Computer Graphics (MIEIC)

Practical Work 3

Shading and approach curved surfaces

Goals

- Explore the different shading modes
- Create composite geometry, including nãoplanas surfaces that explore shading

Practical work

Over the following points are described various tasks to accomplish. Some of them are noted

with the icon  (Image capture) .Nestes points should, with the program running,

capturaruma image execução.Devem nomearas images captured following the format **"CGFImage-TP3-TtGgg-xypng"**, on what **TtGgg** refers to the class and group number and **x** and **y** correspondemao Score and bullet correspondentesà assignment (E.g. **"CGFImage-TP3-T3G10-2.4.png"**).

The tasks marked with the icon  (Code) must create a .zip file of your project, and

nomeálo as**"CGFCode-TP3-TtGgg-xyzip"**, (with **TtGgg, x** and **y** identifying the class, group and task as described above).

When the icon  arise, it is expected to execute the program and observe the results. At the

end, should submit all files via Moodle through the link provided for this purpose. They should also include a file***ident.txt***with the list of group members (name and number). Only

one member of the group must submit the work.

Preparation Desktop

This work should be based on previous work. They should criaruma copy of this work, and

add to the project additional file**MyPrism.js**provided in Moodle for this job (not

Be sure to add to ***includeSerial*** the file ***main.js***).

1. Drawing of a prism

the intention is to complete the class***MyPrism*** so that you can draw a prism with a

variable number of "sides" and "floor" (**slices** and**stacks**, Parameters already included in the builder

class, verFigura 1) as if contained (registered) a cylinder radius equal to a

unit coincident base with the XY plane and centered at the origin, and length also

unit in Z. The cylinder can be opened at the ends (without lids).

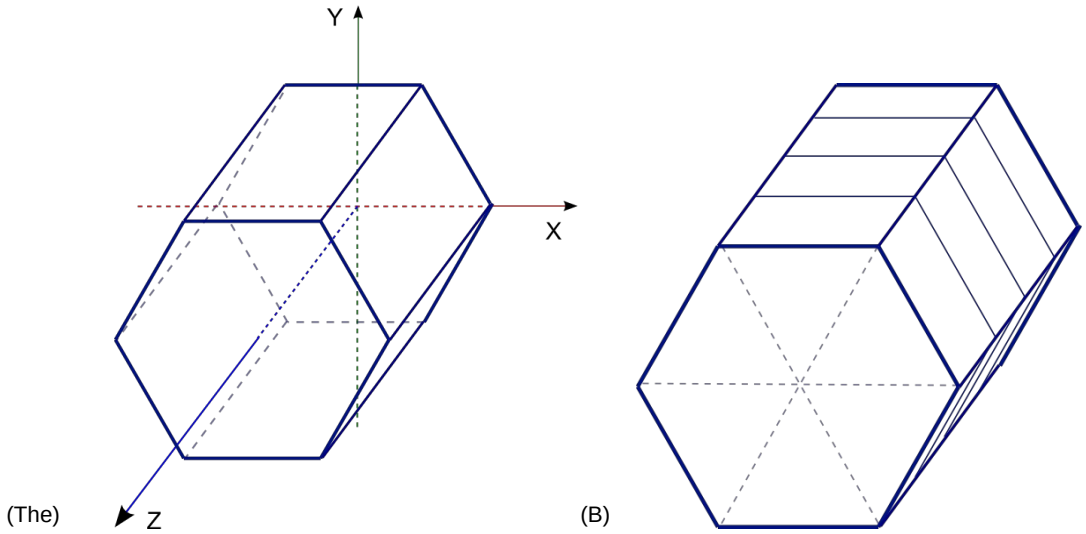

Figure 1: Prism (a) six sides (***slices***) And floor (***stack***) And (b) six sides and four floors.
(The scale is not real)

1.Numa first version of Prism, consider that the cylinder has only one "floor" (such as example in Figure 1 (a)). Note that, for each face normal of its vertices must be perpendicular to this face (Figure 2). **You may therefore have to set the same vertex more than once in the list of vertices, so that different normal atribuirlhe.**

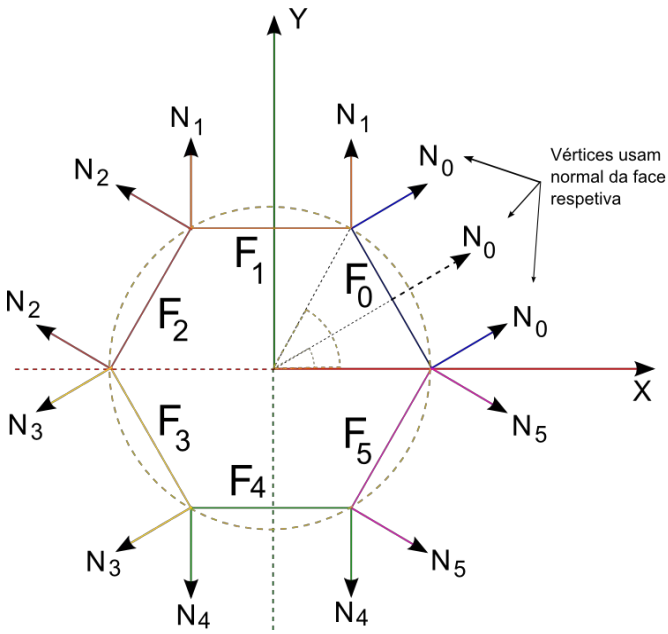

Figure 2: Illustration of normal to assign to each vertex in the case of six sides. The will be normal equivalents of all the vertices ***stacks***

2.Acrescente an instance thereof with the method sides 8 ***init*** scene, representing a column verticalcom dimensions to find appropriate, and the method desenhea ***display*** scene. You can terde usarrotações, scales and translations on the scene before draw the prism.

3. In 1.1 should have implemented various sides and only one floor. Adjust the implementation to support multi-storey design (**stacks)**as in the example in Figure 1 (b), and guaranteeing

the column designed in 1.2 is now designed with 20 floors.

(1.3) (1.3)

2. Prism Adaptation to simulate a cylinder

1. Create a new class***MyCylinder***making a copy of the file***MyPrism.js*** changed in previous year. Do not forget to change the new file name, the class contained therein and all methods, and adding ***MyCylinder.js*** to ***serialInclude*** of ***main.js*** .
2. Altere normal method***initBuffers*** from class***MyCylinder*** So that the normal each vertex is perpendicular to the surface of perfect cylinder in which the original prism is inscrito.Ou is, each vertex is used on two adjacent sides, will always same normal (Figure 3).

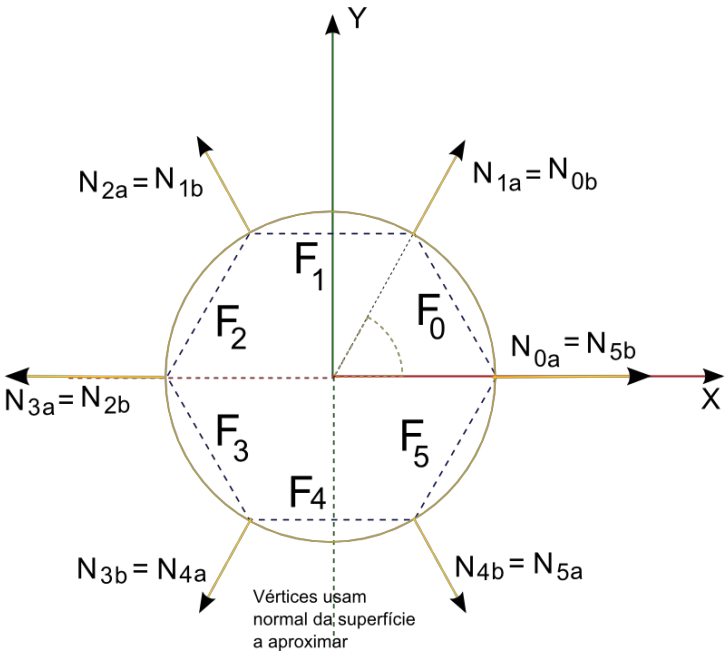

Figure 3: Illustration of normal allocated to each vertex in the case of an approximate cylinder with six sides.

3. Acrescente a second column to the scene, with the same number of sides and floors of prism (**8 *slices*** **20 *stacks***), Now using an instance of ***MyCylinder.***
4. Simplifique the list of vertices and normal to remove duplicates (means obviously going to refer to the same vertex more than once in the index list)

(2.4) (2.4)

Extra: Creation of a hemisphere

Create class***myLamp*** to draw a half-sphere (representing a ceiling lamp). use the same principles of "stacks" and "slices" that used in***myCylinder*** .Add also the respective normal. Adicionea the roof of the center with the appropriate dimensions.

(extra ) (Extra )

Check list

Until finaldo work must submit the following images and versions of code via Moodle, strictly respecting the rule of names, and the ident.txt file with the identification of Group members:

-  Pictures (3): 1.3, 2.4, extra (names like "CGFImagetp3TtGggx.y.png")
-  Code zip file (3): 1.3, 2.4, extra (type names "CGFCodetp3TtGggx.y.zip")