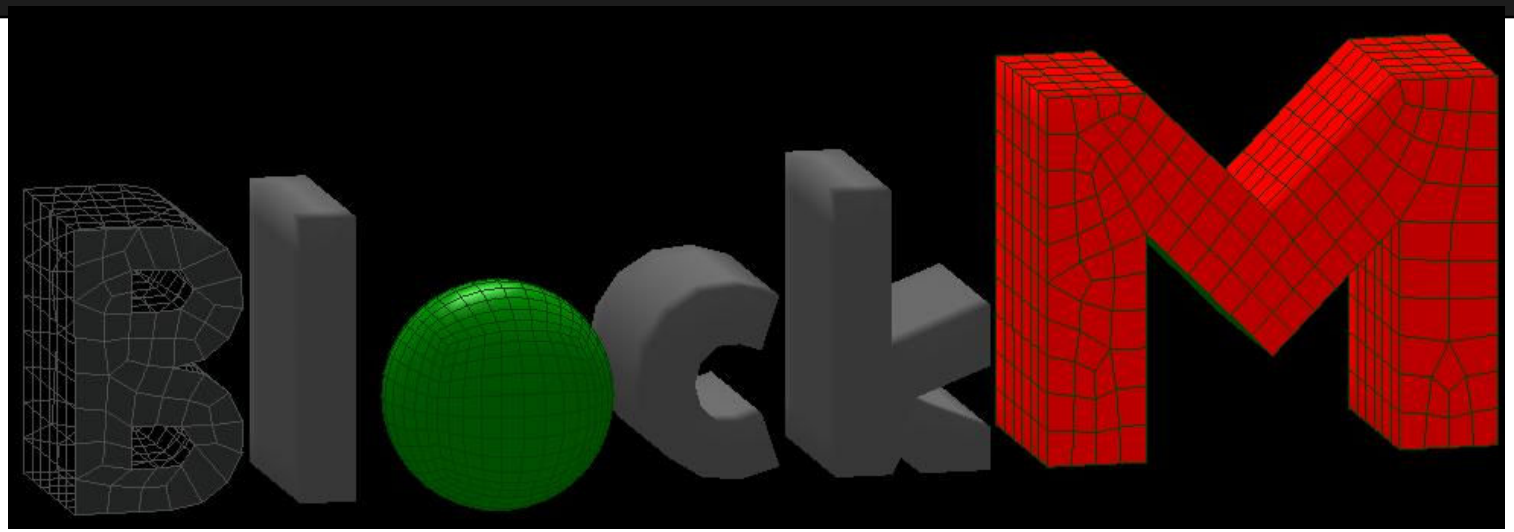
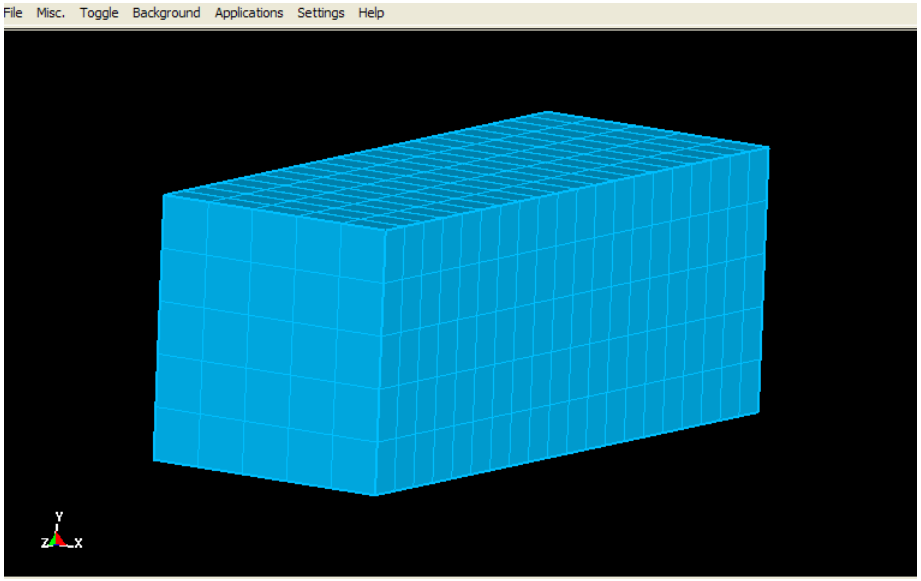


Examples

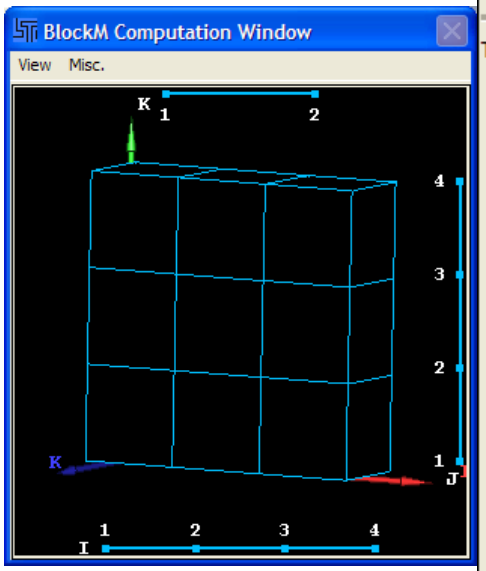
BlockM: Multiple Examples

Solid Cylindrical Rod

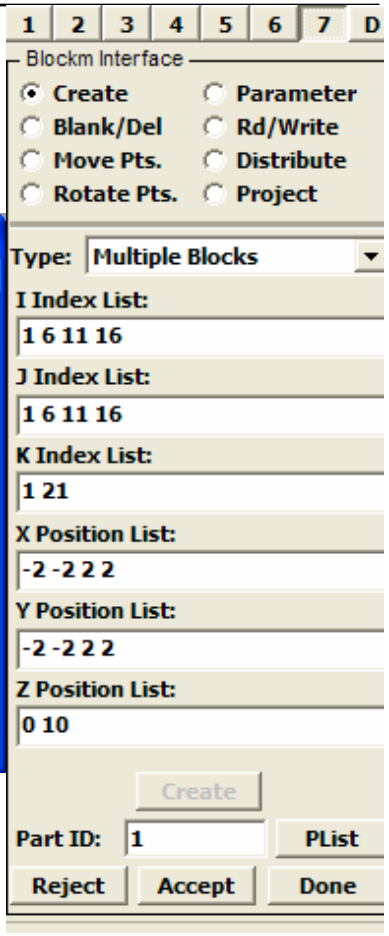
- To the right is how we setup and initialize the block for a cylindrical rod.
- Below is how the block appears in the Main and Computation windows.



Main Window



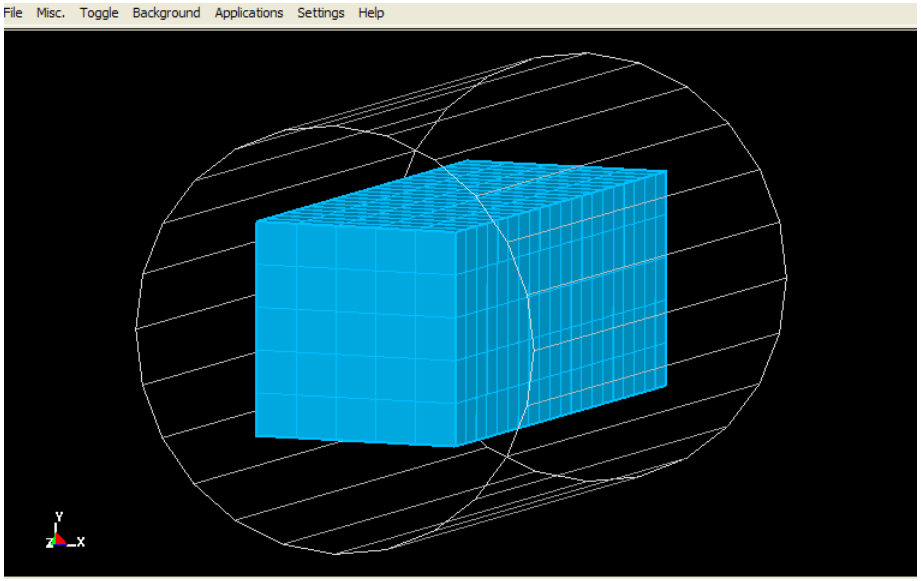
Computation Window



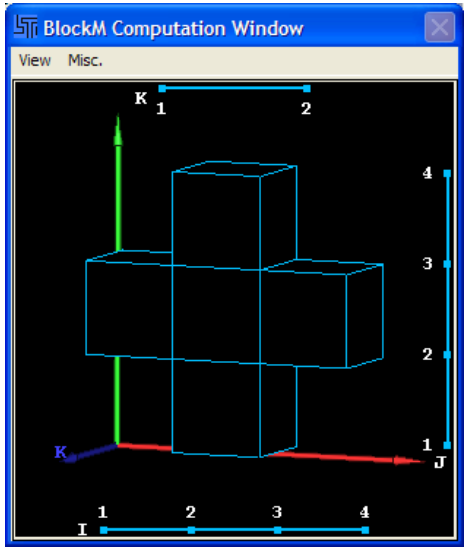
BlockM: Multiple Examples

Solid Cylindrical Rod

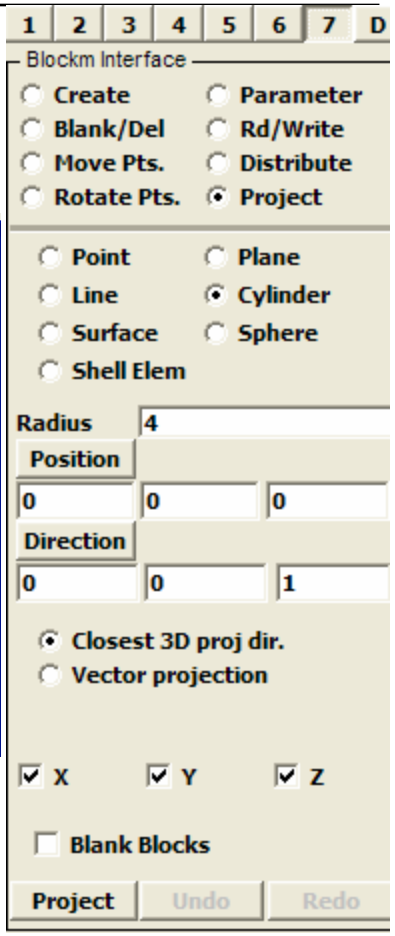
- Next, we delete the 4 regions in the block. This is only noticeable in the Computation window below.
- Then, we setup a cylinder with a radius of 4, along the Z axis for projection.



Main Window



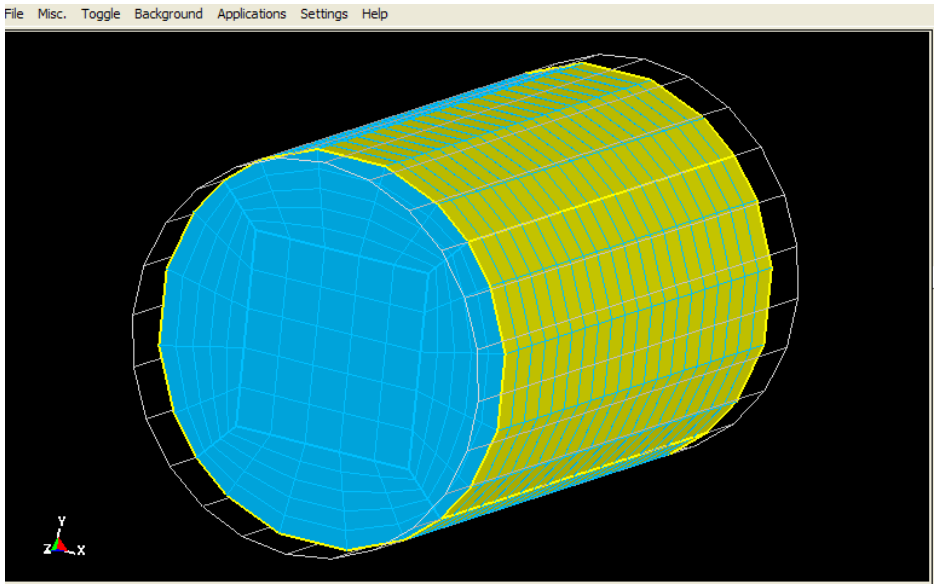
Computation Window



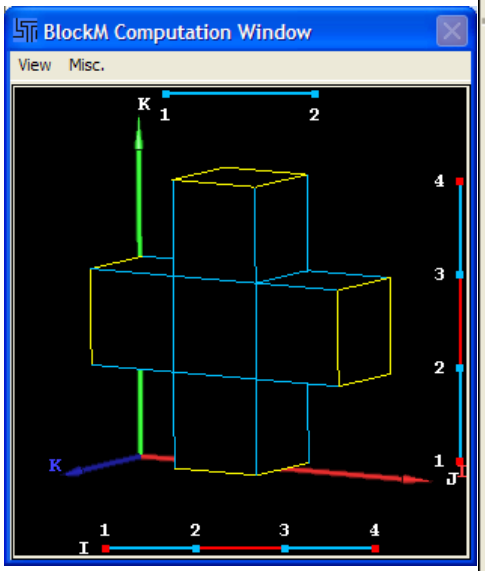
BlockM: Multiple Examples

Solid Cylindrical Rod

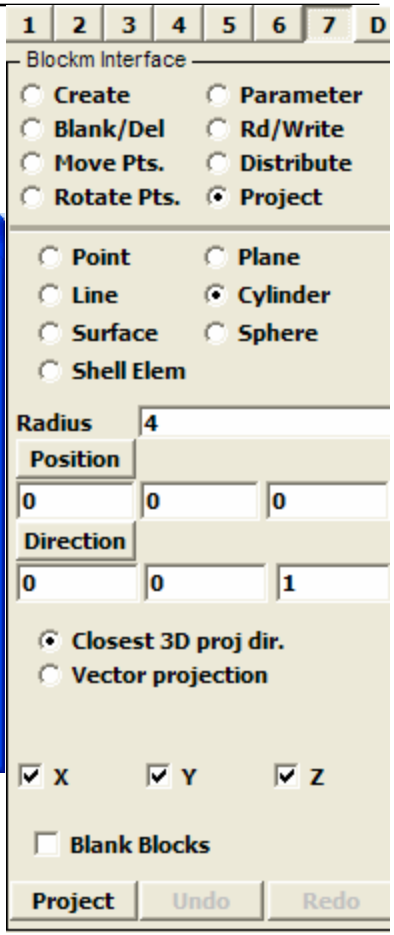
- Finally, we select all the outside faces in the I and J index directions and project.
- The selected faces are highlighted in yellow, as seen below.



Main Window



Computation Window

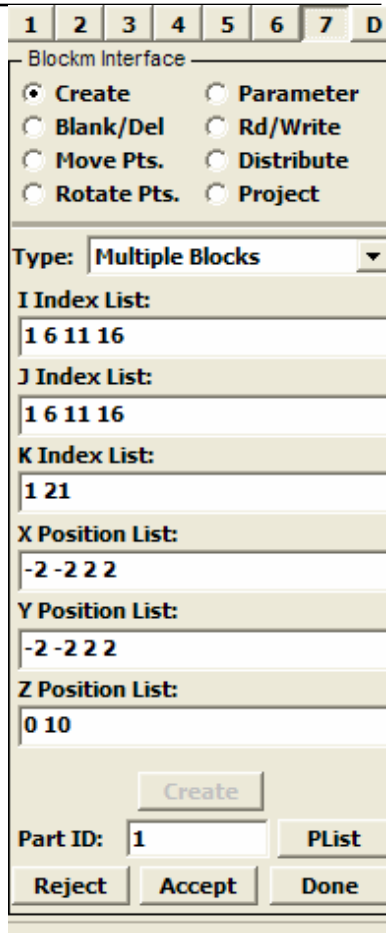


BlockM: Multiple Examples

Solid Cylindrical Rod

- Below are the commands representing the cylindrical rod above in BlockM.
- There are only 3 lines. So, modifying this model, such as adding more element, is quite trivial.

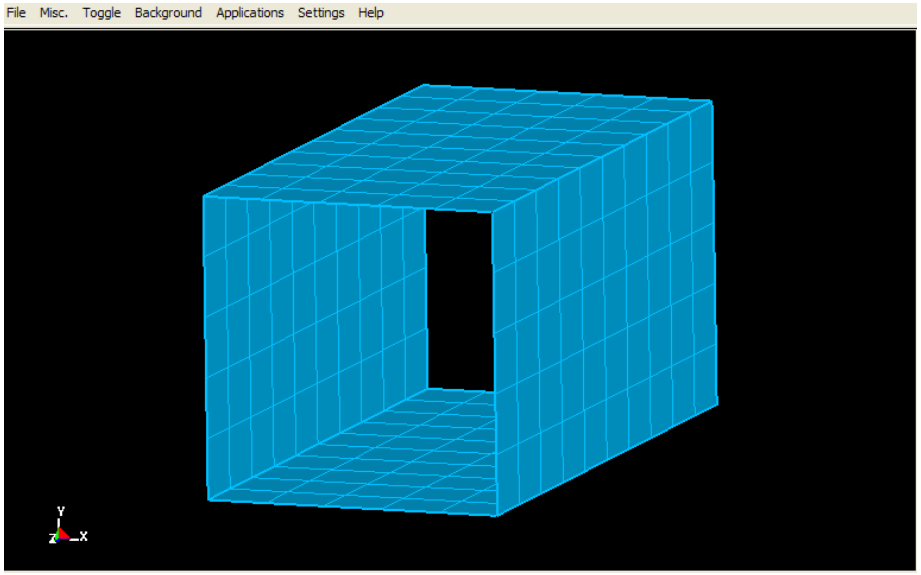
```
bmcreate multiple i 1 6 11 16 j 1 6 11 16 k 1 21 x -2 -2 2 2  y -2 -2 2 2  z 0 10
bmdeletei i 1 2 0 3 4  j 1 2 0 3 4  k 1 2
bmproject i -1 0 2 3 0 -4  j -1 0 2 3 0 -4  k cylinder 0 0 0 0 0 1 4 xyz
```



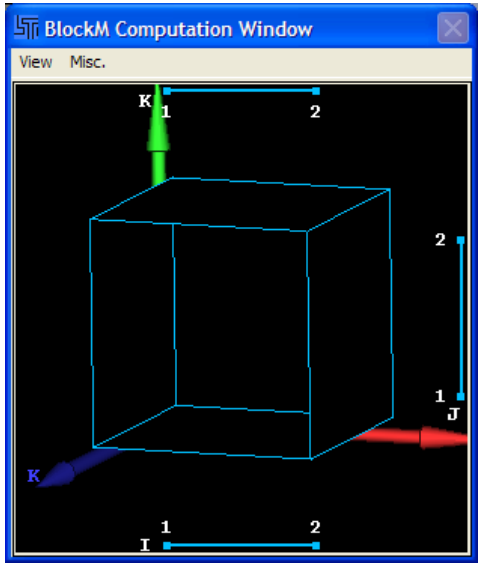
BlockM: Multiple Examples

Shell Cylindrical Pipe

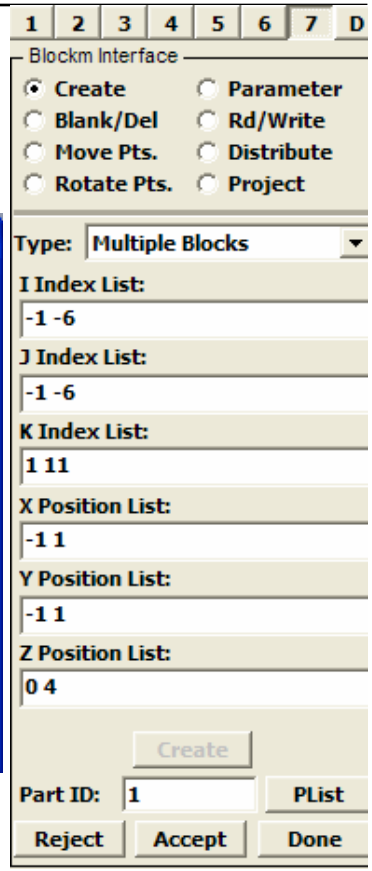
- To the right is how we setup and initialize the block for a cylindrical pipe with shell elements.
- Note the minus signs in the index fields for shell specification.



Main Window



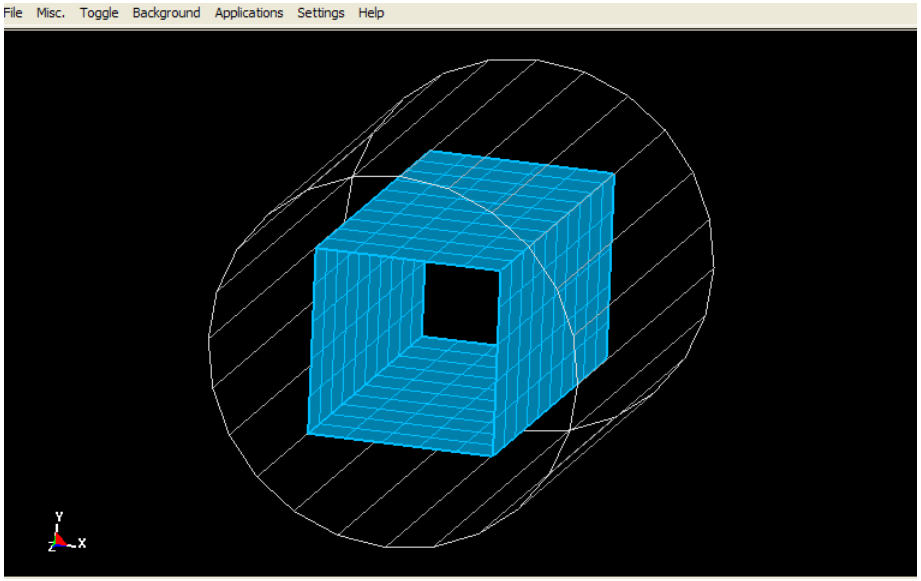
Computation Window



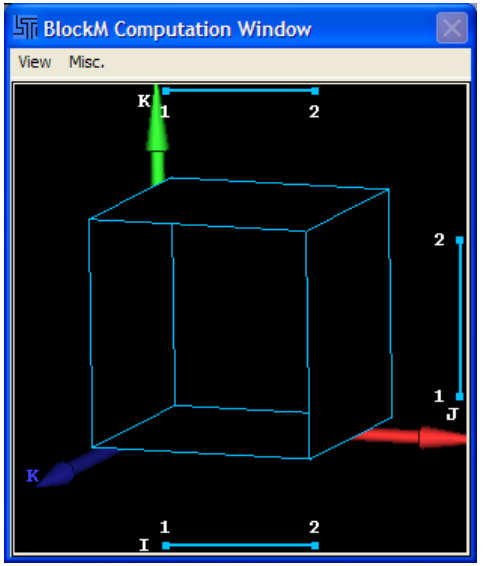
BlockM: Multiple Examples

Shell Cylindrical Pipe

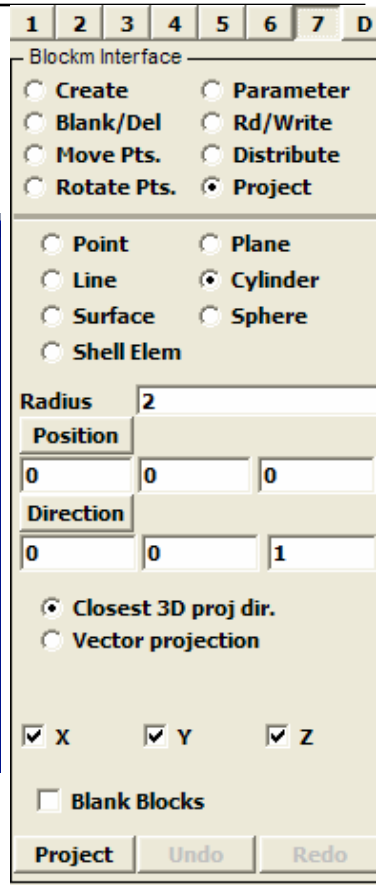
- There is no deletion needed.
- All we need to do is define a cylindrical surface with a radius of 2, in the Z-direction.



Main Window



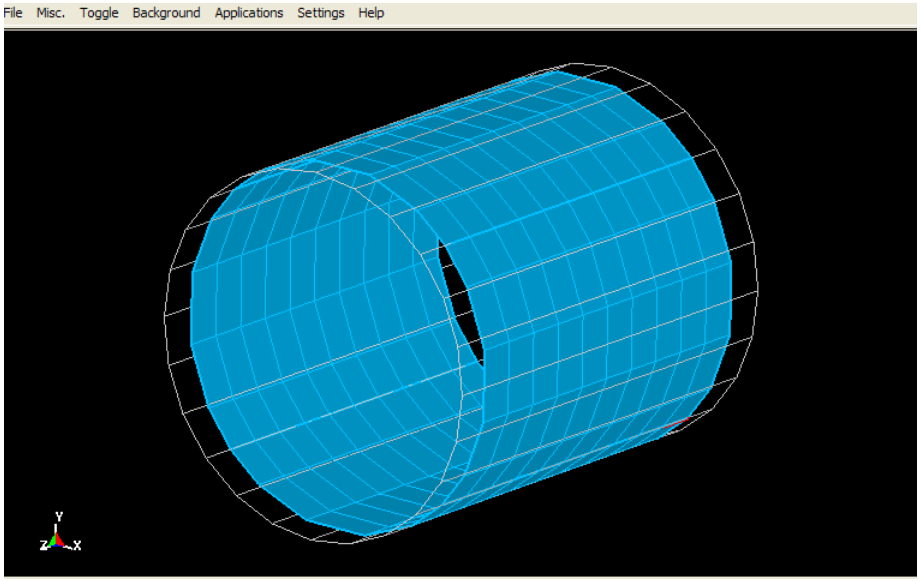
Computation Window



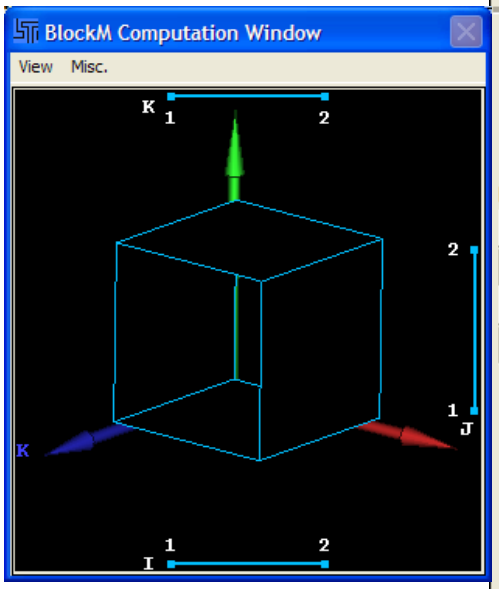
BlockM: Multiple Examples

Shell Cylindrical Pipe

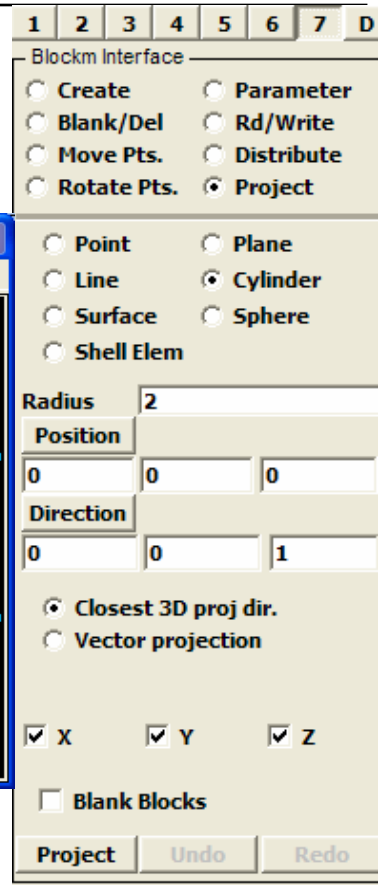
- Finally, we select the 4 faces using the Computation window and project.



Main Window



Computation Window

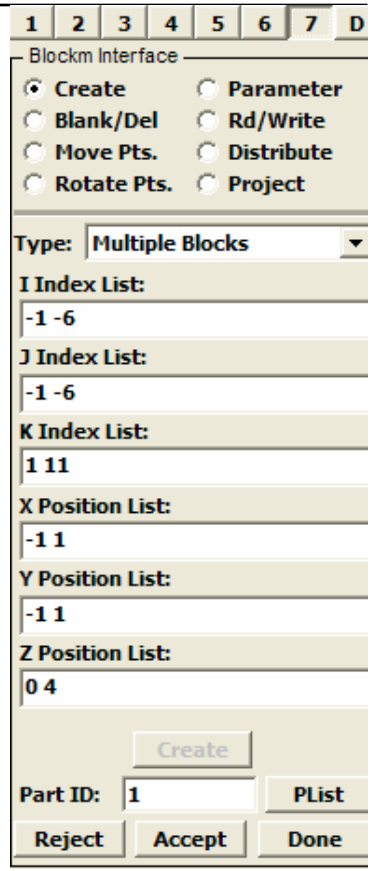


BlockM: Multiple Examples

Shell Cylindrical Pipe

- From the command file below, we see that it only takes 2 lines to generate a cylindrical shell in BlockM. How easy could it get?

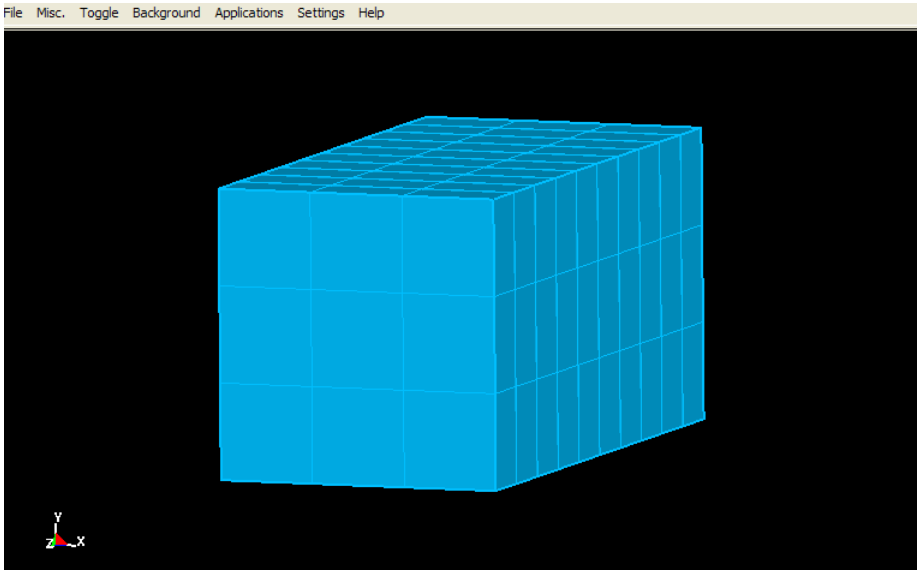
```
bmcreate multiple i -1 -6 j -1 -6 k 1 11 x -1 1 y -1 1 z 0 4
bmproject i -1 -2  j -1 -2  k cylinder 0 0 0 0 0 1 2 xyz
```



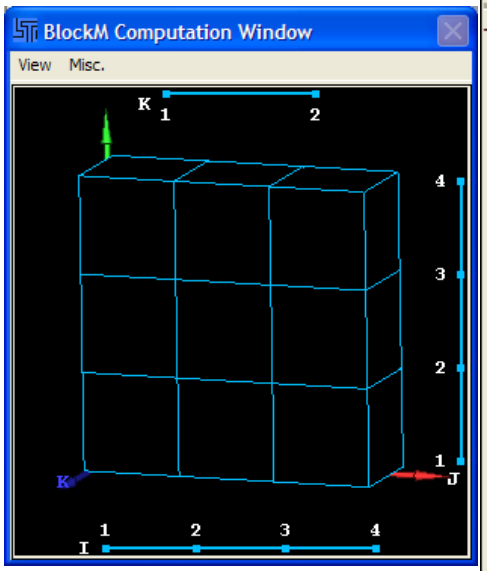
BlockM: Multiple Examples

Solid Cylindrical Pipe

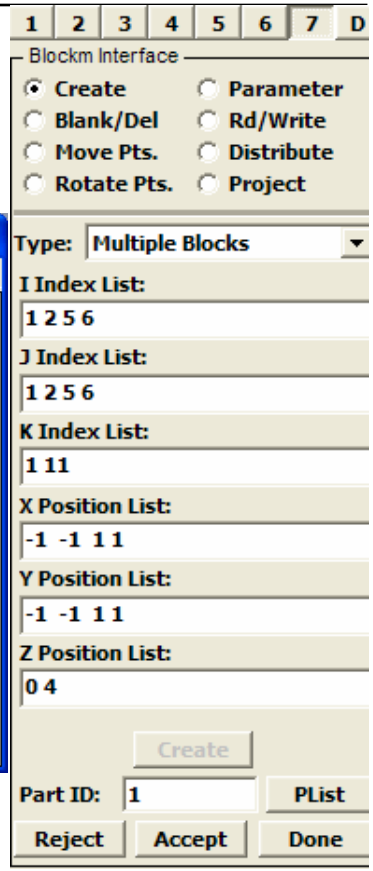
- Again, to the right is how we setup and initialize the block for a cylindrical pipe with solid elements.
- Notice the position of the indices in the I and J directions. This has the effect of collapsing the outer elements onto the inner ones.



Main Window



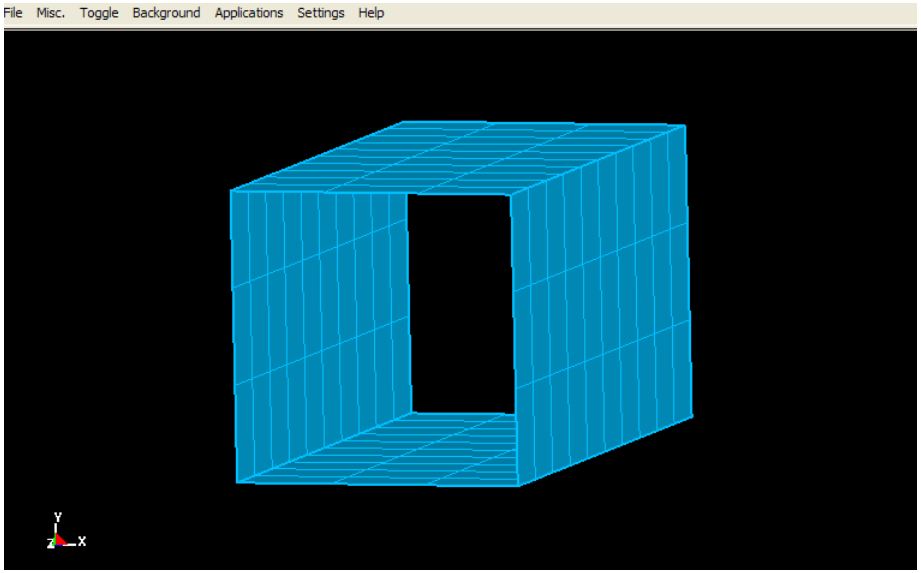
Computation Window



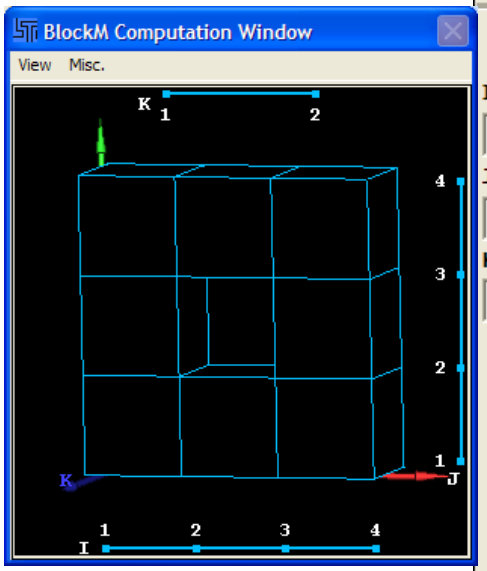
BlockM: Multiple Examples

Solid Cylindrical Pipe

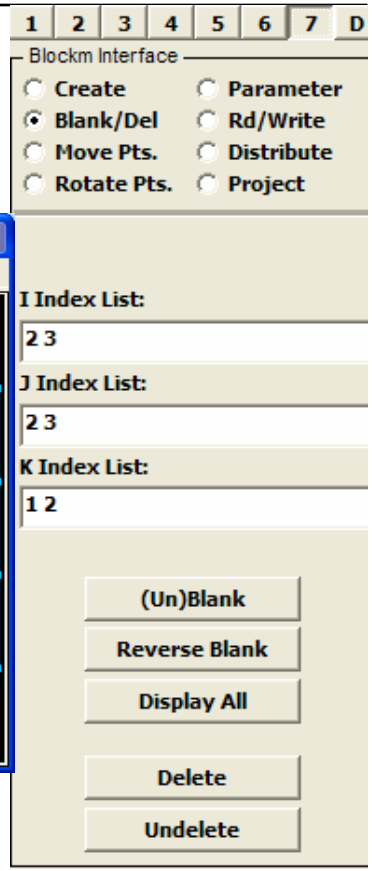
- Here, we need to delete the center region in order to form a hole.
- Because of the we initialized the block, regions left over appear to be shell elements. Don't be alarmed, they are still solid elements.



Main Window



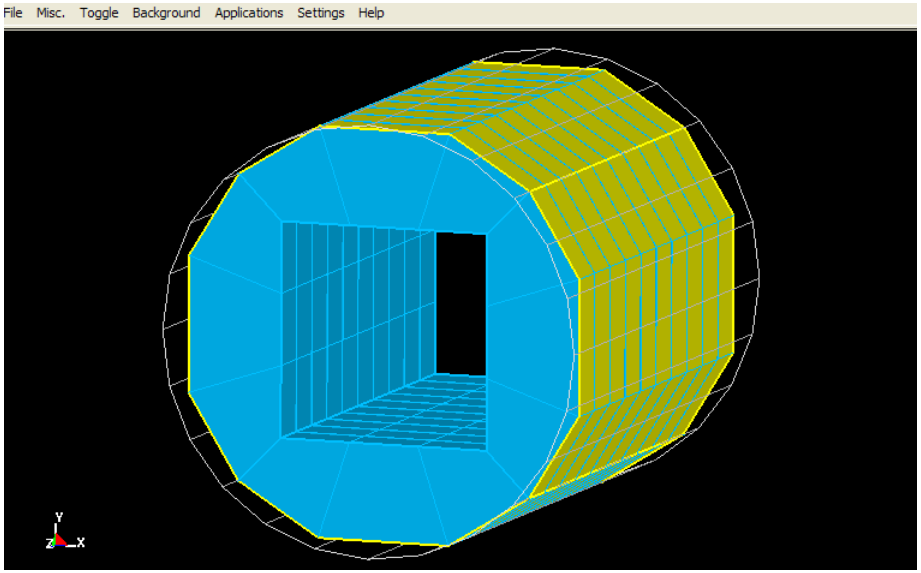
Computation Window



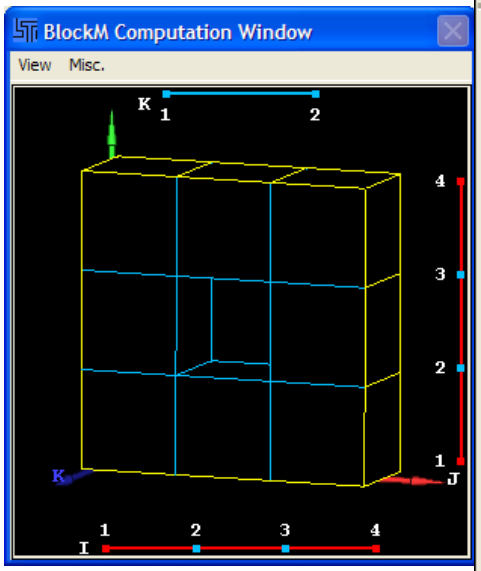
BlockM: Multiple Examples

Solid Cylindrical Pipe

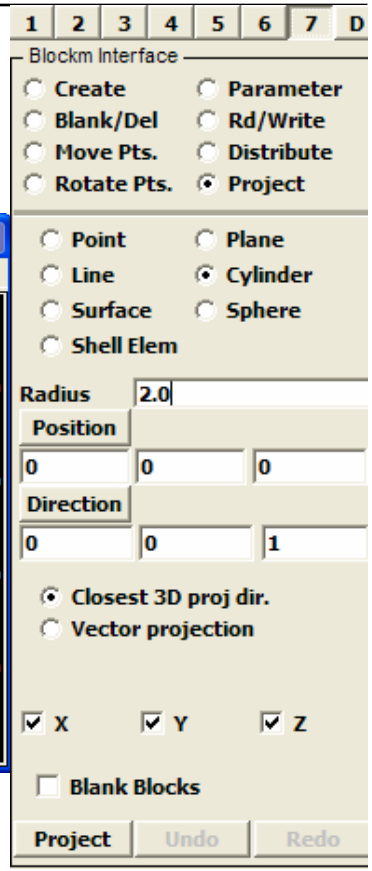
- We first project the outer faces to a cylindrical surface with a radius of 2.0.
- Notice how the elements are "stretched" out.



Main Window



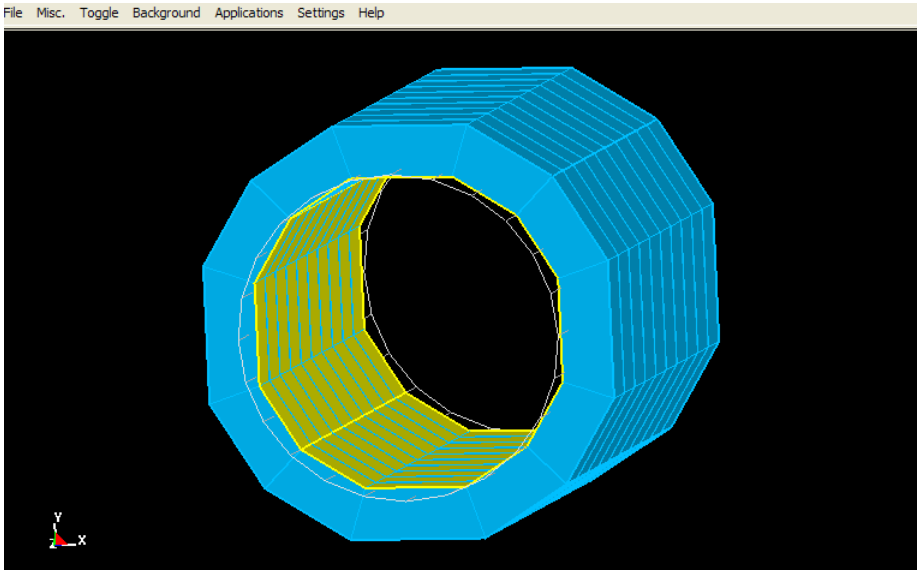
Computation Window



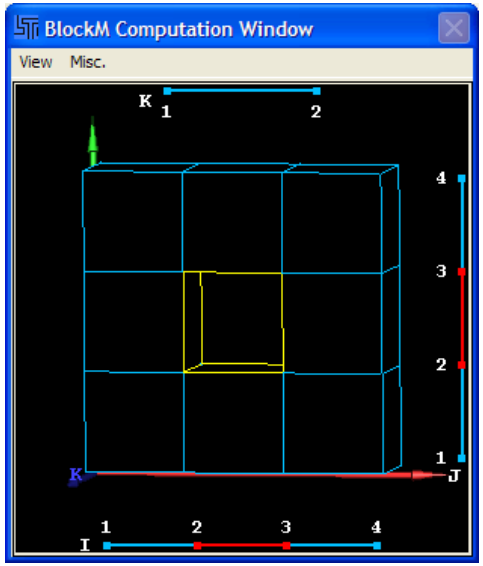
BlockM: Multiple Examples

Solid Cylindrical Pipe

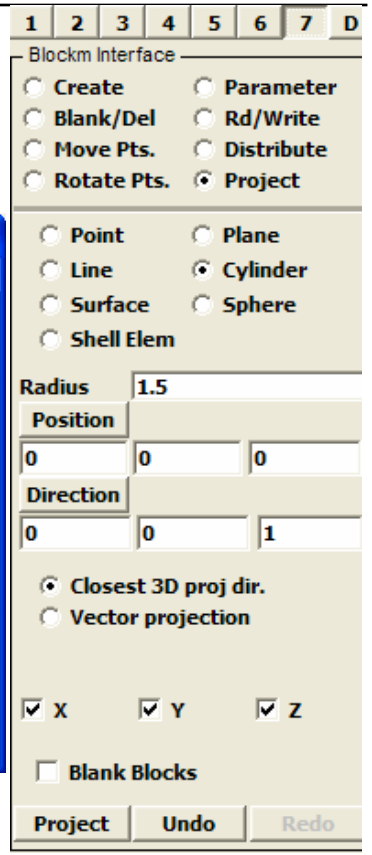
- Now, we project the inner free surfaces to a smaller cylindrical surface with a radius of 1.5.
- This model appears to be a bit coarse. However, this is not a problem because we could easily increase elements with the BlockM command file.



Main Window



Computation Window

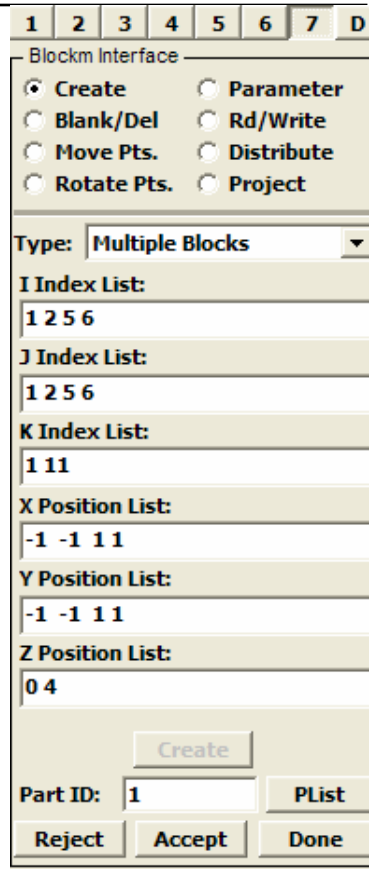


BlockM: Multiple Examples

Solid Cylindrical Pipe

- This model only requires 4 commands to generate. This is still quite small.

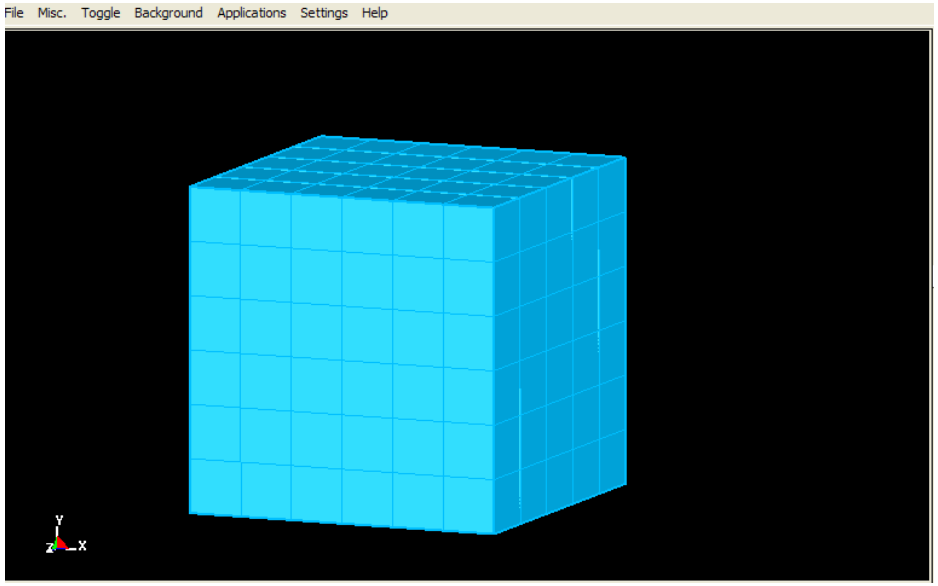
```
bmcreate multiple i 1 2 5 6 j 1 2 5 6 k 1 11 x -1  -1  1 1 y -1  -1  1 1
z 0 4
bmdeletei i 2 3  j 2 3  k 1 2
bmproject i -1 -4  j -1 -4  k cylinder 0 0 0 0 0 1 2 xyz
bmproject i -2 -3  j -2 -3  k cylinder 0 0 0 0 0 1 1.5 xyz
```



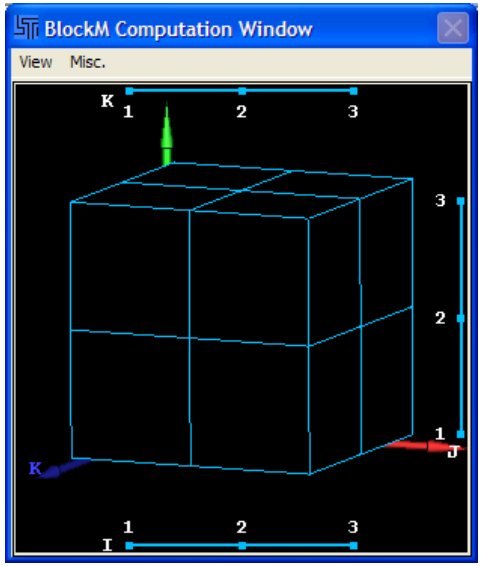
BlockM: Multiple Examples

Solid Quarter Sphere

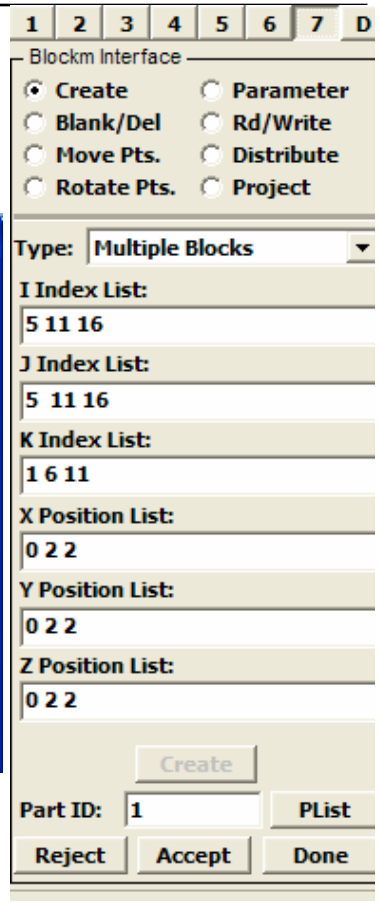
- In this example, we initialize the block slightly different than in previous examples. However, the effect is still the same.
- Note the I and J index fields to the right. We are not starting with 1 here.



Main Window



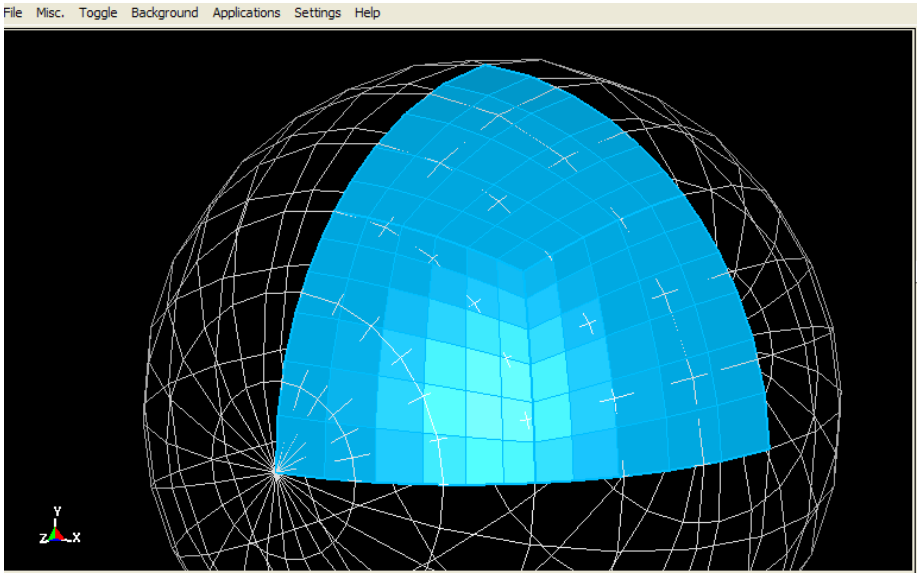
Computation Window



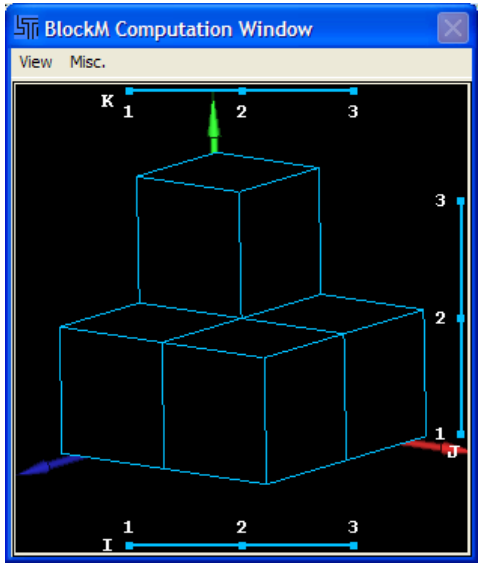
BlockM: Multiple Examples

Solid Quarter Sphere

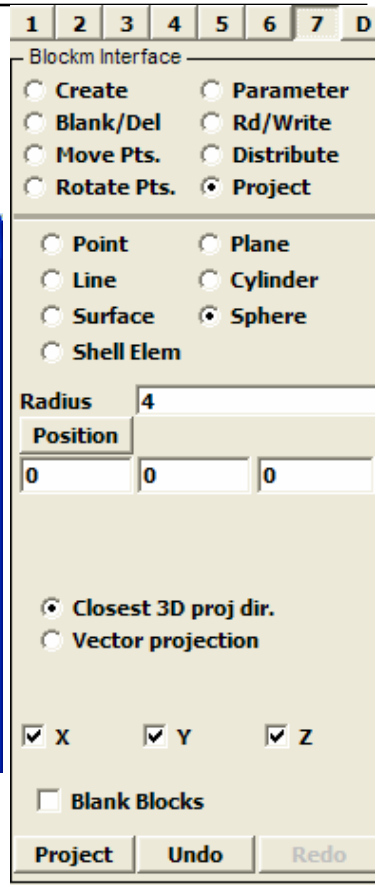
- Next, we delete the regions as seen below in the Computation window.
- Then, we specify a sphere with a radius of 4.
- Finally, we select all the outer faces and project.



Main Window

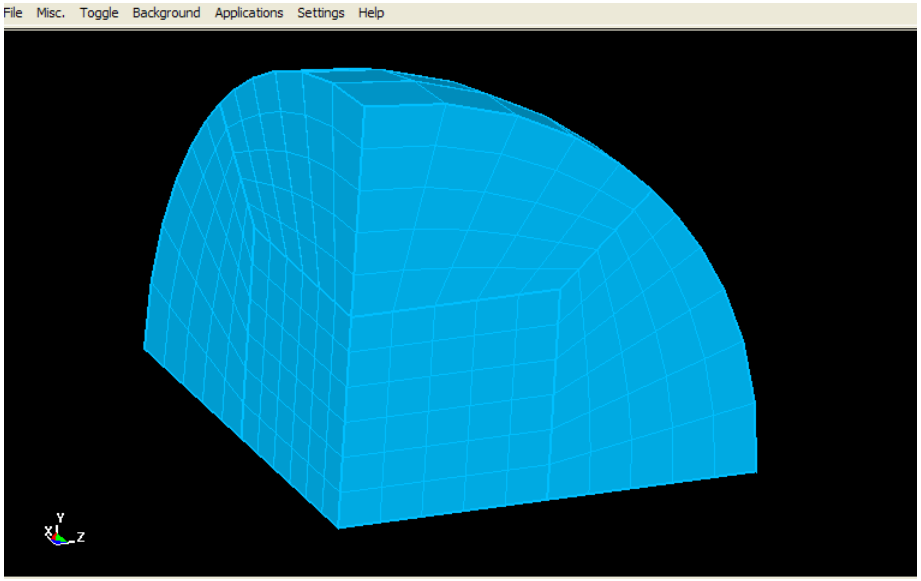


Computation Window

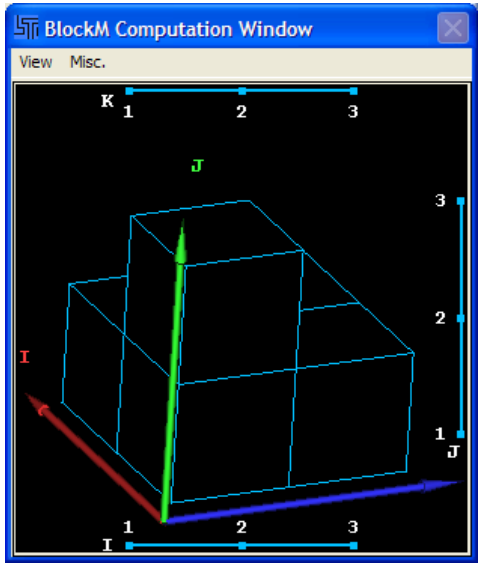


BlockM: Multiple Examples

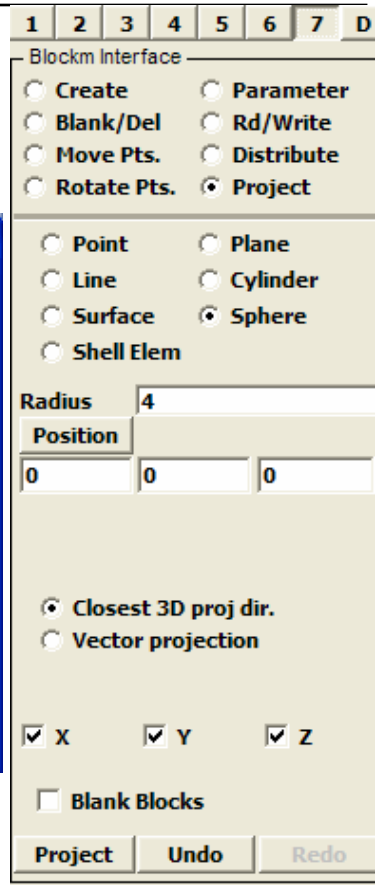
- Solid Quarter Sphere



Main Window



Computation Window



BlockM: Multiple Examples

- Solid Quarter Sphere

bmcreate multiple i 5 11 16 j 5 11 16 k 1 6 11 x 0 2 2 y 0 2 2
z 0 2 2
bmdeletei i 1 3 j 2 3 k 1 2
bmundeletei i 1 3 j 2 3 k 1 2
bmdeletei i 2 3 j 2 3 k 1 3
bmdeletei i 1 2 j 2 3 k 2 3
bmproject i 1 2 j -3 k 1 2 sphere 0 0 0 4 xyz
bmproject i 1 -3 j 1 2 k 1 -3 sphere 0 0 0 4 xyz