Optional Practice Problems for Chapter 02

1. **Working with Ad Systems:**
   a. How Ad systems works? Use Facebook and YouTube Ad system to elaborate on your answer.
   b. How Ad blocker works?
   c. How Can Publishers Detect Ad Blockers?
   d. How anti- blocker works?
   e. How cookies are used to detect the removal of the Ad blocker?
   f. A machine got infected with a botnet that making fake clicks on an Ad banner. How would we differentiate between *a fake traffic generated by the botnet that impersonate the user* and *the real traffic generated by the actual user?*

2. **Working P2P Systems:**

   a. Suppose there are N active peers in the Gnutella network, and each pair of the peers has an active TCP connection. How many nodes and edges are there in the corresponding overlay network?
   b. Consider a query flooding in a P2P Gnutella network. Suppose that each peer is connected to at most N neighbors in the overlay network. Also, suppose that the node/peer count field is initially set to k. Suppose Alice makes a query. Find an upper bound on the number of query messages that are sent into the overlay network.