1. For each of the carbon nanotubes identified by the following index numbers \( (m, n) \), indicate whether the tubes are expected to be metallic or semiconducting.
   a) \( (8, 0) \) - semiconducting

   b) \( (11, 8) \) - metallic

   c) \( (11, 11) \) - metallic
   (Metallic if \( m-n = 3i \) \( i=\text{integer} \), otherwise semiconducting)

2. List two materials from which quantum dots have been fabricated.
   Possibilities include Si, GaAs, CdS, ZnSe, ...

3. Briefly describe the method by which the authors in the coursepack were able to assemble a device with which they were able to measure the conductance of a single molecule.

   A thin gold wire was carefully broken by flexing it with a piezoelectric actuator. This was done in a solution of molecules that had thiol groups attached to both ends such that both wires (including the ends) were coated with the molecules by self-assembly. The solvent was then evaporated off. The wires were brought closer together until a current was measured. It is believed that a single molecule then bridged the gold wires.