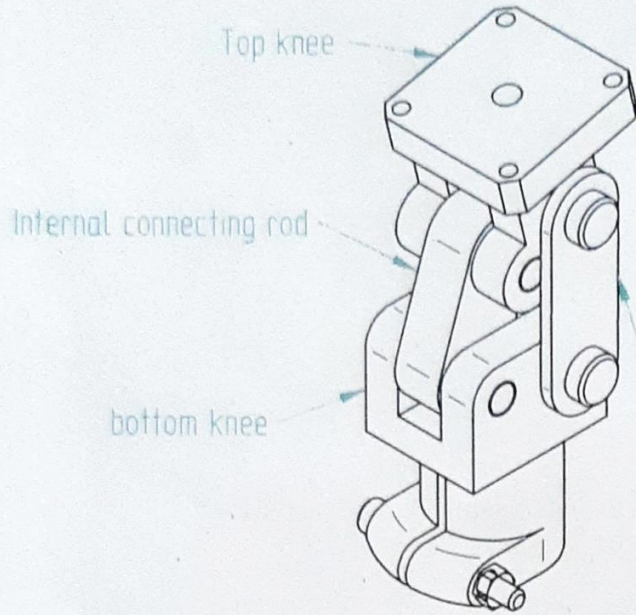
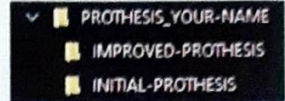


**Purpose :** you are asked to create a first assembly, and then modify parts to improve the solution and to create the assembly drawing.

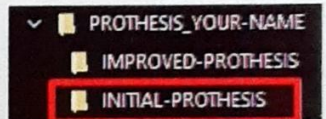
**Management of files :** - Create a folder called "PROTHESIS\_YOUR NAME"

- In this folder, create 2 folders : "INITIAL-PROTHESIS" and "IMPROVED-PROTHESIS"
- You will save all your files in these folders (including all the given file).
- At the end of the session compress your folder in a "PROTHESIS\_YOUR NAME.zip" file and upload it on Moodle



This mechanism is a low-cost prototype of a simplified knee prosthesis. This last is headed to countries suffering from spreading of anti-personnel mines. It helps to link the top part of the thigh to an artificial foot.

### A : CREATE A FIRST ASSEMBLY : INITIAL-PROTHESIS



All the files you need are in the zip file "PROTHESIS\_Student-files.zip" downloaded from Moodle.

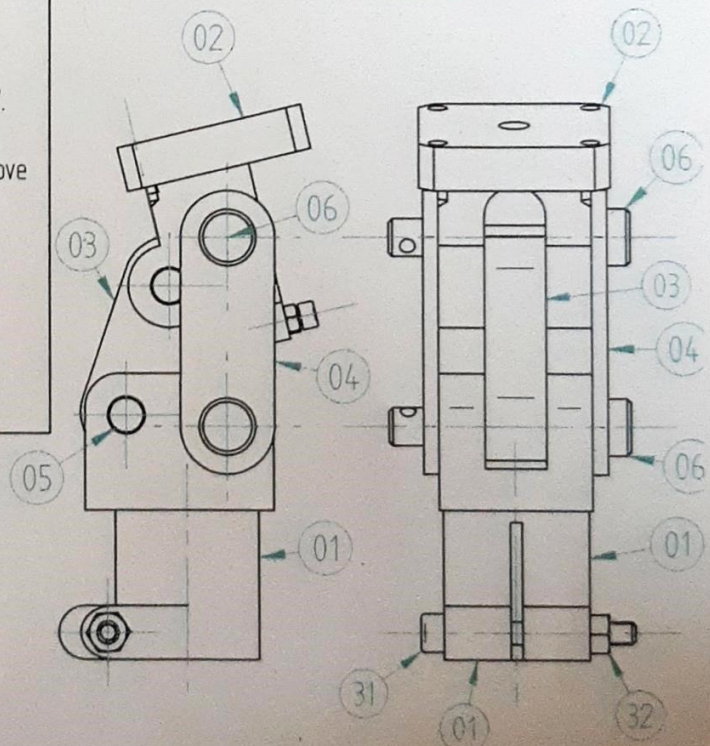
In this part A, you will work in the folder "INITIAL-PROTHESIS".

A.1 : Create a new assembly file. Save it as "Initial-prosthesis\_YOUR NAME".

A.2 : Assemble the 4 sub-assemblies given as shown on the perspective above and the drawing opposite. The names of sub-assemblies to assemble are :

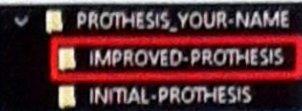
- 001\_Asm-BOTTOM\_KNEE
- 002\_Asm-TOP\_KNEE
- 003\_Asm-INTERNAL\_CONNECTING\_ROD
- 004\_Asm-EXTERNAL\_CONNECTING\_ROD

Save your assembly.



05	Internal axle	2	32	Nut H-M6	1
04	External connecting rod	2	31	Screw CHC_M6x50	1
03	Internal connecting rod	1	11	Screw CHC	1
02	Top knee	1	08	Nut H-M4	1
01	Bottom knee	1	06	External axle	2
Ref	Description	Qty	Ref	Description	Qty

## B : MODIFY the INITIAL-PROTHESIS : IMPROVED-PROTHESIS



In this part B, you will work in the folder "IMPROVED-PROTHESIS".

Copy all the files of your folder "INITIAL-PROTHESIS" and paste them in the folder "IMPROVED-PROTHESIS".

You will only modify the files contained in the folder "IMPROVED-PROTHESIS".

To improve the initial solution, you will modify certain joints of the initial prosthesis ; the views below represent the improved solution and can help you.

B.1 : Open your "Initial prosthesis" file and save it as "Improved-prosthesis\_YOUR NAME".

B.2 : First modifications : to reduce friction in all the revolute joints, you will use bushes between the axles and the top knee and bottom knee.

The bush is given : "07\_Bush-10x16x10.par"

- Modify the parts 01\_Bottom-knee and 02\_Top-knee to allow bushes insertion.
- Insert the bushes.
- Save your assembly.

B.3 : Second modification : maintaining in position between the Internal connecting rod and the internal axles will be ensured by pressure screws.

The pressure screw is given : "30\_Screw-HC\_M4x6.par".

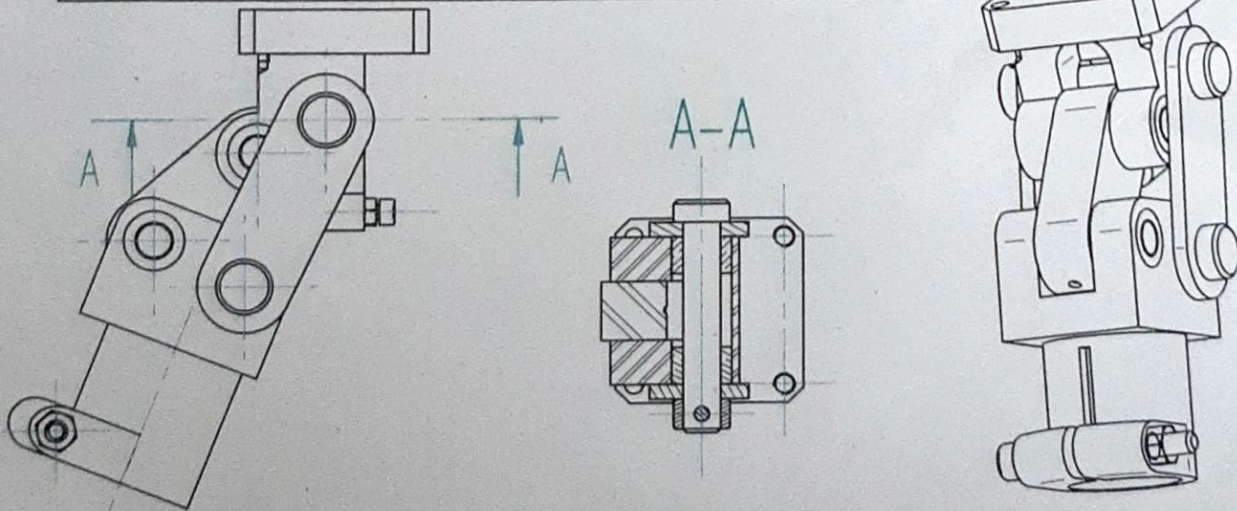
- Modify the internal connecting rod to allow the maintaing by pressure screw
- Insert the pressure screws in the concerned sub-assemblies.
- Save your assembly.

B.4 : Third modification : axial stops for external axles are ensured on one side by a shoulder and on the other side by a special washer. The special washer has to be fixed with the external axle by a pin.

The special washer (to be modified) and the pin are given : "10\_Special-washer.par" and "09\_Pin-4x14.par".

- Modify the special washer to allow the insertion of the pin. Ensure an axial clearance of 0,5mm between washer and external rod to ensure mounting.
- Finish and save the assembly.

### Views of the IMPROVED-PROTHESIS that can help you :



## C : CREATE THE ASSEMBLY DRAWING of your IMPROVED-PROTHESIS

In this part AC you will also work in the folder "INITIAL-PROTHESIS".

C.1 : Create the assembly drawing of your solution. Make your modifications appear on this drawing using external and cross-section views.

Indicate the fits related to the bushes mounting.

=> Save your drawing as "Improved-prosthesis\_YOUR NAME.dft".