SLT#4 Lithography (Litho)

4.1	Describe the principle of UV photolithography using a photomask. What are the different types of light sources used? How does the resolution of a photolithographic process depend on the wavelength of light used, and how on the thickness of the photoresist? Use drawings to explain your thoughts.
4.2	Describe the steps to fabricate a Cr mask used in photolithography. How is that type of mask used to create patterns in a resist layer on a wafer? Compare exposure modes in contact and proximity. Discuss the limitations and advantages of using masks compared to Direct Laser Writing (DLW). Use drawings to explain your thoughts.
4.3	Pattern transfer into a thin metal film (e.g. Al) can be done by etching or lift-off. Make a step-by-step schematic process flow of both methods and explain their key differences. Assuming that we have only one photomask, can we perform both processes with it? Use drawings to explain your thoughts.
4.4	What is the working principle of electron beam lithography (EBL)? What are the advantages and limitations of EBL? For what is it used in R&D and industry? Compare it with Direct Laser Writing (DLW)
4.5	Explain the photoresist contrast curve and the meaning of exposure dose. Describe how to achieve a well-defined resist sidewall profile inclination. Assume you want to perform lift-off of thin film deposited by evaporation, how would you select the photoresist (tone/contrast)?
4.6	Apart from conventional photolithography and electron beam lithography (EBL), which other lithography methods exist? What are their working principles and their advantages and disadvantages? At what scales and throughput are they working?