# T-Splines Car Tutorial

Hi. My name is Tibor Toth and I'll show you how to model complex cars like the Alfa Romeo 147 gta using the T-Splines Maya plugin and various techniques. This will be useful if you want your output in NURBS or T-Splines.

1. Start with high quality blueprints.

2. We have to cut off our blueprint for 4 separately pictures with the same size at W and H. The side, front, back and top views.

3. I usually use an alpha mask in my blueprints because sometimes you have to change the background color in Maya.

4. Launch Maya and create a new project. After that you can import your blueprints as image planes. In the front view there will be 2 image planes: the front and the back view. I created a marking menu for turning on and off image planes; I recommend that you do this as well. It will speed up your workflow.
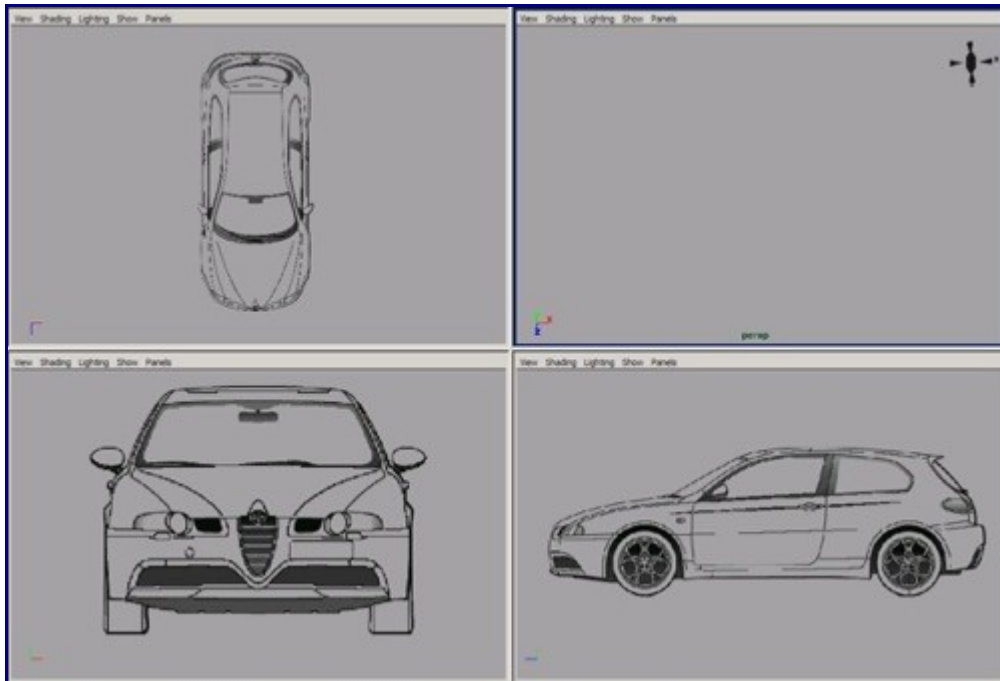

5. We can start our modeling with few NURBS curves. That's the simplest way for modeling a car. After we created our curves we can build our first surfaces. We always have to rebuild our curves and surfaces because those curves and surfaces which aren't rebuilt can can complicated our work later.
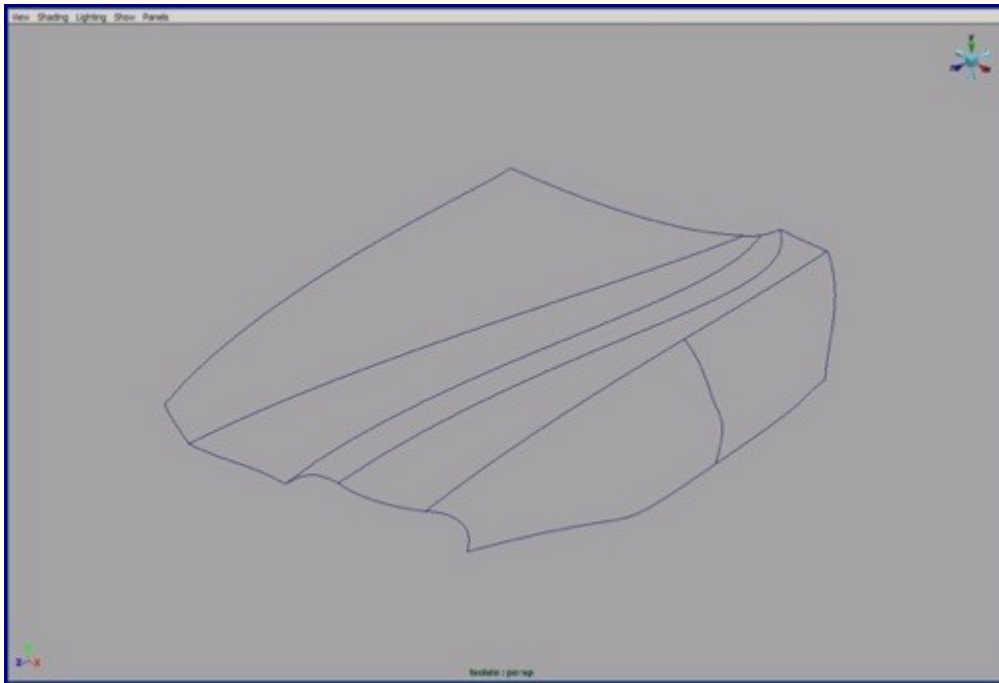
6. We can use Birail+ tool for creating the surfaces. Don't forget to rebuild them. You may want to put that action in your marking menu or into the shelf.
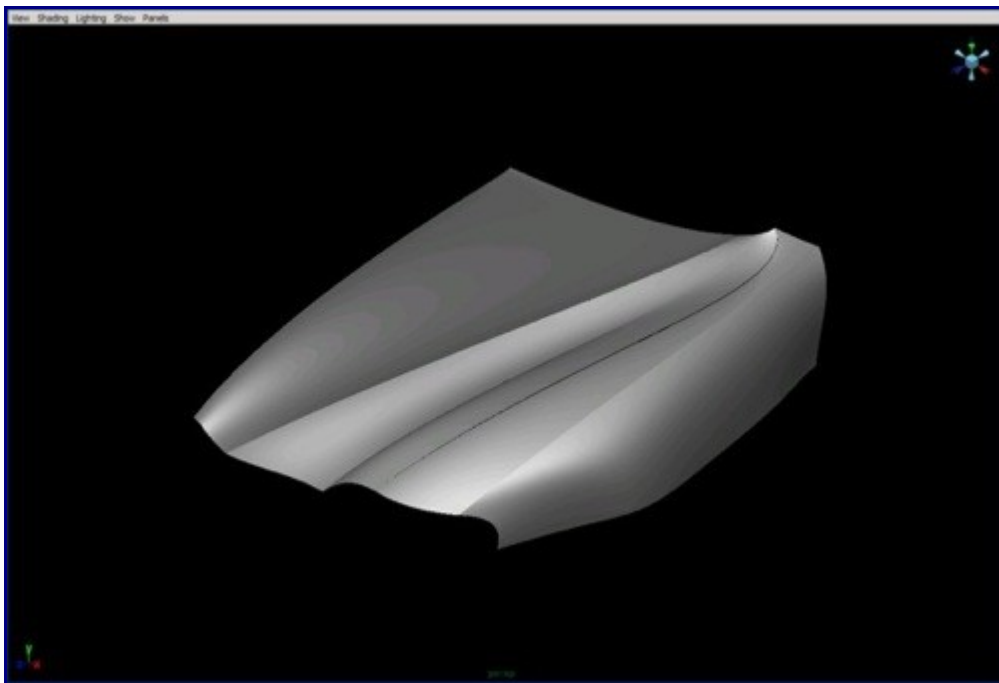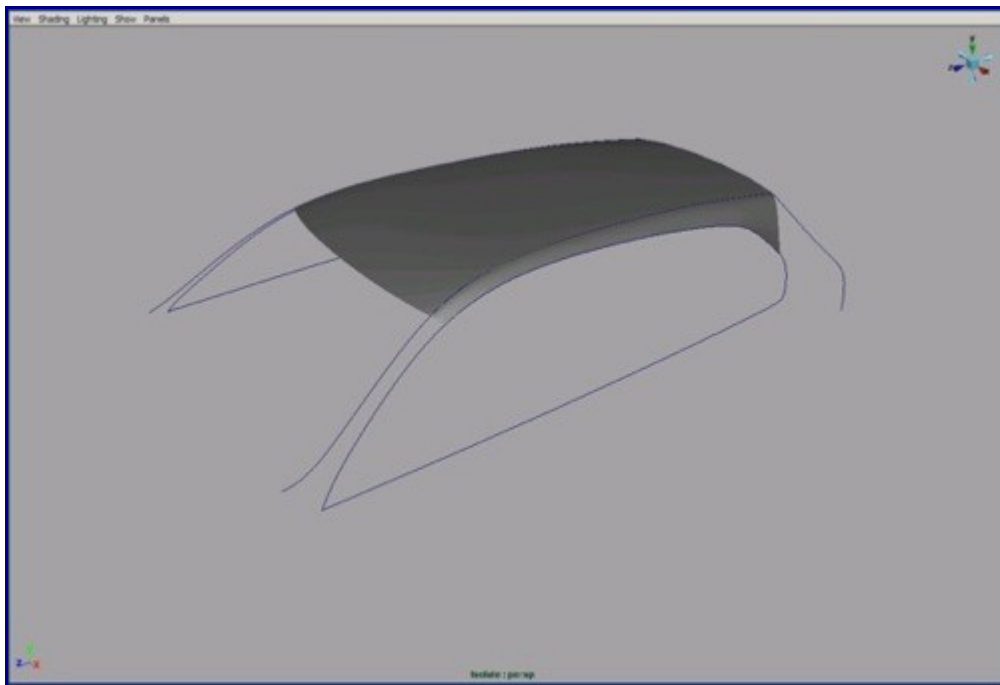

7. We start modeling the front fender with curves. From all views we have to match our curves to the image planes and after that build a surface with the loft tool. Then convert the 2 surfaces to the polygons because we're going to merge them.
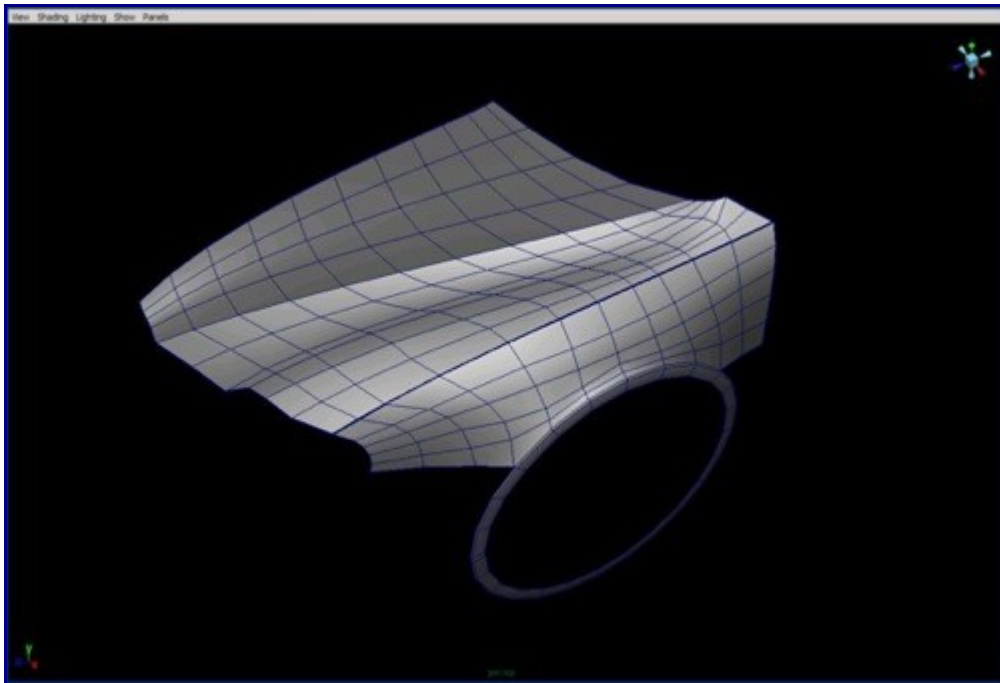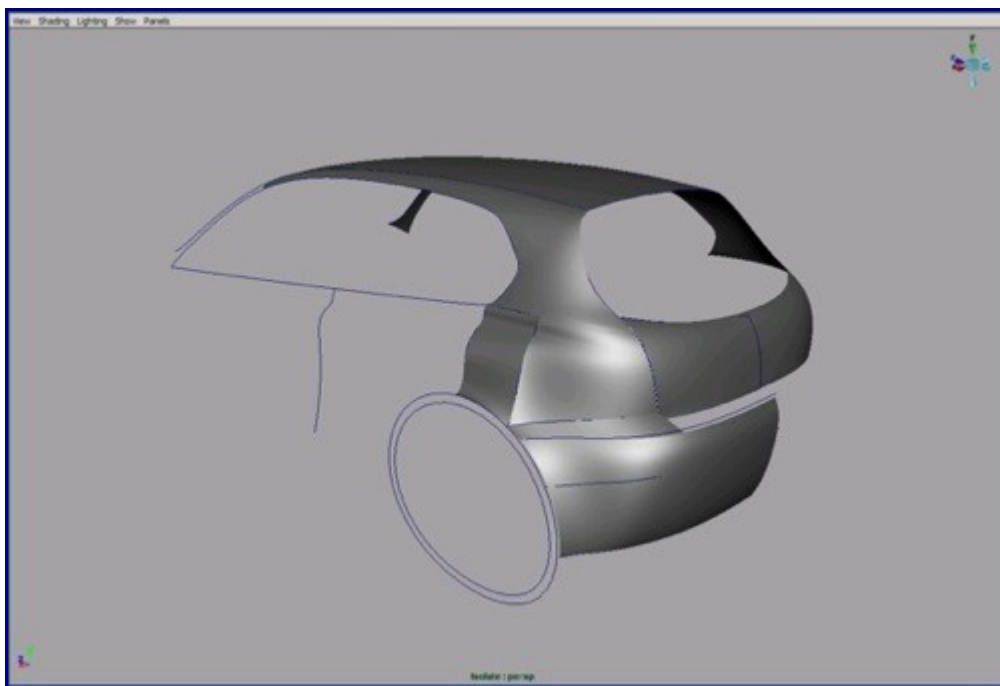
8. We continue creating curves and building surfaces of the front part of our car.
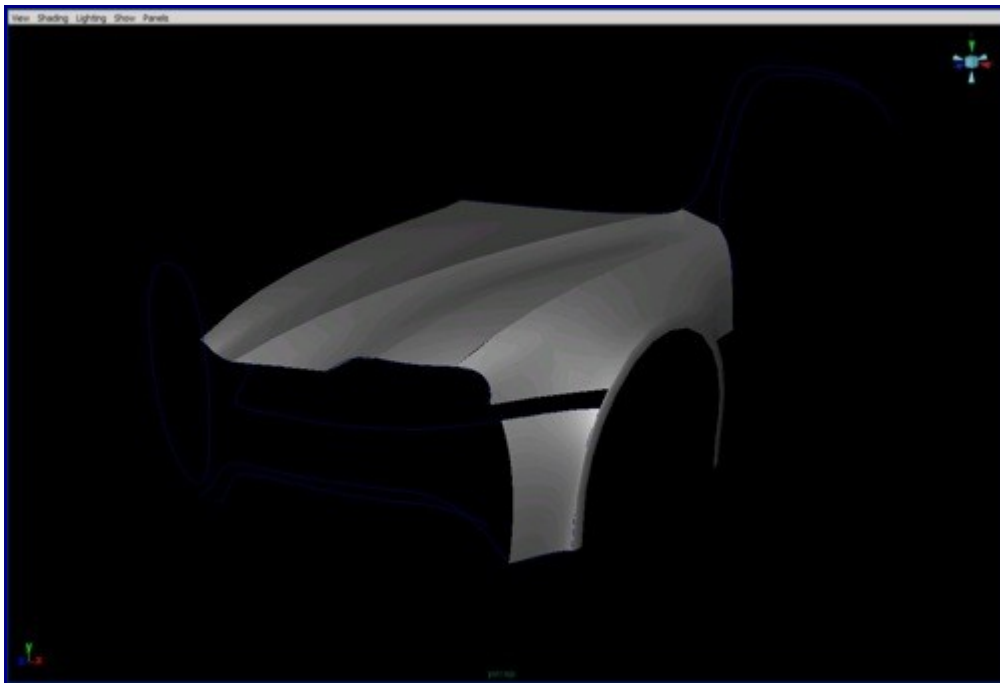
9. Create the roof curves and surfaces also.

10. Now we move to the back part. With those curves and surfaces will be shown the car outlines.


11. We going to build the front surfaces. For that we should use the Birail+ or the Loft tool, whichever you prefer more. We can see that the topology does not look very good, but we can edit it after converting to polygons.
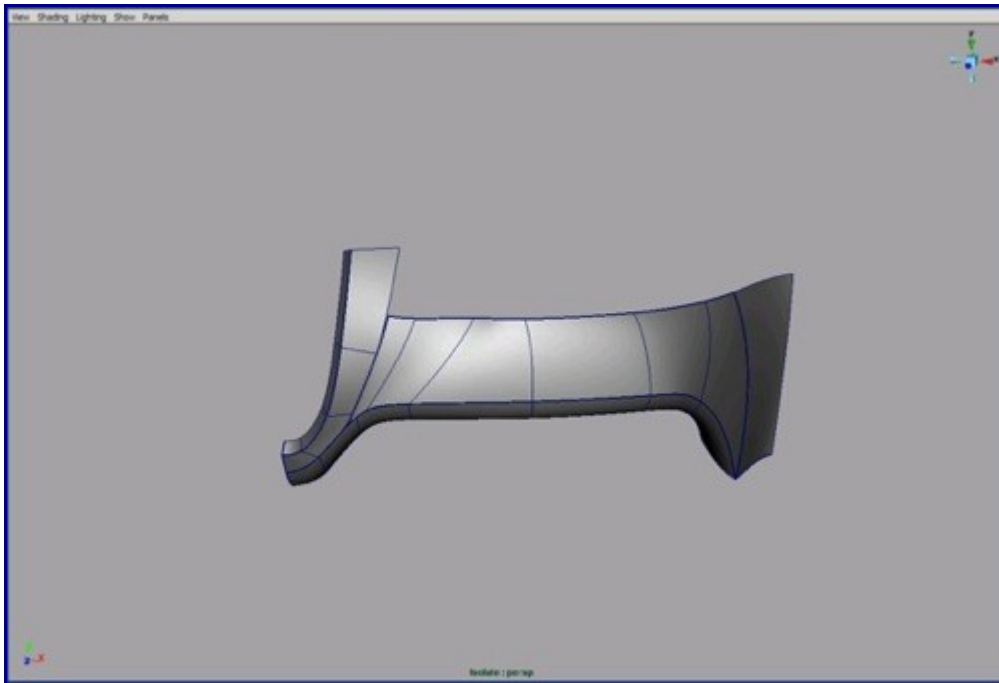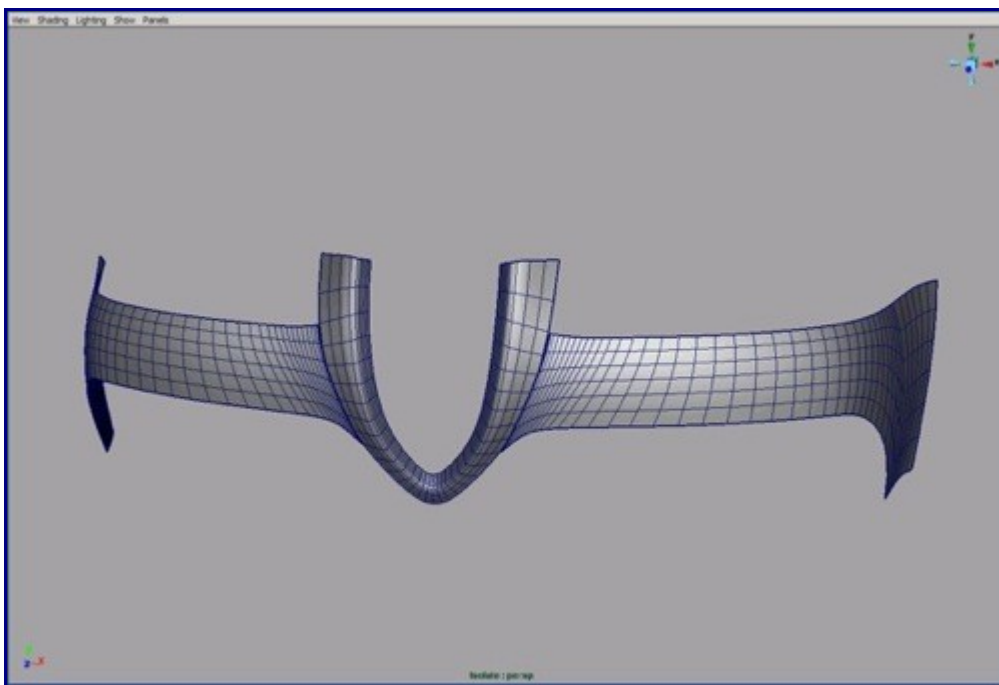
12. It will be very helpful to use mirrored references.
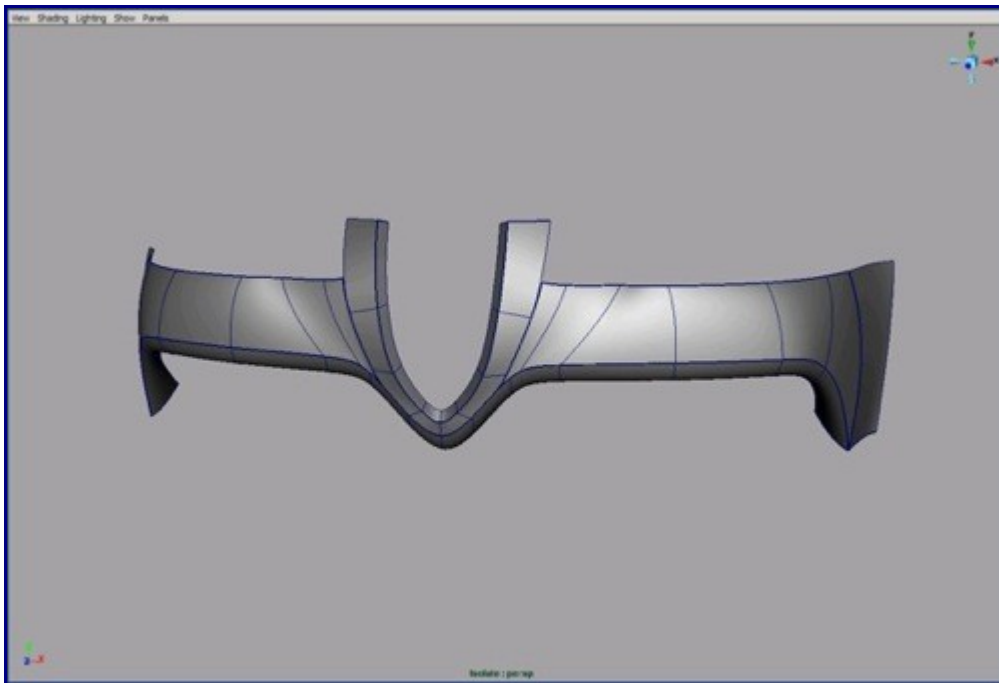
13. Before we convert the surfaces to the polygons we should use the stitch tool on the selected edges.
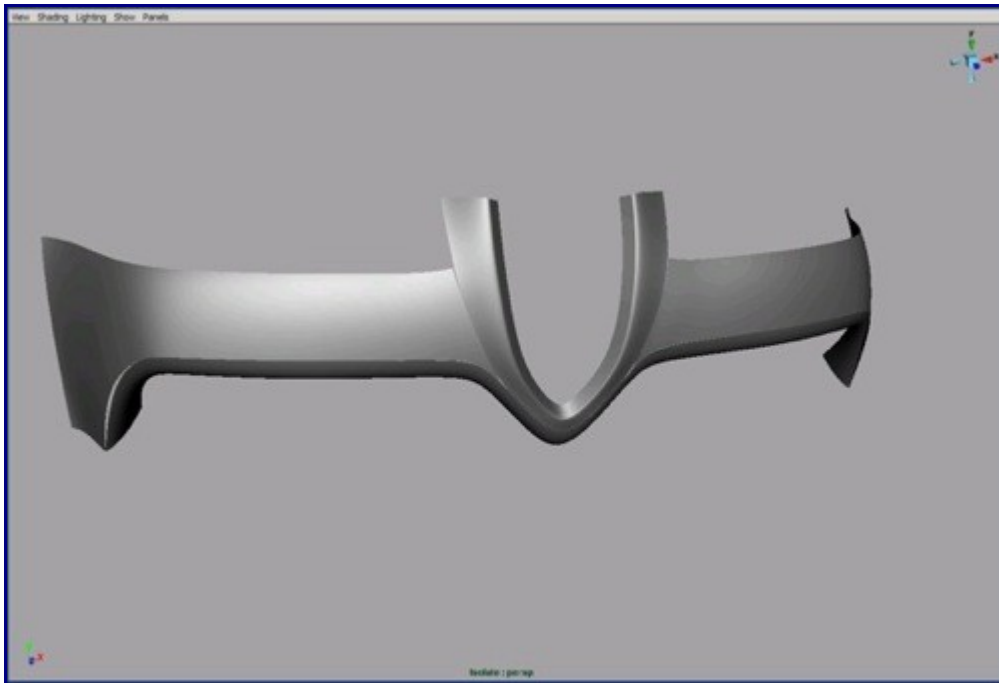
14. The parts converted to polygons. We have to tried to tessellate it so the neighbor polygon surfaces have the same or similar tessellation lines.


15. Now we are going to clean up our geometry and edit the topology. Always try to create the best looking topology. On the picture I've circled the newly added edges in red. The most effective tool for editing that is the edge split tool.
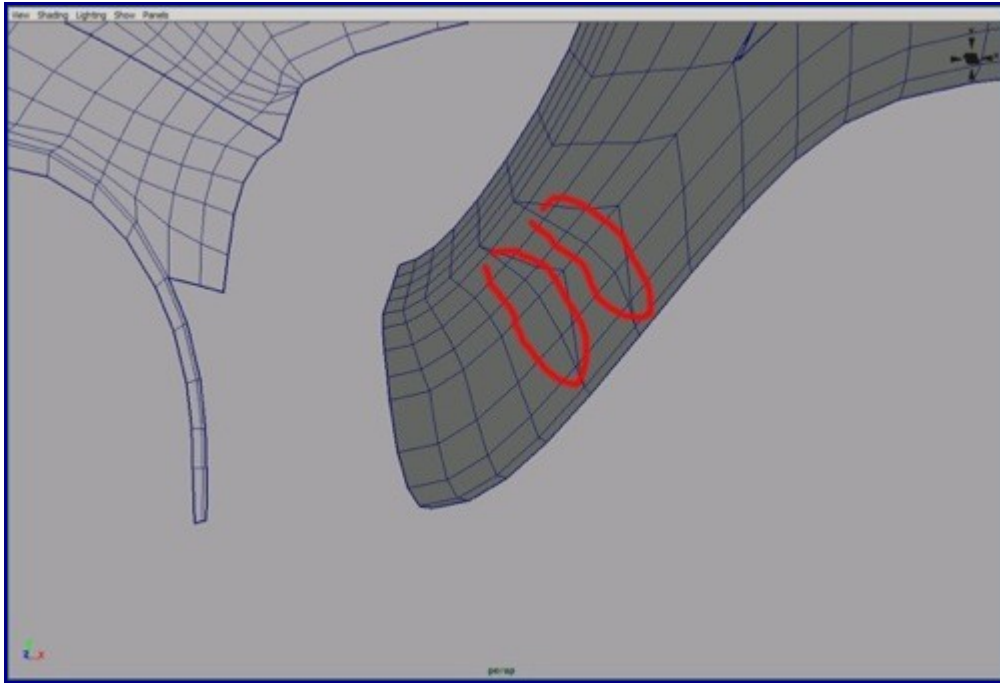
16. After editing the topology on that part of our car, it looks pretty good. Later we will need to reduce those parts because they have too many vertices. But for now keep it high density because looks a lot like our final car. If we leave it like this now, then we won't need to convert between polygons and T-Splines as often.
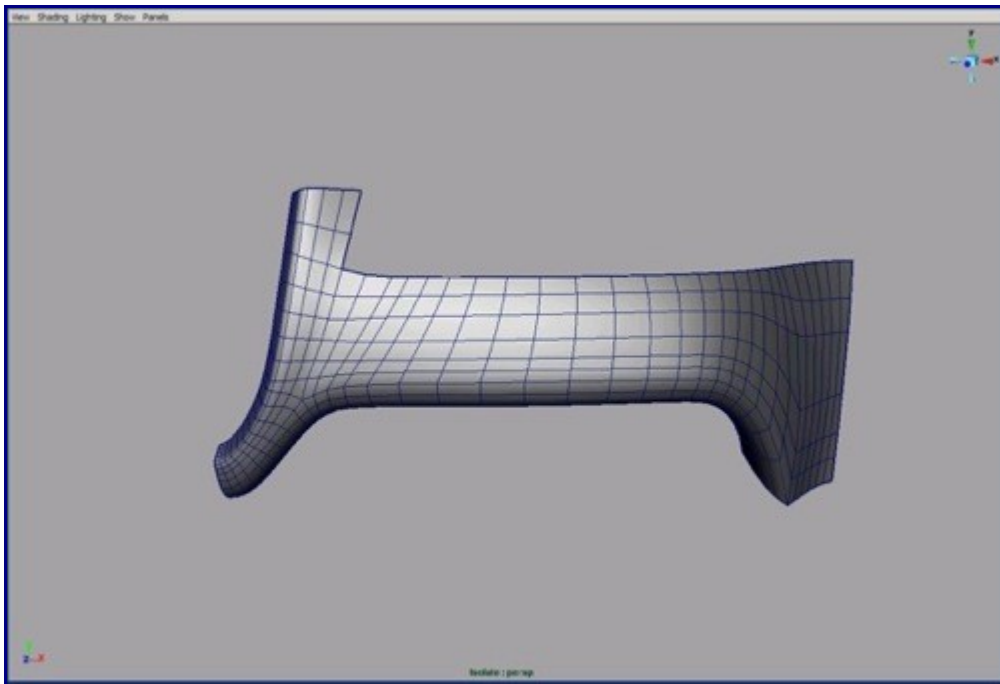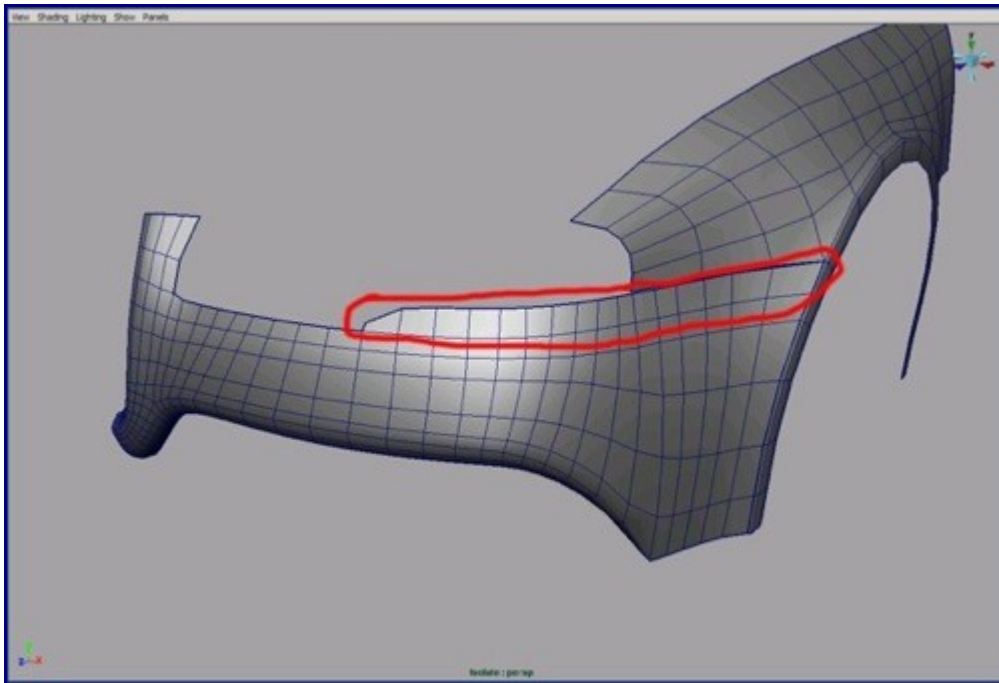

17. On the picture you can see that the lines bend to inside of hood. Edit the other edge loops like the ones circled in the picture.
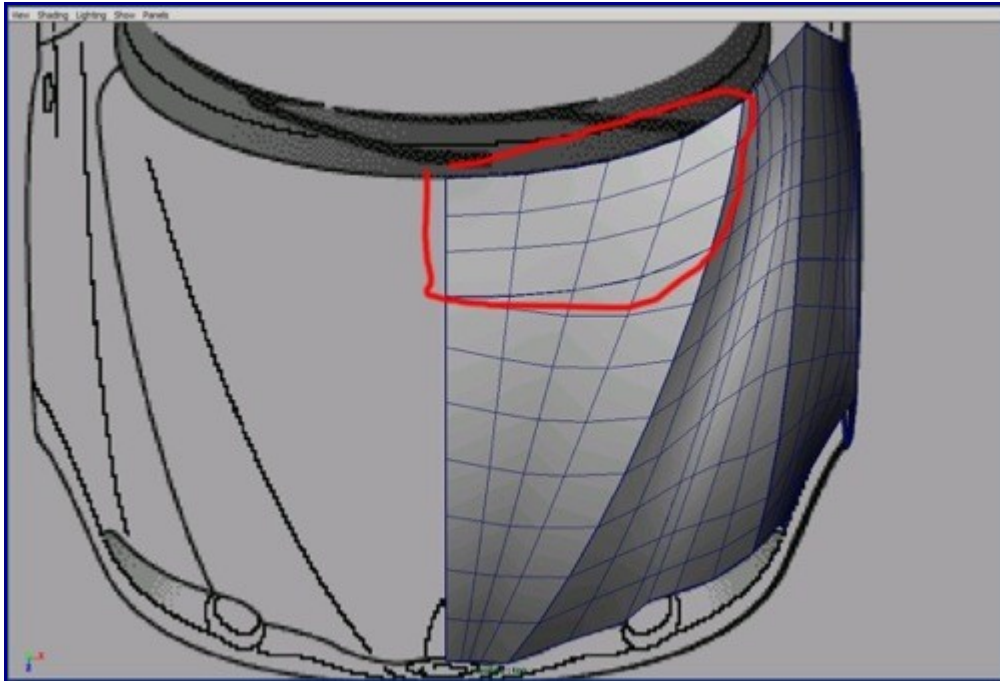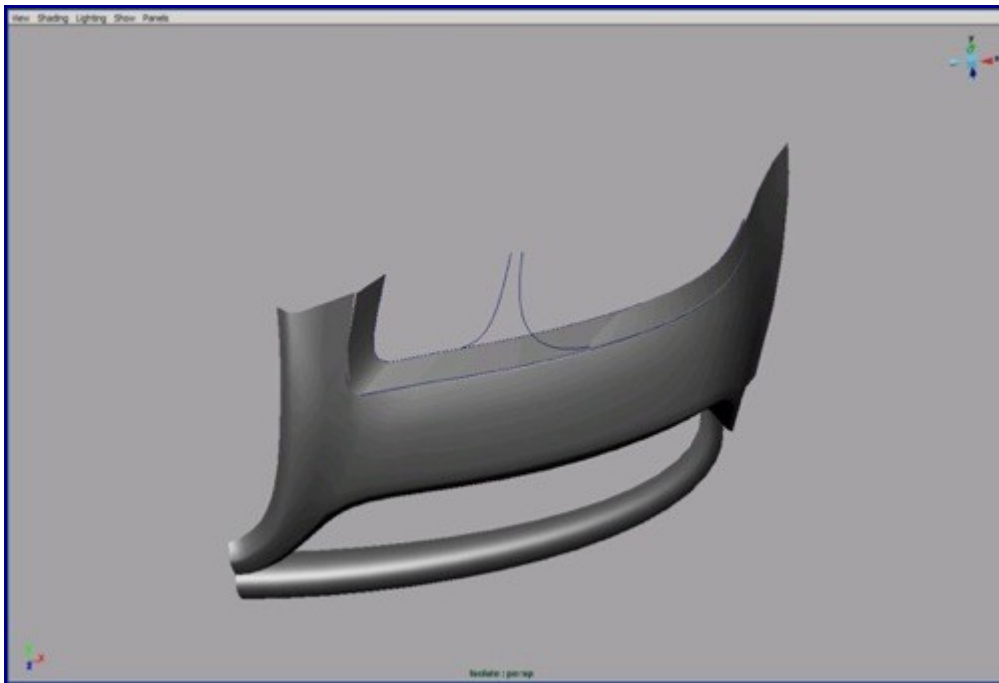
18. Your results should look similar to these.
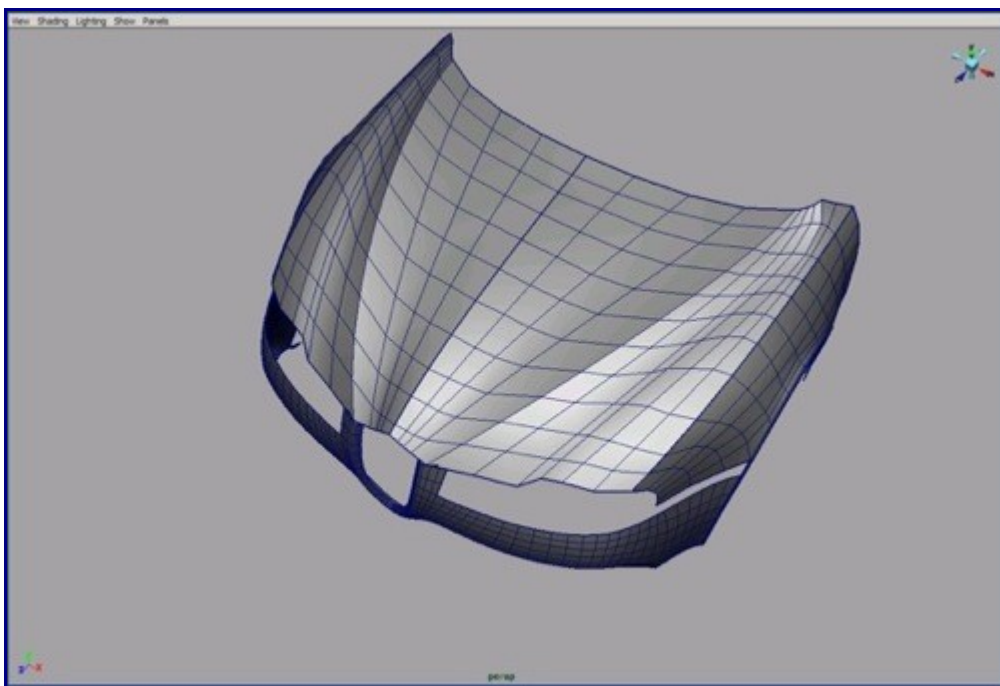
19. Now we will create one new polyloop with the extrude edge tool.

20. Build the part between the lamp and vent from curves.

21. Now we have to convert it to polygons and edit the topology with the edge split tool.
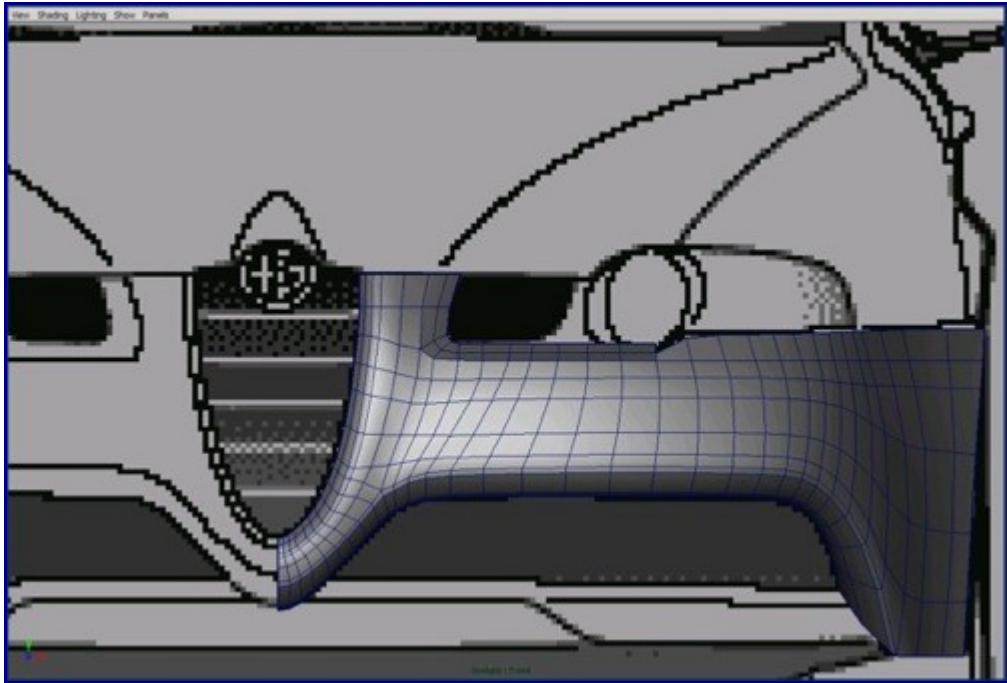
22. Build the surface with the Birail+ tool and after that convert it to polygons. After editing the topology, merge that part to the rest of the polygon parts.
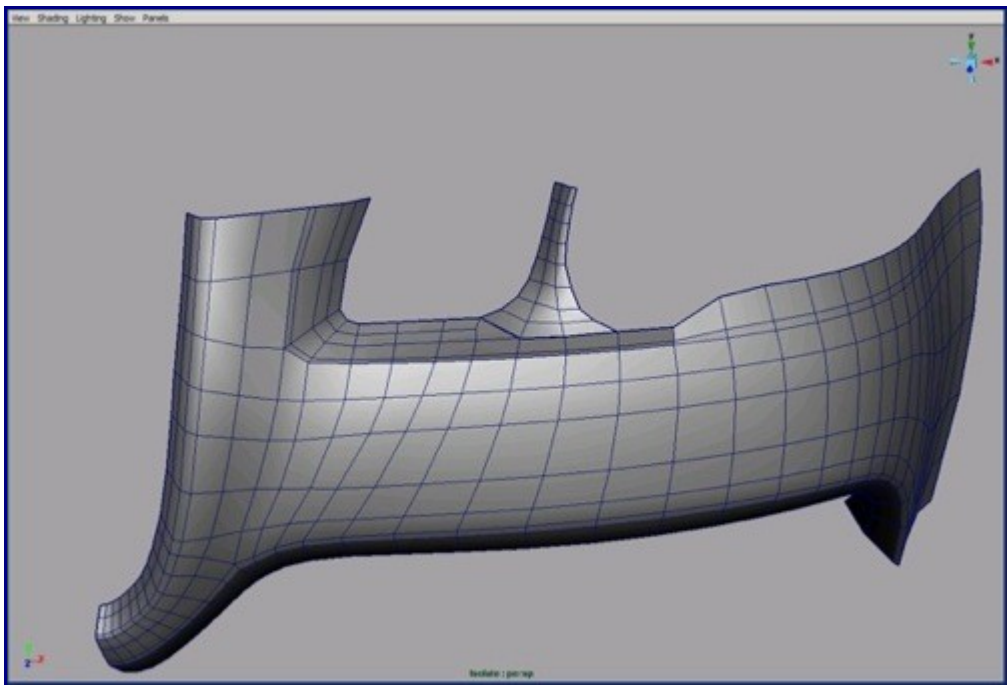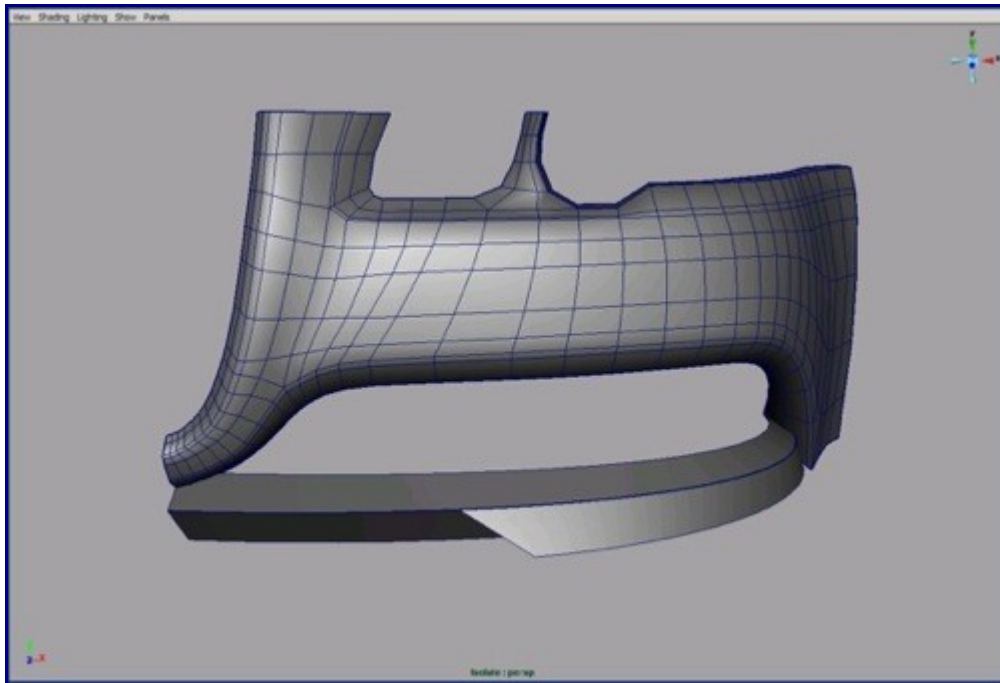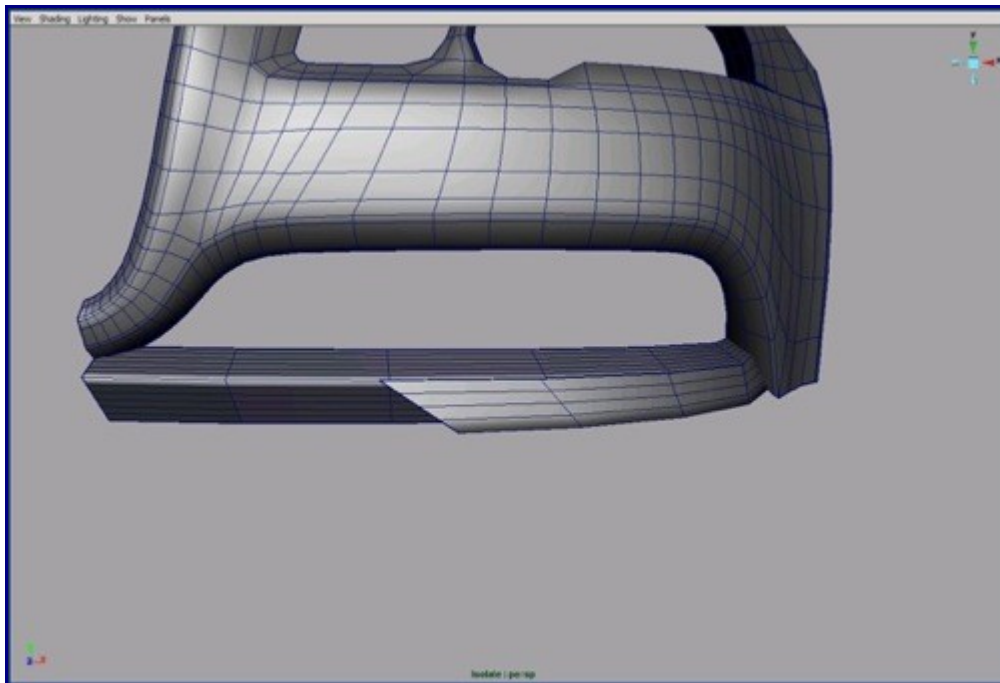

23. With the extrude edge tool scoop the location of the front lamp and the gap.
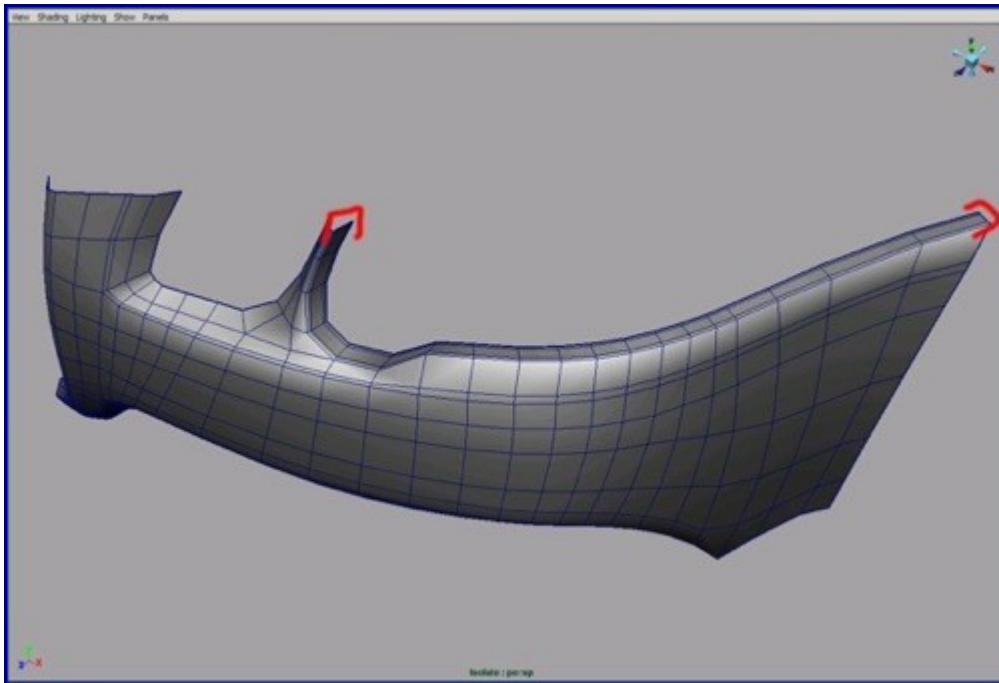
24. Create a few new curves for the bottom part. You can model them more easily if you duplicate and detach the long curves that we created before.
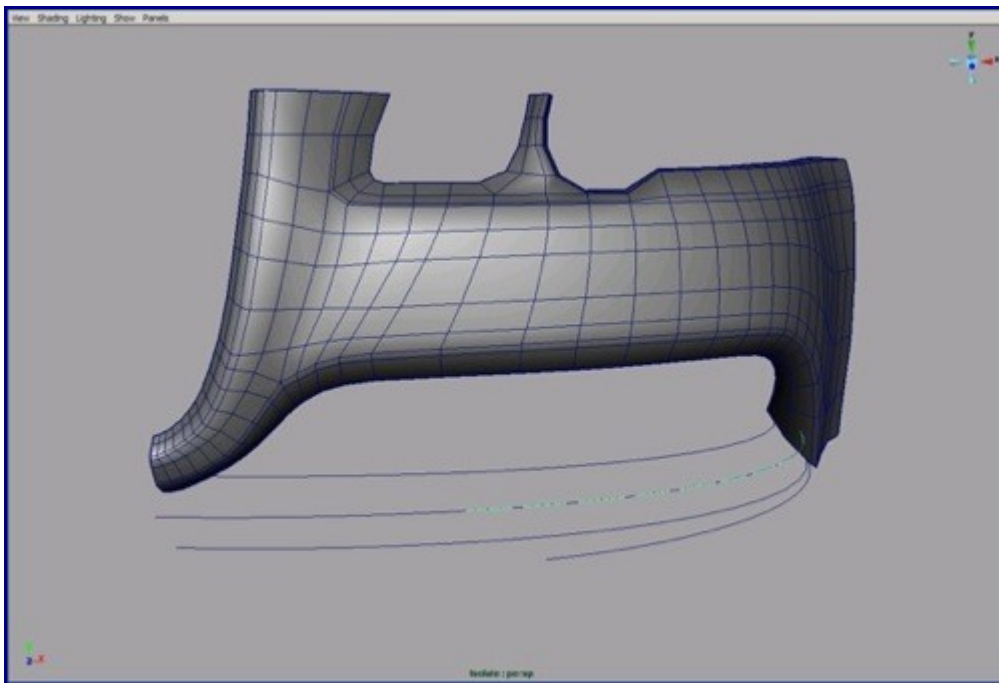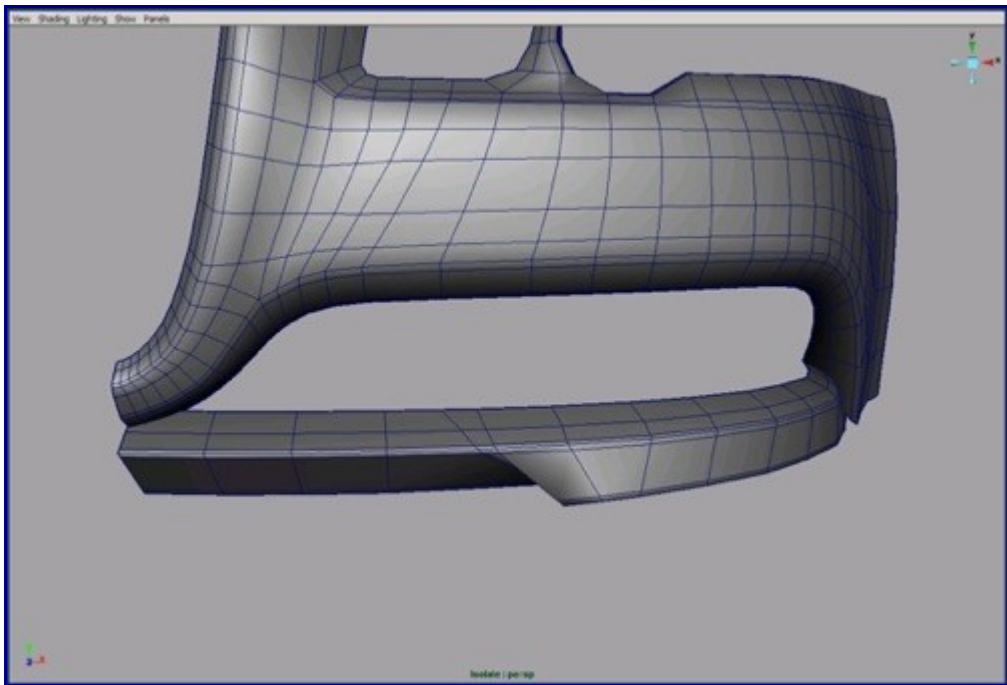

25. I lofted these surfaces.

26. And then converted them to polygons.

27. Now we have to decrease the tessellation and after that merge the patches. Try to keep quad topology and don't use triangles.
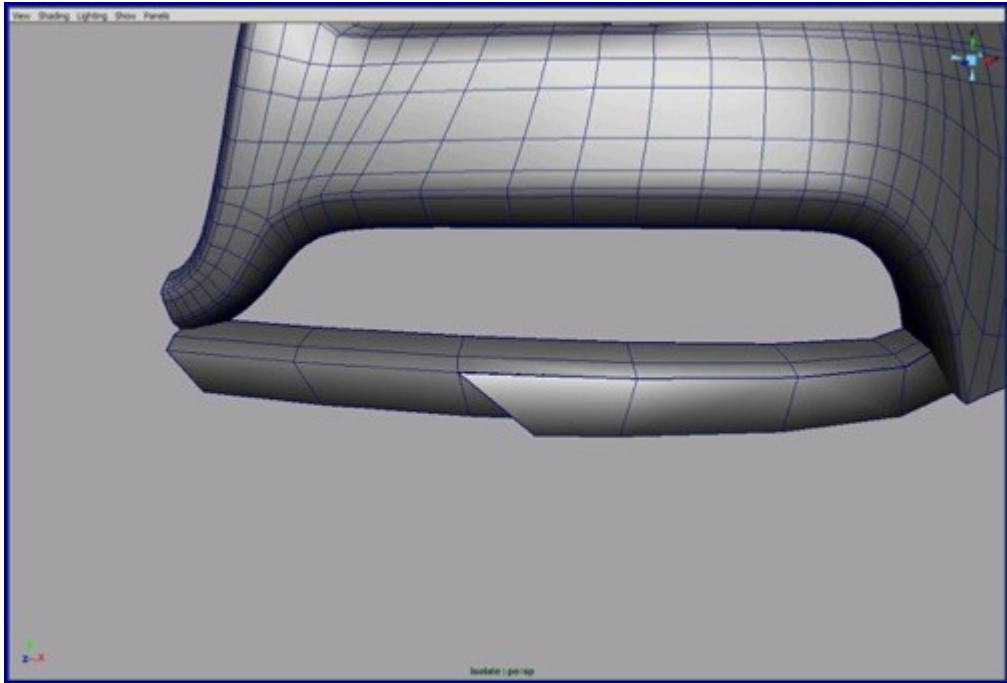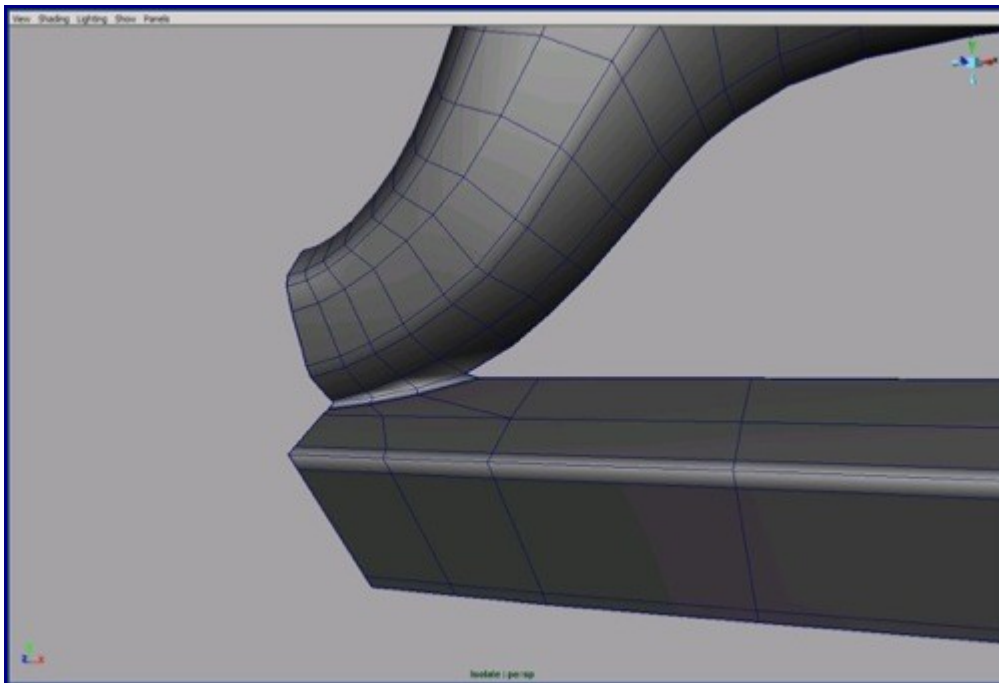
28. Add more detail on it so you will keep the bevel edges after converting to T-Splines.

29. The front part of the picture shows how to eliminate the triangles from that part of our car and keep the shape of geometry and bevels.
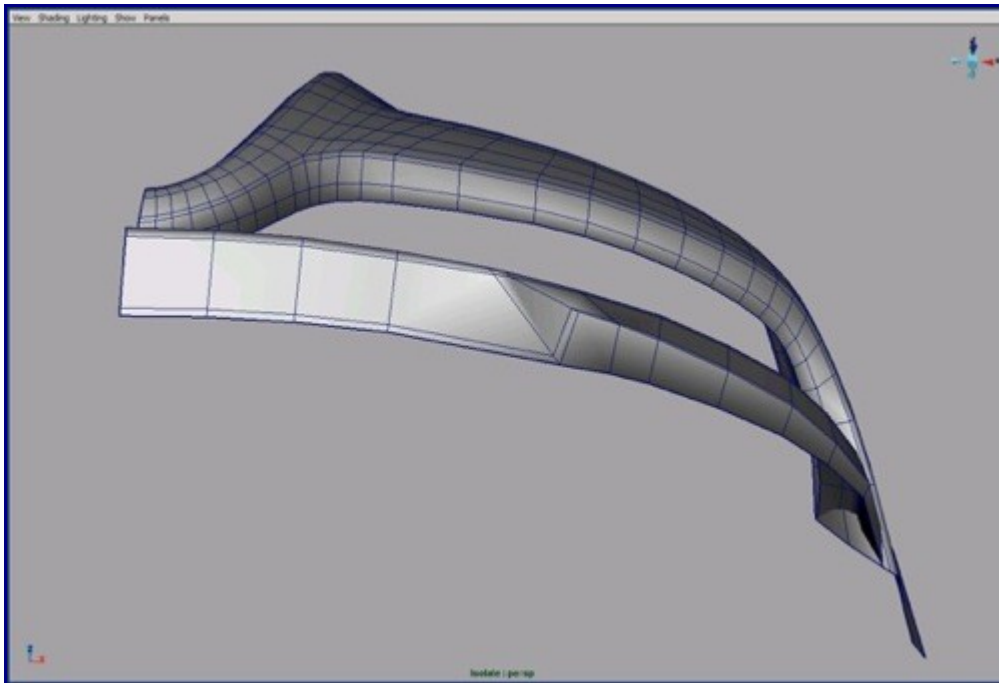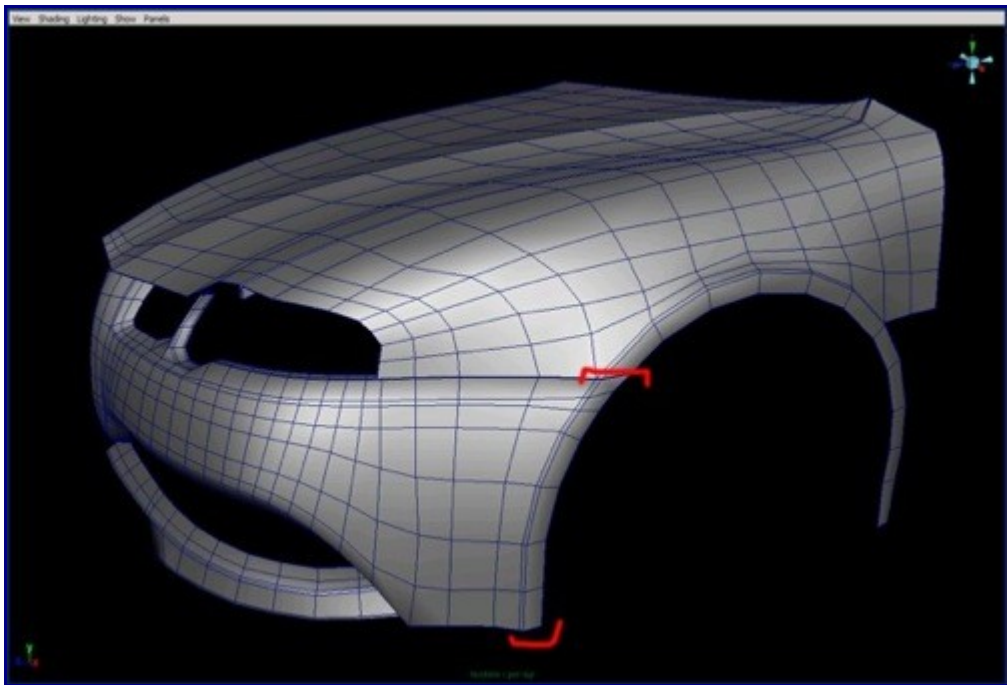
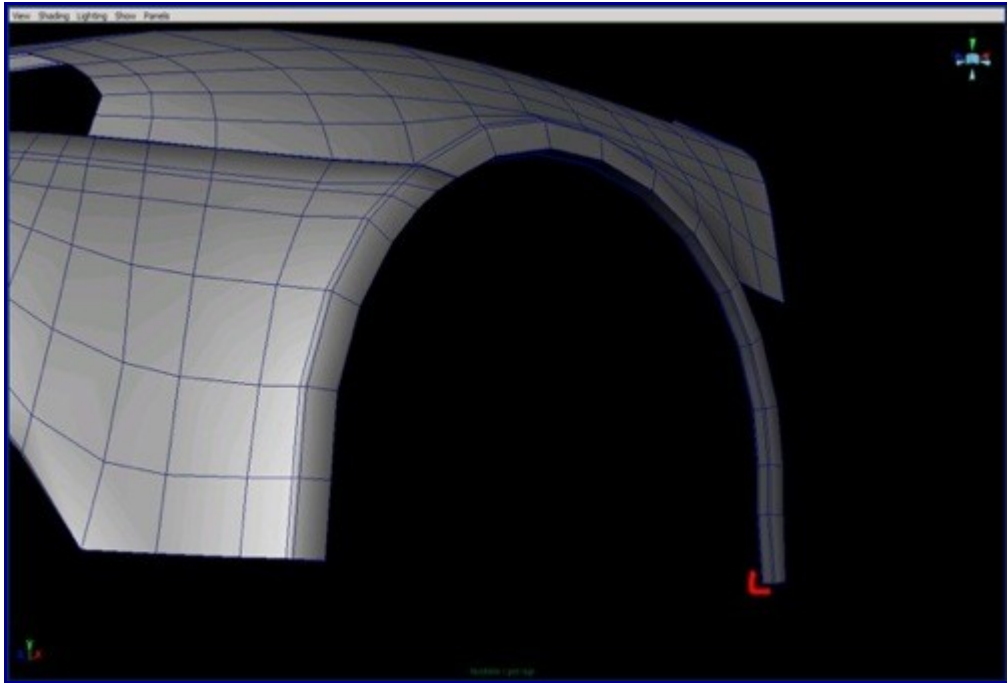30. Now we merge the "V" shaped geometry to the bottom part.

31. Detach the hood and scoop the borders with the extrude edge tool and add extra edge loops near the edges.
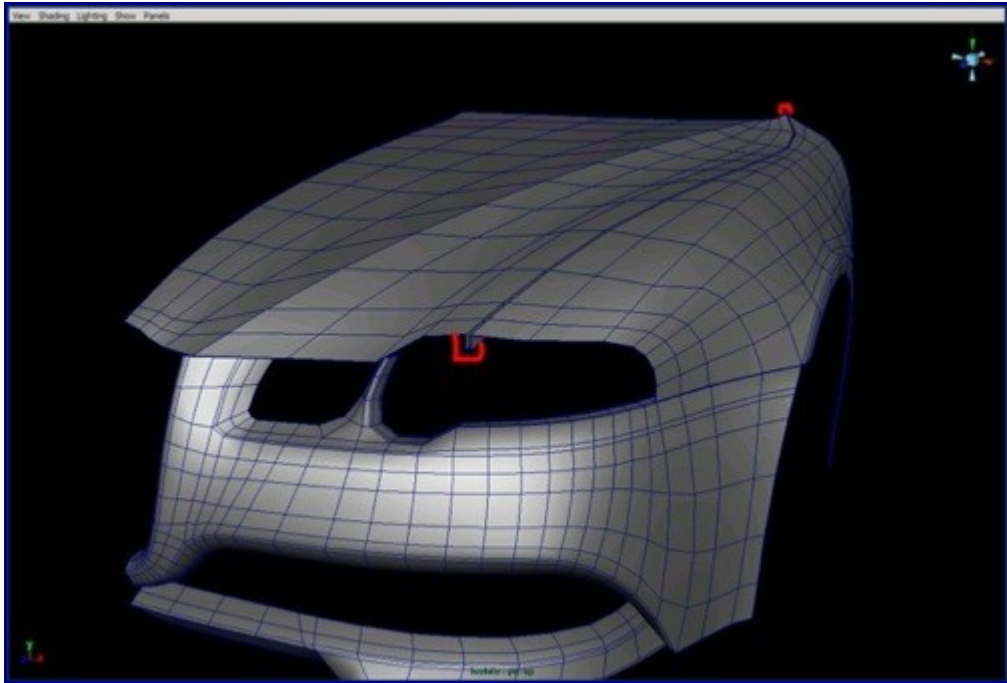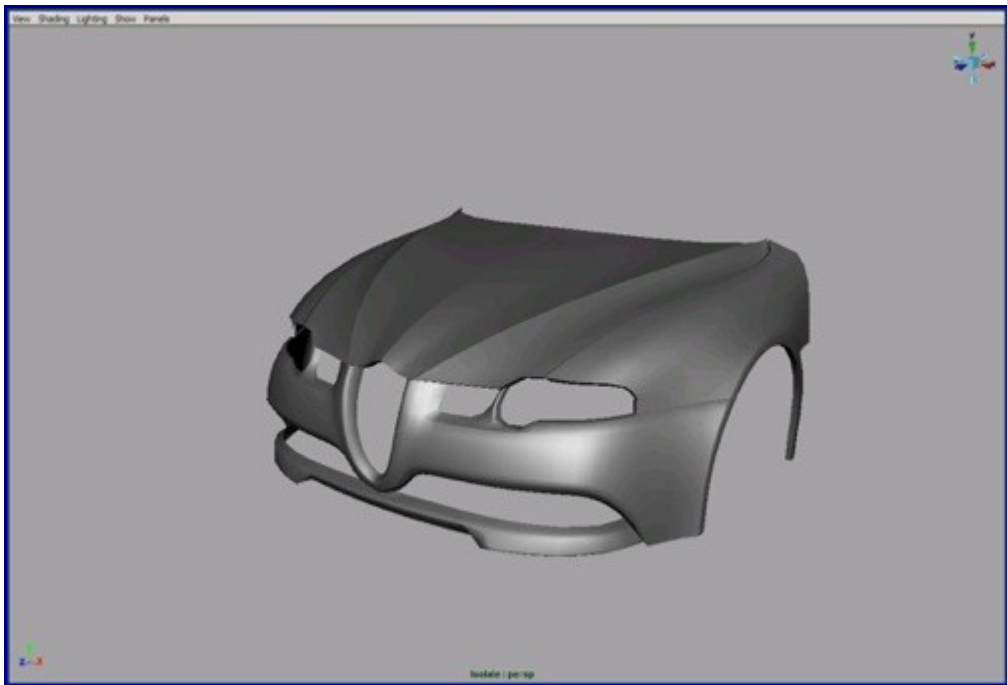
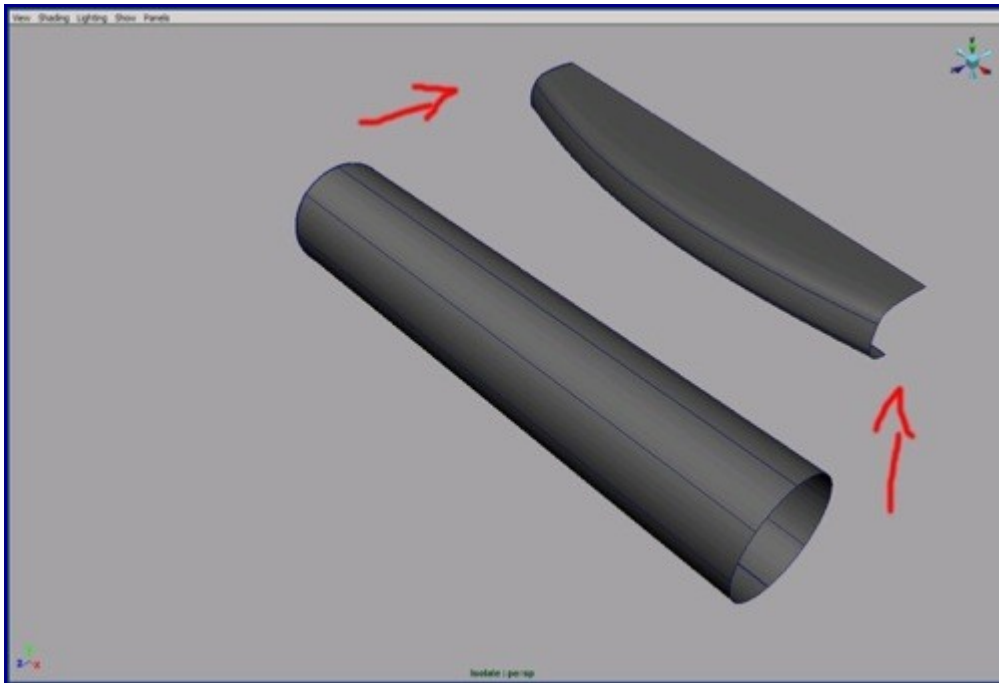32. Merge that arc to the front fender.

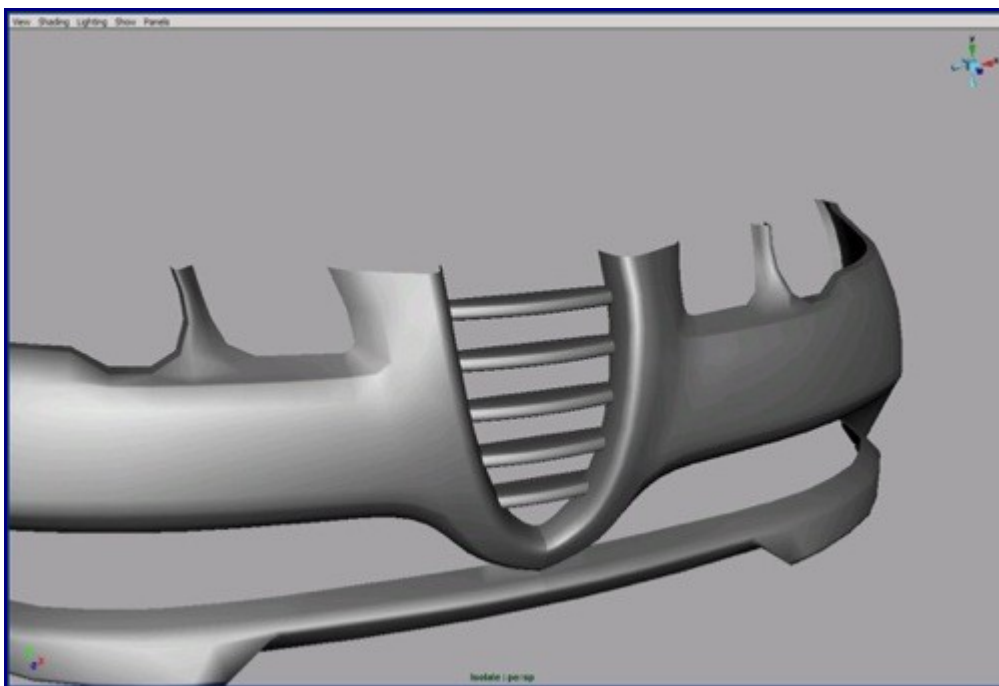33. Scoop the front fender also and add on it an extra edge loop.
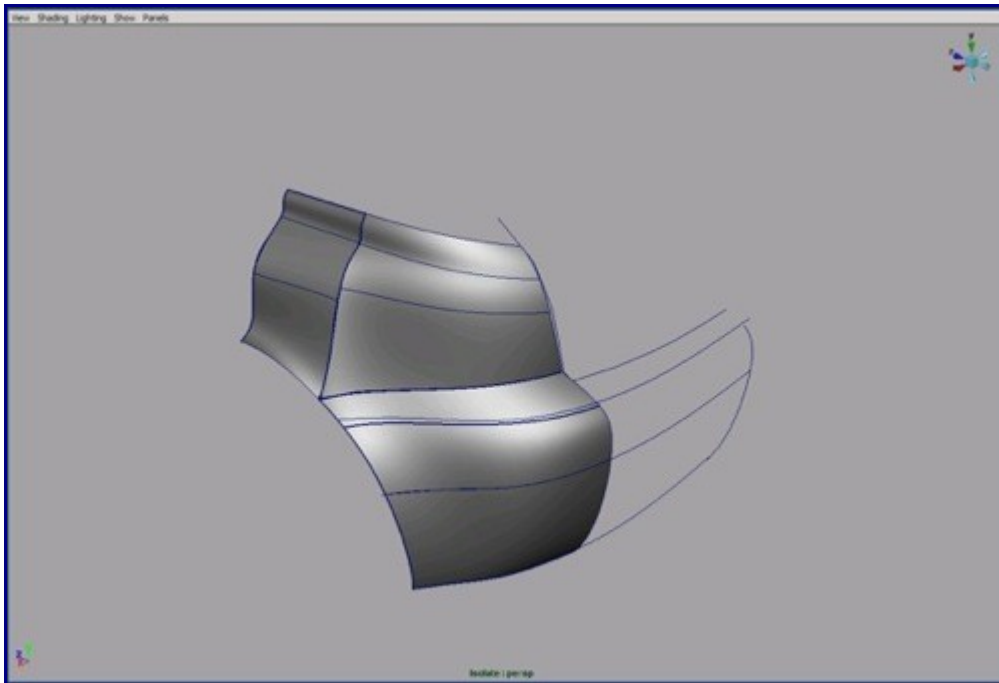
34. Our work until now.

35. From a nurbs cylinder we can reshape the front grid. You can delete the hidden parts of the cylinders.
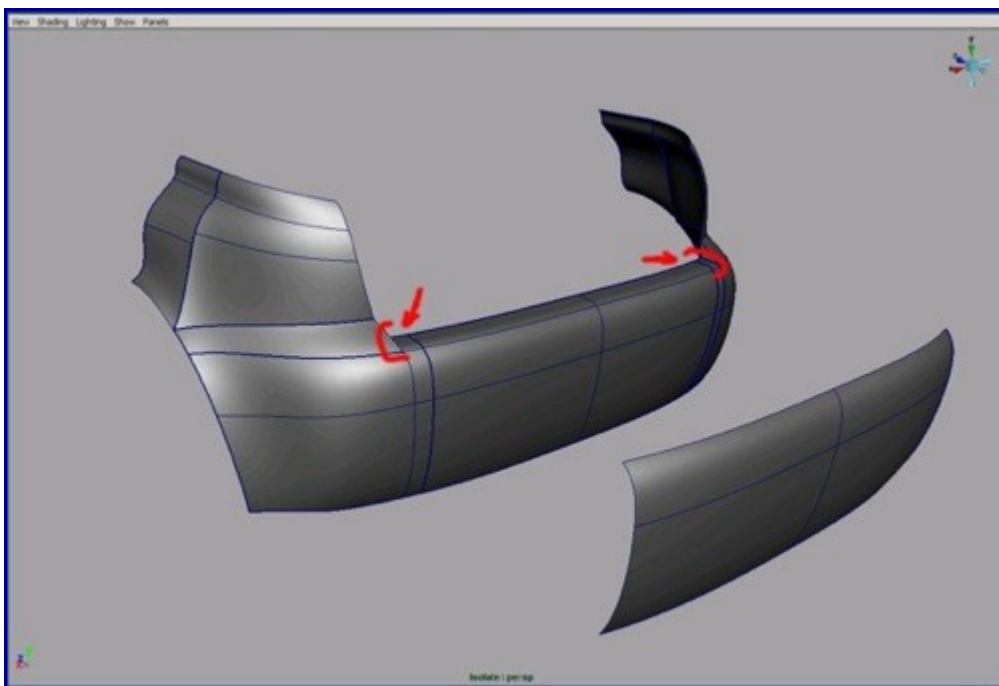
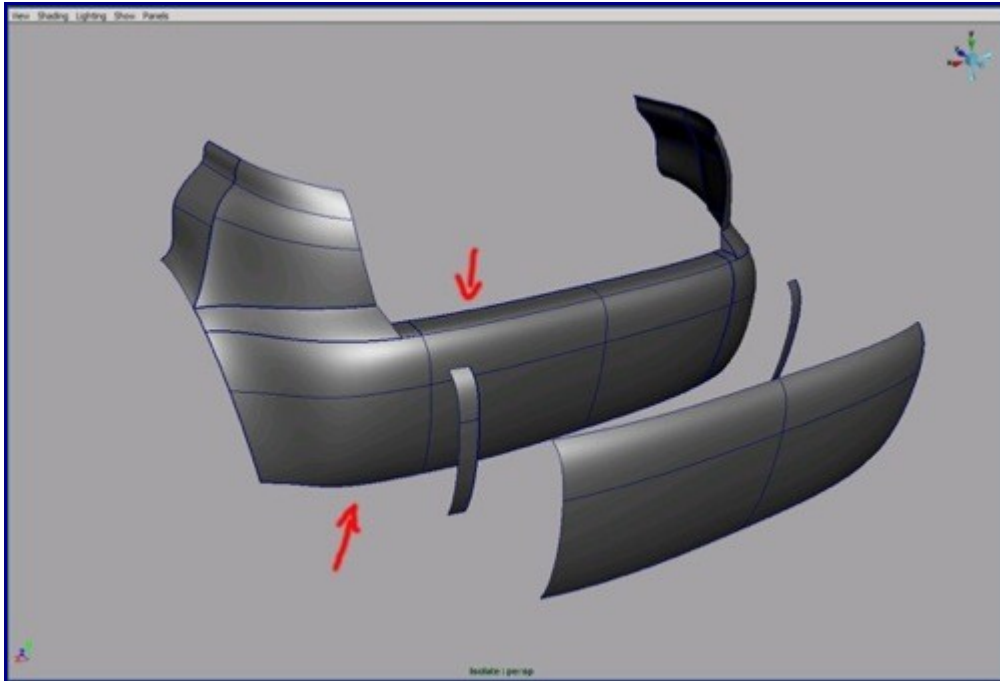36. Move to the right position and scale them in the front image plane.

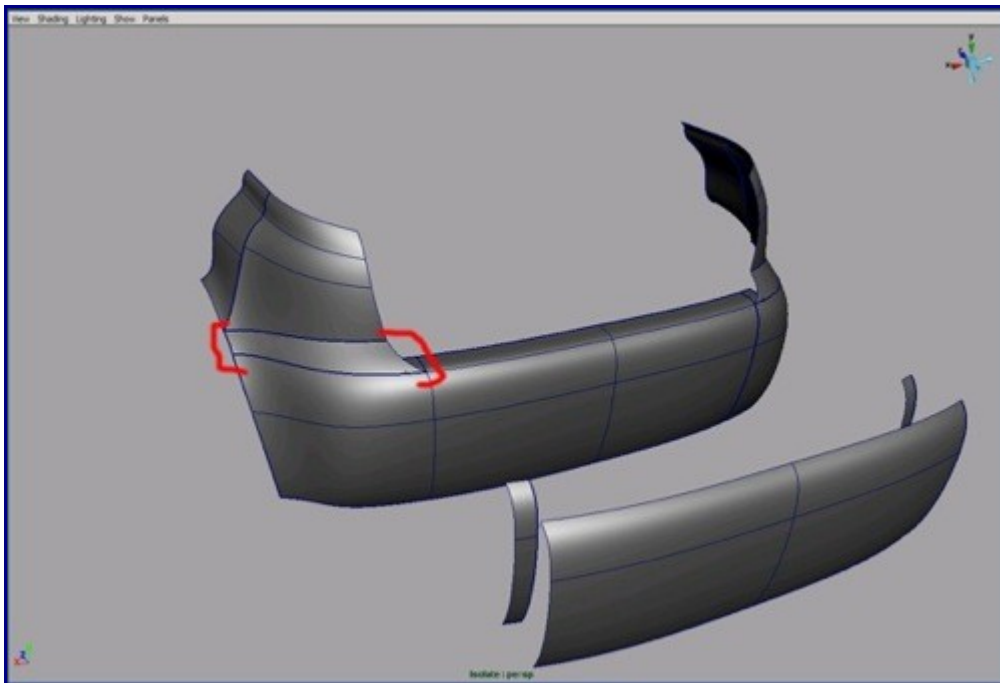37. Now we move to the back part of our car. Create a few surfaces from curves.

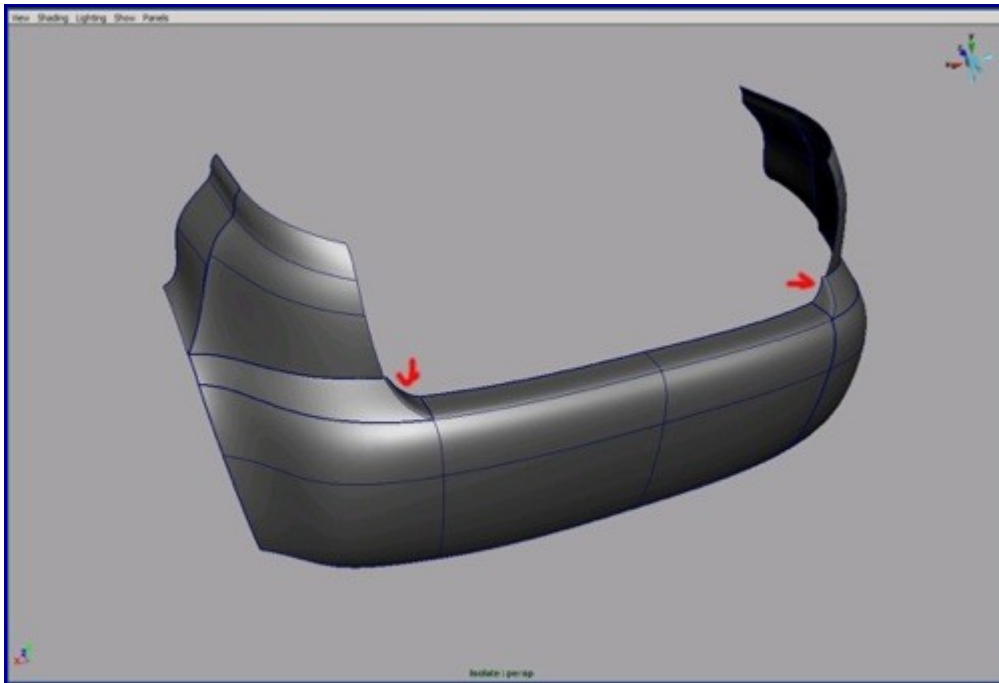38. Build the scooped surface and detach it where indicated.

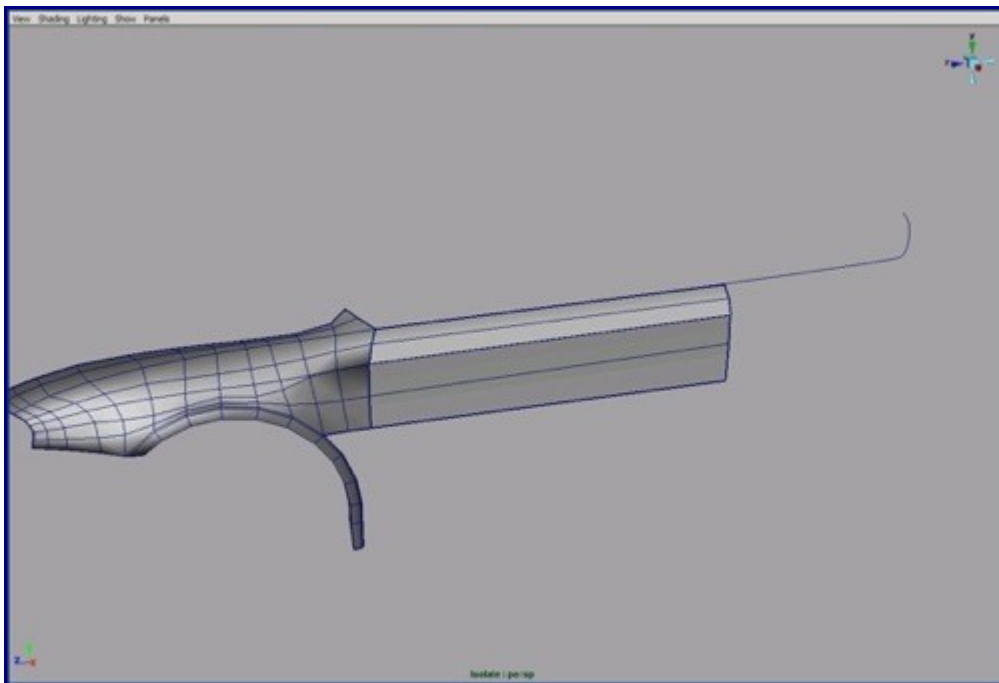39. Merge the 2 selected surfaces and reduce the number of spans.

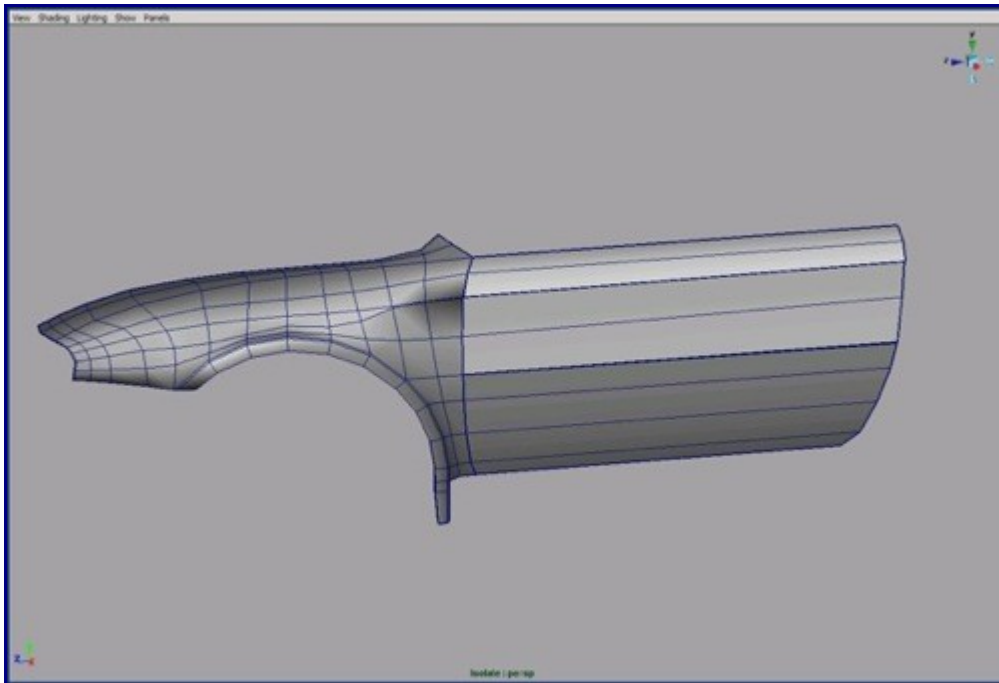40. We will stitch this part onto our new surface.

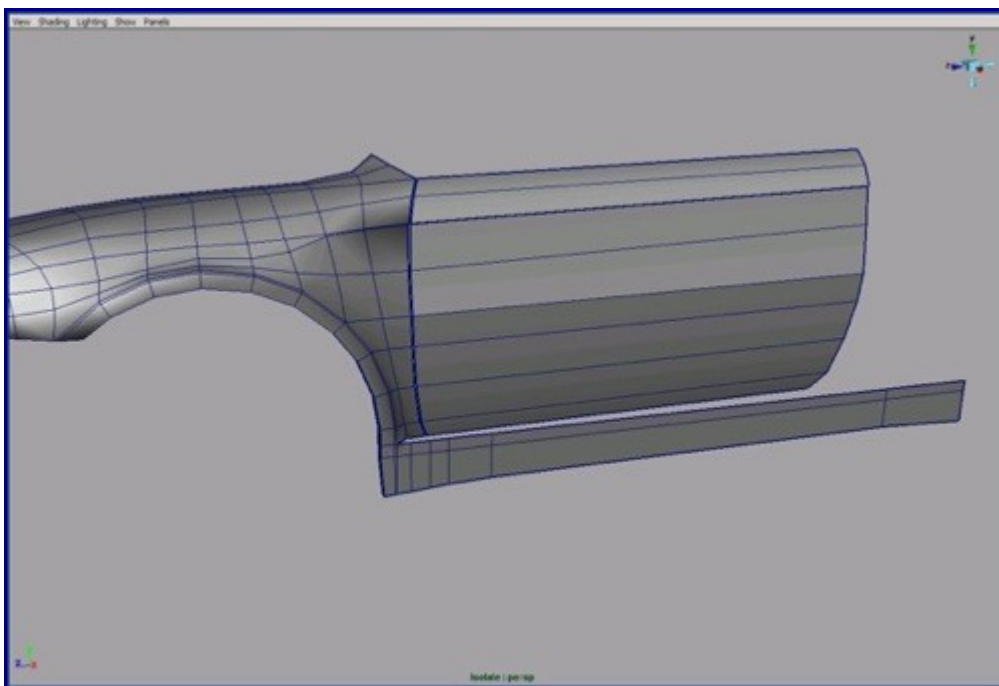41. Now we can build these surfaces and stitch them.

42. We move on to the doors now. Create a new curve at the door and the window intersection. Keep on extrude edge along that curve.
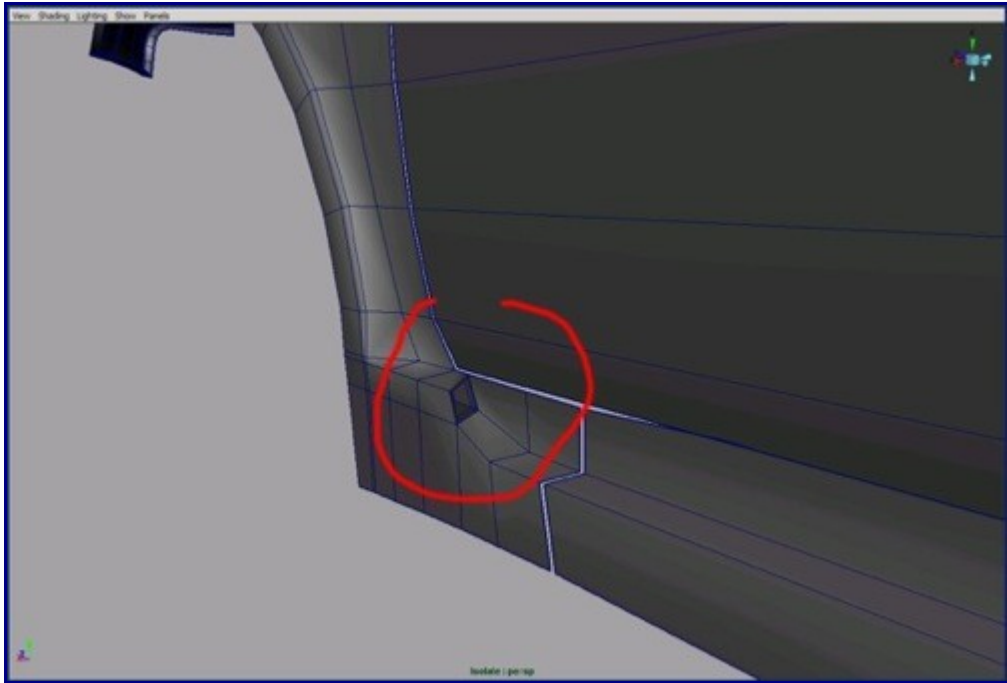

43. Extend the fender with extra faces that we can extrude the edges from for the door. Tweak the end by the image plane.
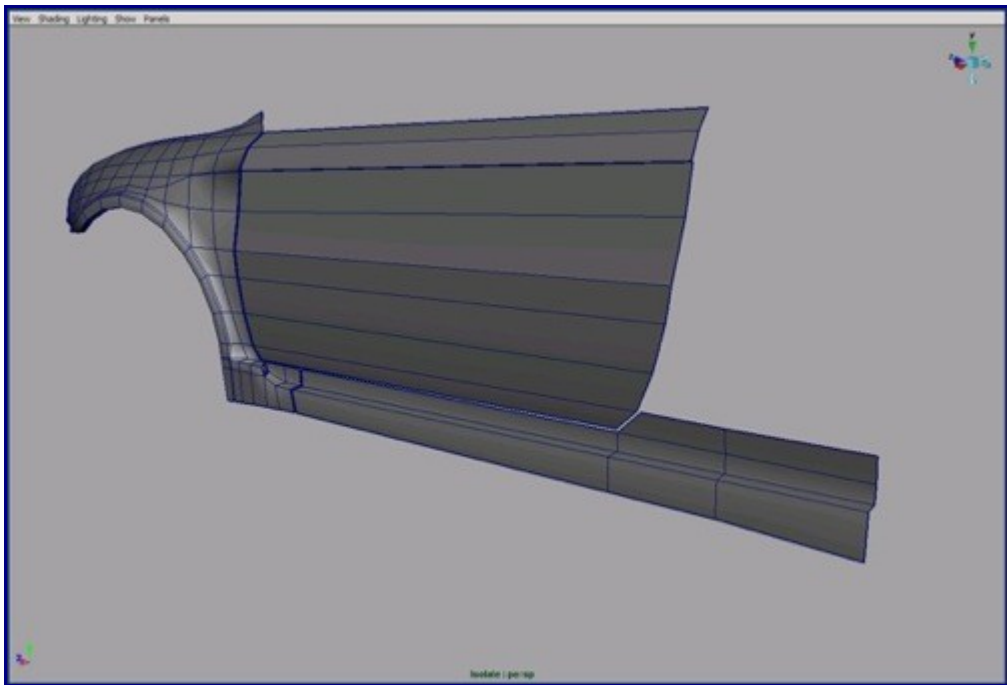
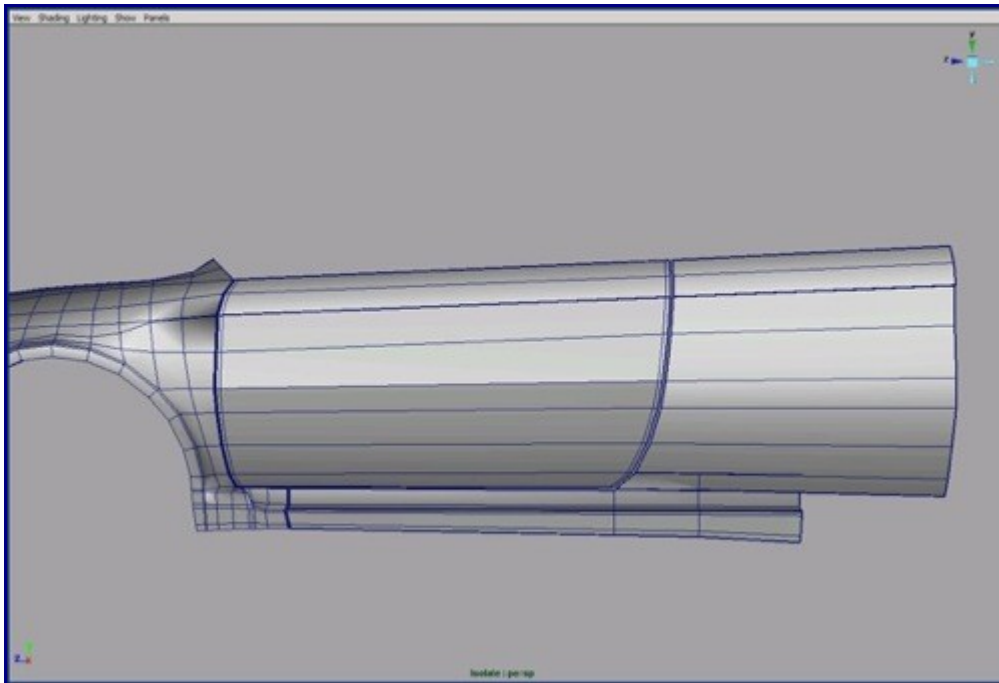44. We need one more loop for that part below the door.

45. With the append tool we can merge the faces and build the quad hole. After converting that will be nice and smooth circle shaped. Tweak that part by image planes.
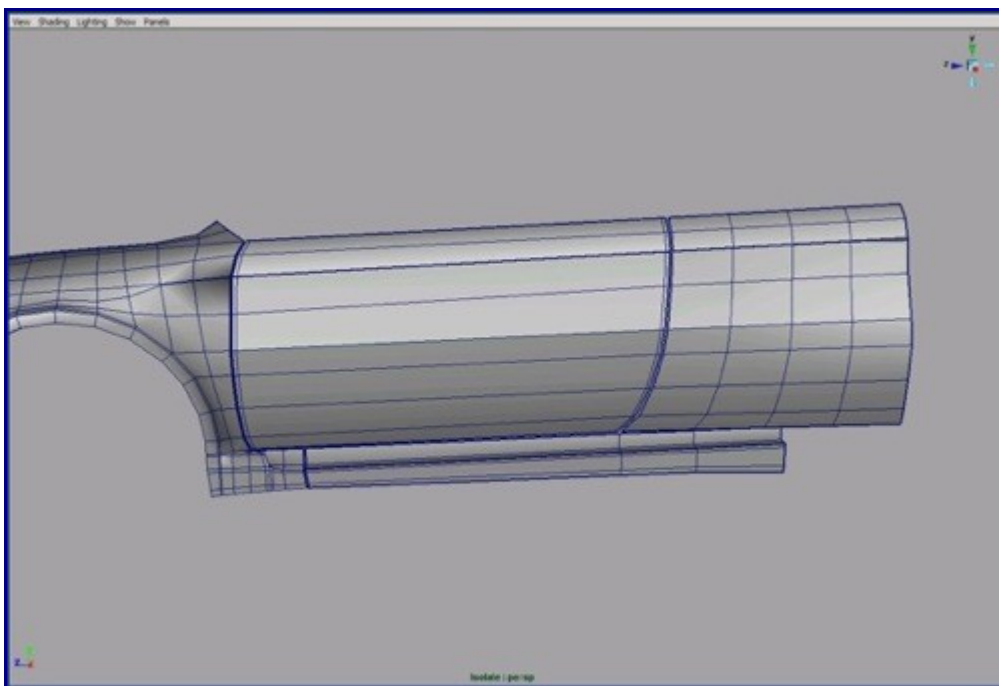
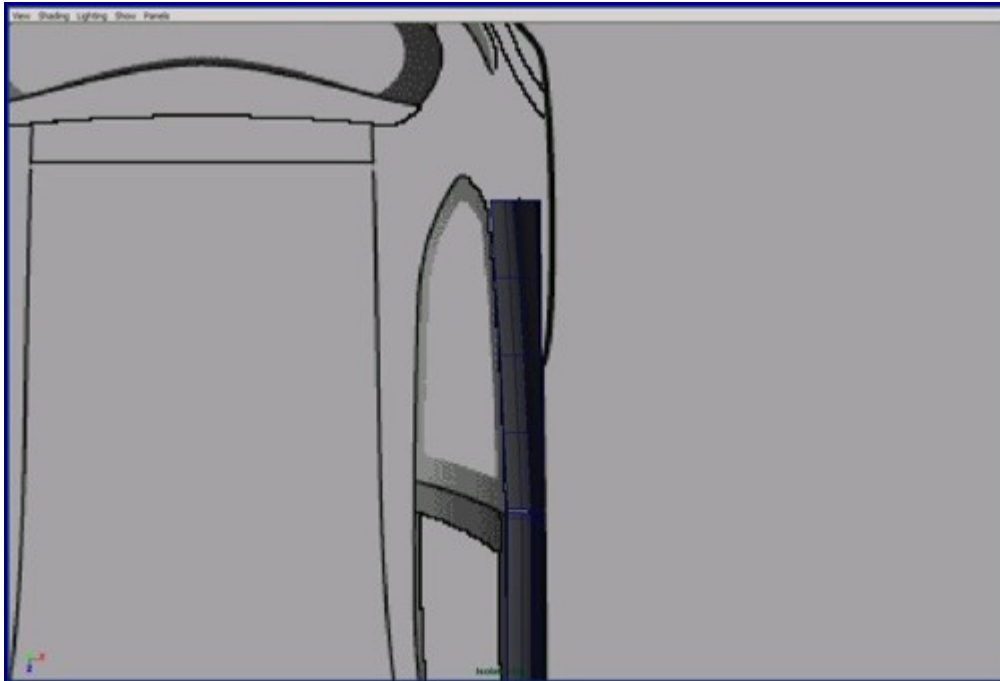46. Detach the new parts where there are gaps.

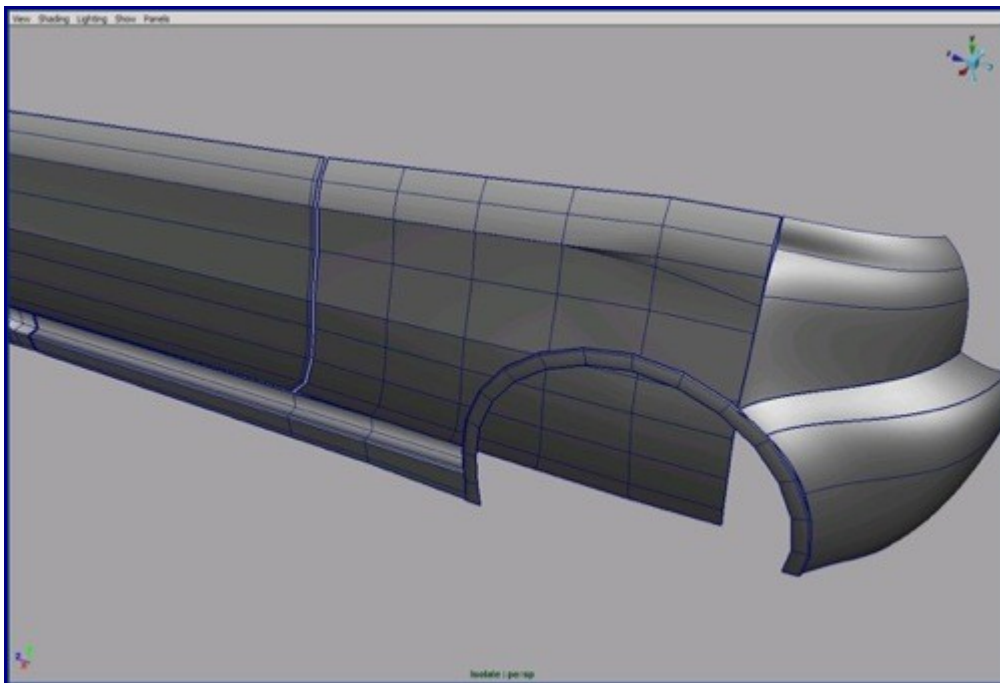47. Now we build the rear quarter panel.

48. Align the topology to existing parts of car.

49. Don't forget to check the surface from all angles. It must fit from all views.

50. Build the rear quarter panel surfaces. Use curves and loft tool for that and after you are done convert it to polygons so we can merge it to the rest of the parts.
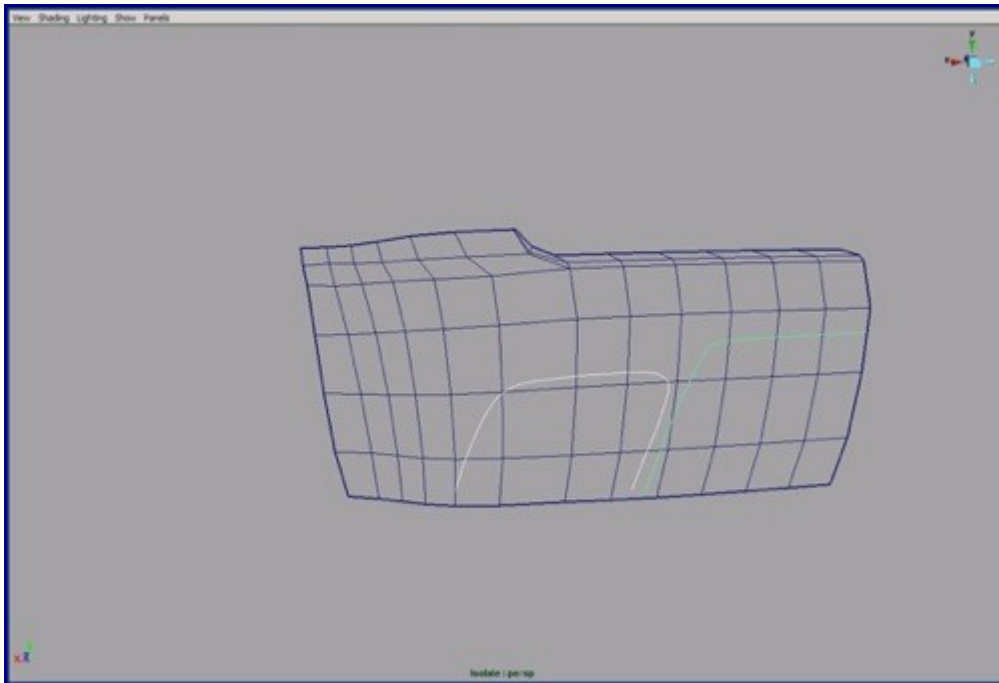

51. Convert the back bumper and the rear quarter panel to polygons and align their topology to the rest of the parts.
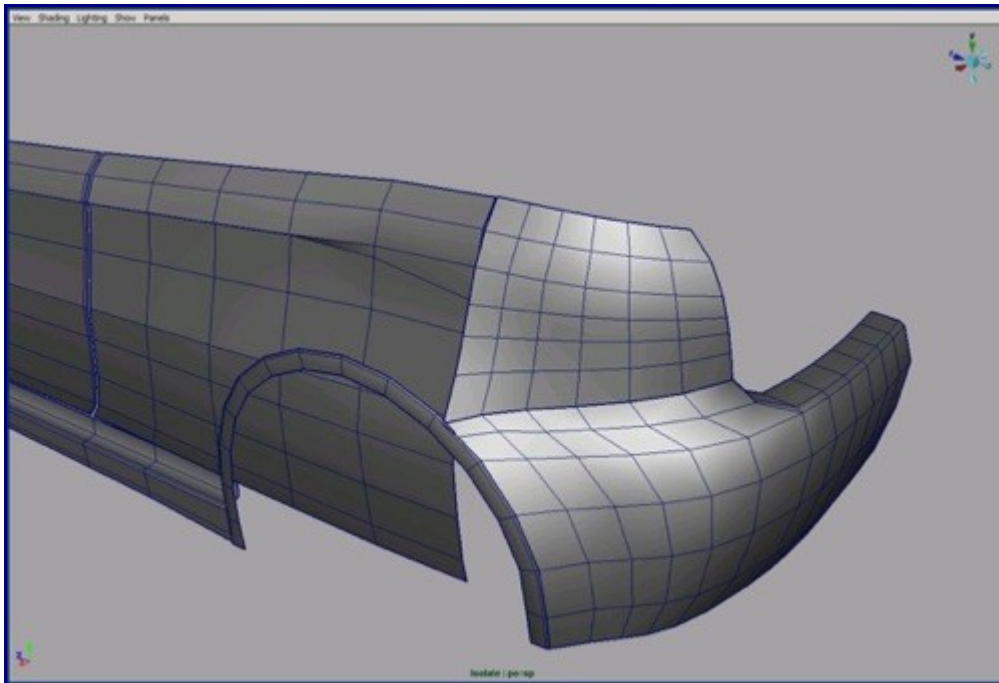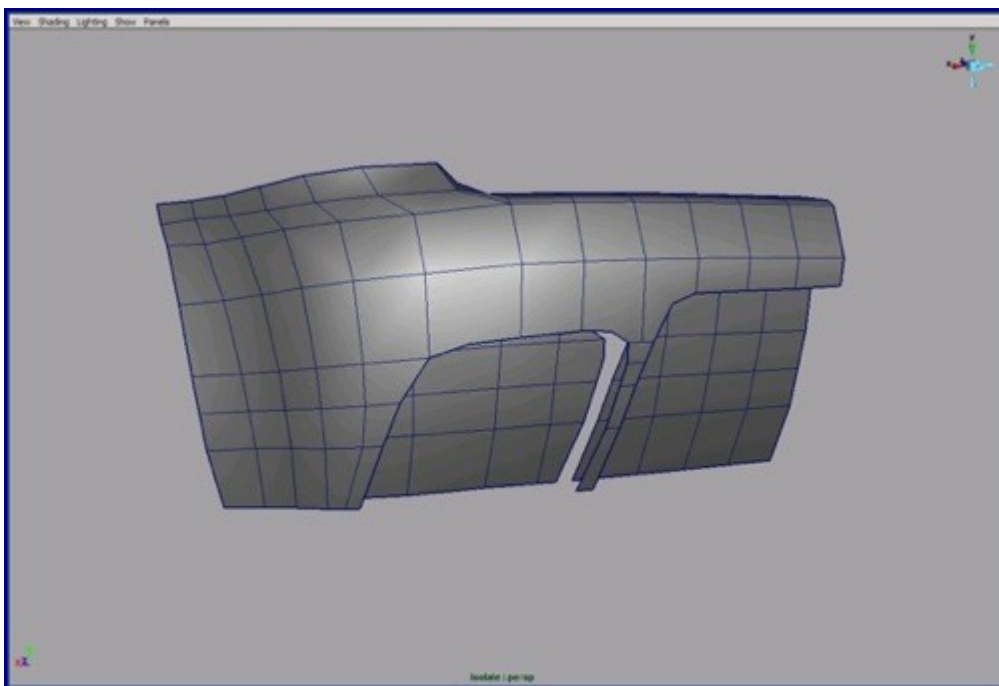
52. Snap and merge the vertices of rear quarter panel to arc and delete any unnecessary vertices.
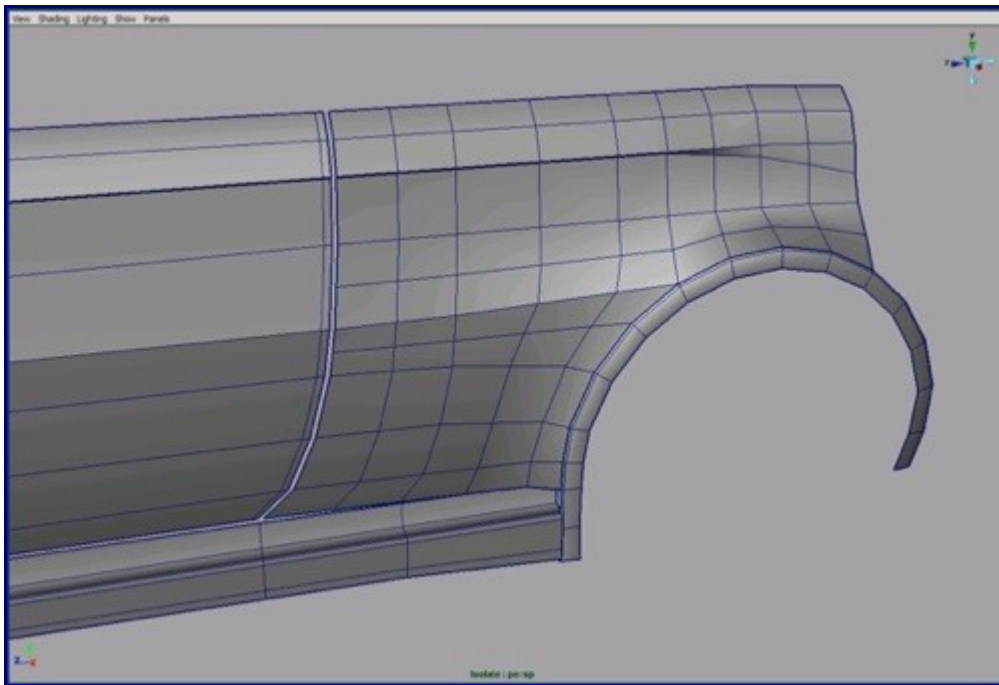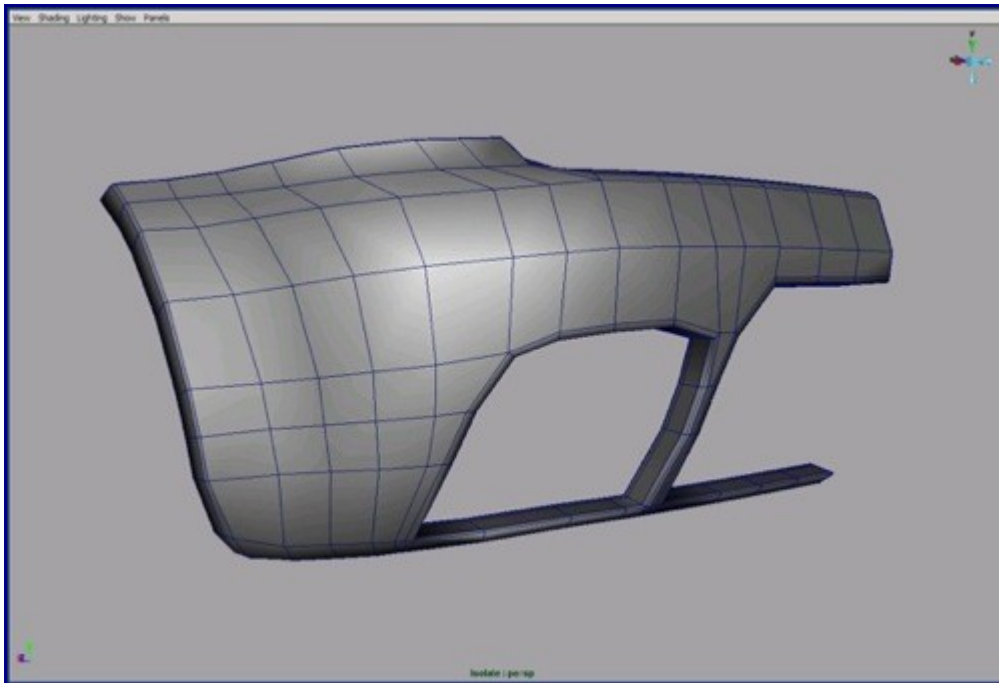

53. Add more details to back bumper. Turn on "make live" on the polygon part and by back image plane draw a curve on it. Split that polygon along that curve.
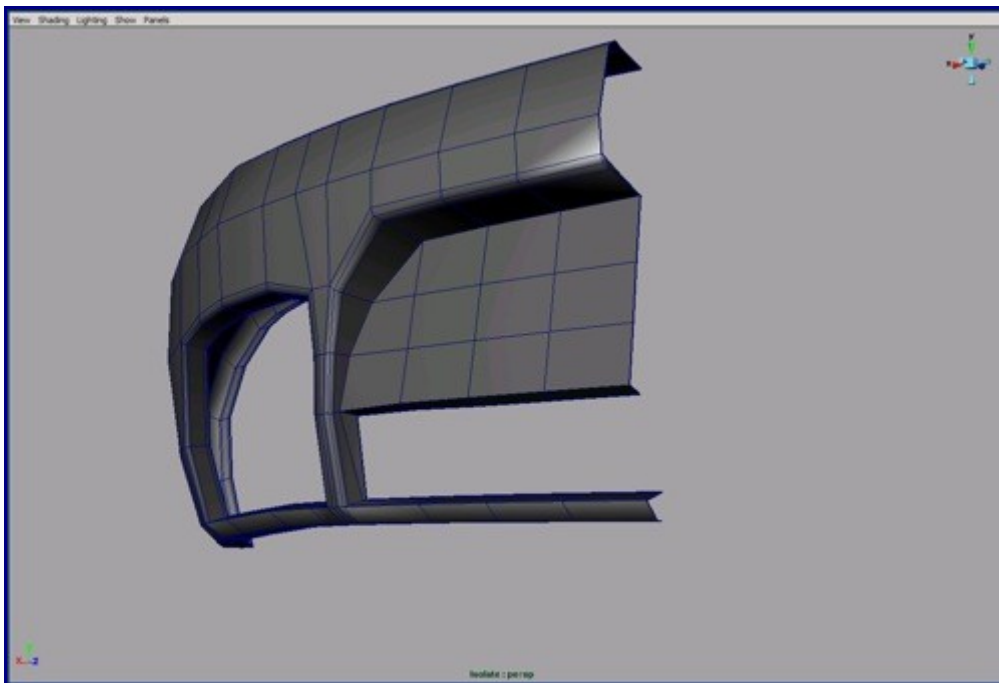
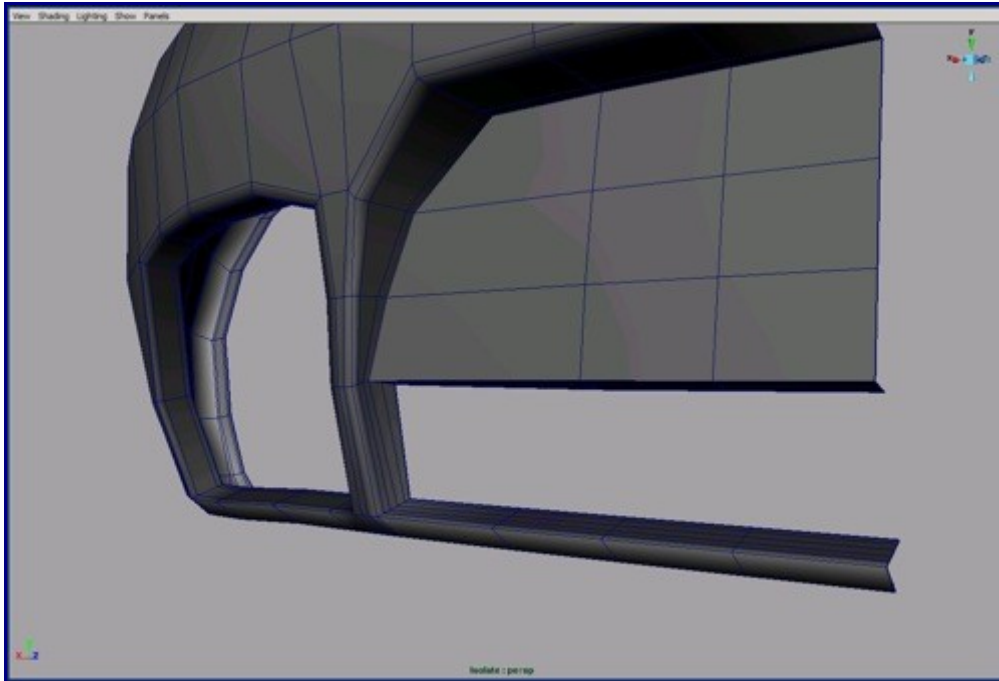54. Detach the spare part and move it a little deeper in the picture.

55. Build the sides and add extra edge loops for more realistic result.
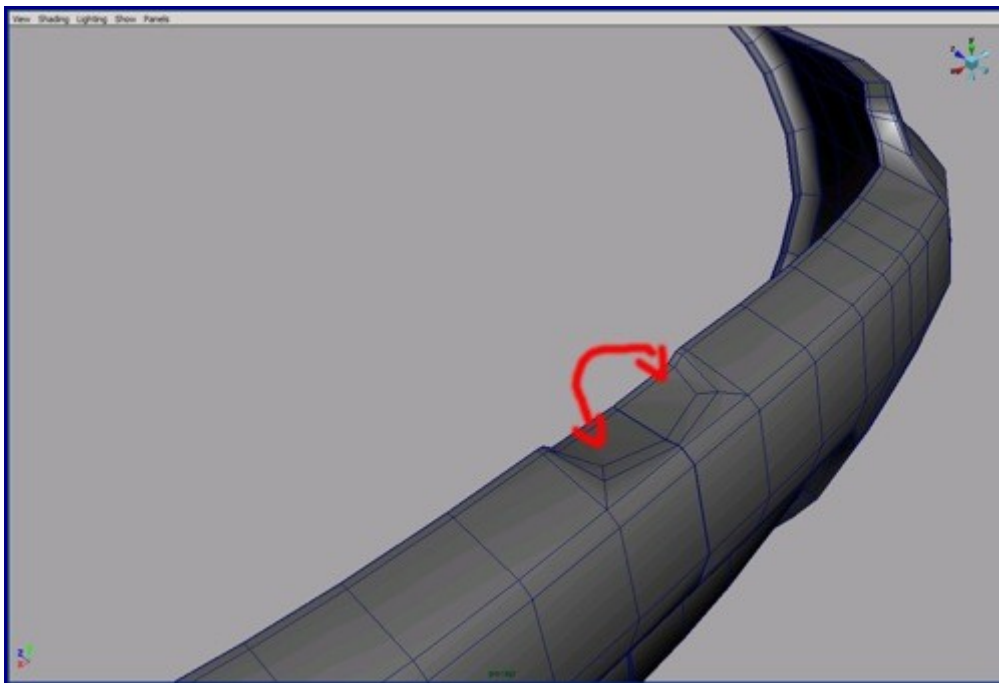
61. We need to rotate the surface a bit in the middle. This isn't on blueprint, so use reference pictures.
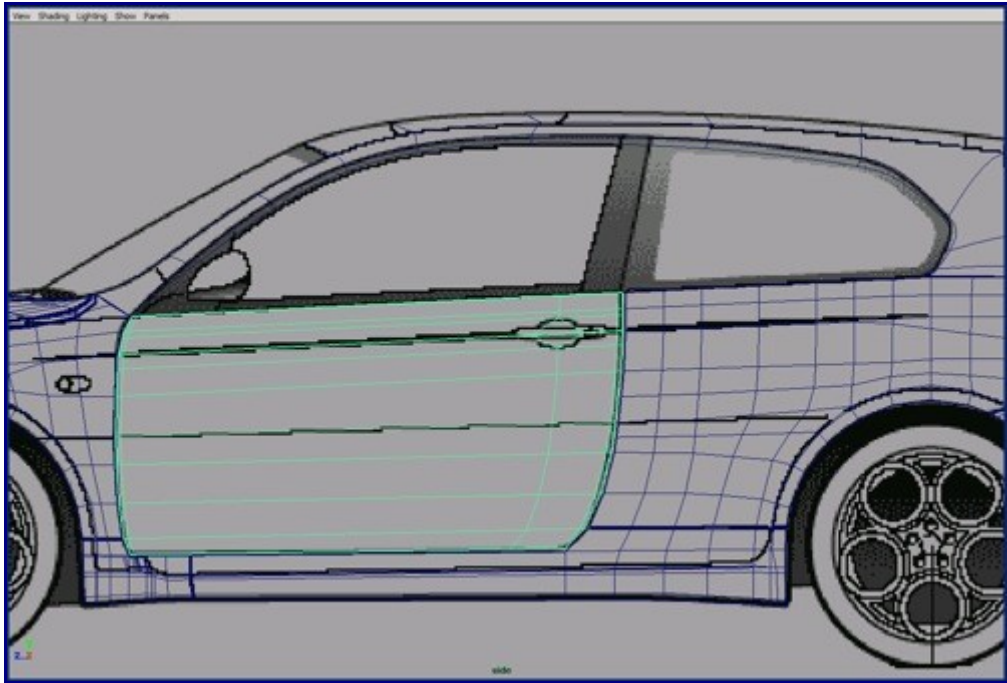

62. Add new edge loops at the borders of our new surface.

63. Use the split poly to create the indentation. After splitting, select the faces that are selected on the shot and recess them with the move manipulator.
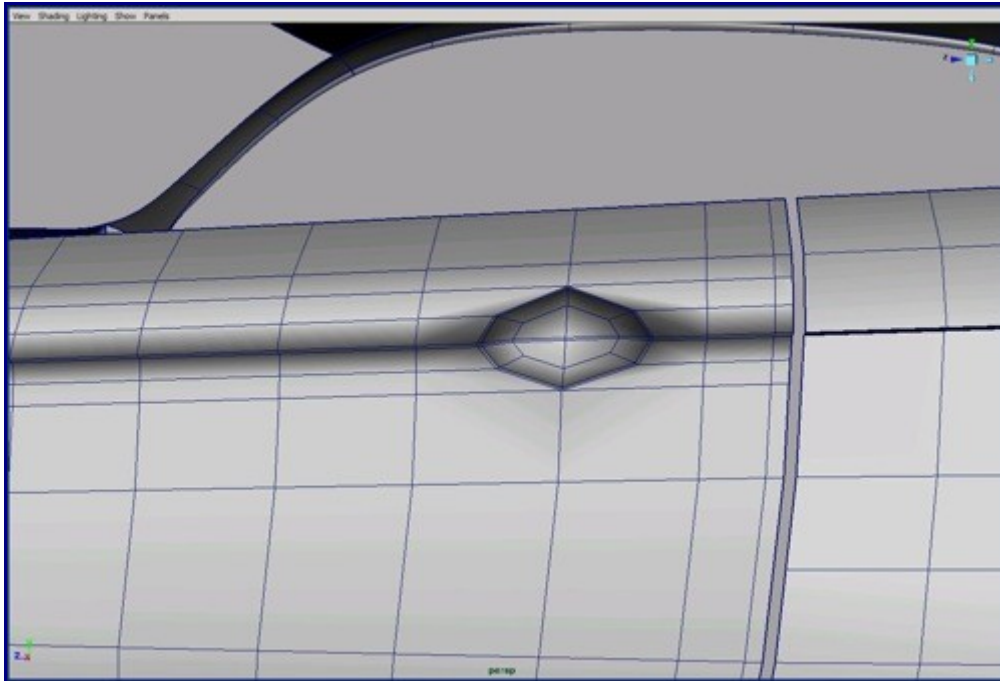

64. Now add details on the door. Split the indentation outline behind the handle. Split vertically the whole door along that indentation also.
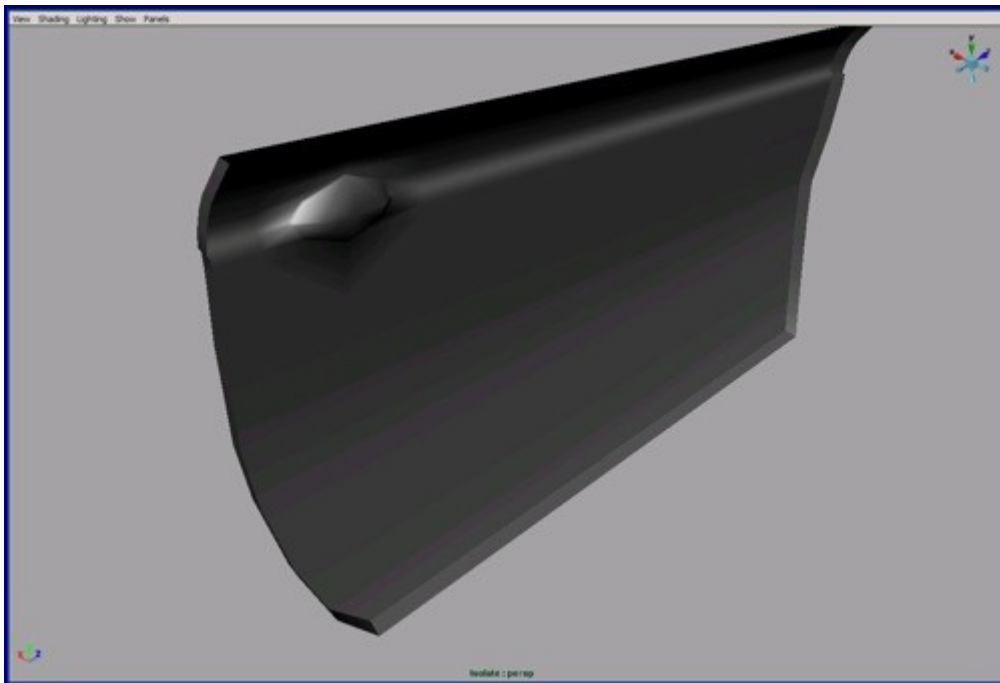
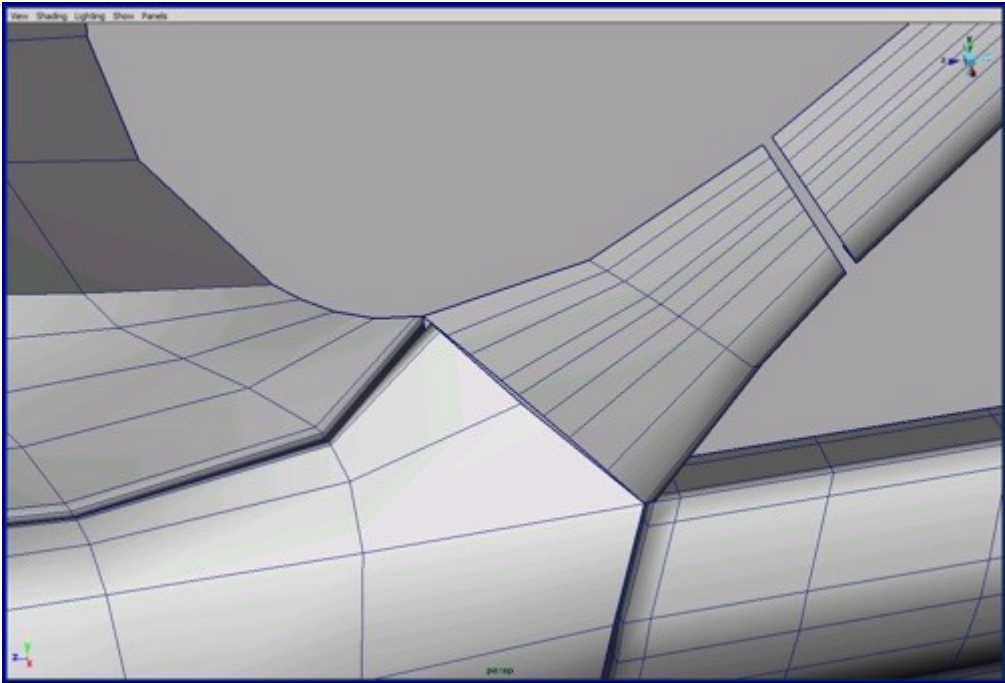65. Reshape as quads the outline of the indentation.
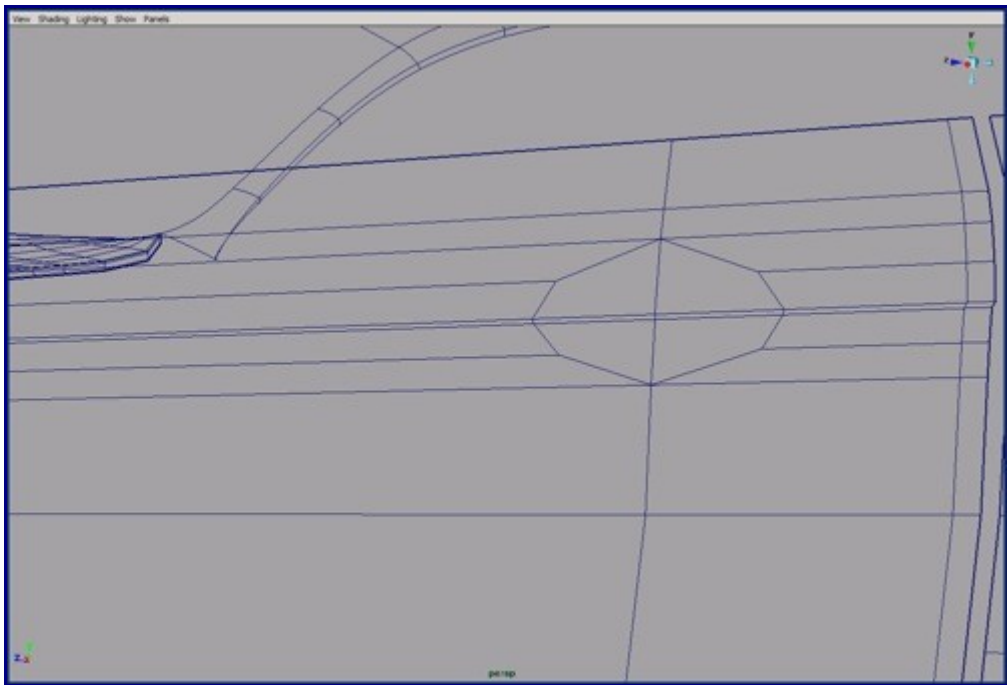
66. With the extrude face tool create the indentation and add an extra edge loop along the edge.
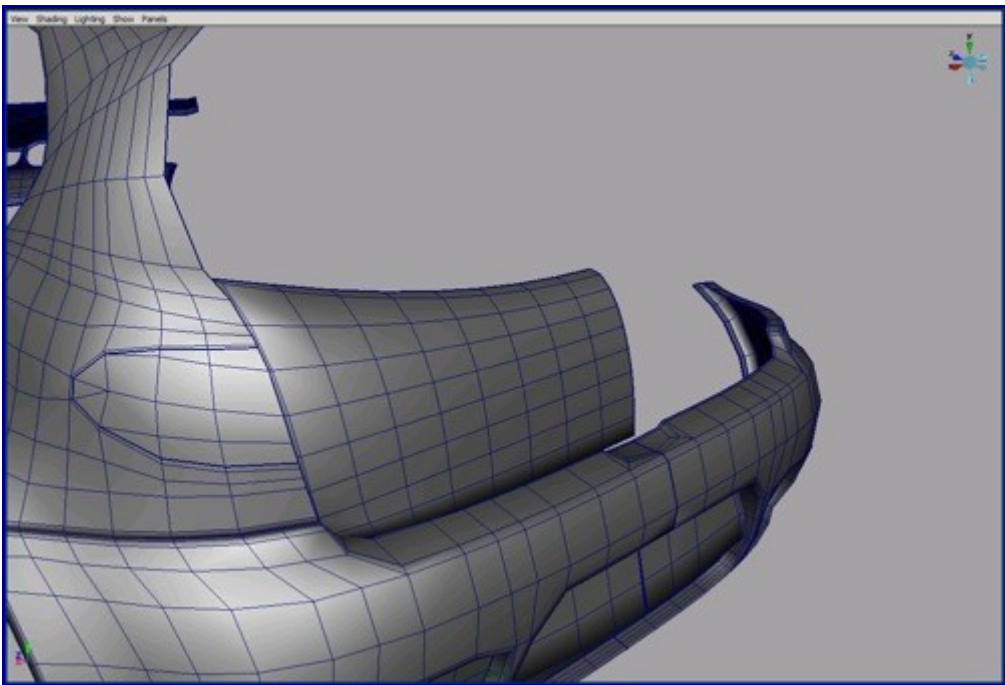
67. Build the door sides with the extrude edge tool and add an extra edge loop on it.
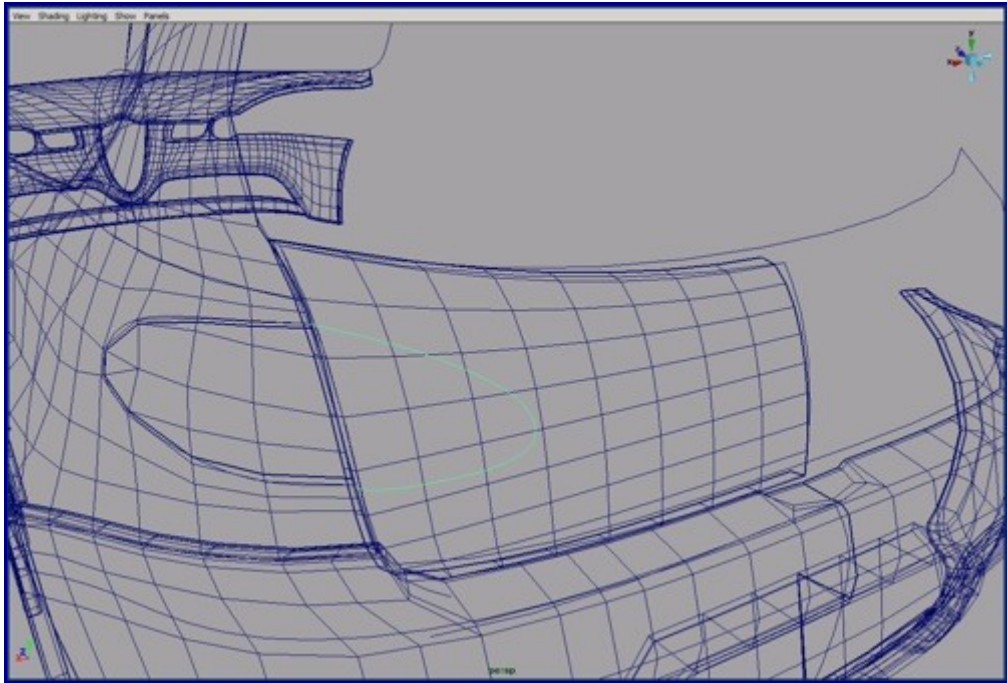

68. Now merge these parts. If you use T-Splines 1.6 then you can handle T-junctions in polygon mode.
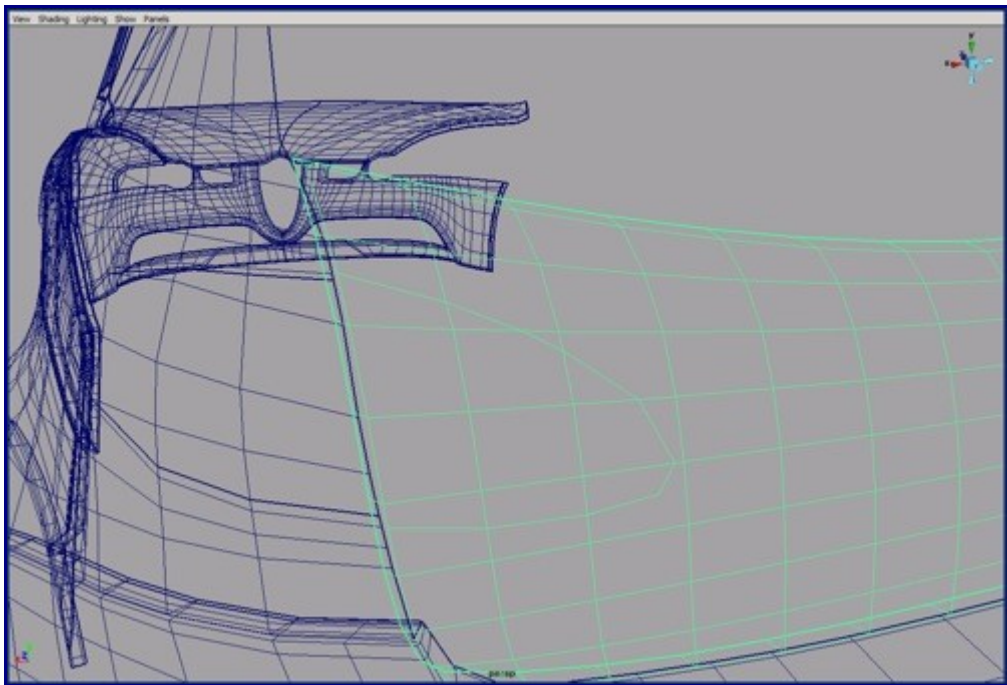
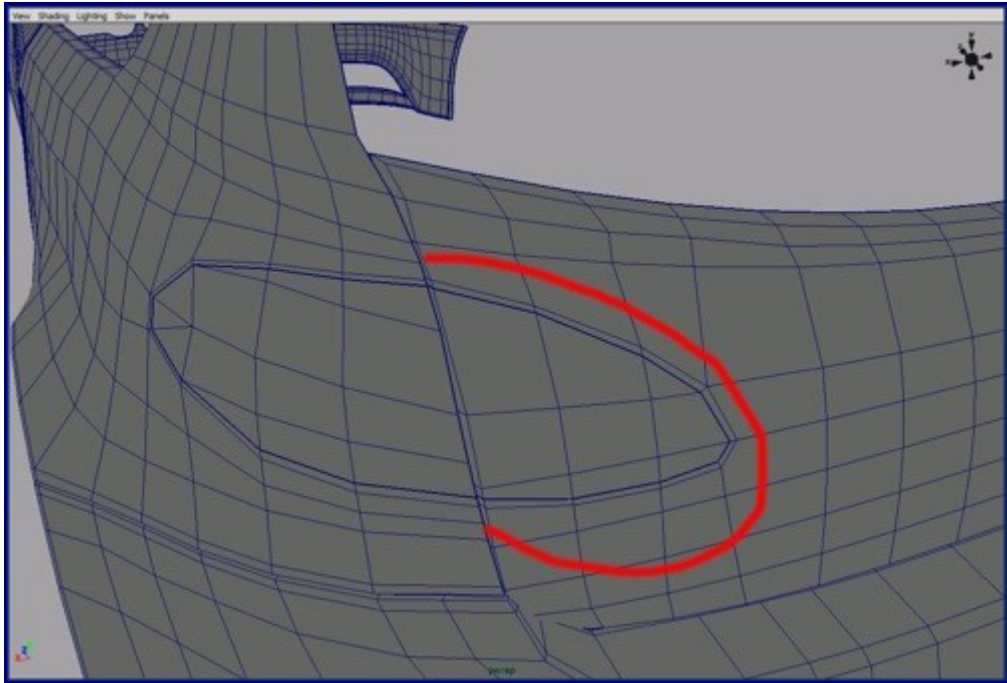69. Convert the trunk surface into polygons.

70. Turn the trunk surface to Live with the "Make Live" command and draw the lamp outline onto it.
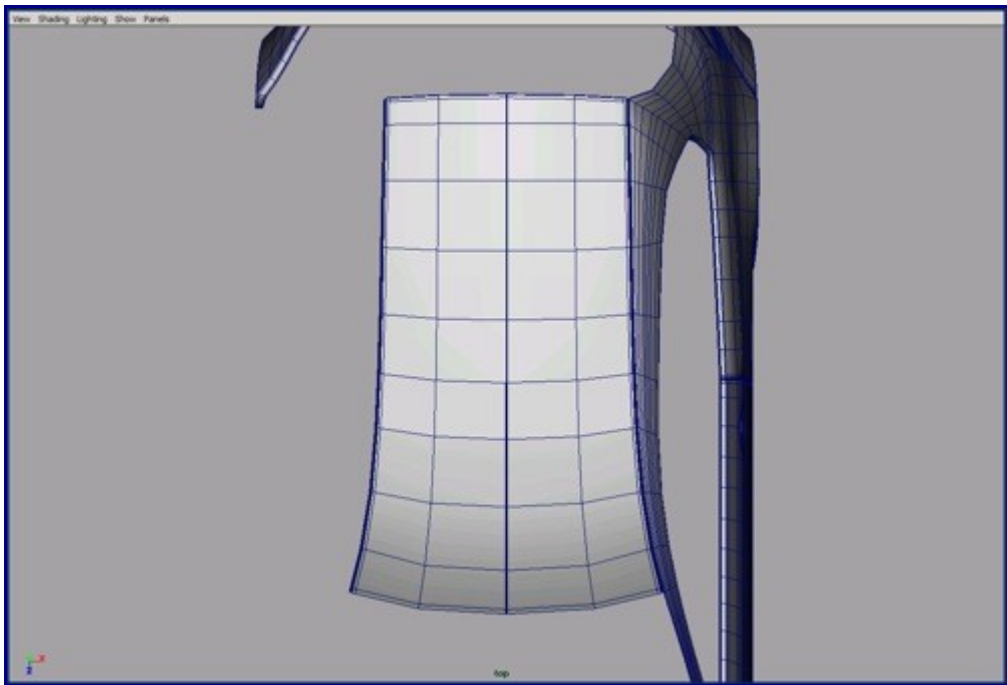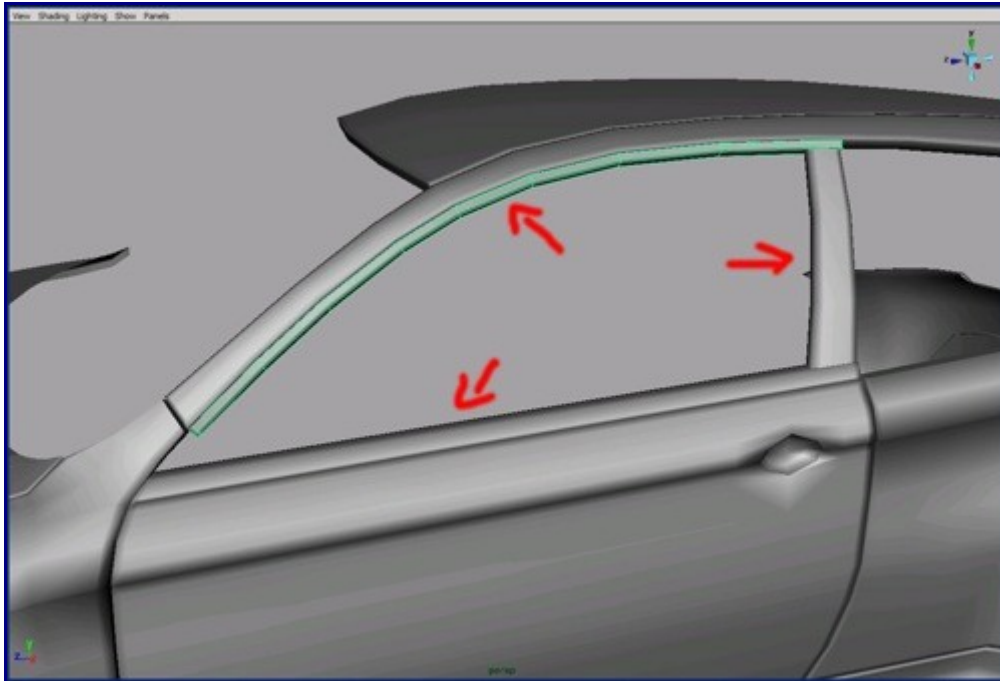
71. Split along the curve.

72. Detach the inside part of the surface and build a polyloop along the edges.

73. Convert the roof to polygons and merge it to other parts of the car.

74. Build the next parts of the door by front and side image plane. For those parts you can use any techniques that do you prefer.

75. The rims are the most complex parts of that car. First, create polygon cylinders from the image plane. Merge the 5 cylinders whose diameters are smaller than the others. It's important to keep the number of segments if we want a polygon model without triangles.
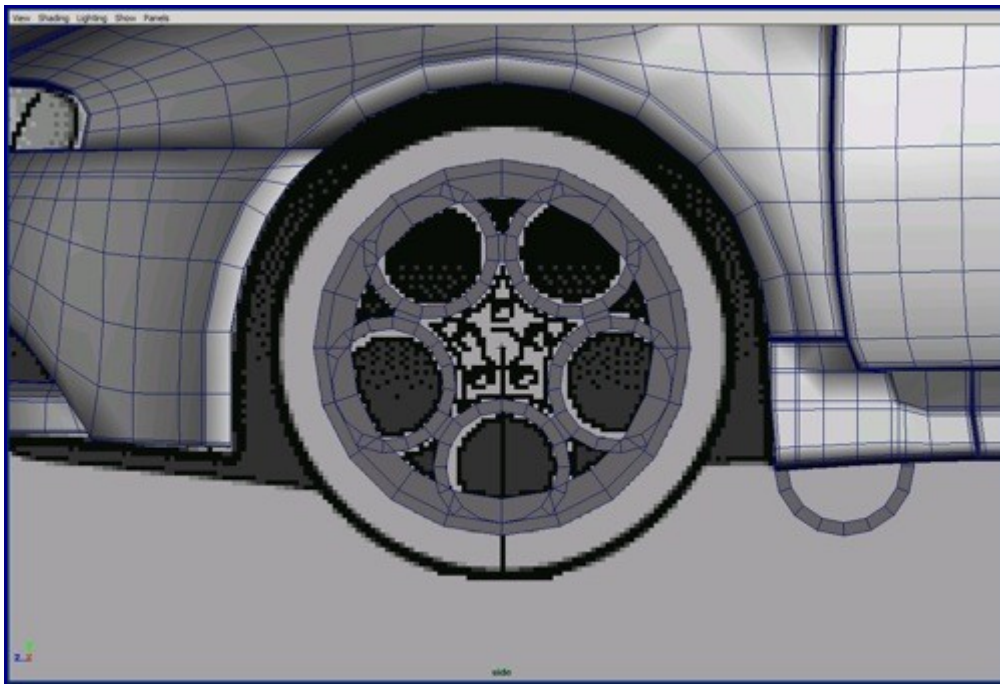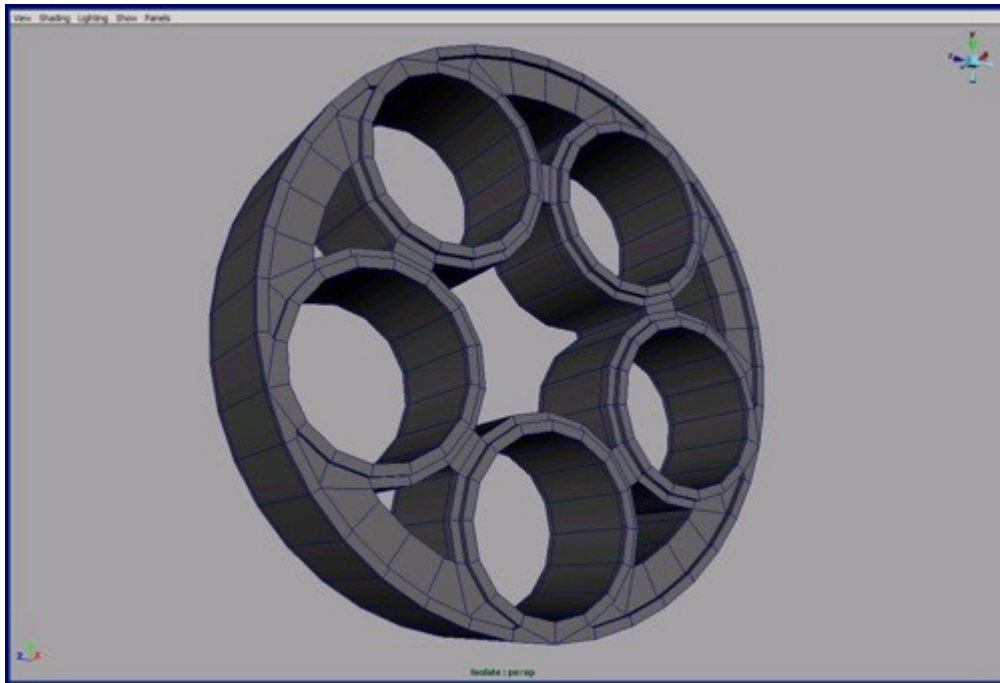

76.Merge the five small cylinder and the one big cylinder into one model. Use the Boolean tool but don't forget to clean up the topology after the Boolean.
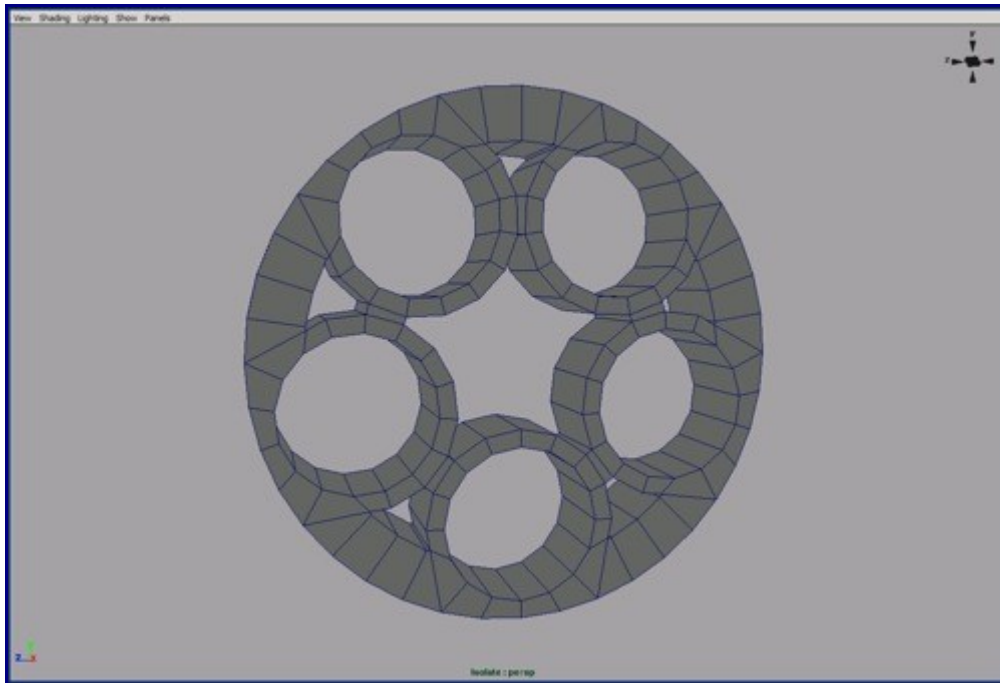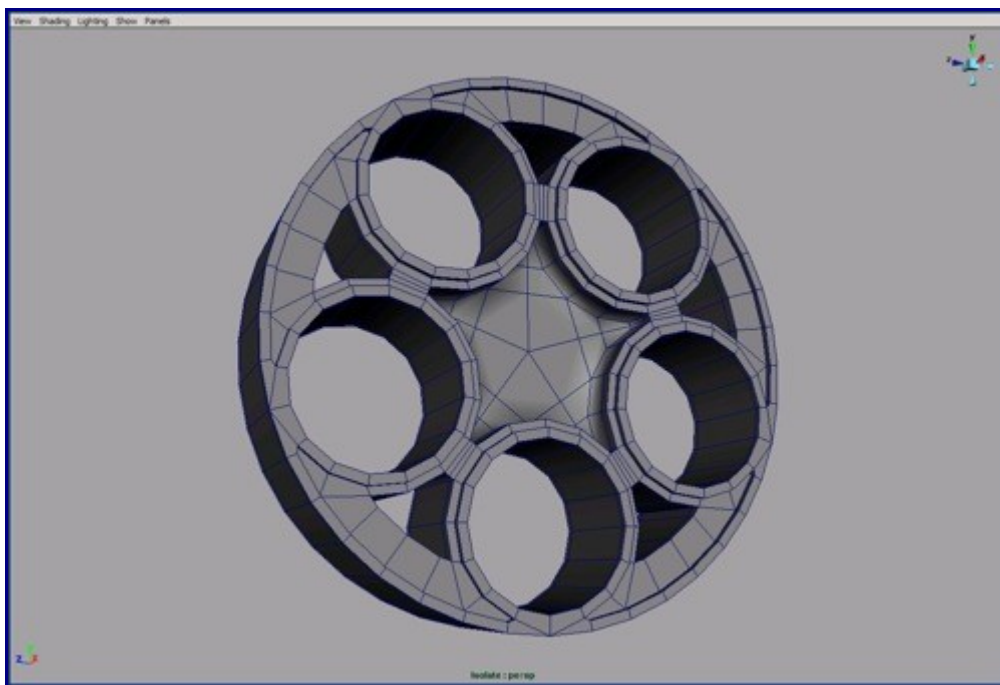
77. Create another five cylinders with small diameters by image plane and copy them onto that five holes.
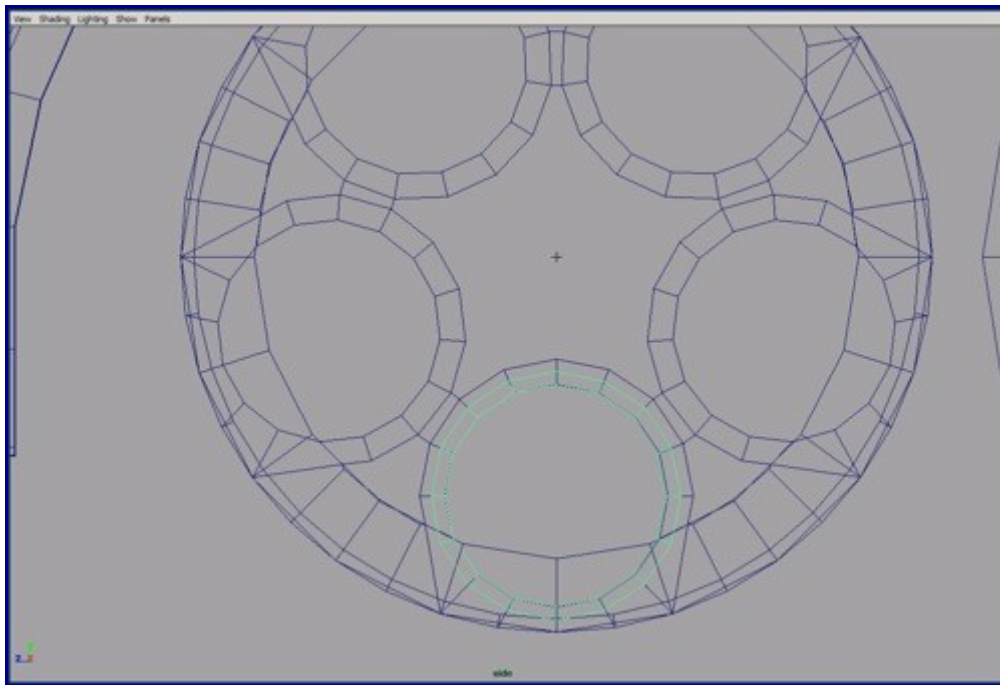
78. Now merge everything into one object. You can see from the picture how to merge it to keep the quad topology.

79. After merging those parts, build the star shape in the center of the rim. I recommend using the append poly tools and the split poly tool.


80. Create a new cylinder. The size and the position are set by the image plane. For the first cylinder you need only six and the second cylinder you need eighteen faces. I circled on the picture the faces you need. With the edge loop create two loops inside the hole. Use snap to point to precise positioning. You only need to model 1/5 of the model because it's symmetrical. After you complete the model, duplicate, rotate and merge the copies.
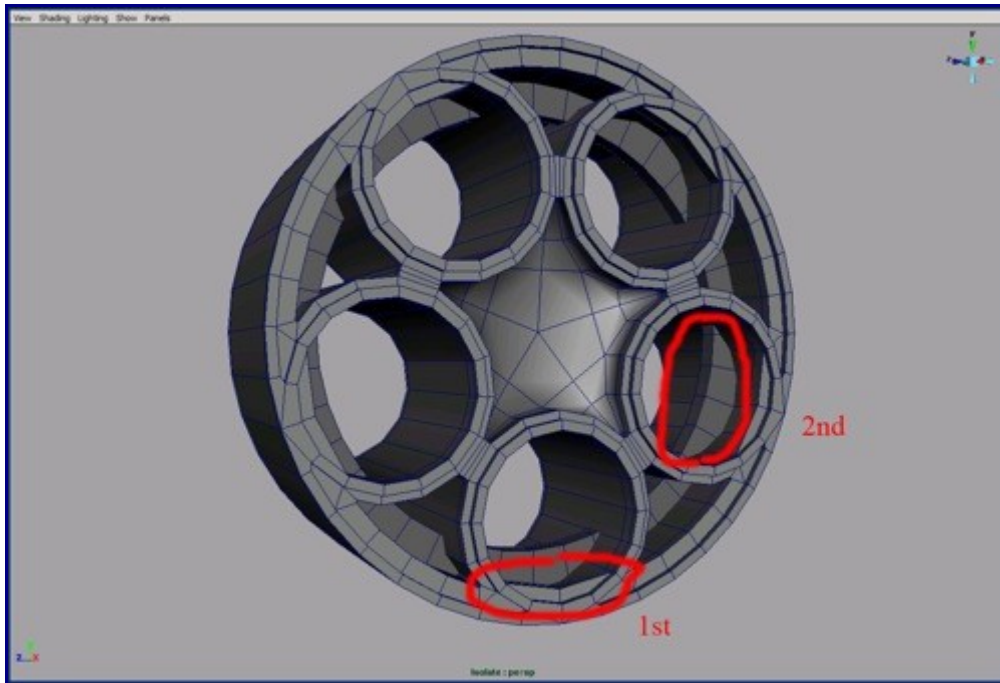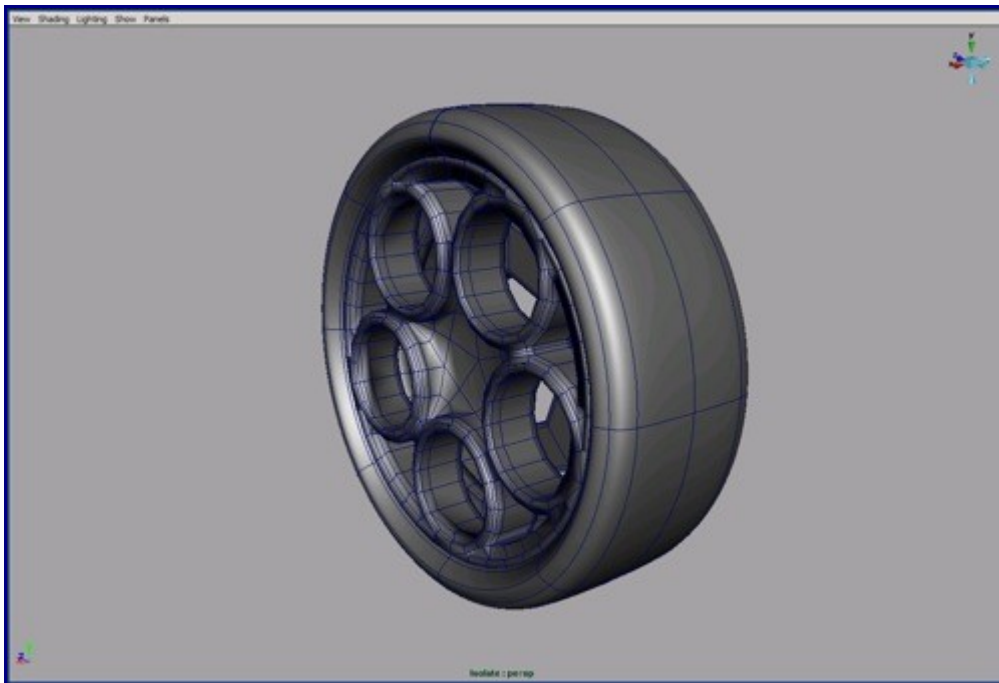
81. Duplicate the cylinder that is inside and move it to other side of the rim. Add extra edge loops at the indicated area.
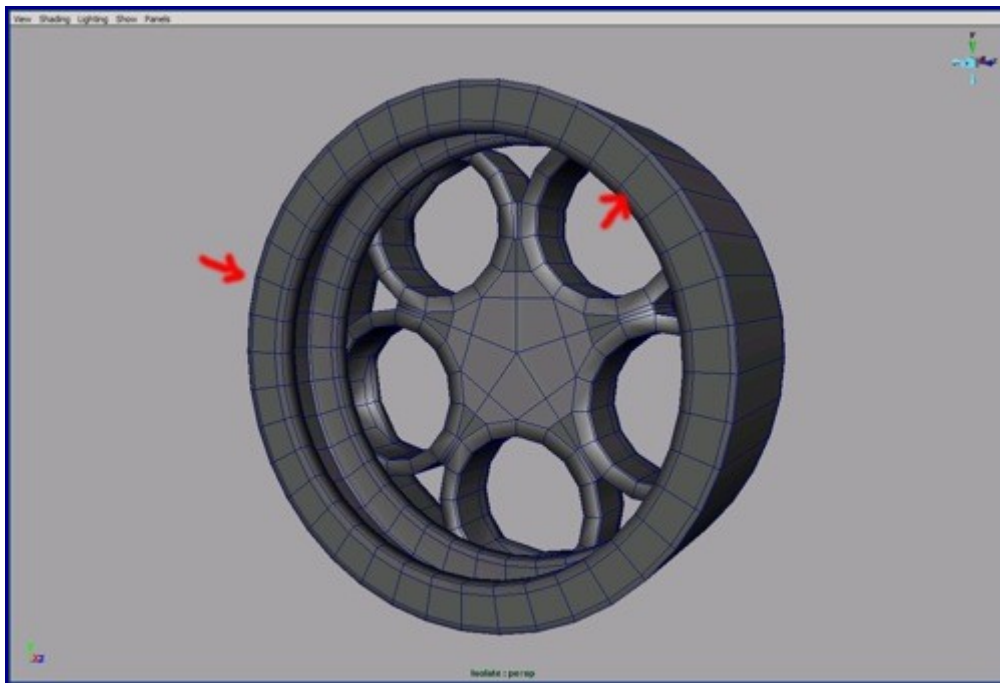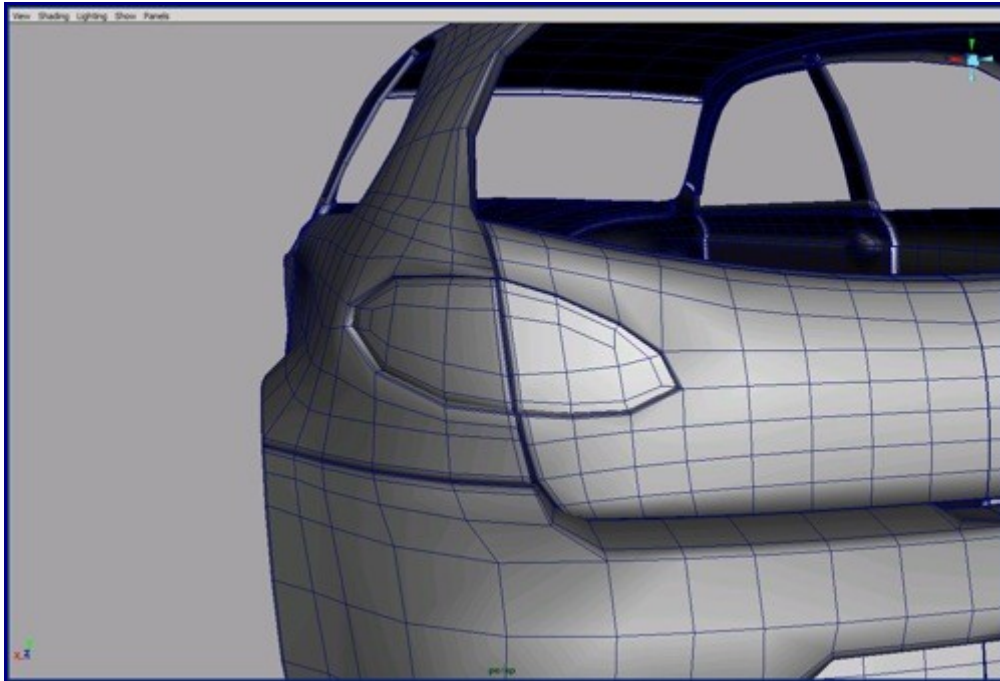

82. Create an another cylinder for the breaks and move it inside the rim.
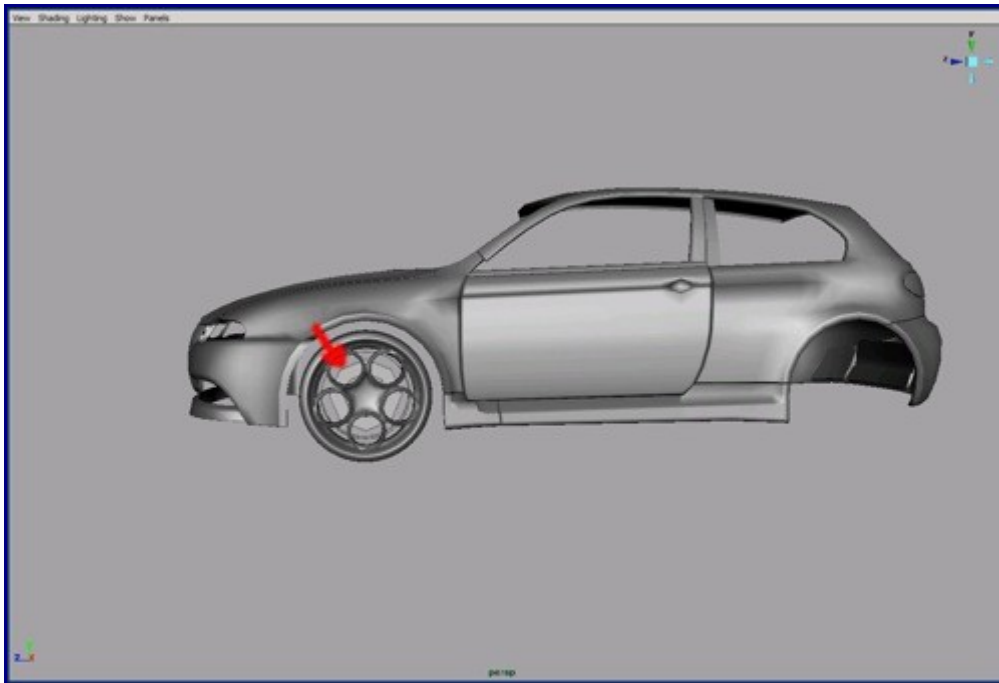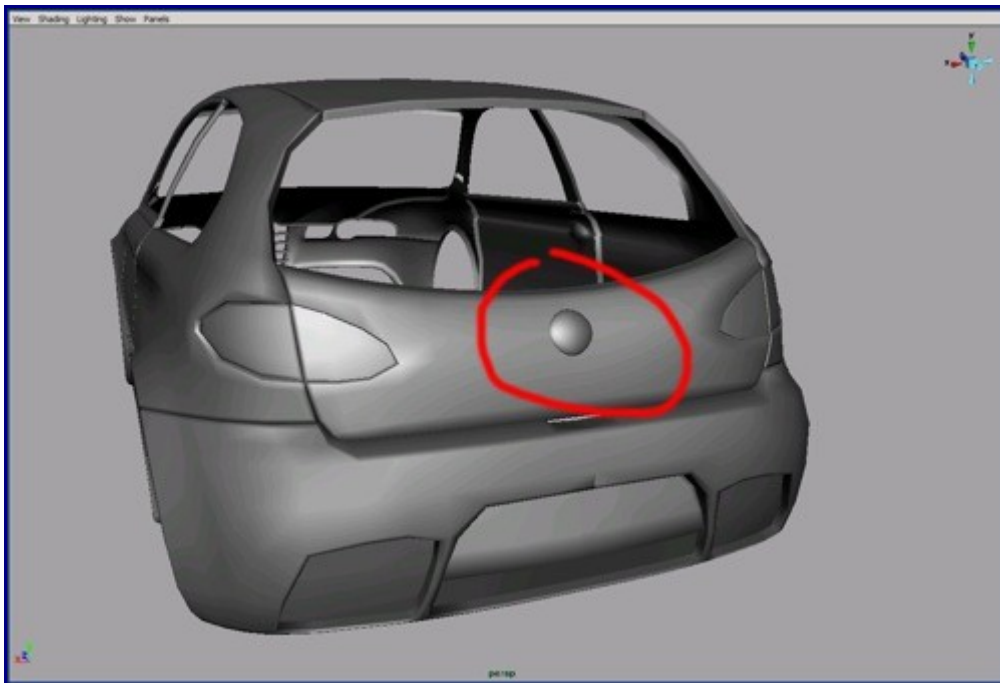
83. From NURBS torus curves you can build a tire. Detach and delete the invisible parts.
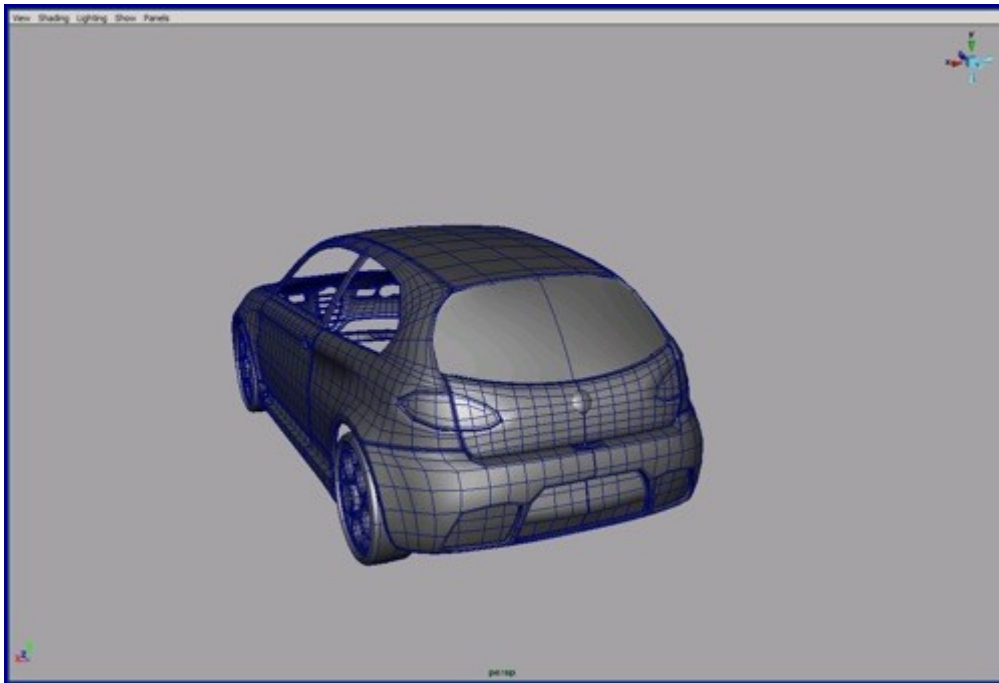

84. Now we move back on the backlights. Reshape the topology of the lamps by the image plane.
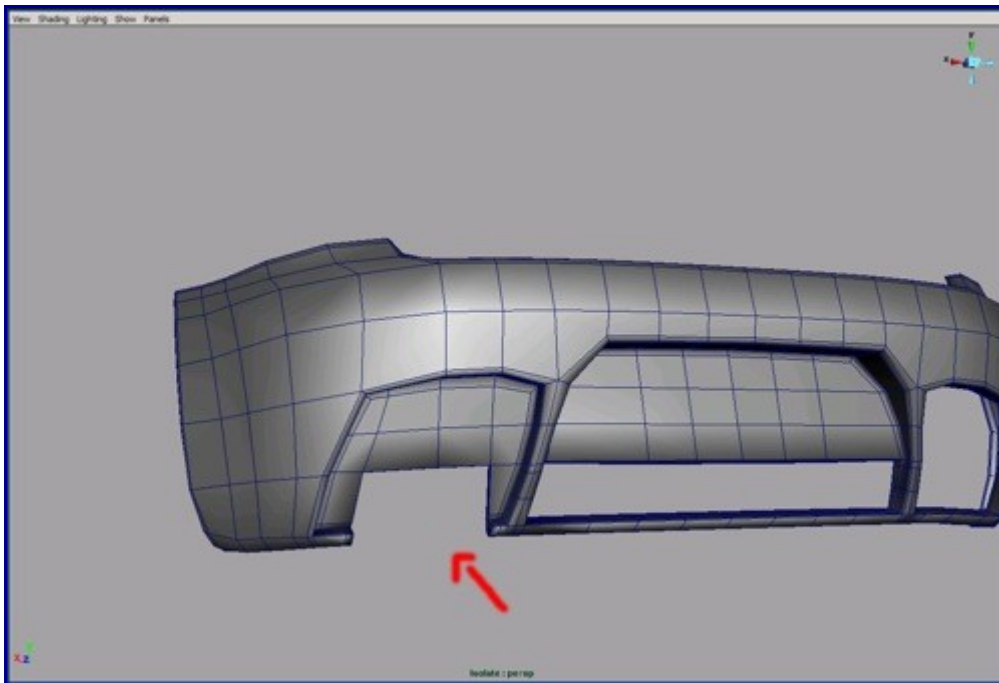
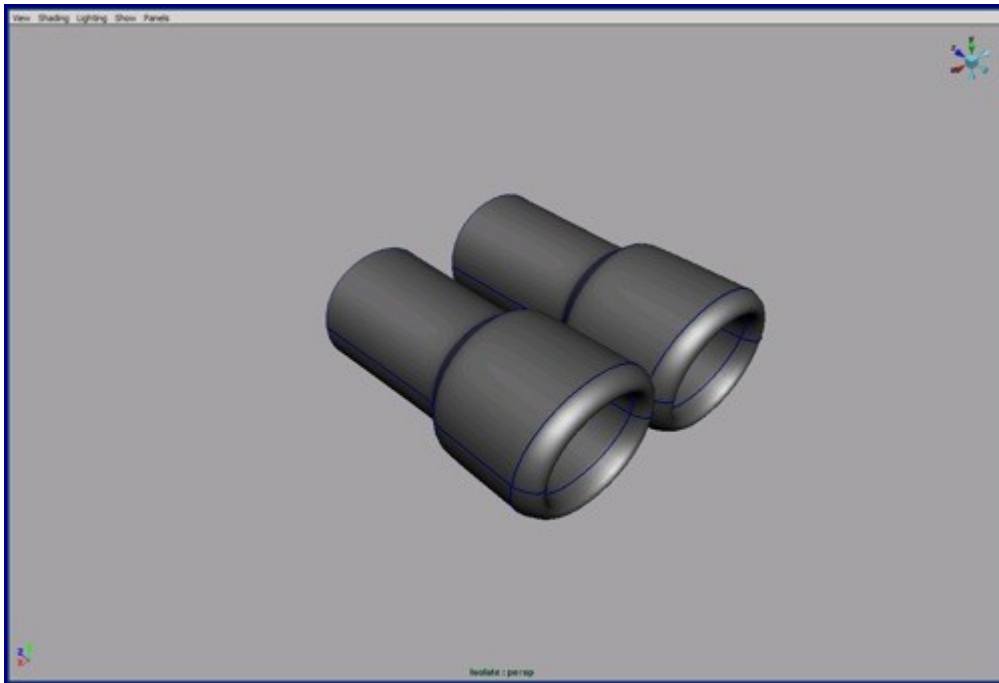85. Build the car logo from NURBS hemisphere and fit it by image planes.

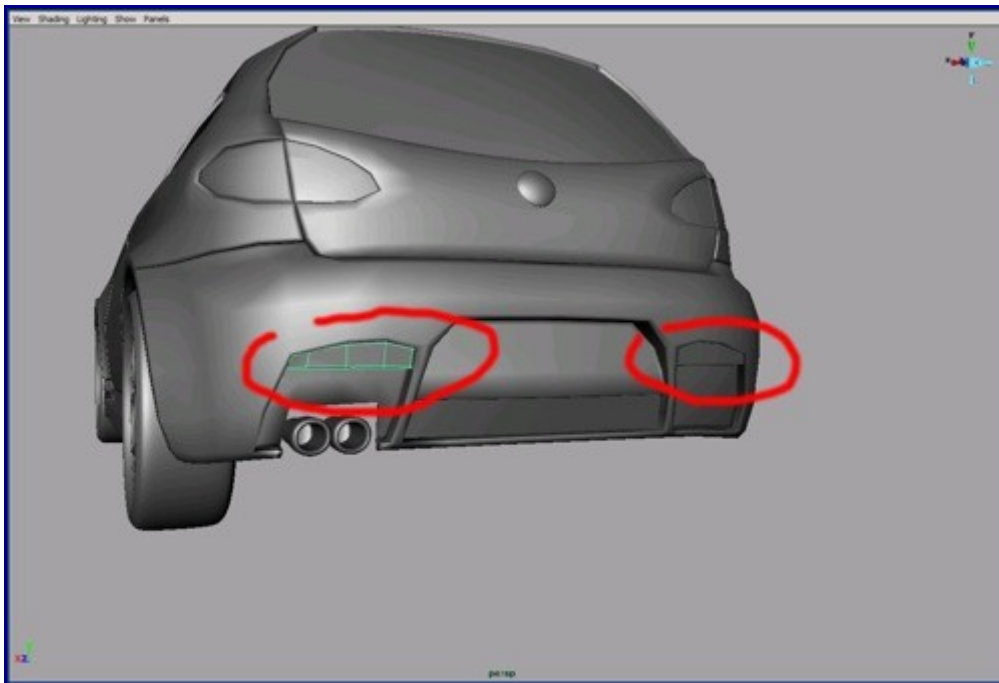86. Now build the back window with NURBS curves and use loft or Birail+ tool.

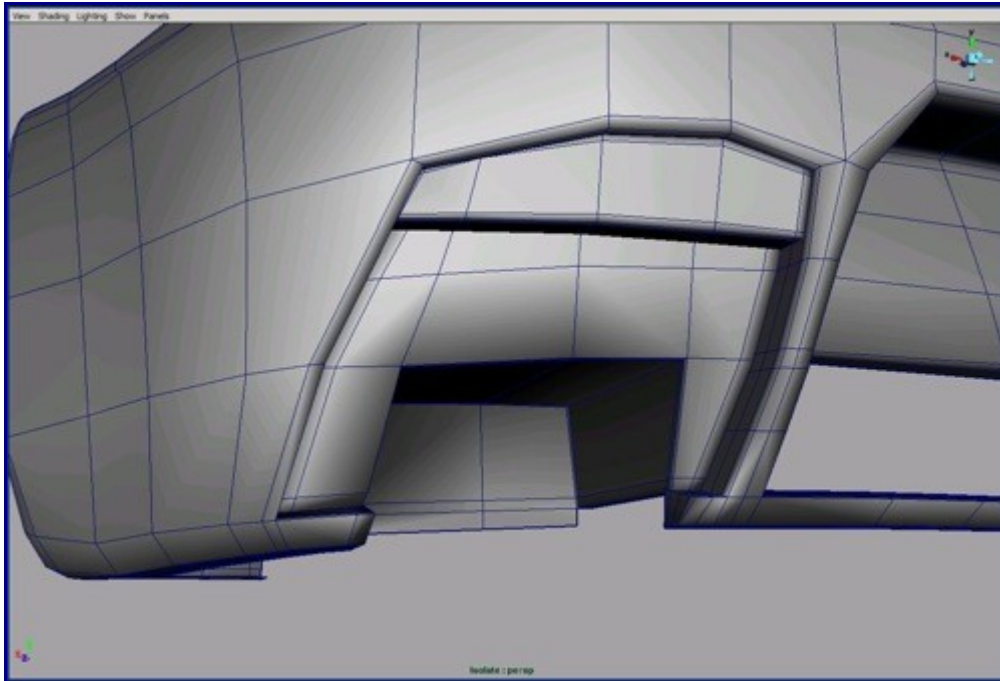87. Create the place for the muffler from the image plane.

88. You can build the mufflers from NURBS cylinders. After you create the NURBS cylinders, reduced the number of spans to minimum.
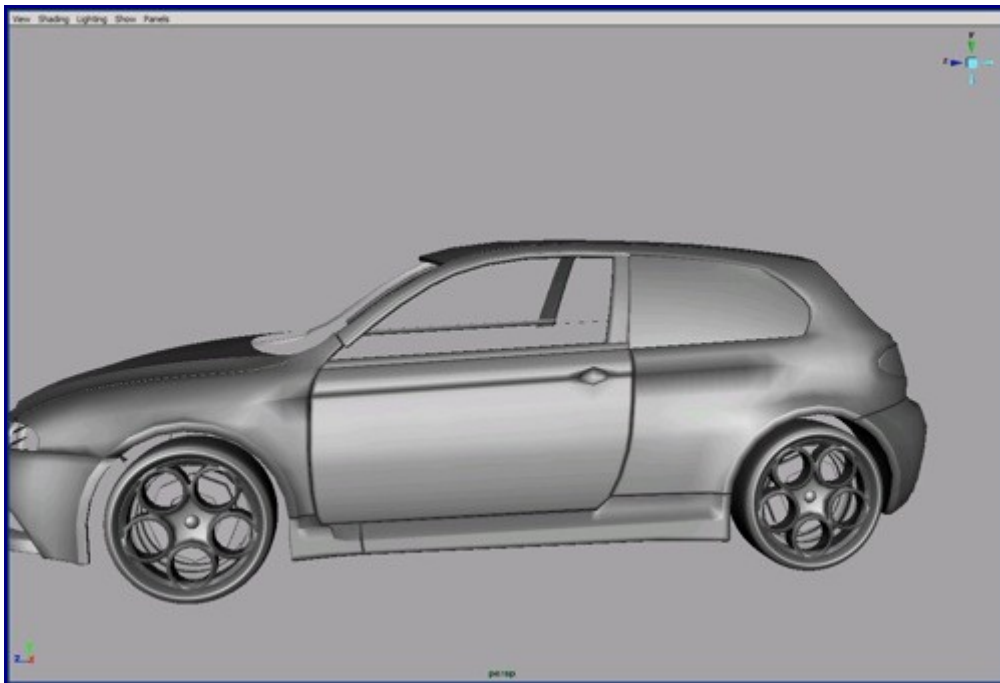
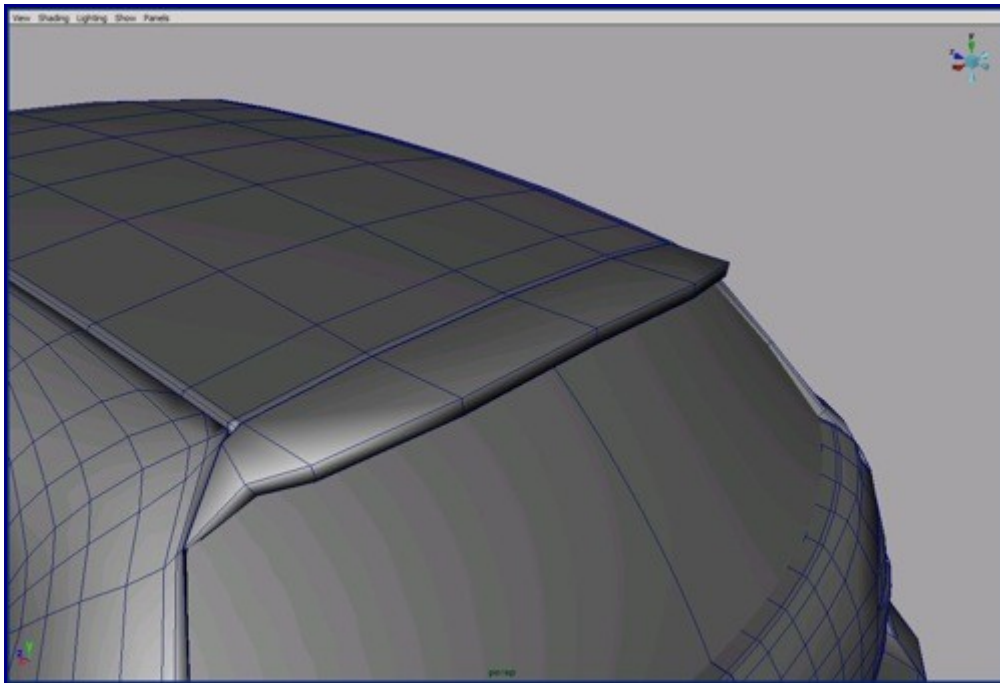89. Build the back lower lamps also. You can use any techniques.

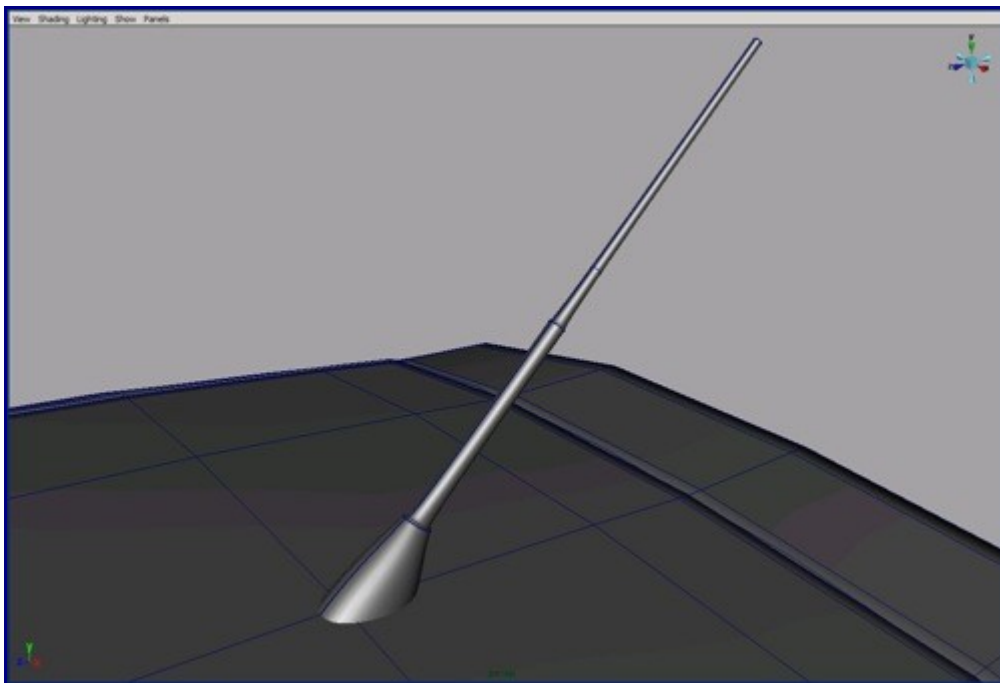90. Create this hole for the muffler pipes with the extrude edge tool.
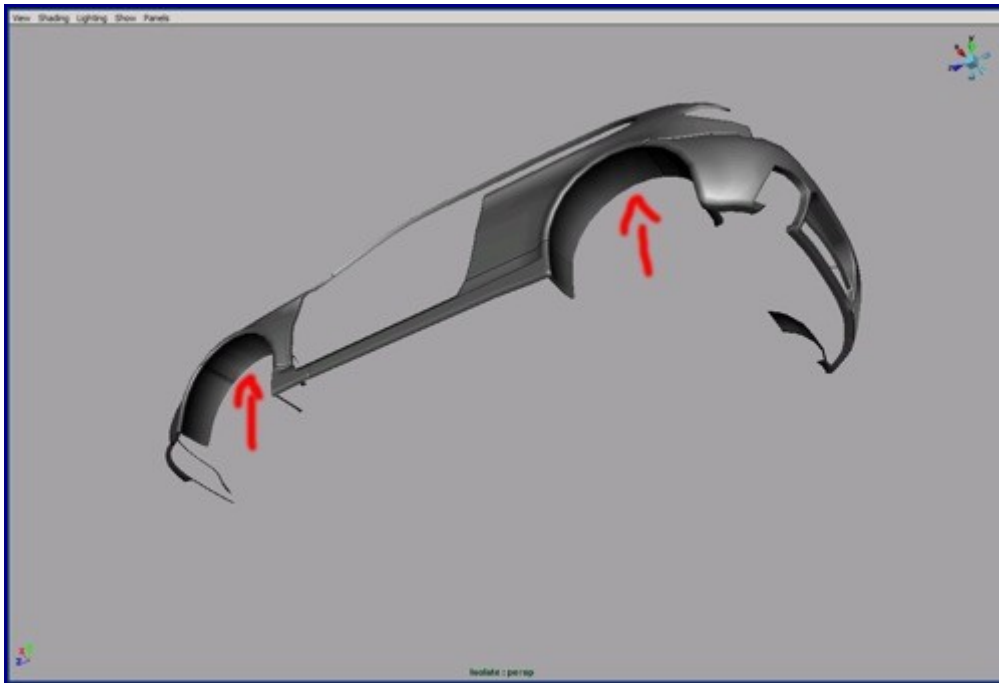
91. Build the side windows with NURBS.

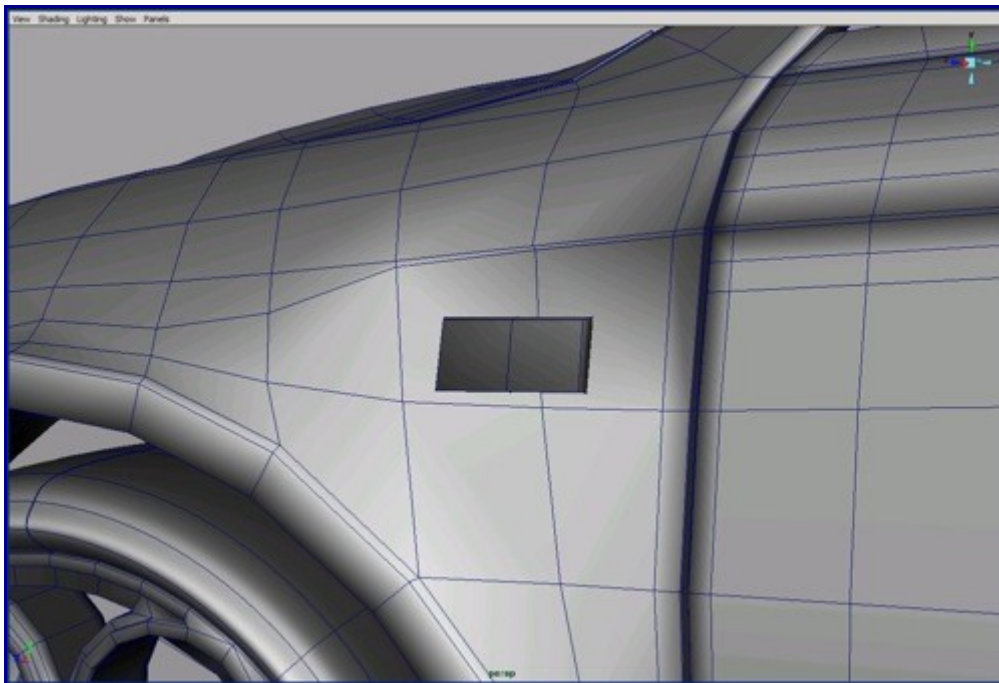92. Use curves to help build the back spoiler.

93. Build the car radio antenna from NURBS cylinders and reshape them. After reshaping you can reduce the number of spans to minimum.
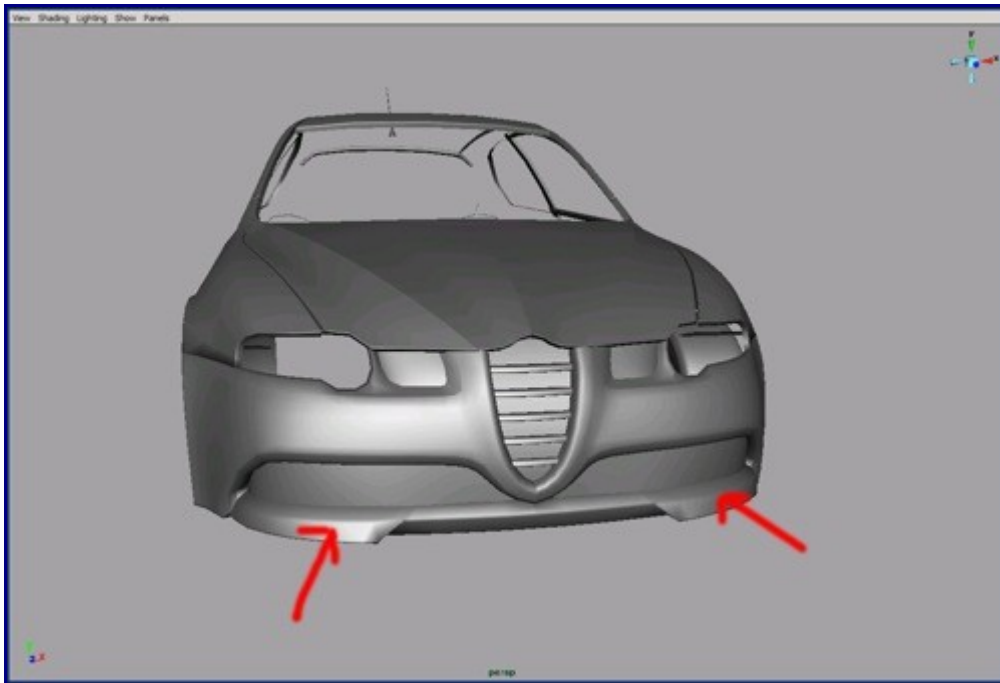

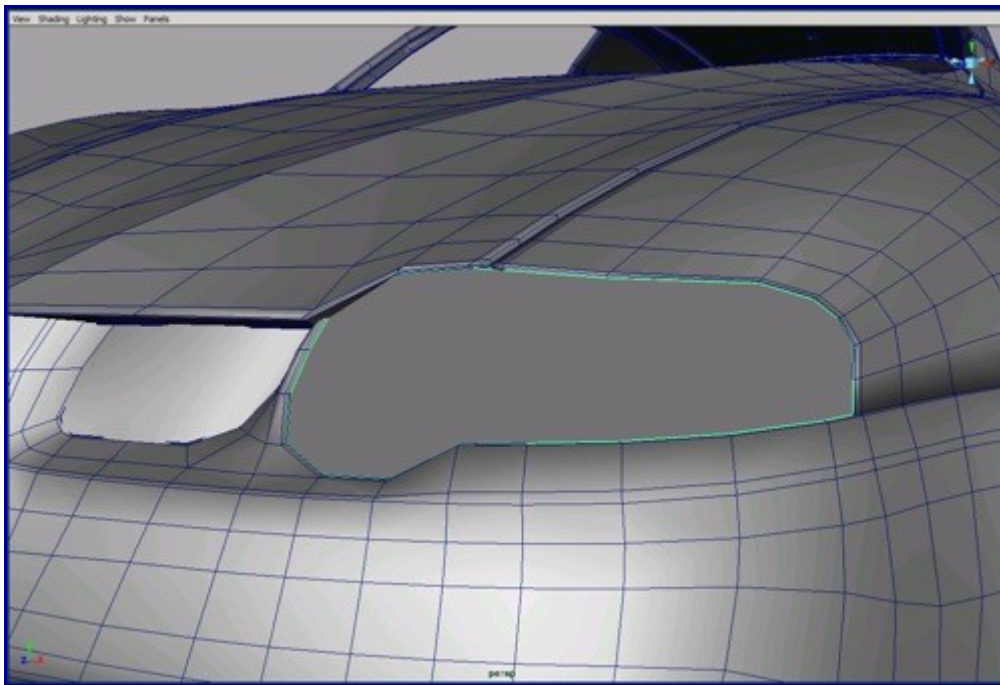
94. Extrude edges for the wheel wells.

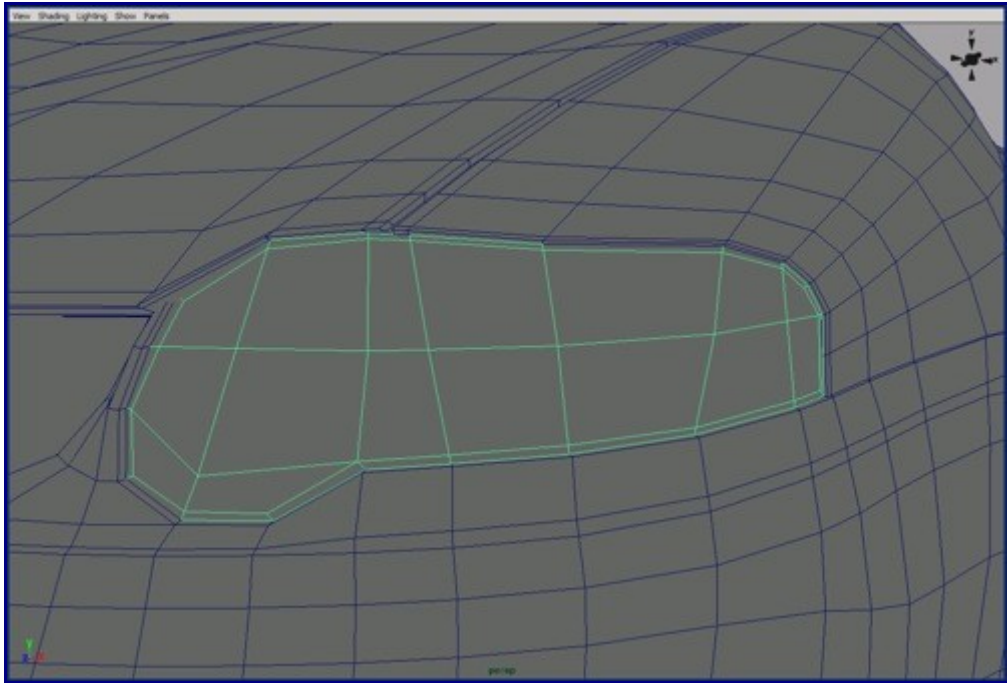95. I built the side indicators with a polygon cube.

96. Build these parts from curves using the NURBS loft tool.

97. Use the create polygon tool for build the outline of the headlights. Vertex snap is very useful in this case also.
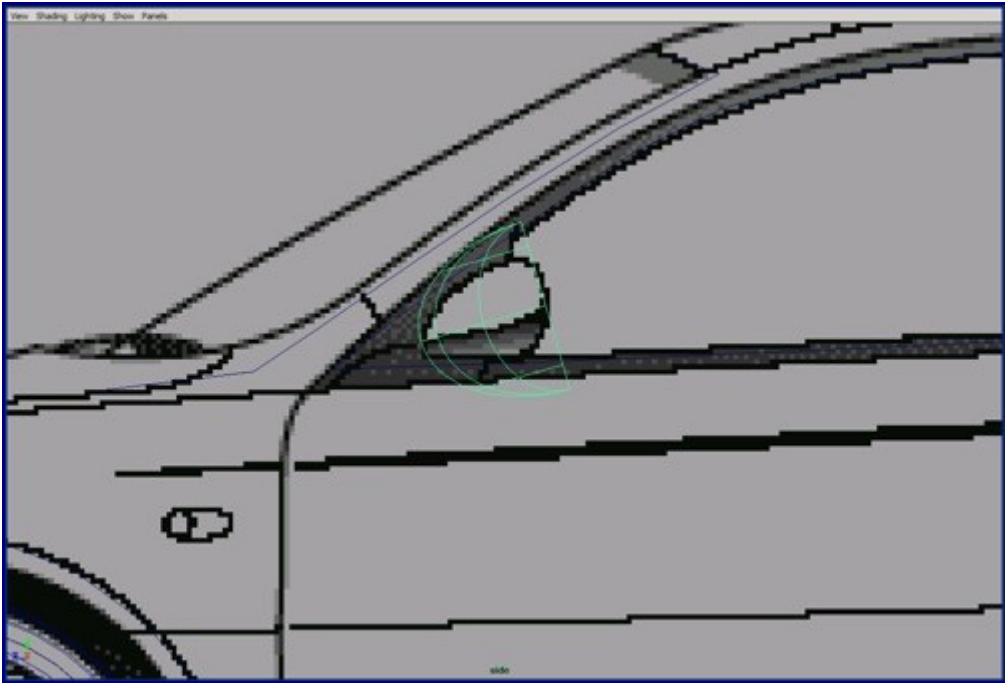

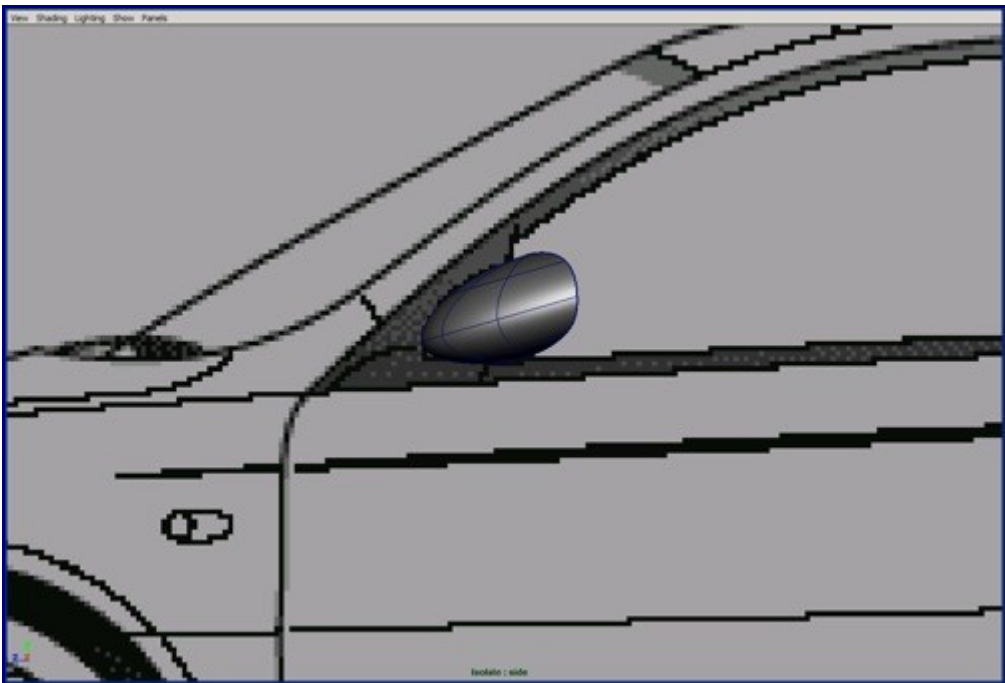98. Tessellate the headlight and tweak by image plane.

99. You can cut the gas cap cover on the back right side of the car. It's enough to cut it into a six-sided cylindrical shape. After converting to T-Splines it will be nice smooth circle.
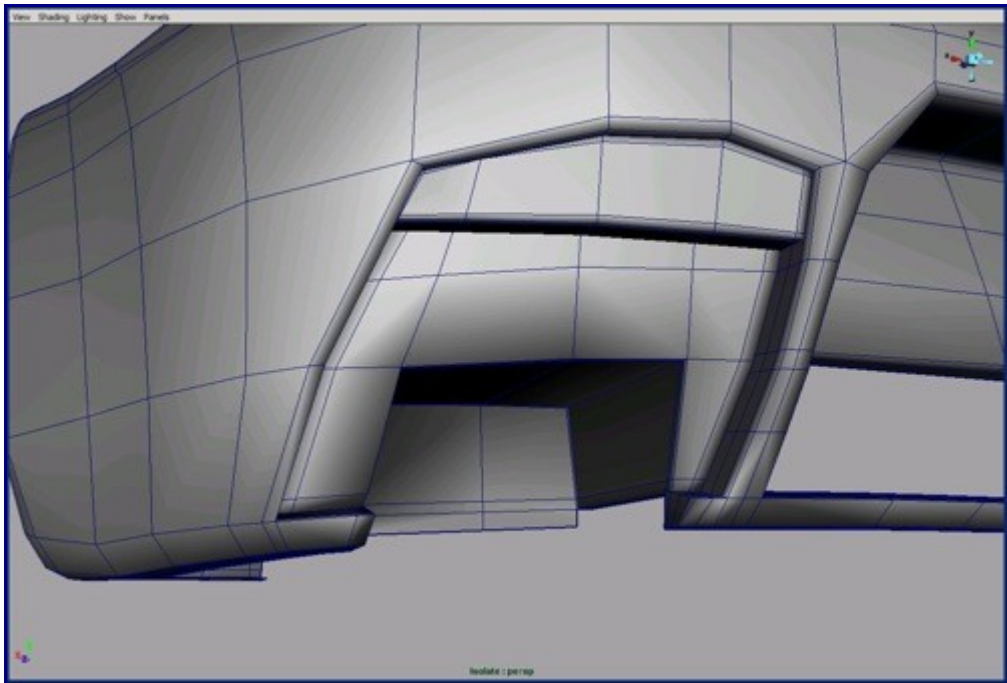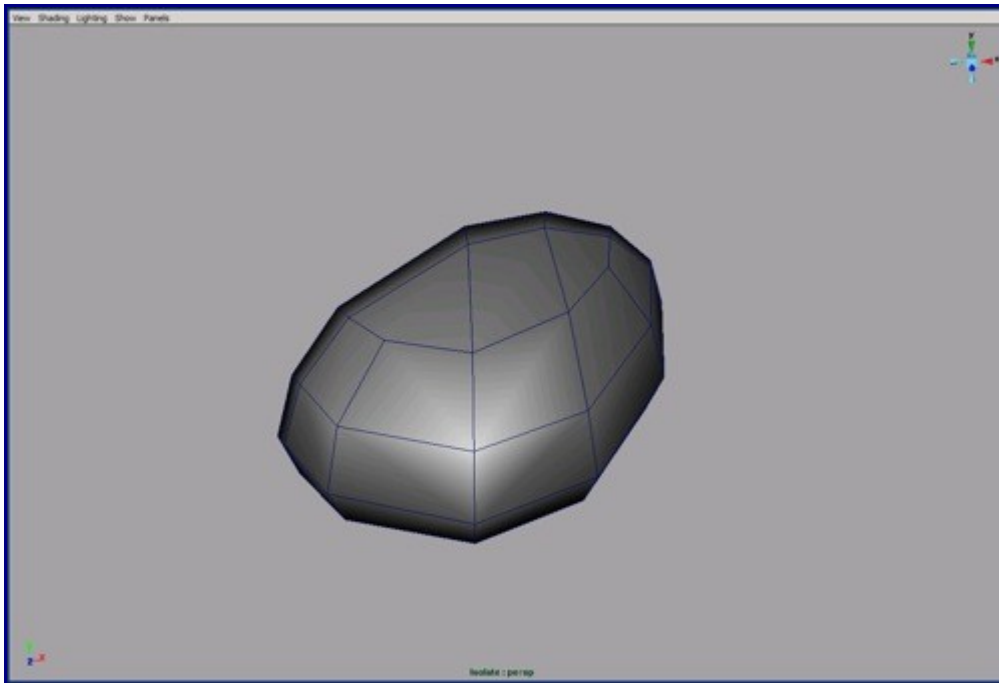

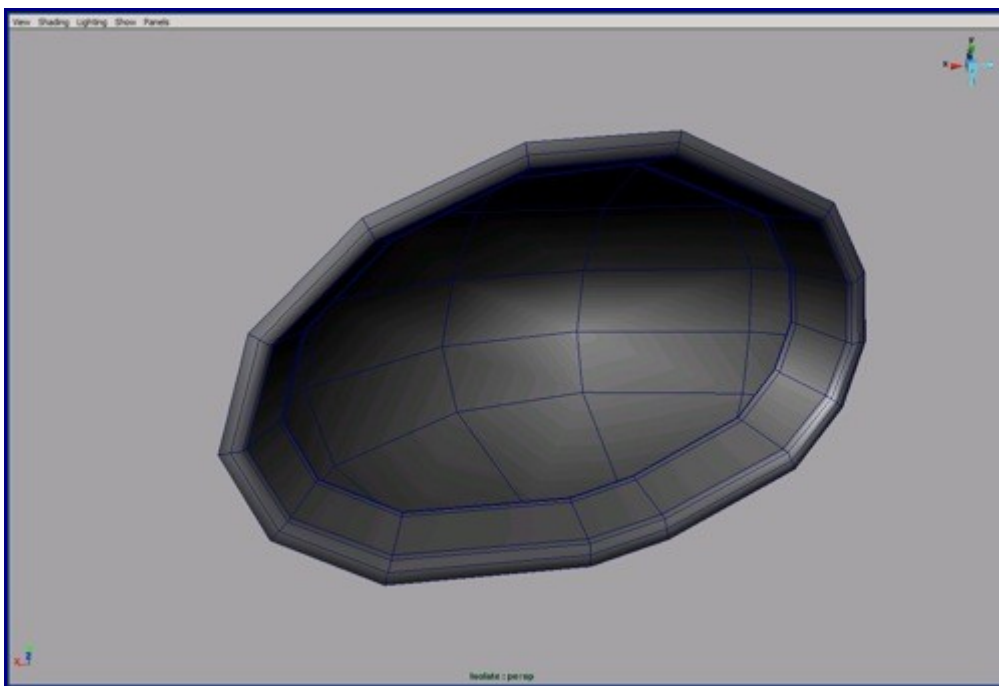100. Use a NURBS hemisphere to build the side mirror.

101. Reshape it and use the ffd box tool for deforming.
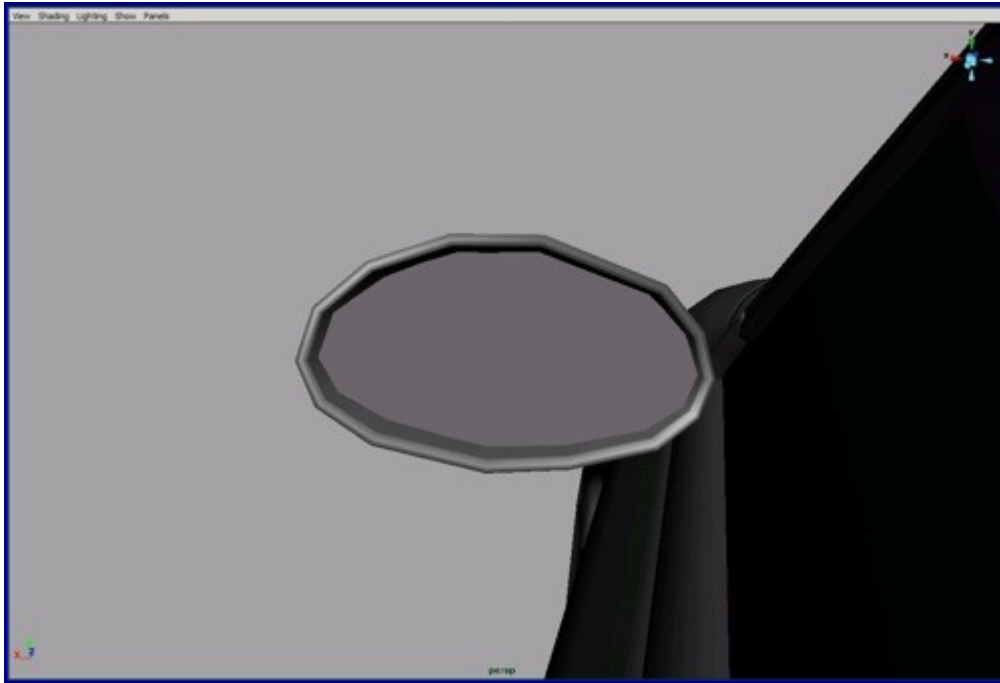

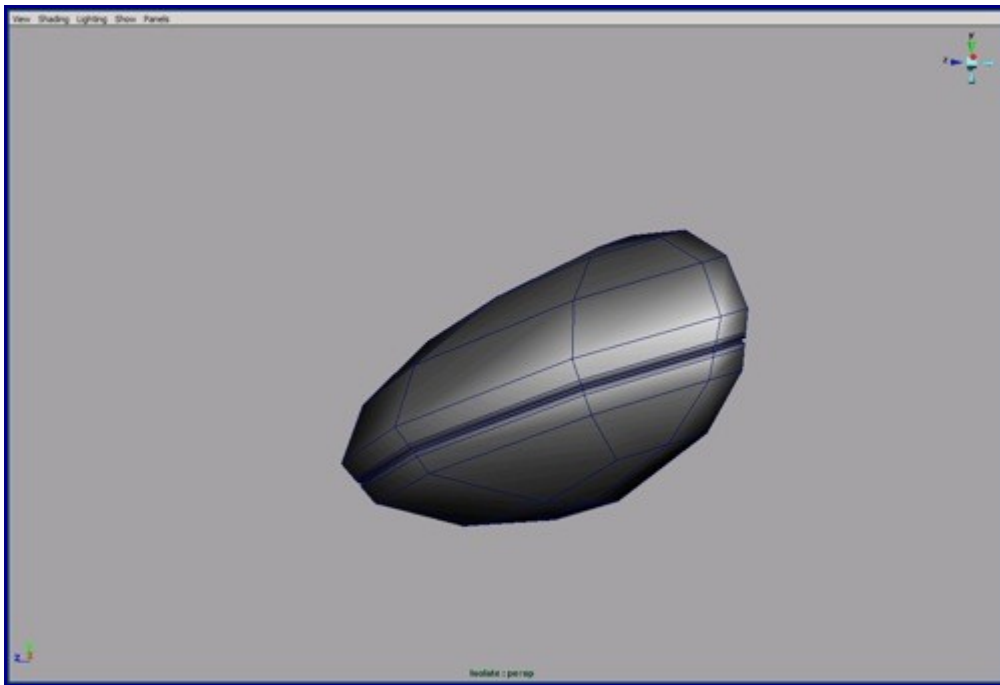102. After converting to polygons, reduce it onto quads.

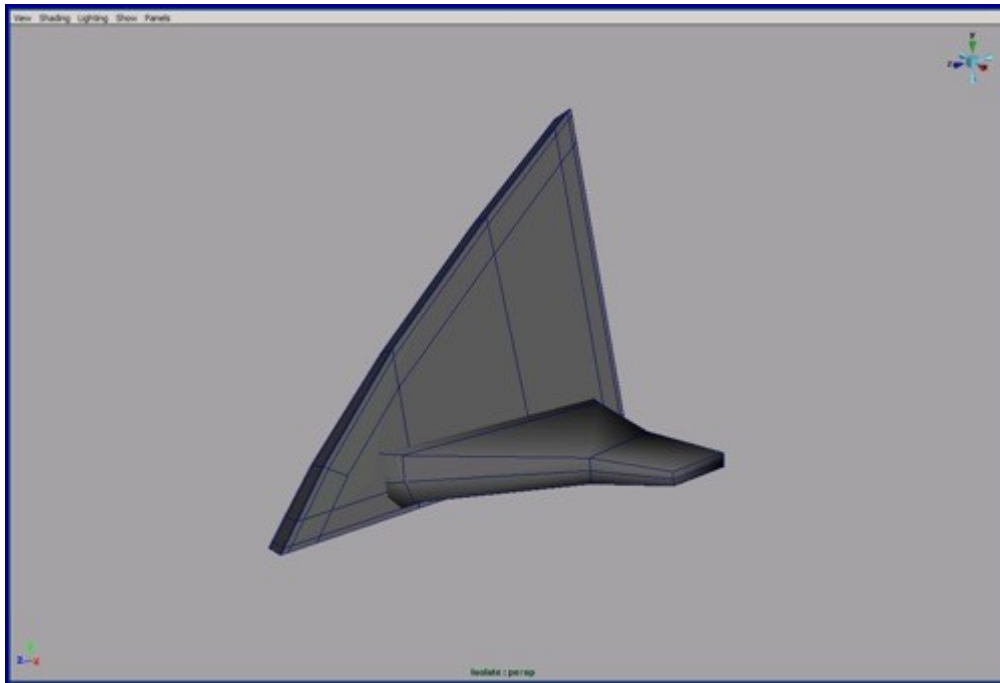103. Use the extrude edge tool to build the inside part of the mirror.

104. Create a NURBS plane for the glass of the mirror.

105. Add more detail along the mirror. Use reference images because that level of detail usually isn't on the blue prints.
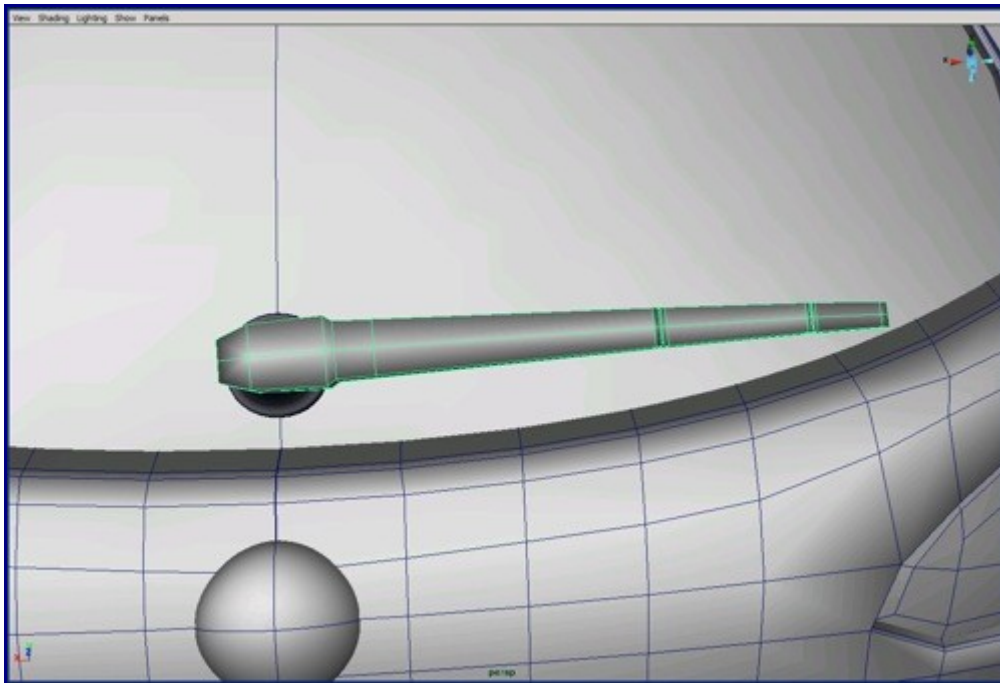

106. Build the mirror holder. Merge the two objects pictured above.

107. Don't forget edit the topology after you used Boolean. Add extra edges close on the borders and extrude those faces for holding the mirror.
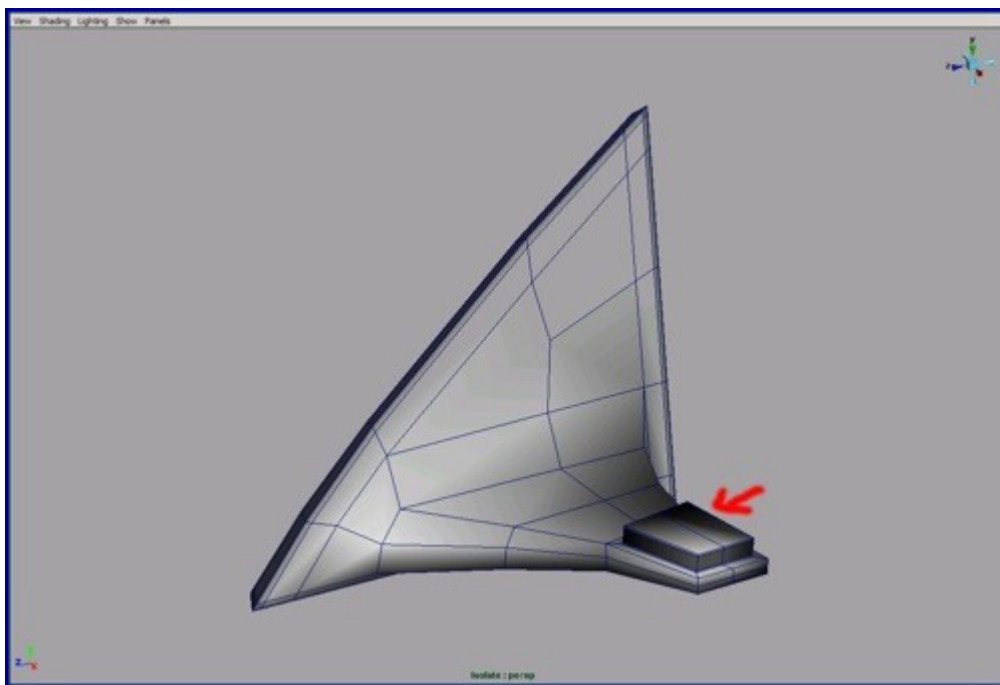

108. Build the rear windshield wiper and move it to its place. I won't go into detail here because you can build this part by using any your own techniques.

109. Add extra edges on the borders for the nice bevel result after the conversion.
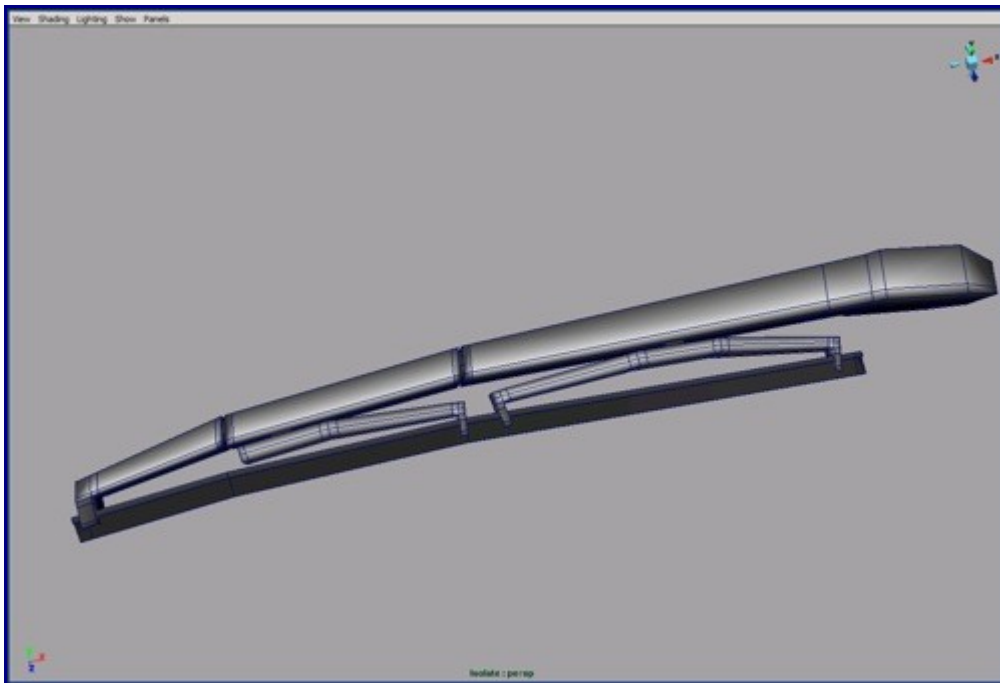

110. For the front windshield wipers you can use the copy of the rear screen wiper. You have to reshape and rotate it by the image planes or the reference images because the shape isn't the same for any two windshield wipers on this car.
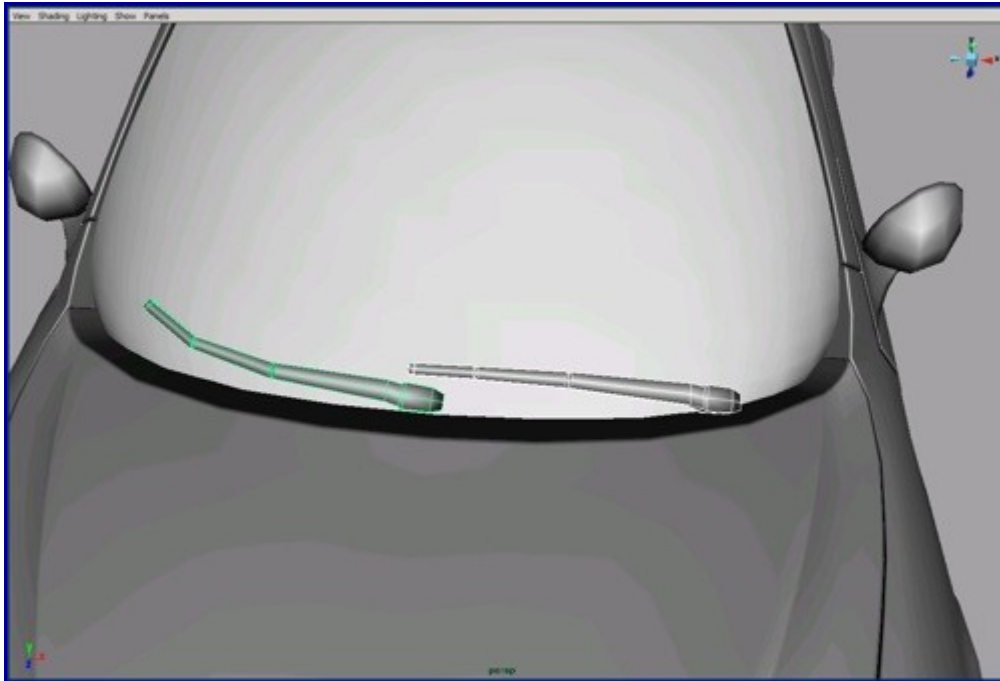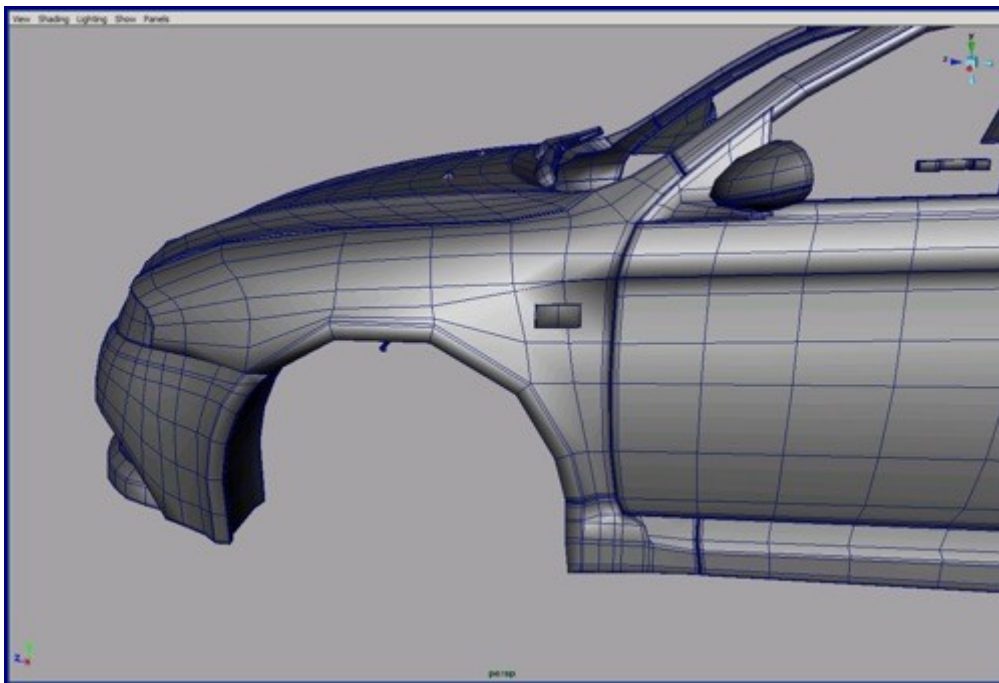
111. It's easiest to build the windshield wiper fluid squirter from a polygon cube.
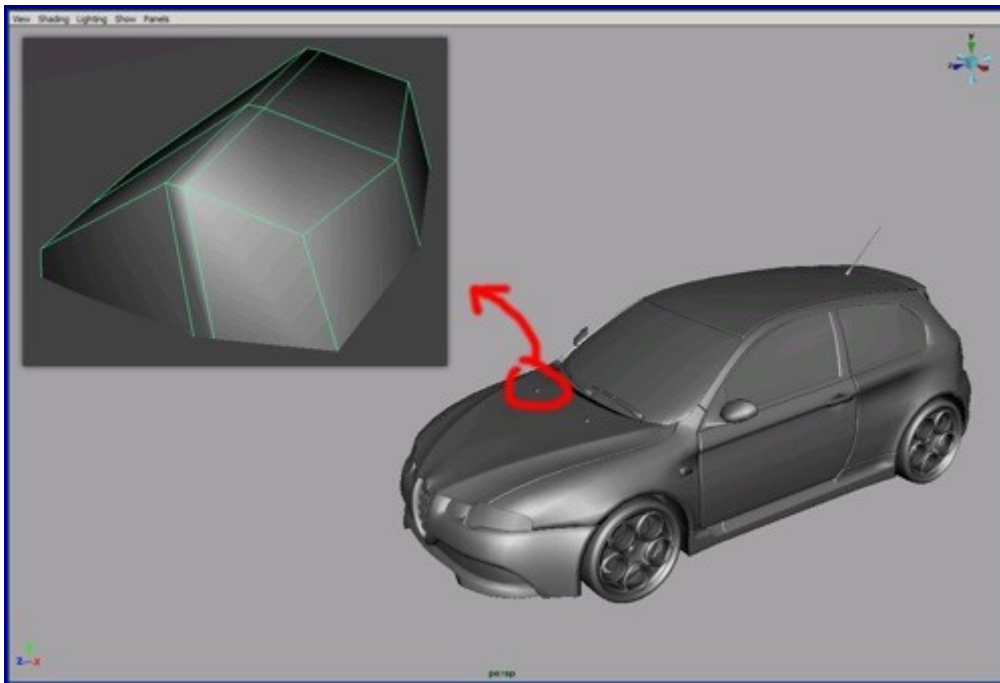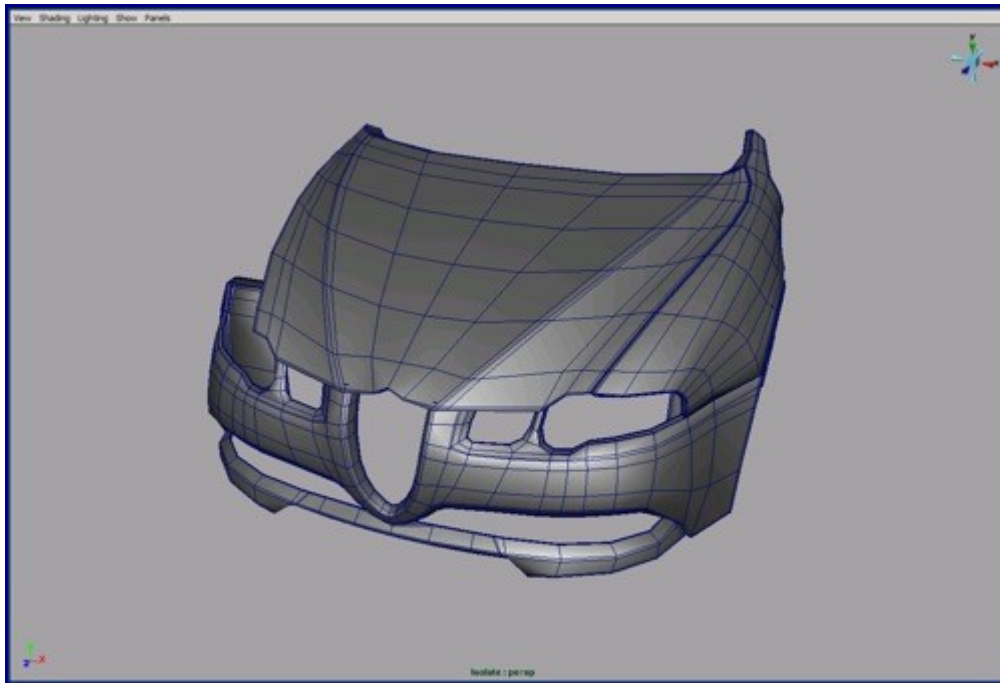

112. Now the car is ready for reducing and converting to T-Splines.
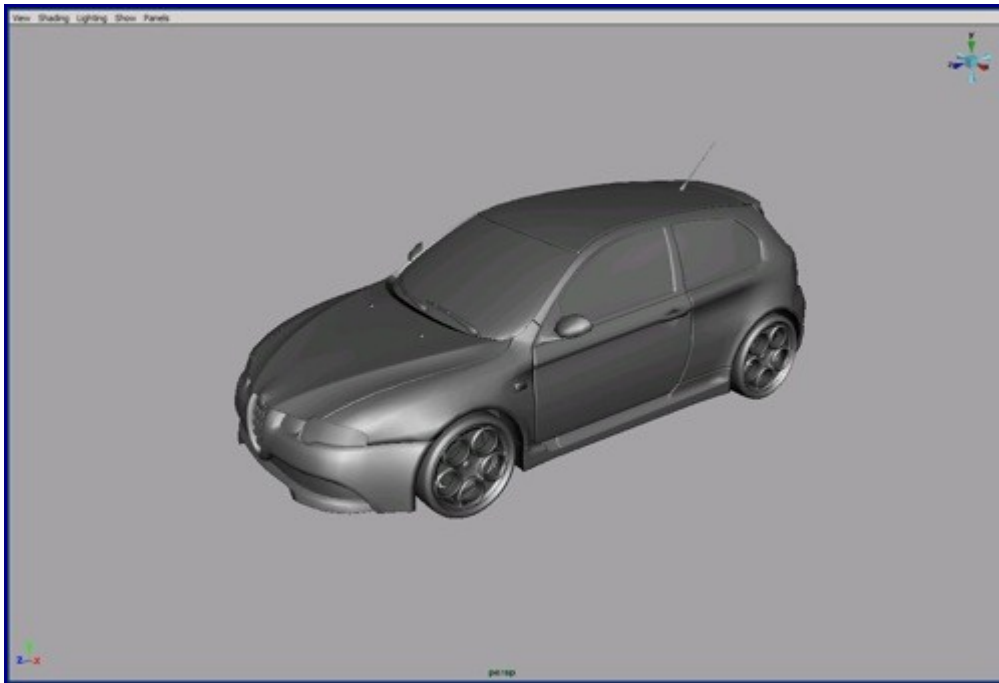
113. Reduce the density of this part of the car. You don't need as much detail because after conversion to T-Splines you get a nice clean and smooth result.



114. Pay attention on the topology.

115. Merge all possible parts into one object. The vertices of this shot are merged, and it's all quads. Try to replicate this.
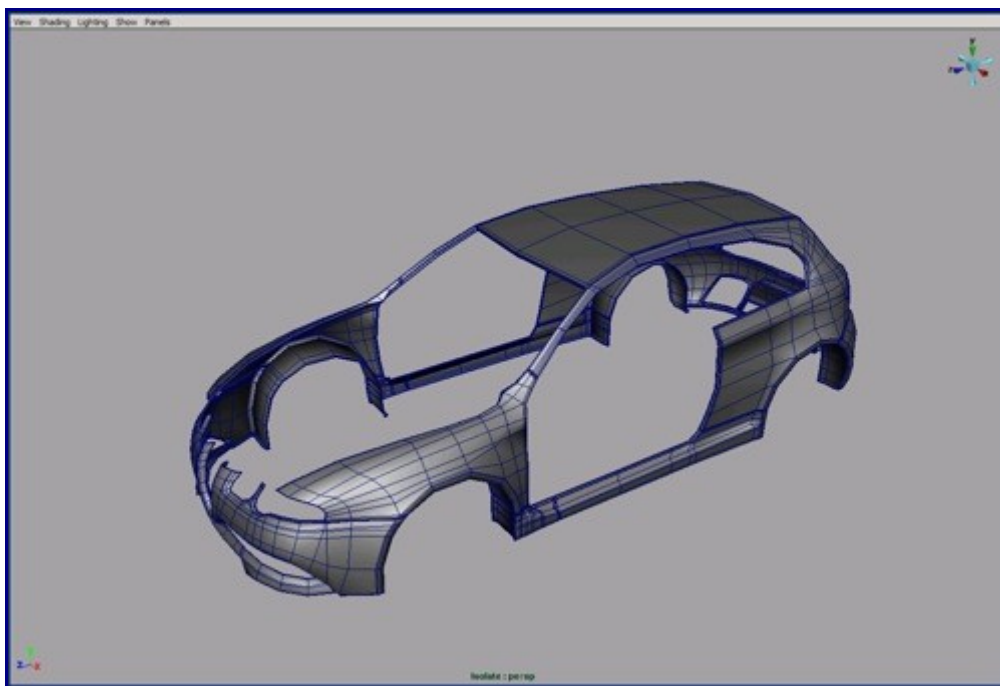
116. After you reduced the whole car, convert it to T-Splines. The reason why I left the reducing for the end is because the higher density car was much closer to our final output than that reduced version. This way, you don't need to continually convert to T-Splines to verify the result after every modeling step. (In the future if T-Splines has an extrude edge tool you can model this car all from T-Splines.)
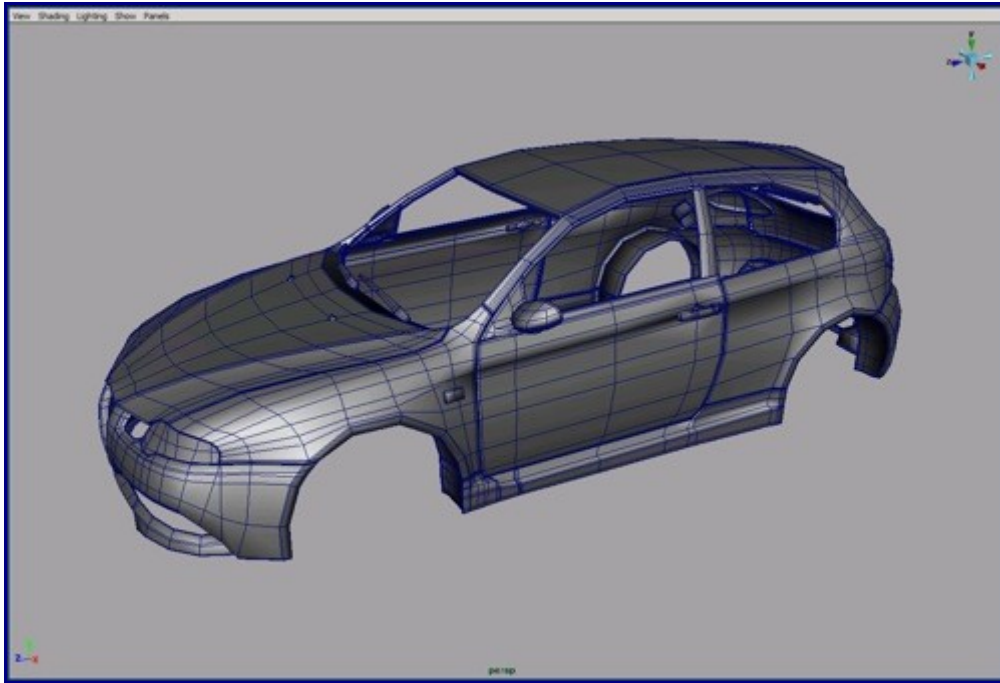
117. Now you can delete the unnecessary edges whose existence don't affect the shape of the car. After deleting some edges you can see the nice T-junctions result.
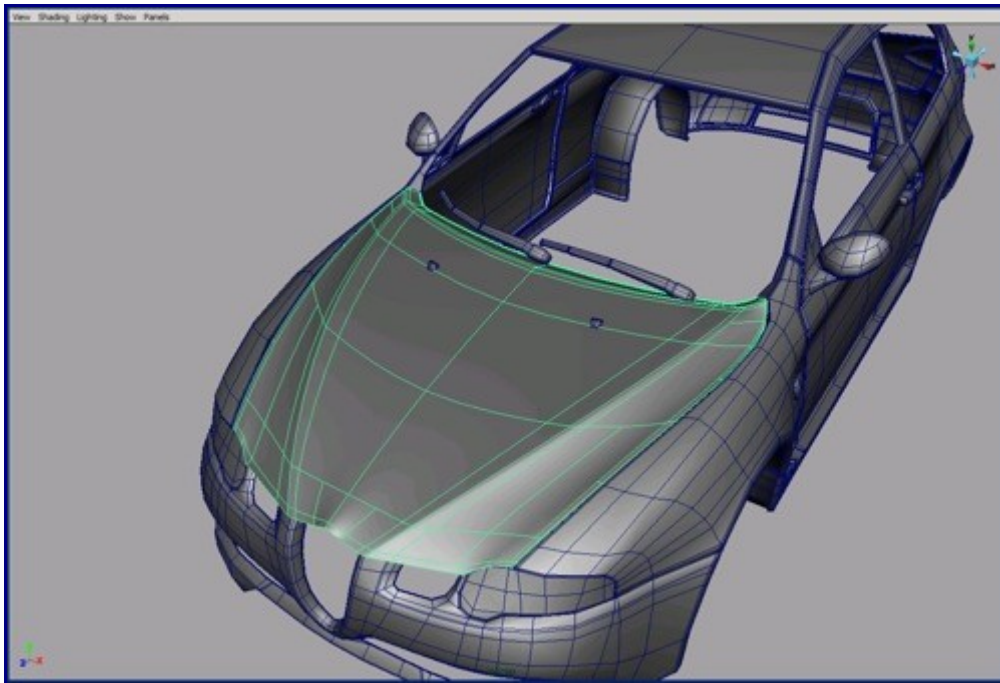
118. The converted and reduced model.

119. Our final car.