Problem 1 (Nanowire Applications)
Draw a schematic diagram of a nanowire-based MOSFET (there are different ways to answer this question and you only need to come up with one way).
   (a) If the nanowire is used as the “gate” – draw a process flow to make this MOSFET
   (b) If the nanowire is used as the “channel” – draw a process flow to make this MOSFET

Problem 2 (Nanowire Basics - Crystallography)
Conventional (cubic) unit cell for a face-centered cubic crystal is shown below. There is an atom at each corner of the cube, and one atom at the center of each facet.
   (a) Calculate the density of atoms (#.cm\(^{-3}\)) in a face-centered cubic (f.c.c.) crystal as a function of the lattice constant \(a\).
   (b) Calculate the density of atoms in silicon. Crystalline silicon has a diamond structure (not f.c.c.) with lattice constant \(a=5.43\text{Å}\)
   (c) Calculate the density of atoms (#.cm\(^{-2}\)) in a silicon (100) plane and in a silicon (111) plane

Problem 3 (Conventional Electrospinning)
Please find FIVE different polymeric materials that have been successfully demonstrated in the literature by means of electrospinning.
   a) Material or material compositions?
   b) Their specific applications in the particular article you have found?
   c) Please write down the author, title, journal, page numbers, year of the article similar to one would write as a reference in a research paper.