

## Batmobile 3D

Expand the scene to 3D with the following items (Previous project functionalities are still retained unless the following items modify them):

- 1) Create a 3D cabin for the betmobile, housing a camera (at the driver's position)
  - The dashboard includes a display of the previous project (in 3D space).
  - The external scene is visible through the windshield.
- 2) Include depth testing and removal of back faces.
- 3) Create a long street with buildings on both sides for the betmobile to move along
  - The betmobile cannot pass through buildings.
  - Buildings and ground have appropriate diffuse and specular maps.
- 4) The betmobile can move forward-backward and left-right (the car has an automatic transmission) and can rotate left-right.
  - While one key is pressed, gas is added, and when released, the gas decreases.
  - Left-right movement is half as slow as forward-backward.
- 5) Perspective projection with arbitrary parameters is active.
- 6) The camera is set up to show the dashboard and the scene through the windshield, following the movement of the betmobile.
- 7) Implement the Phong lighting model.
- 8) Add lights.
  - Add directional light to the scene mimicking the moon.
  - It is possible to turn on lights on the front of the betmobile that are headlights directed in front and below the betmobile.
  - It is possible to activate a night vision mode, affecting the entire scene.
  - The moon is 2D and has a visible bet signal (It is sufficient to load it as a transparent texture).
  - All dashboard lights are now point lights of small range and intensity.
- 9) All instruments and dashboard lights are now activated based on the behavior in the scene (no need to use a library, it is possible to implement custom logic).
  - The tachometer shows the current gas.
- 10) The steering wheel of the betmobile is visible (loaded as an arbitrary steering wheel model).