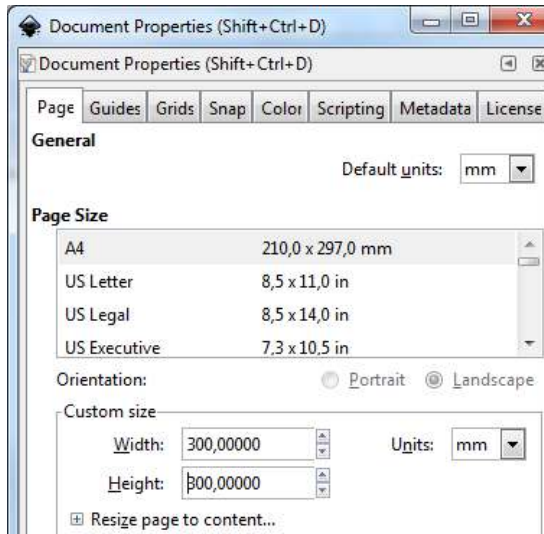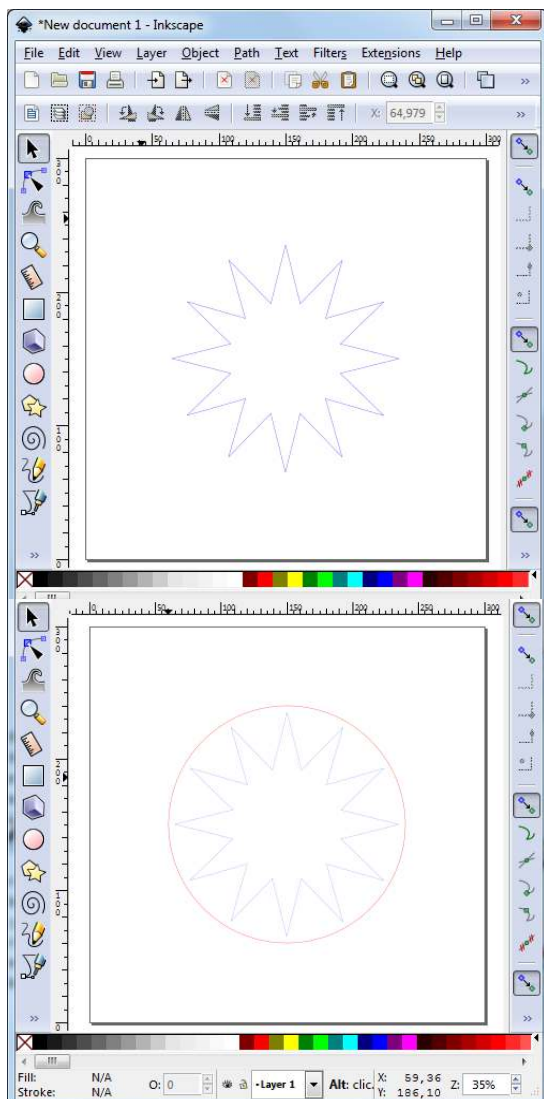# Tutorial clock

As a clock is usually round, you start with a working area (through file - document properties) of 300 x 300 mm.

Draw a 12-star by using the star icon in the left toolbar and make sure that the star has 12 corners. The star will be 170x170mm – you can adapt that later on. Make sure the lines are blue 255 max with 0.1 mm stroke style (through icon →).

You use this star in order to determine the location of your numbers. The 12-star needs to be rotated a little bit, otherwise the upper point is not fully in the middle (click twice until you see the rotation arrows and then you can rotate it with the mouse).
Put the star in the middle of your page.

Draw a circle (180x180mm) in RGB red max 255, stroke style 0.1mm. Also put the circle in the middle of your page.
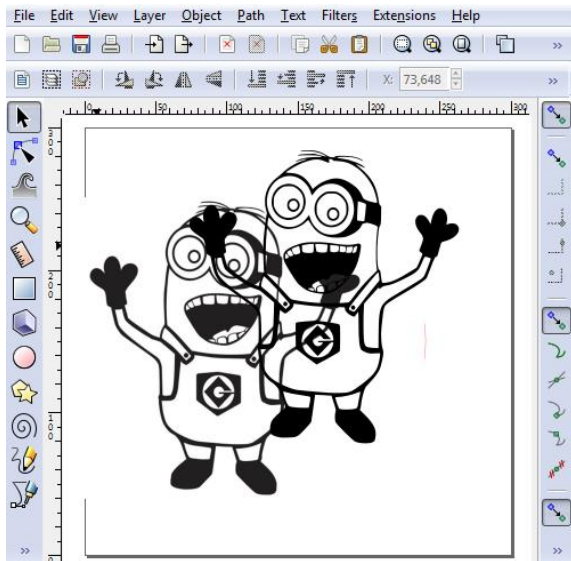
Then you search the internet through images (search in black-white + clip art or line drawing) for an image that you want to use for your clock - in this case: minions. Important here is that you look for drawings that are completely closed at the outlines. Later you'll know why.

Select the minion and go to path - trace bitmap. There you click Update and ok. Now you can drag a **vectorial** drawing off the original minion.
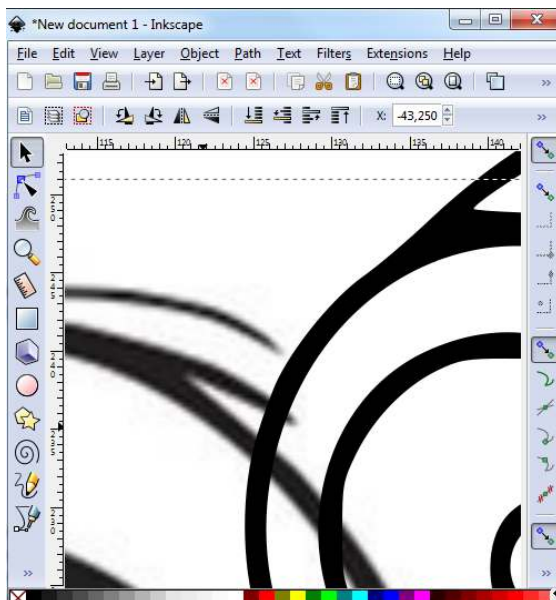
If you zoom in, you can see that the old drawing consist of small blocks (bitmaps) and the new drawing has smooth lines.

The old drawing can be erased. We will then shrink the "new" minion until it's big enough to fit between the red circle and the working area (herewith you can turn on the lock, so that the proportions of the drawing will be kept).
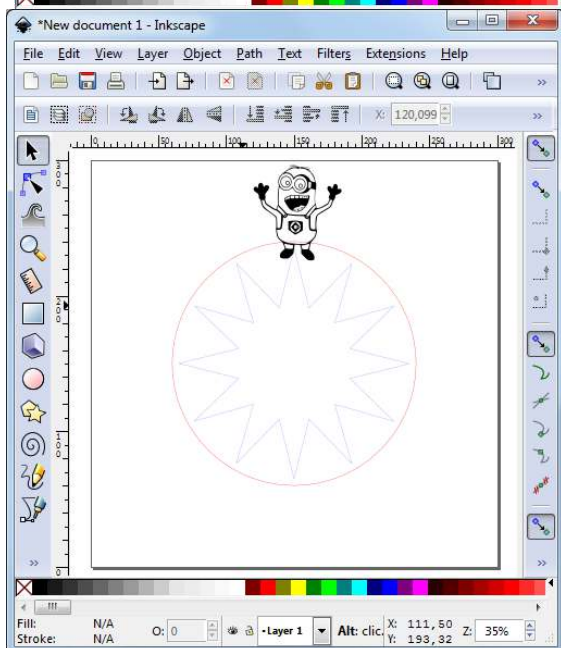
Select the minion and shrink it until it still fits within the page above the "twelve". The minion ideally falls partly within the red circle, as in the end it needs to be fixed to the clock. If you would only have the feet within the circle it would be rather breakable, so I put it a bit further within the circle. Now you make a copy of the minion and drag it aside – you'll need it later on.
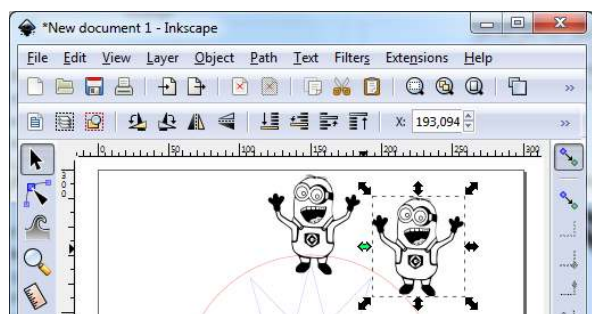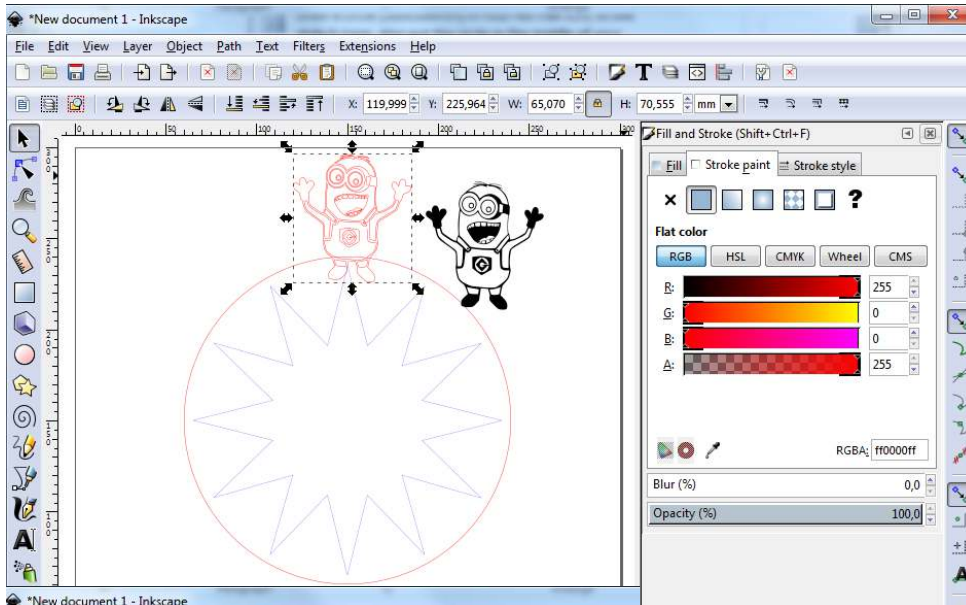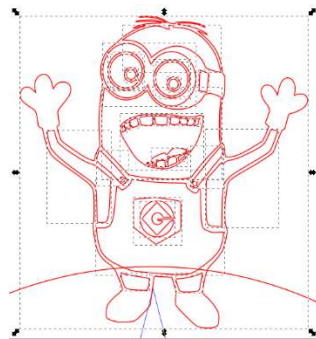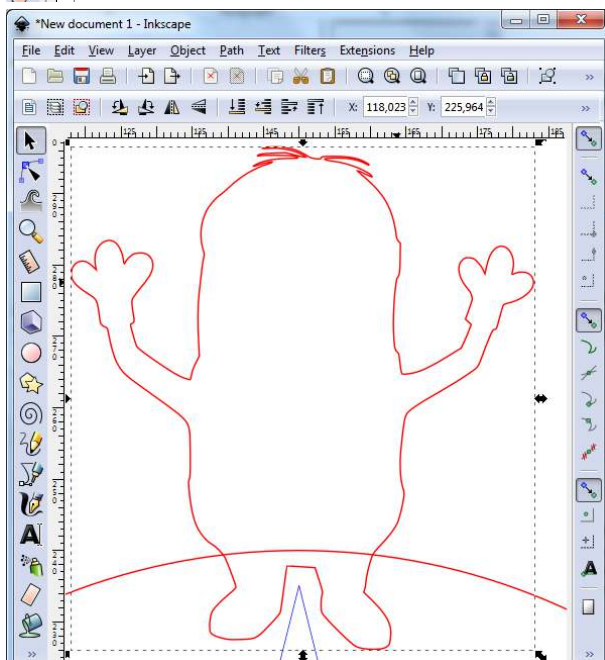
You choose the paintbrush icon and turn the fill off and put the stroke paint on red RGB 255 max, stroke style 0.1mm.
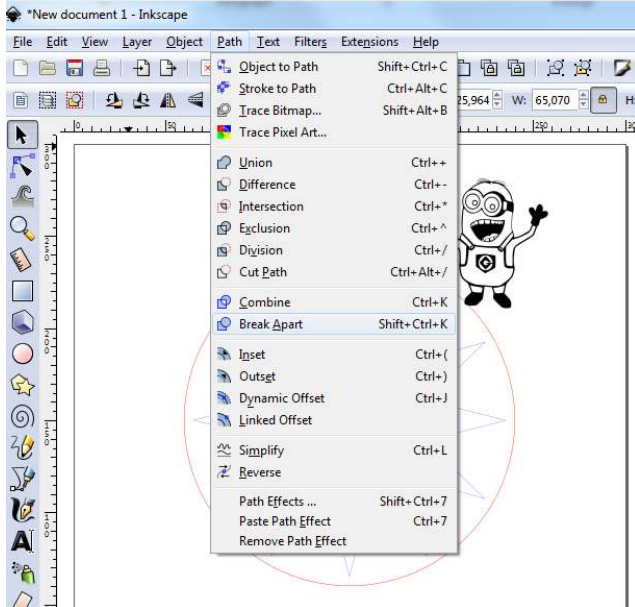
Then you choose path – break apart. You'll then get a red minion divided into a lot of sections.


In case you chose a good drawing with 'closed' outlines, you can keep the outline of the minion by deleting the other sections.


SUCCEEDED ?!?!

Now we'll attach the minion to the clock. Therefore you need to click the minion as well as the circle (by pressing the shift button when you select them). Please, make sure the minion is already centered with the star. If not, you still need to move the minion a bit…
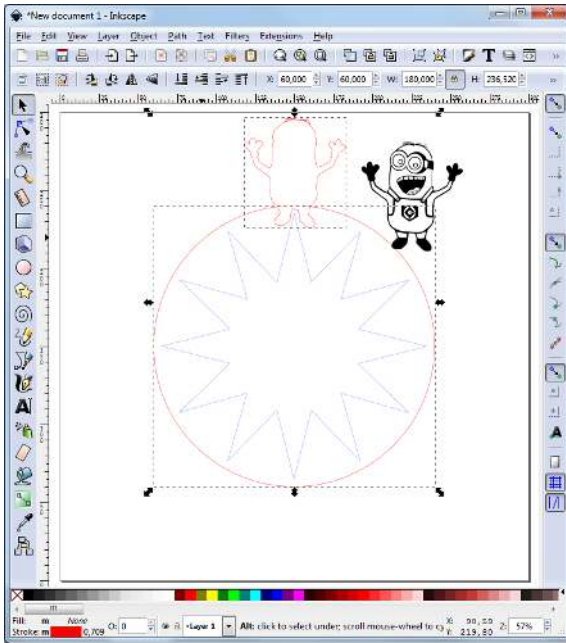
You go to path – union and you now see that the minion and the circle are one whole. You can then drag the copied drawing into the minion – this way the minion will not only be cut out, but also be engraved. Pay attention that the minion's hairs are quite fragile. You can solve this by altering the drawing a little bit. This will be shown with the next minion.

By zooming in, you can make sure that the black minion fits exactly in the red minion shape.
In the meantime you make another copy and you'll place this minion at the "three". You follow the same routine as for the first minion. You start with another copy and then continue.
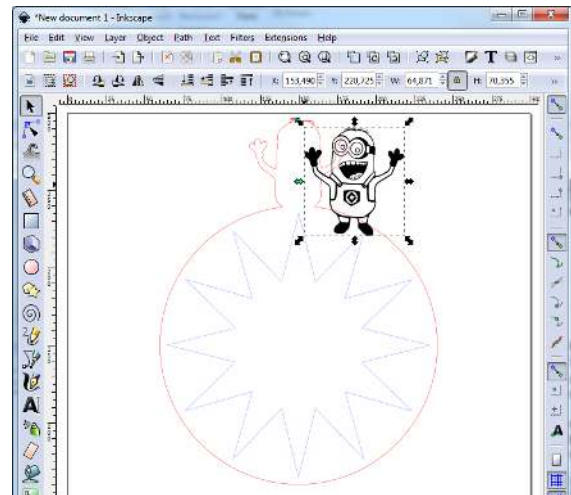
This time we'll smooth the hairs so that they are not so fragile anymore.

We'll do this by double-clicking the red line – you then see a lot of grey mini-squares. These are the vectors (they determine how the lines go). You can select them by dragging a surface round them with the mouse or by clicking them one by one – they will then turn blue/green.
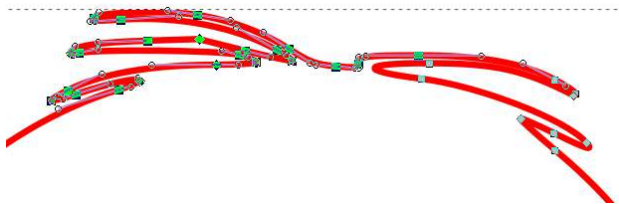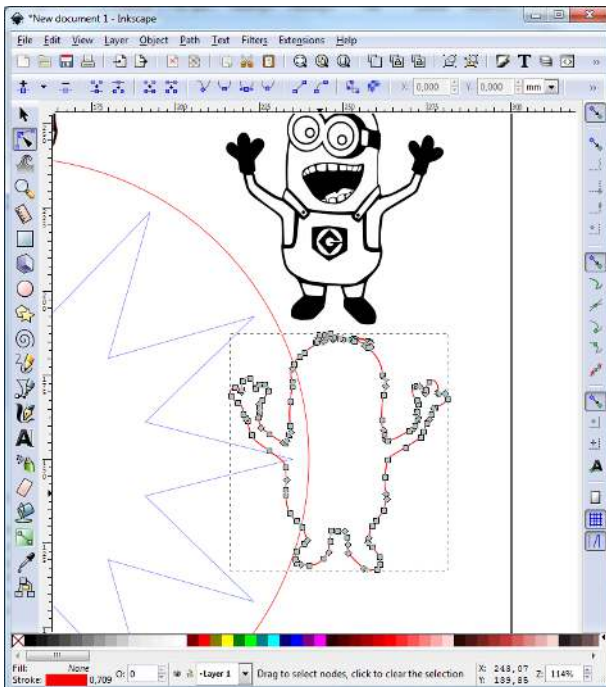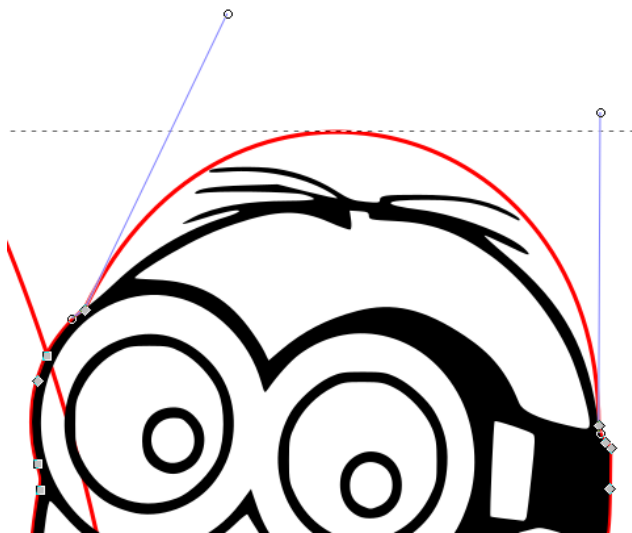

Then you can erase these squares. You may also notice that blue lines will appear when you click a square. You can drag these in such a way that the line will move in another direction. You can play a lot with this, but we'll now try to see if the minion fits in. We drag the 'black' minion and put it in the red drawing.
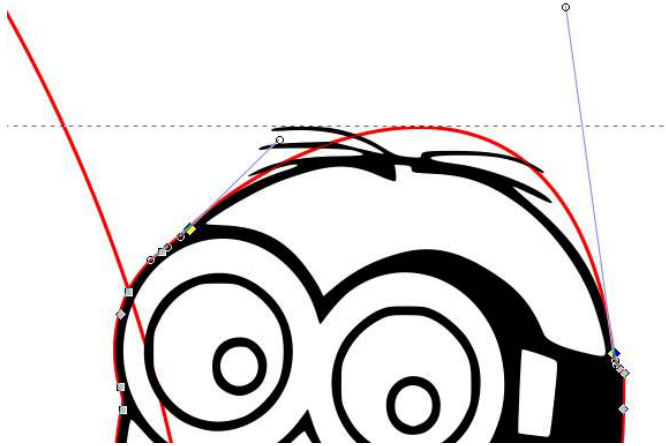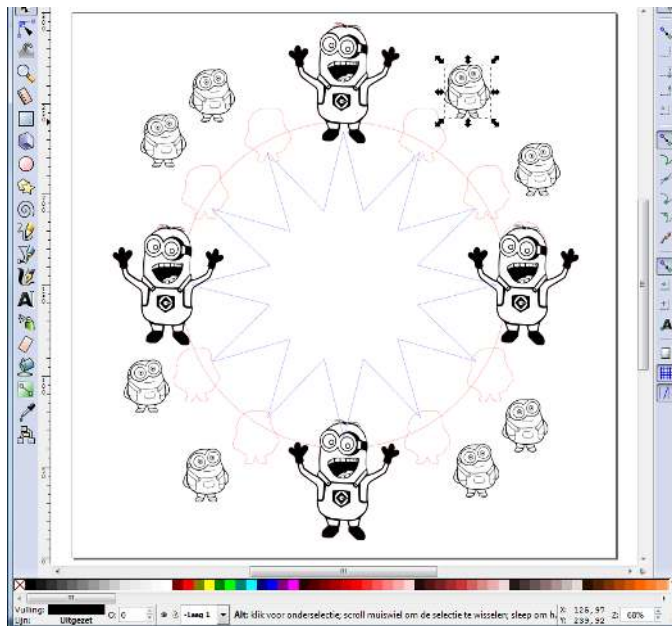
Not yet a good fit ☹

Okay now ☺

Don't forget to make a copy of the black minion, before you union the red lines and then you can continue with your clock. I put the same minion at the '"sic" and "nine" and after that I will look for another one.


Here you see all the minions ready for union and positioning, but I will still do something special with it. There's also possibility of what we call 'fast cutting'. It would be nice if the glasses of the minion would have some more accent and we can do that by using 'fast cutting'. Therefore you take one of the black minions and turn off the fill. Instead of making the lines red, you make them blue (RGB 255, stroke style 0.1mm) and you go to break apart. Then you only keep the parts that you want to accentuate.
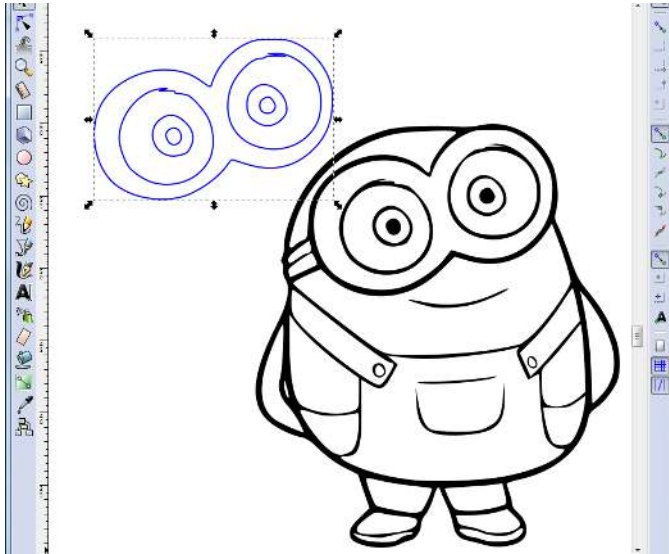
You put the blue part on top of the black part and then you group these two. After that you can copy them and for them in the red minions.

Now, the clock is almost finished, but there still needs to be a hole in the middle in order to fasten the clockwork. This hole should be in red and 8x8mm.
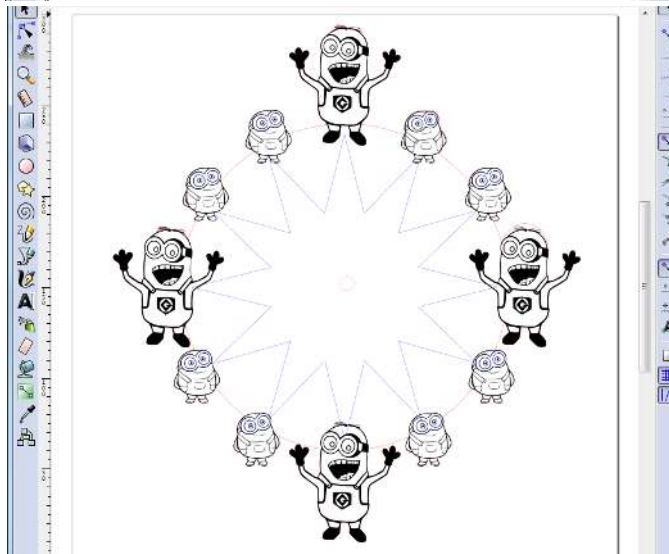
You can now consider the clock as finished, but you should still remove the star (otherwise the star will also be 'fast cut'). But wouldn't it be nice if there would be some numbers on the clock as well – this way it's easier to tell the time. You then leave the star at its place and put the numbers in.
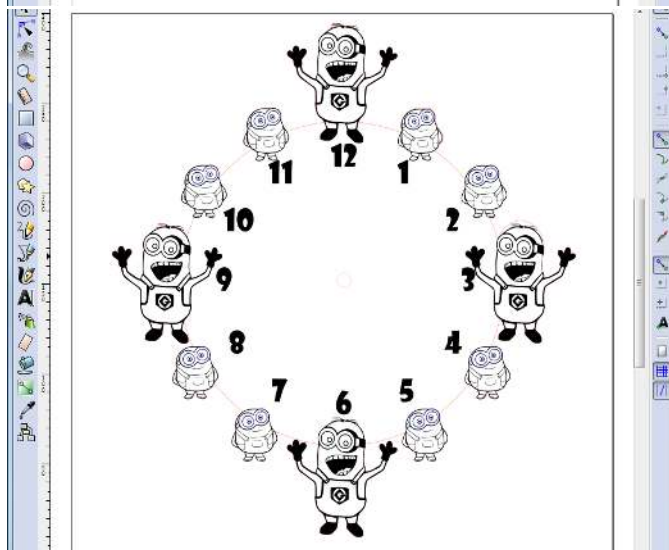
Then you remove the blue star and here you are, your clock is ready ☺☺☺☺☺☺. Now you can have your file engraved and (fast)cut on the laser cutter.
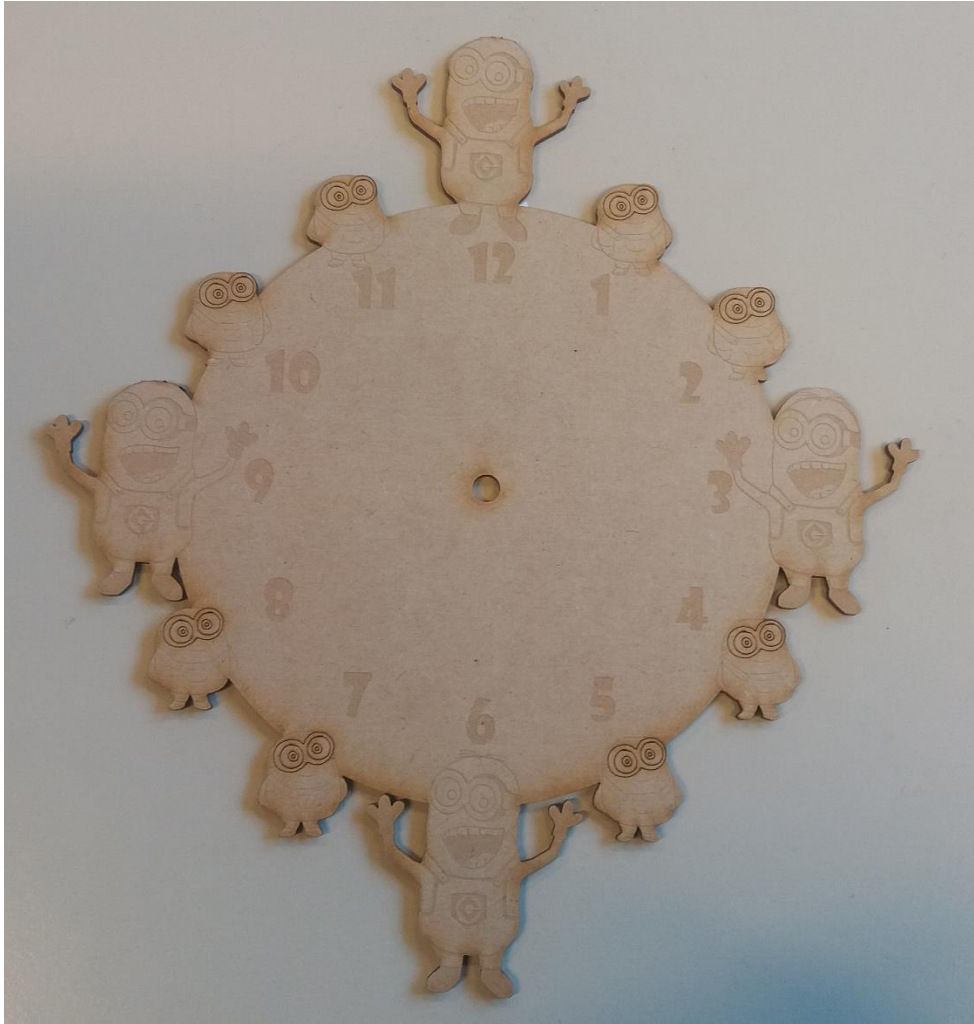
The clockwork and hour- and minute hand you can get in FabLab.