3D model of the Collin clock in the Paris Notre-Dame cathedral
(c) Denis Roegel, 2020

Introduction
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The former 1867 Collin clock in the Paris Notre-Dame cathedral
was modelled in 3D in 2020. This clock was destroyed during the fire
which took place on April 15, 2020. The present model is quite complete,
except for some unreachable details, screws and a few other details.
The dimensions are not perfectly identical with the original clock,
except for general dimensions, teeth counts, distances between arbors
which have been measured. The other features are consistent with eachother.
Dimensions can be improved in the future and this model should be
seen as an ''ébauche.''

The files provided here require a minimal effort to be used,
to a large extent because these files aim to be portable, thus useable
in all possible computer environments. This effort is however
neglectible compared to the time it took to design the model, about 500 hours.
I believe that a CAD expert should be able to use my files
in less than an hour. For those who are not experts, it will be sufficient
to get in touch with an expert.

The 3D files do not (yet) contain colors. Perhaps this will be the
case in a future version. The colors which are shown on the provided
images stem from non portable versions of the model, which can not
be used by others. But adding colors and animations are at reach
to any CAD expert.

Content of the distribution
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The included folders contain the following files:

 (1) a documentation of the model : roegel2020notre-dame-3d.pdf (in French)
 (2) all the made parts in the STEP, IGES, OBJ and STL formats;
 (3) a raw assembly of all these parts, without structure, and without colors:
        assemblage.stp, assemblage.igs, etc.
 (4) a file positions.txt giving the position in space of all the
     individual parts, which only need to be translated
 (5) a small file exemple-blender.py showing how the individual parts
     could be loaded in the Blender software.

All these files are organized in the following folders:

assemblages (assemblies): IGES, OBJ and STEP assemblies (as .zip files)
contrib : future contributions (currently empty)
doc : documentation (only in French)
img : a few screenshots
other : currently empty
pieces (parts): compressed folders (zip) of the IGES, OBJ, STEP and STL files
README-en.pdf : README in English (this file)
README-fr.pdf : README in French
scripts : files useful for scripts, in particular the file positions.txt
              and a embryo for use with Blender.


All these .zip files must be decompressed before being used.


How to use these files
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The present distribution is not an ''out of the box'' distribution
where it would be sufficient to run a program and see an animation.
I have not produced any animation and my aim was to provide a
model that could be used in all environments, no matter what CAD software
is used, or even without a CAD software. In order to take advantage
of this distribution, it is essential to have an advanced knowledge in CAD
and not merely to be familiar with a software such as SolidWorks or others.


Several cases can be contemplated:

(1) you are not a CAD expert and have no software, you are also
    no computer guru; then, you could first view the .obj files
    or other formats using public tools, in particular those
    found in the following places:

    https://kitware.github.io/vtk-js/examples/OBJViewer/index.html
    https://3dviewer.net/
    http://masc.cs.gmu.edu/wiki/ObjViewer
    https://www.pyramidproject.net/objviewer.php (untested)
    https://chrome.google.com/webstore/detail/3d-stl-obj-viewer-with-dr/
                      pjbghnibbgbmpokpcfoojnihcdcdejhi (untested)

    https://stpviewer.com/ (untested)
    https://3d-viewers.com/fr/step-viewer.html (untested)
    https://igsviewer.com/ (untested)

   Then, you can ask a CAD expert to follow the next steps.

(2) you are a CAD expert and you have a software such as SolidWorks.
    Inventor, Rhino, or others, including free software;
    in that case, you can merely take the files in a suitable format
    (depending on the software), as well as the file positions.txt,
    and assemble the parts; this procedure can be automated and should
    take at most a few hours, and probably even a lot less for
    a real expert; you can also color the parts, or animate them;

(3) you are a CAD expert and have no specialized software;
    in that case, you can yourself write a program loading the .obj files
    and visualize them, for instance with OpenGL;
    you can also color the parts or animate them;

(4) you can also, if you wish, directly print out certain parts
    using the provided STL files; please keep in mind that
    the assembly will not be immediately functional, as I did not
    take backlashes and play into account, except in a few rare cases.

Updates will probably be put online in the future and interesting
contributions by others might be added to the distribution.

Please do not ask me how to use this or that software, as I am familiar
with almost none of them.

Denis Roegel
1 May 2020