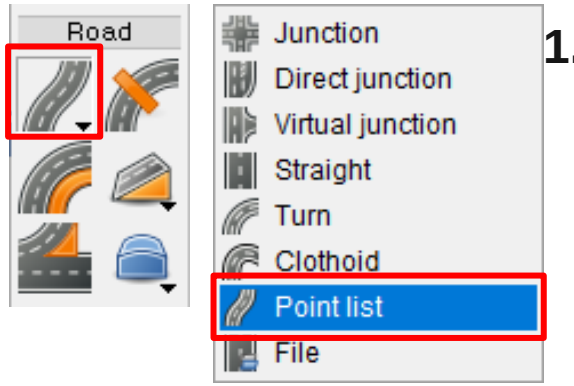
3. 마우스를 움직여 Straight segment 생성.(300m 구간) 동일한 방법으로 같은 x축 선상에 800m 직진 Link 생성

4. Road > Road segment > Turn 선택 후 Radius 500m, Angle 50 deg의 Link 생성

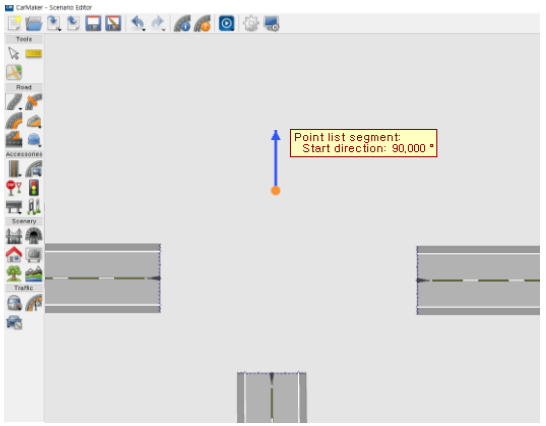
소과제 #2

Road Model 생성 - 기본 형상 생성

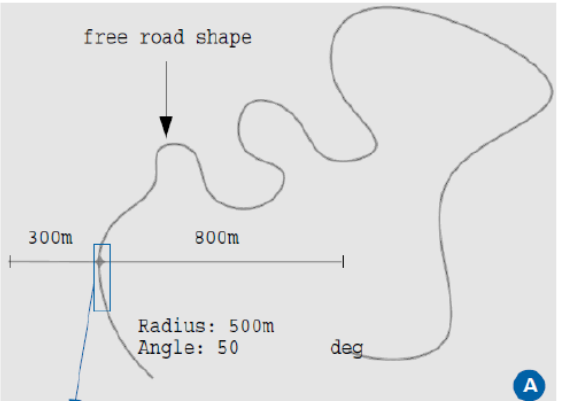
- Ⓐ free road shape 생성 - 1

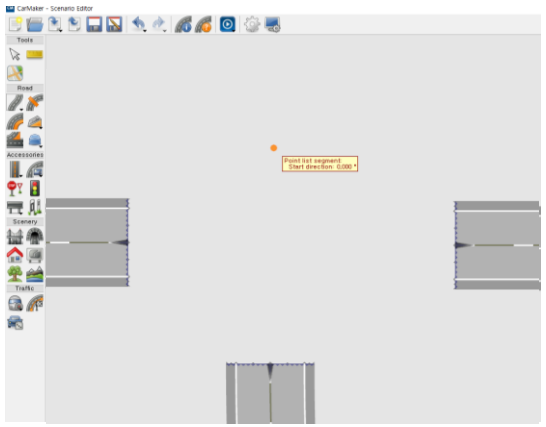


1. Road > Road segment > Point list 선택

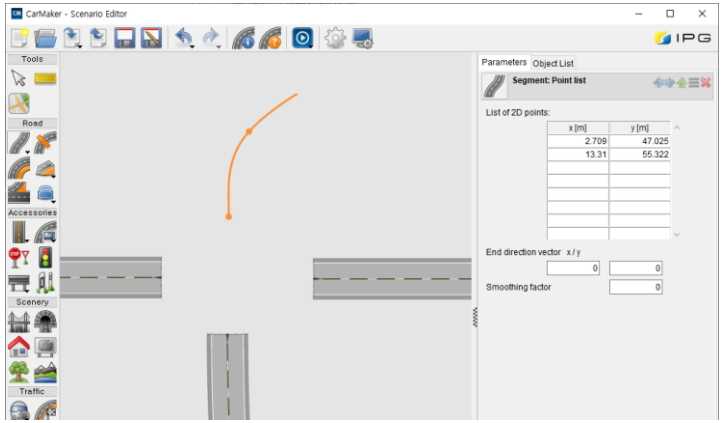


3. 마우스를 움직여 Segment의 시작 방향인 파란색 화살표 방향을 고려하여 Segment 시작 구성





2. Segment 시작 위치에 오른쪽 마우스 클릭하여 주황색 점 생성

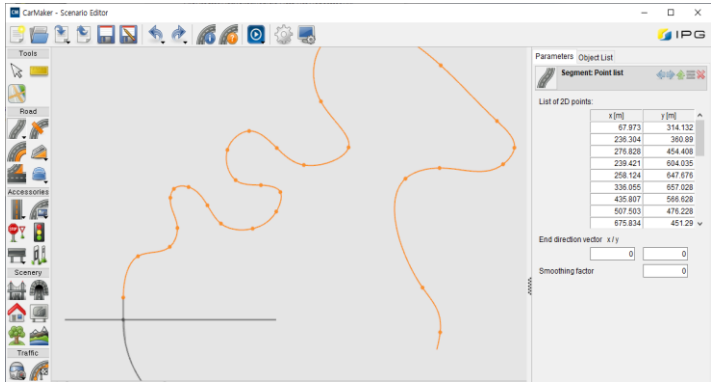


4. 주황색 점선과 실선을 연결하며 Ⓐ 와 유사하게 Road 구성

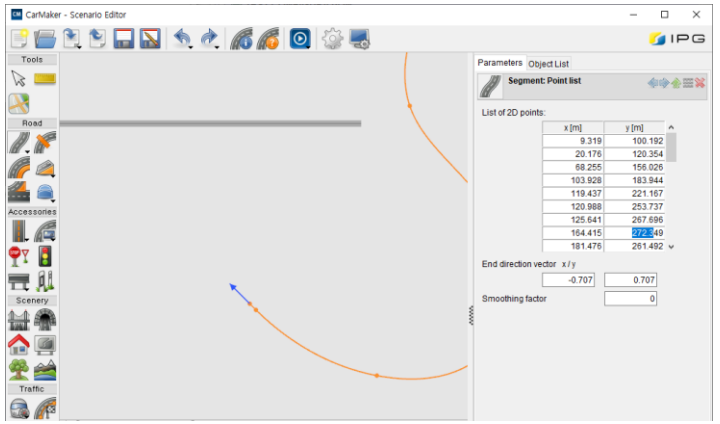
소과제 #2

Road Model 생성 - 기본 형상 생성

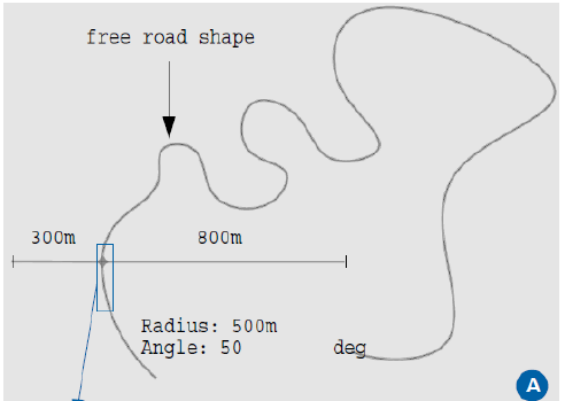
- Ⓐ free road shape 생성 - 2



5. Ⓐ 와 유사하게 Road 구성

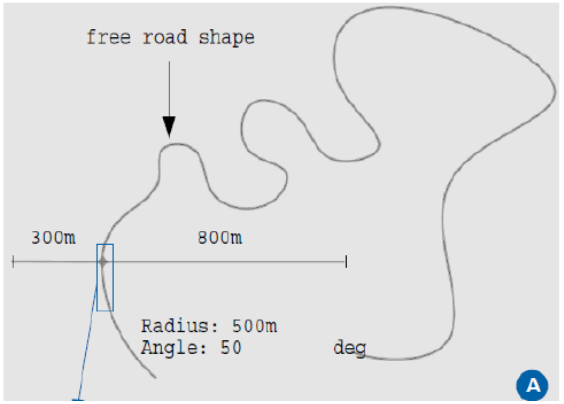


6. 마지막 지점에서 마우스 왼쪽 버튼 더블 클릭 후 Segment의 End node의 방향을 고려하여 마우스 왼쪽 버튼 클릭

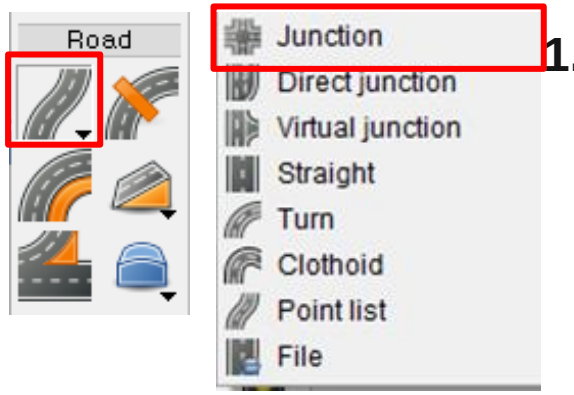


소과제 #2

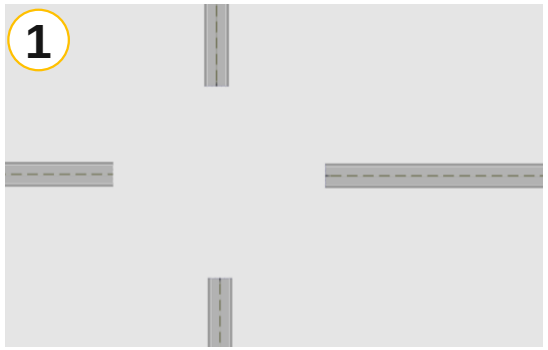
Road Model 생성 - 기본 형상 생성

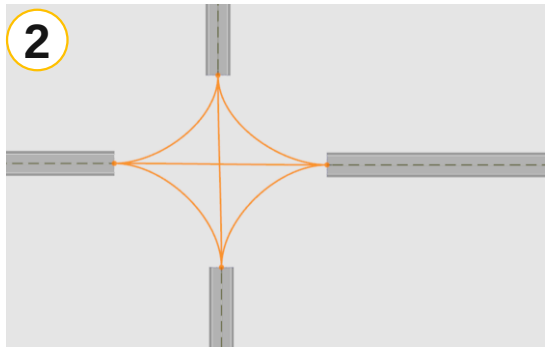


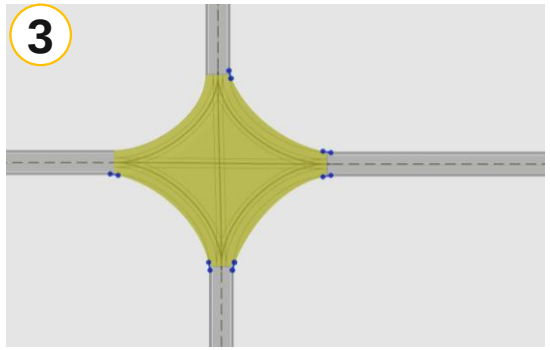
- Ⓐ Junction 생성



1. Road > Road segment > Junction선택





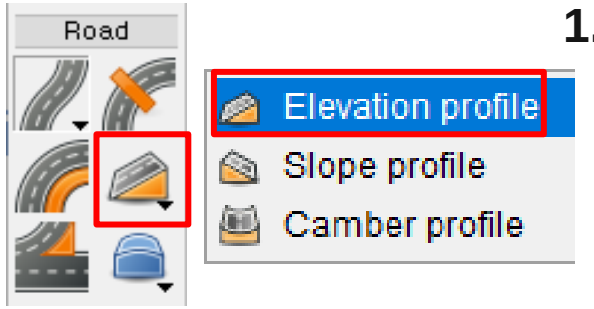


2. 각 Link의 끝 부분의 중앙을 선택하며 연결. 연결이 끝난 후 마우스 왼쪽 버튼 더블클릭을 통해 작업 마무리.

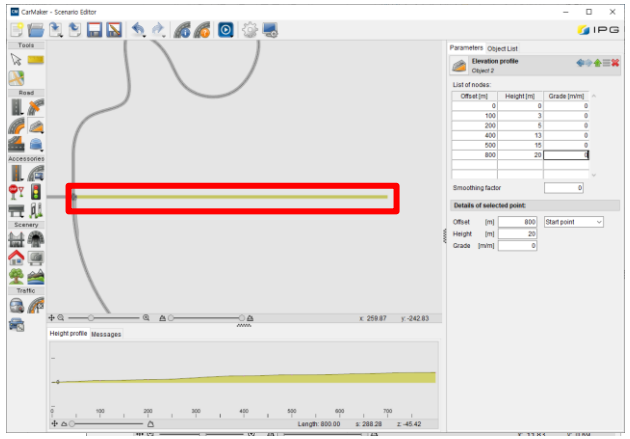
소과제 #2

Road Model 생성 - 기본 형상 생성

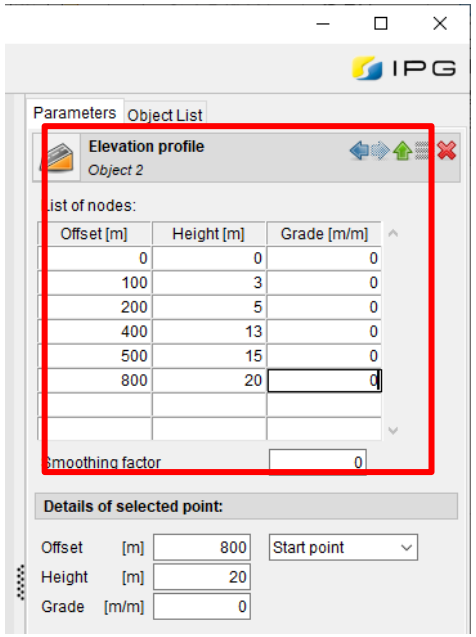
- Elevation Profile 추가



1. Road에서 3D Surface
> Elevation profile 선택



2. 직선 800m구간 선택

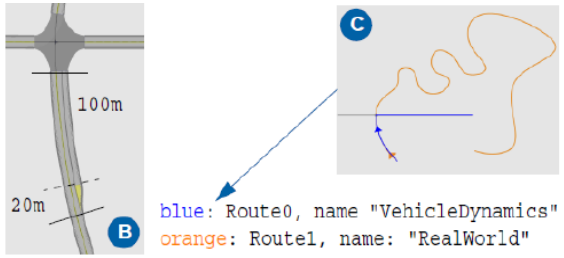


3. 직선 도로에서 차량이 부드럽게 움직이도록 5개 이상의 node 구성
-> Start Height 0m, End Height 20m

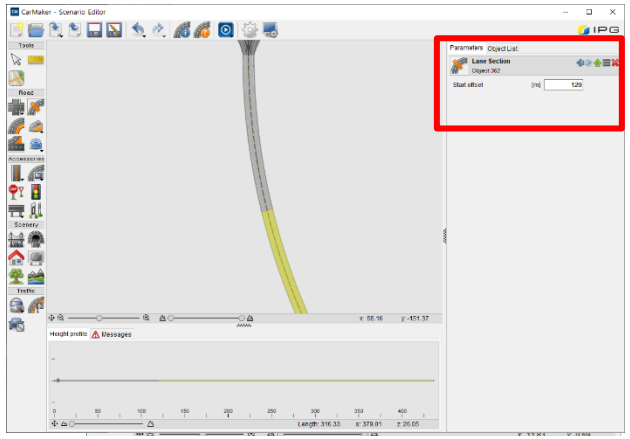
소과제 #2

Road Model 생성 - 기본 형상 생성

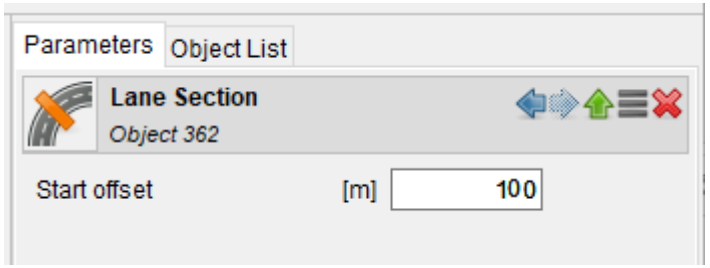
- Lane 추가 및 Lane Width 설정 - 1



1. Road에서 Lane Section 선택



2. 하단 turn segment 선택 후 마우스 왼쪽 버튼으로 Link 내 임의 지점 선택

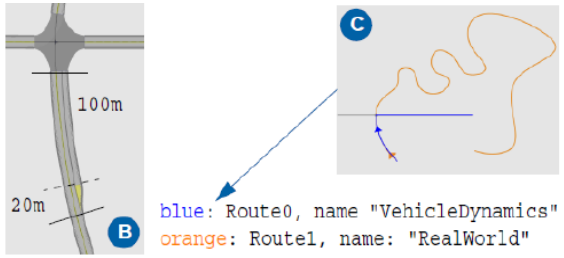


3. 오른쪽 상단에 있는 Start offset을 100m로 수정 후 엔터

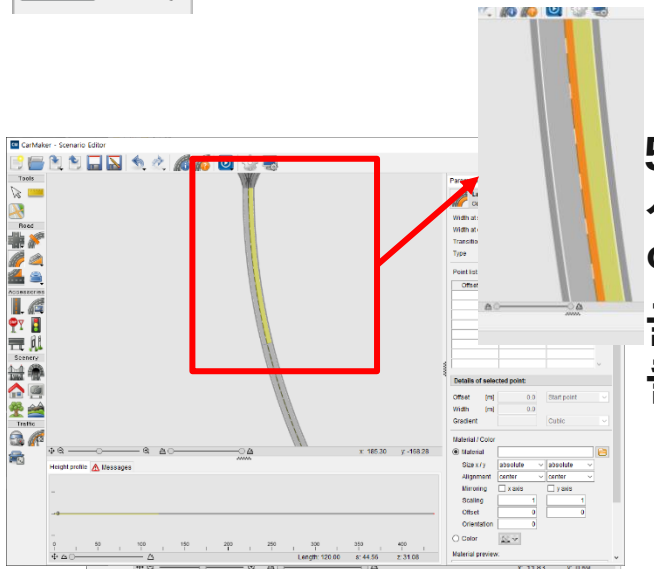
소과제 #2

Road Model 생성 - 기본 형상 생성

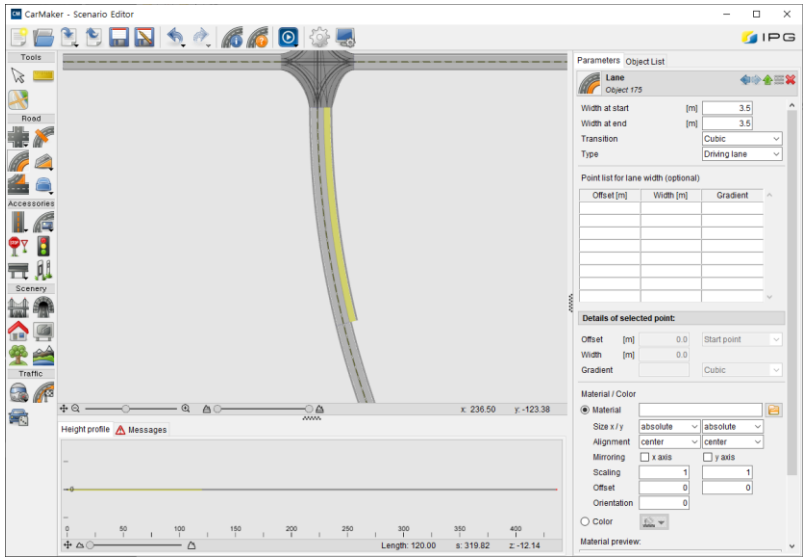
- Lane 추가 및 Lane Width 설정 - 2



4. Road에서 Lane 선택



5. Turn Link의 Lane L0 선택. 선택 후 마우스를 Lane 안쪽으로 움직이면 주황색 굵은 선이 생성. 해당 선을 클릭하면 새로운 Lane 생성

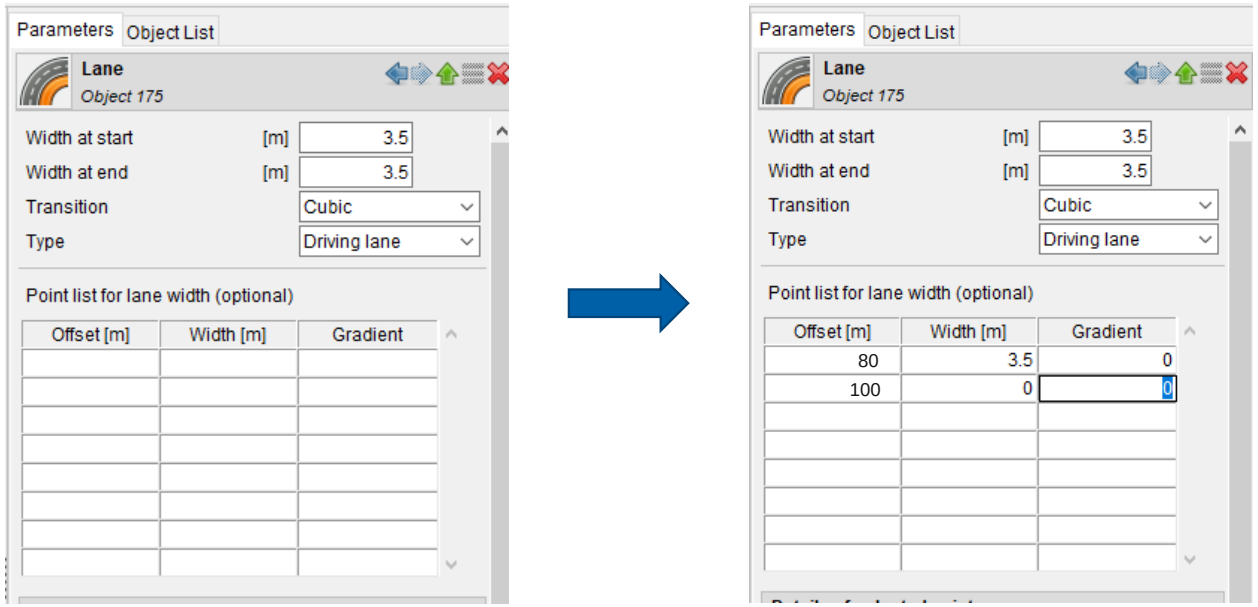


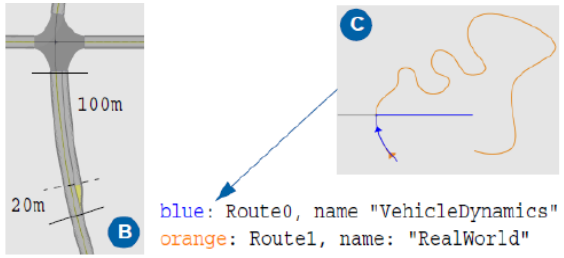
6. Lane 생성 후 Width 수정을 위해 Lane L1 선택

소과제 #2

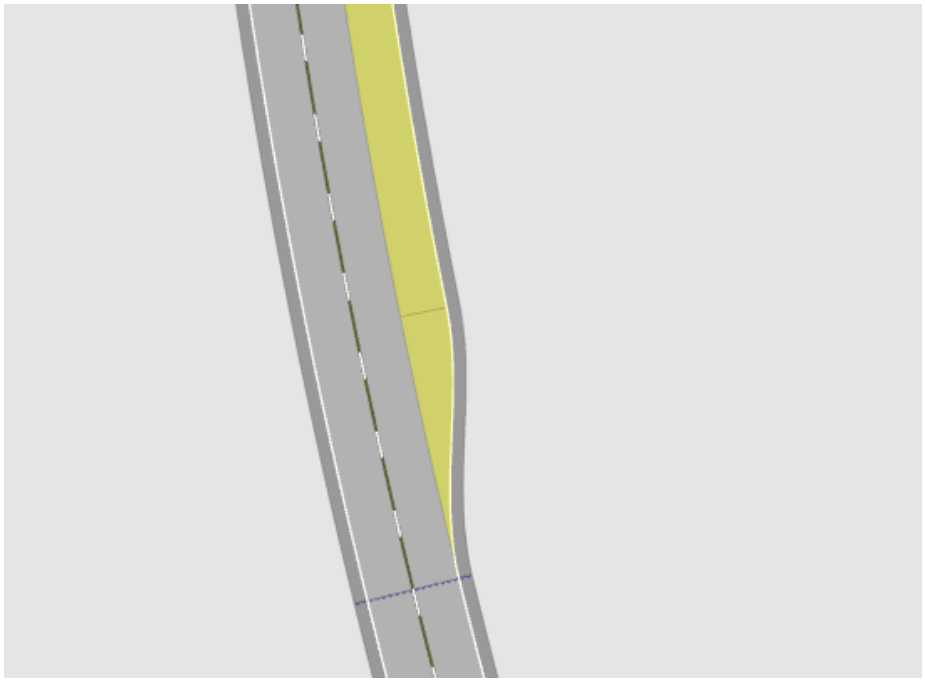
Road Model 생성 - 기본 형상 생성

- Lane 추가 및 Lane Width 설정 - 3





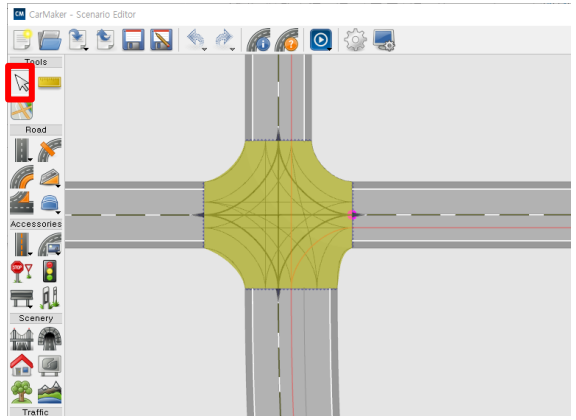
7. 오른쪽에 있는 표에 다음과 같이 작성.



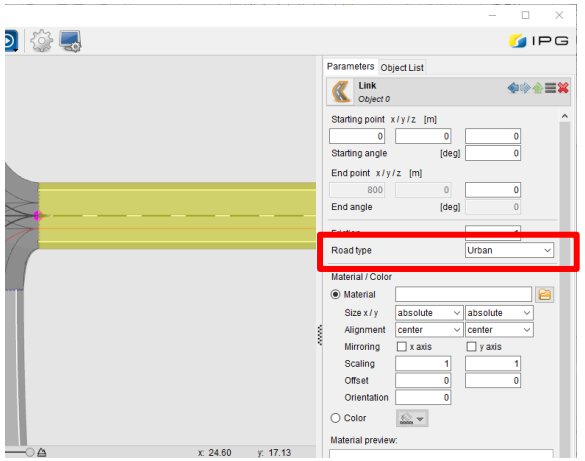
소과제 #2

Road Model 생성 - Road type 및 Speed Limit 설정

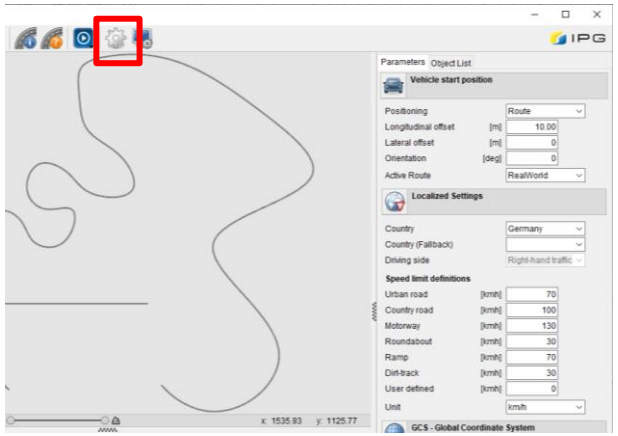
- Road type 설정 및 Speed Limit 설정



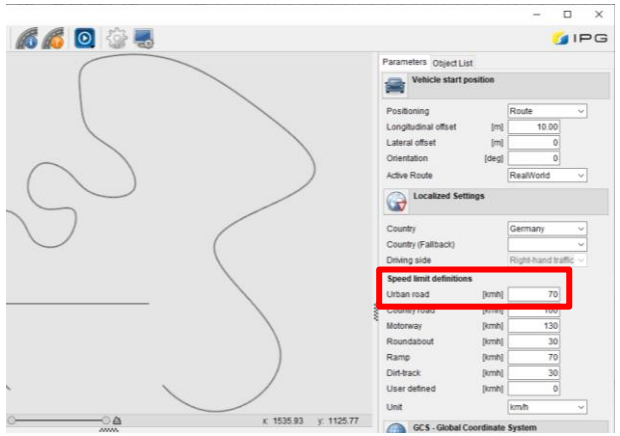
1. Selection mode > Junction/Link 선택



2. 모든 Junction과 Link에 대하여 Road Type > Urban 선택



3. Scenario Settings

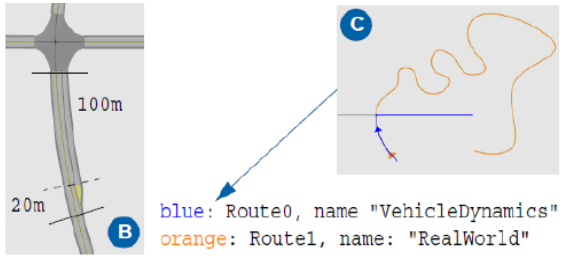


4. Localized Setting > Speed Limit definitions > Urban road의 Speed limit을 70 km/h로 설정

소과제 #2

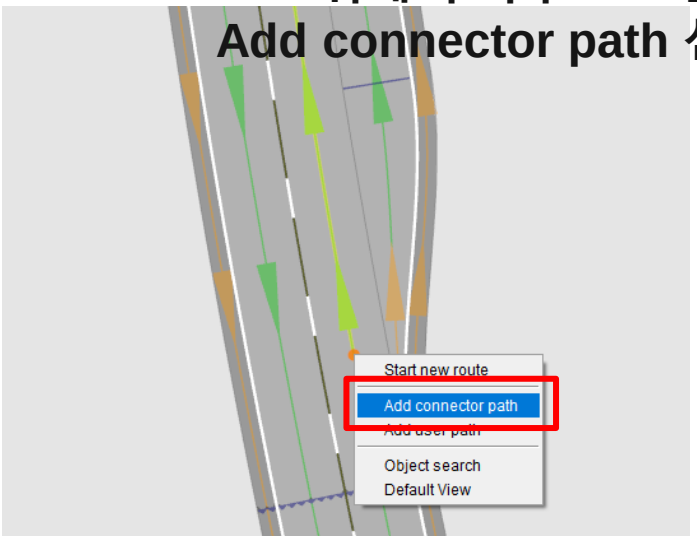
Road Model 생성 - Route 생성

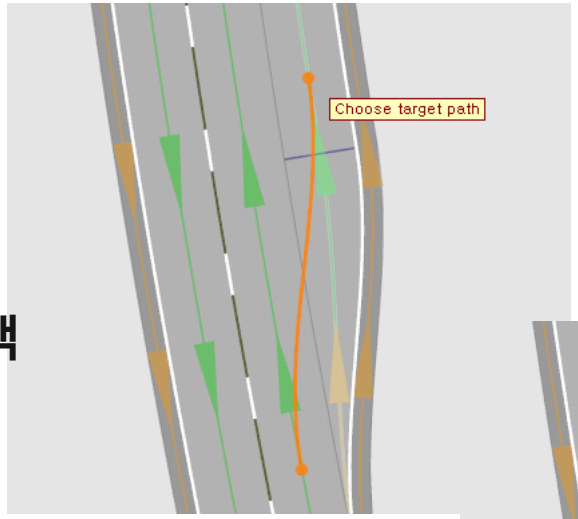
- Route 생성 – Connector path 생성



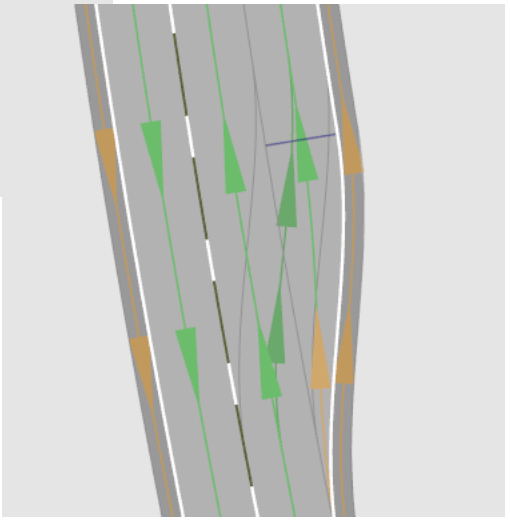
1. Traffic > Route 선택
(Routh : VehicleDynamics 생성)

2. Path 연결하기 : 추가하기 원하는
Link위에서 마우스 오른쪽 버튼 클릭하여
Add connector path 선택 > 시작 path 선택





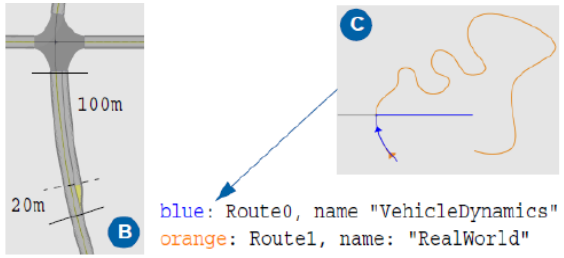
3. Path 연결하기 :
연결하기 원하는
path 클릭하여
두개의 path연결
(같은 진행방향)

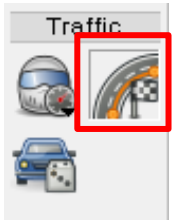


소과제 #2

Road Model 생성 - Route 생성

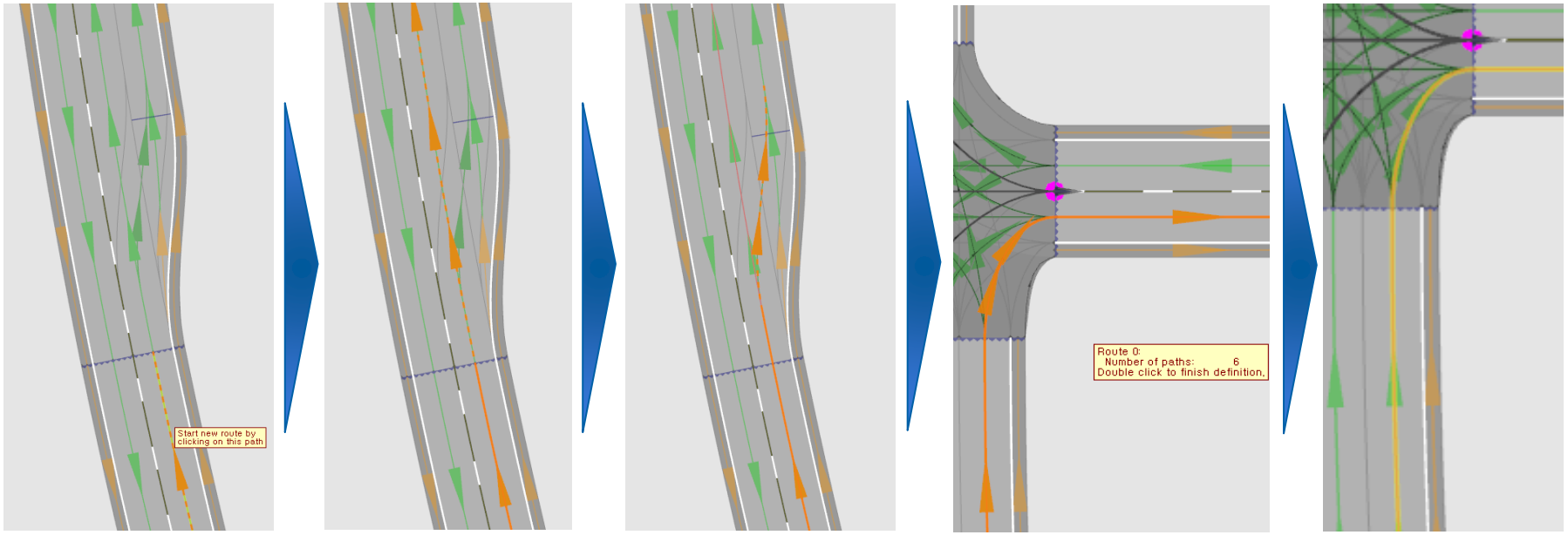
- Route 생성 - VehicleDynamics



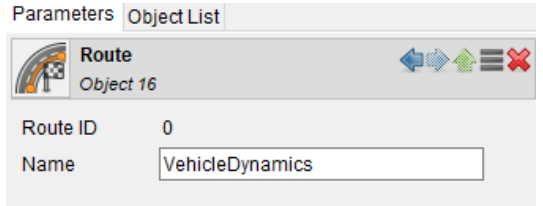


4. Traffic의 Route 선택

5. 지정된 시작 Path에 마우스를 가져가면 주황색 점선이 생김. 주황색 점선을 선택하여 주황색 실선으로 바꾸며 원하는 곳 까지 path 연결



6. 모든 path 선택 후 임의의 곳 더블 클릭으로 Routh 생성

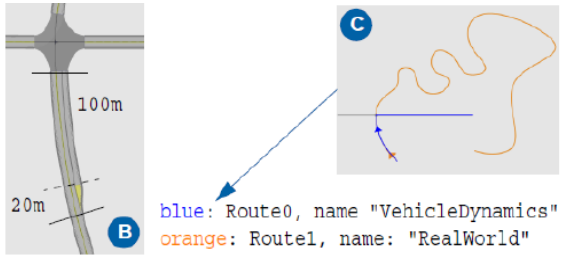


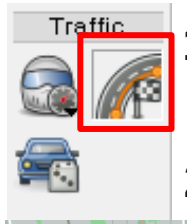
7. Route의 이름 “VehicleDynamics” 변경

소과제 #2

Road Model 생성 - Route 생성

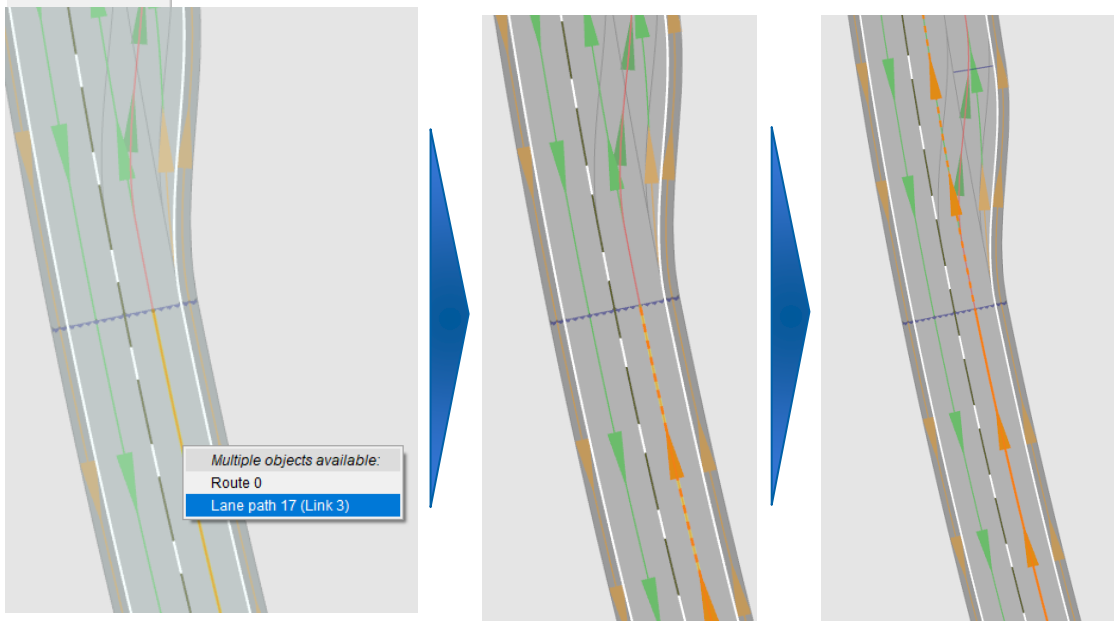
- Route 생성 - RealWorld



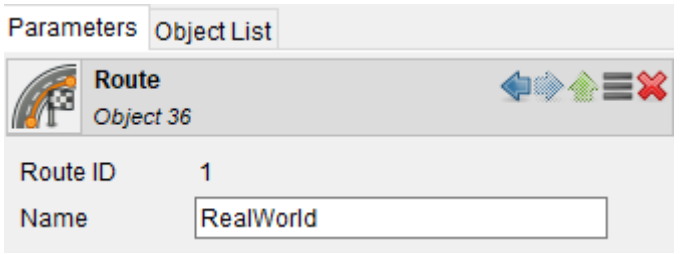


1. Traffic > Route 선택
(Route : RealWorld 생성)

2. 지정된 시작 Path를 선택하여 나오는 List 중 Route 0가 아닌, path를 선택



3. 이전과 동일한 방법으로
Route 생성

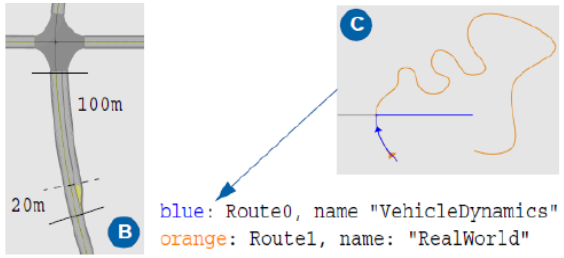


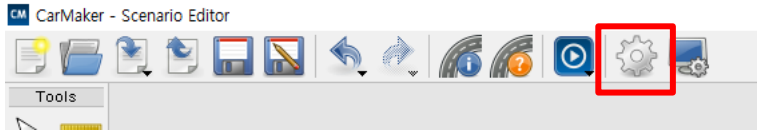
4. Route의 이름
"RealWorld" 변경

소과제 #2

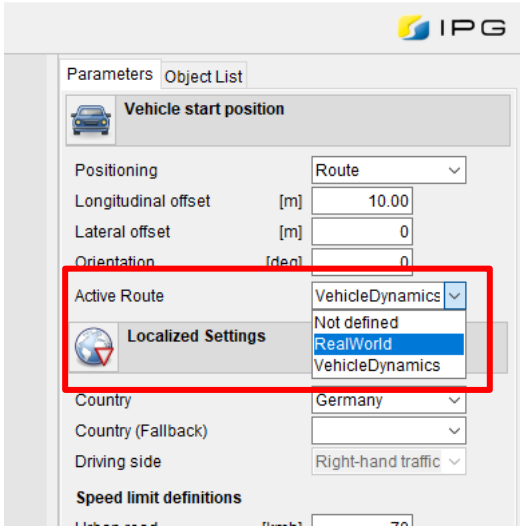
Road Model 생성 - Route 생성

- Scenario Editor에서 Ego Vehicle이 주행해야 하는 Active Route 생성
- Road file 저장.

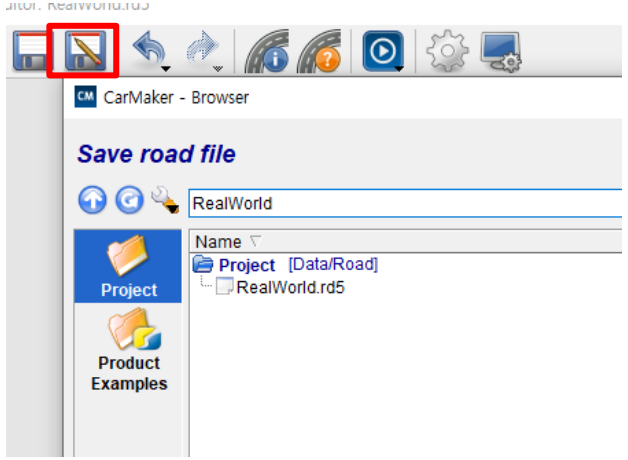




1. Scenario Settings 선택



2. Active Route에서 RealWorld Route 선택

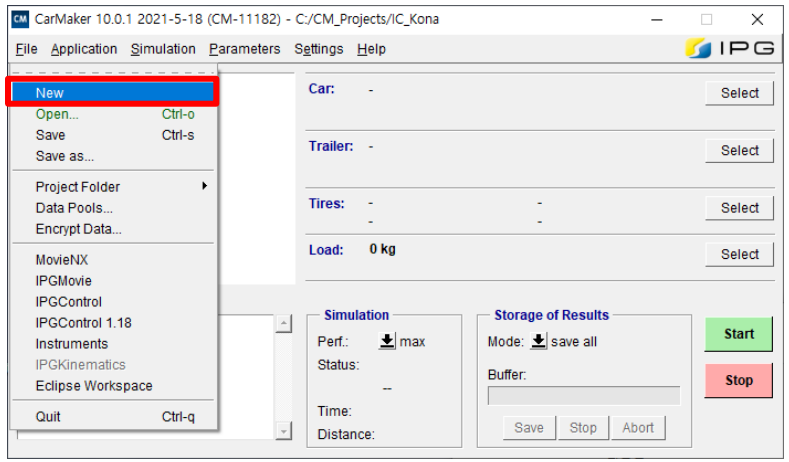


3. Save road fail as 선택하여 rd5형식으로 저장 (이름 자유)

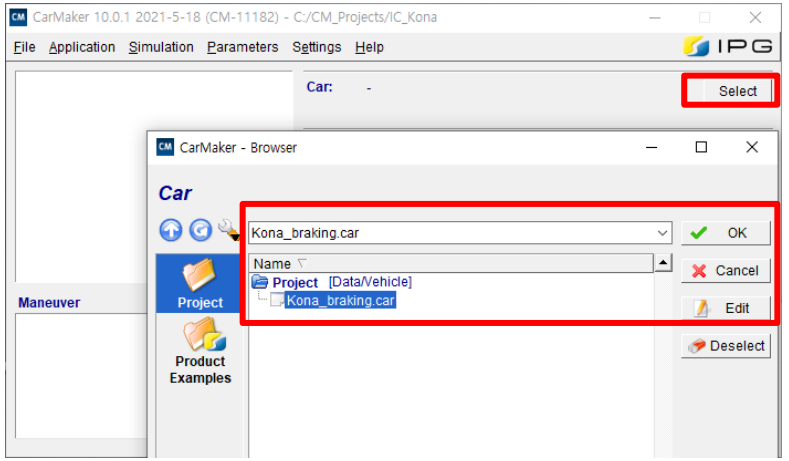
소과제 #2

Road Model 생성 - TestRun 생성

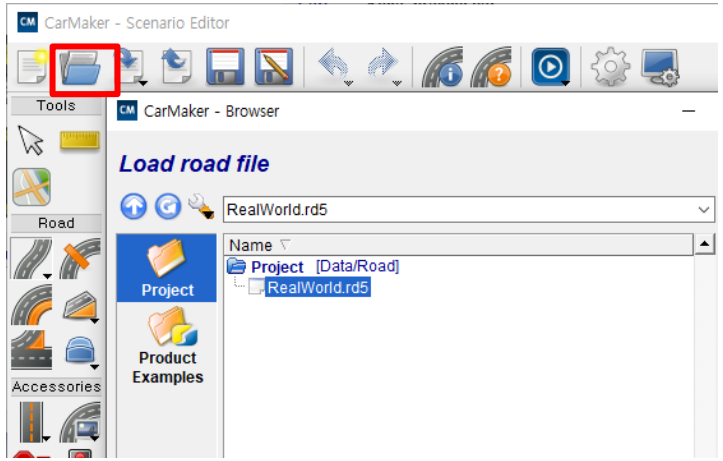
- TestRun 구성 및 Maneuver 설정



1. Main GUI > File > New 선택



2. Main GUI > Car Select
> 1차 소과제에서 생성한 전기 차량 모델 선택

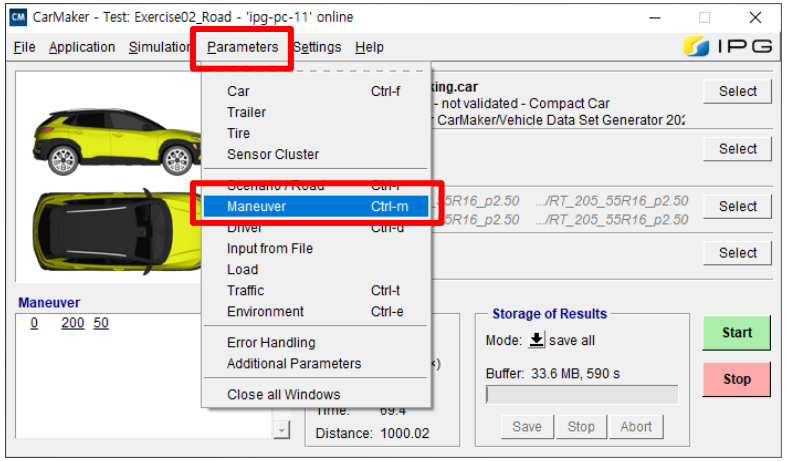


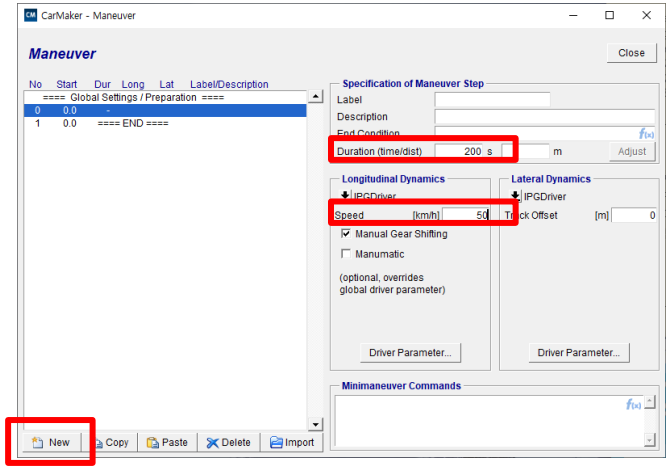
3. Main GUI > Parameters
> Scenario / Road > 2차 소과제에서 구성한 Road file Open

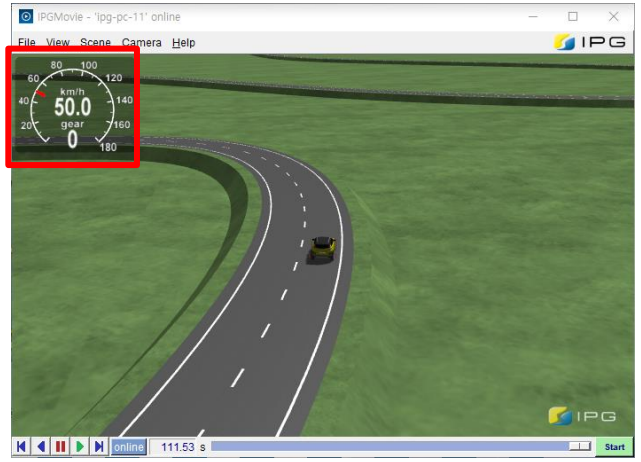
소과제 #2

Road Model 생성 - TestRun 생성

- TestRun 구성 및 Maneuver 설정







4. Main GUI > Parameters > Maneuver에서 차량 주행 Maneuver 구성

5. New 새로운 Maneuver 구성 (Duration 200s, Speed 50km/h)

6. 정상 주행 확인 > TestRun save 이름 'Exercise02_Road'

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