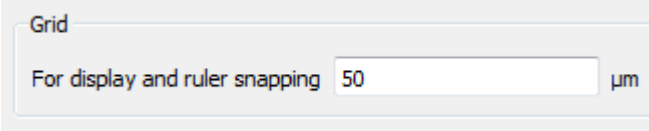# Quick Klayout usage guide

For complete documentation visit: https://www.klayout.de/doc.html
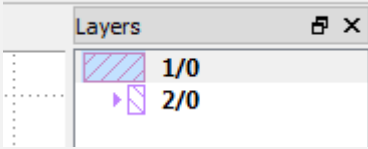
Recommended configuration changes

Before starting to draw your mask, there are two configuration changes that are recommended.

Increase the grid size File->Setup->Application->Grid Set the grid spacing to 50 um or other similar value *Setting the grid size to a larger value helps with the drawing at larger scales as it increases the grid snapping steps.*	Grid For display and ruler snapping 50 µm
Disable Zoom-on-copy File->Setup->Navigation->Zoom and Pan Select "Don't Change View" *This is a preference, but you most likely do not want the view to change every time you copy+paste.*	On Paste ◉ Don't change view ○ Pan to pasted objects ○ Zoom to pasted objects

User interface

The user interface and usability of Klayout is not perfect, but overall using the software is fairly simple. The few things you need to know to design the mask are listed here.
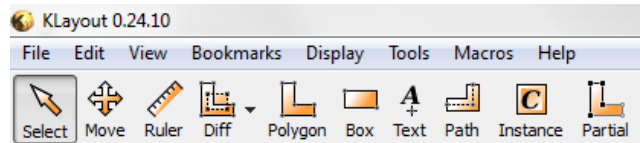
Navigation Arrow keys move the view. Scroll wheel to zoom in and out. Right click to center view on a location.	
Layers Click to select a layer. Double-click to hide/show a layer. In the demo mask • Layer 1 is the actual mask • Layer 2 is the available area.	Layers 1/0 2/0
Scale bar Located on the lower left corner. Displays the current view scaling.	2000 µm

Basic tools

The tools are relatively easy to use and self-explanatory. The following table is a cheat-sheet for the basic tools required to create a simple mask.
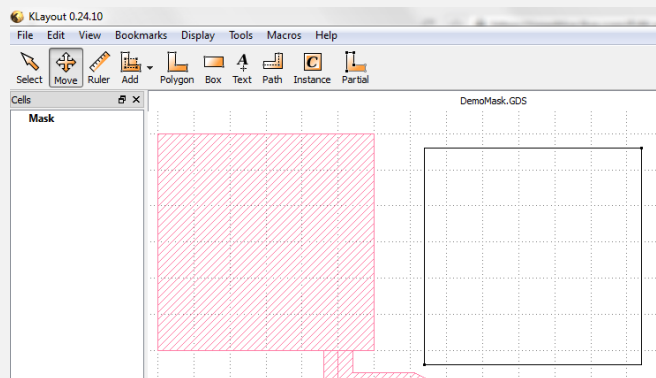
| General notes	
   • Press Esc to stop using a tool. • You can delete the selected objects using the 'Delete'-key on the keyboard. • Holding down 'Shift' will allow you to select multiple objects by clicking them. • Copy-paste (Ctrl+C, Ctrl+V) works. Use it. • Ctrl+Z to undo, Ctrl+Y to redo.	
Move Click a shape to start moving it. Click again to end the movement. To rotate, right-click while moving a shape.	
Ruler Allows you to measure distances. Units are in micrometers. **Note:** The rulers are <u>not</u> saved as a part of the mask. They need to be saved separately as a Session. (File->Save Session, File->Restore Session)	
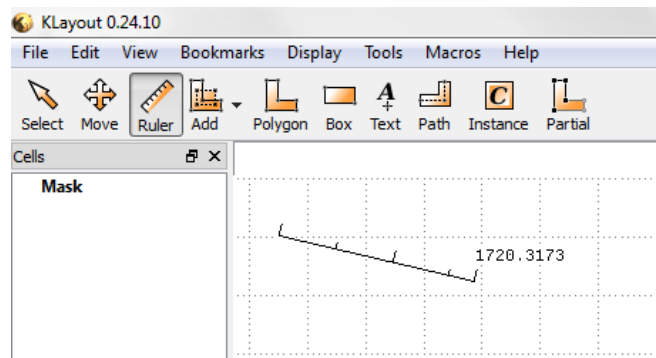
Combination Mode

This setting defines the mode that shapes from other tools use when adding new shapes into the existing mask.

The default mode is Add.
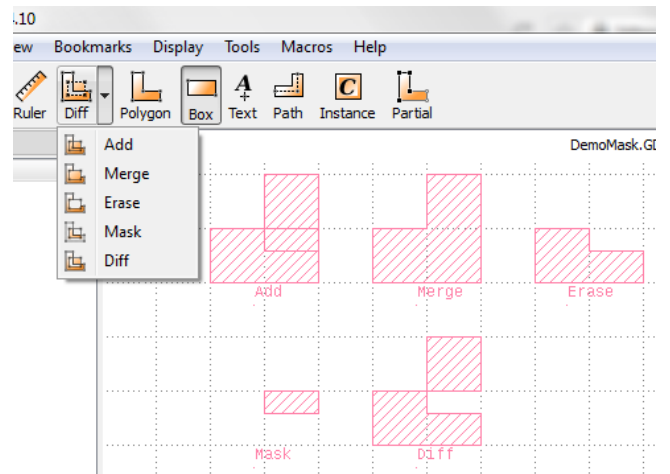You most likely do not need to use the other modes.

Options:
Add - add the new shape as a new object
Merge - Combines the shape with existing objects

Erase - Remove the shape from existing objects
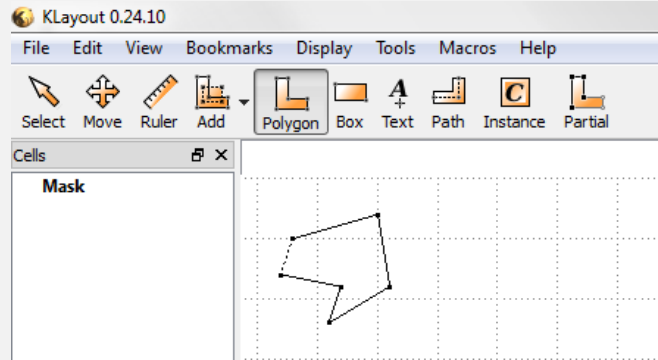Mask - Use shape as a mask for existing objects
Diff - XOR the shape with existing objects
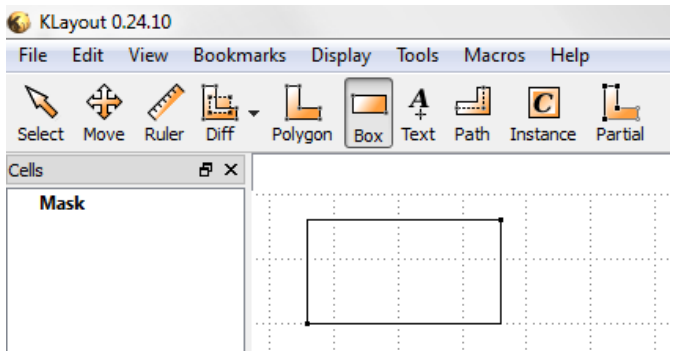
Polygon

Clicking adds a polygon point.
Double click ends the polygon.

Box

Click to start drawing a box.
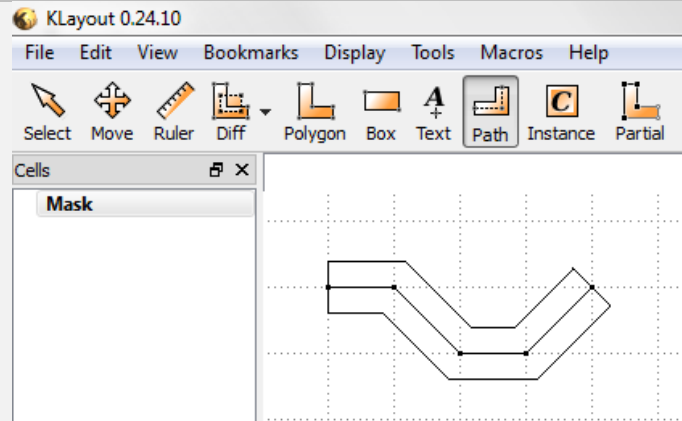Click again to finish drawing the box.

Path

Allows you to define a path.

Click the tool to set the width and style.

Click to add a point to the path
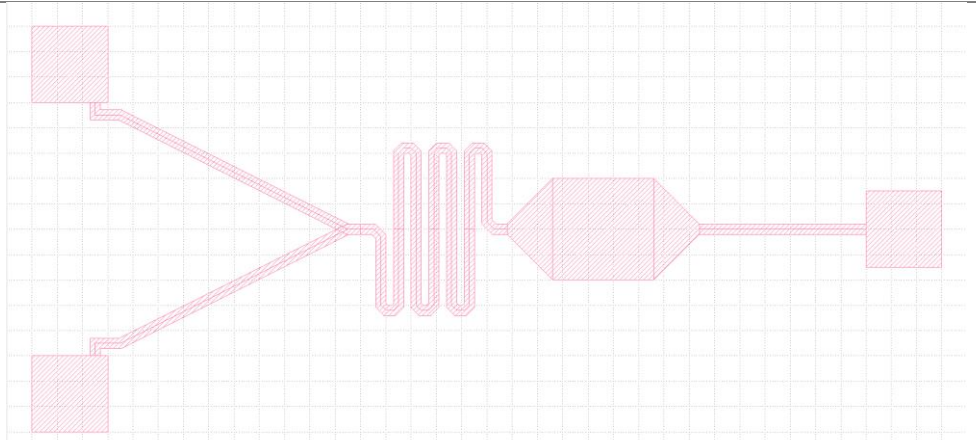
Double-click to end the path.

**Note:** Excellent tool for creating the channels on your chip.

Example workflow

You are free to draw the mask whatever way you want. However, please make sure your design fulfills the design restrictions. These restrictions are listed on a separate document found in the course material.

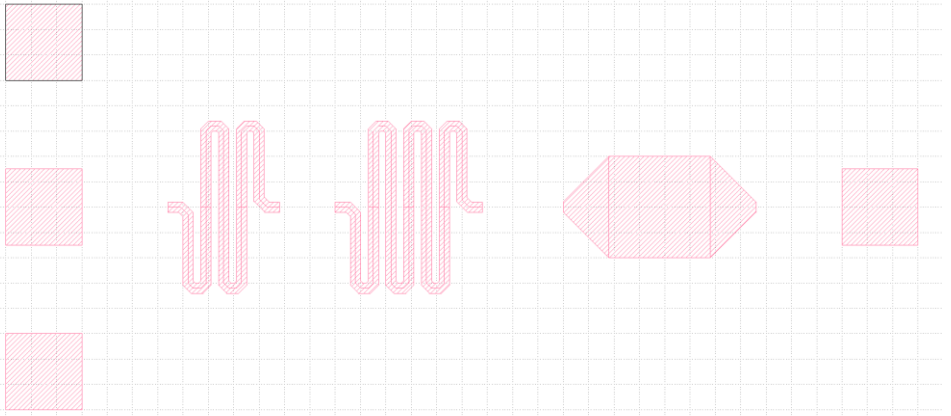|	
Follow the quick start guide in the course materials to get started.	
Adjust the fluid inputs and outputs to match your design.	
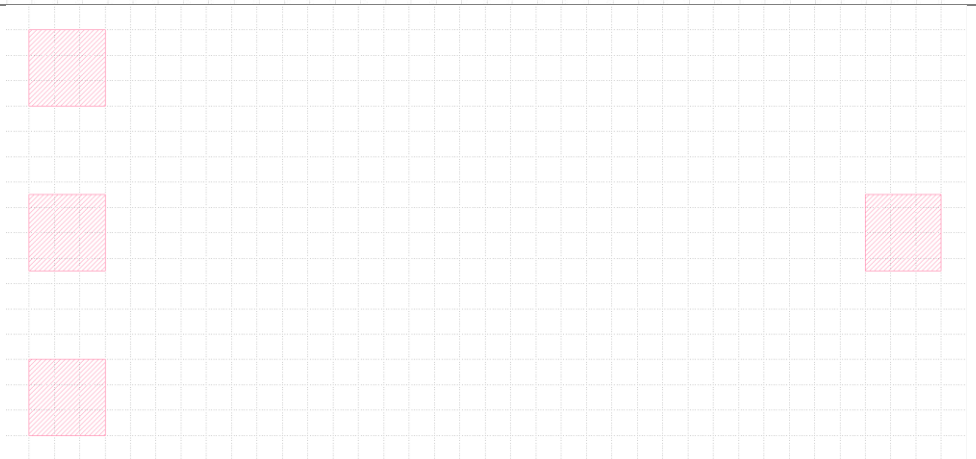
Add the key features like mixers/etc.

Connect the components into a single network.