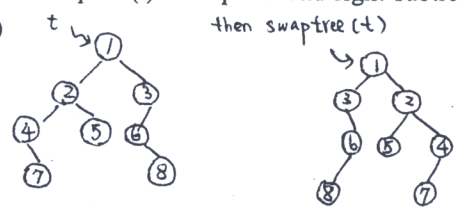


1. (a) Describe the main features of Java ? (%10)
 (b) What's difference between applet and application in Java? (5%)
2. Describe main components of a virtual reality system (10%)
3. DMA can exploit cycle stealing to speed up data transfer between I/O ports and memory. Please answer the following questions
 (a) what's cycle stealing (5%)
 (b) how does DMA achieve cycle stealing (5%)
 (c) why DMA is faster than interrupt I/O?(5%)

4. Describe an algorithm to perform a swaptree(t) : swap left and right subtrees on each node as shown below. (10%)



5. Please answer the following questions as short as possible.
 (a) What's difference between macro expansion and subroutine call? (5%)
 (b) What's difference between compiler and interpreter (5%)
 (c) What's mobile computing? (5%)
6. Doom is a popular multi-player computer game. On such game system, a host must accurately display dynamic data located at other hosts on a network. For example, each participant in the game moves about virtual world while continually interacting with other participants physically located at other hosts; each machine must display the position and orientation of the local participant along with the position and orientation of all visible participants. The *naive* approach and the one that Doom system uses, is to simply have each host broadcast the location of each participant that it maintain. These broadcasts are received by every host in the simulation, and are used to update their local copy of the world database. Please answer following questions in details: (assume we implement Doom on ethernet environment)
 (a) What problems will be caused using *naive* approach? (10%)
 (b) Describe a practical method to solve problems in (a)? (15%)
7. (a)What's B-Trees? (5%) (b) How does it achieve B tree searching? (5%) Please use examples to illustrate your answers.