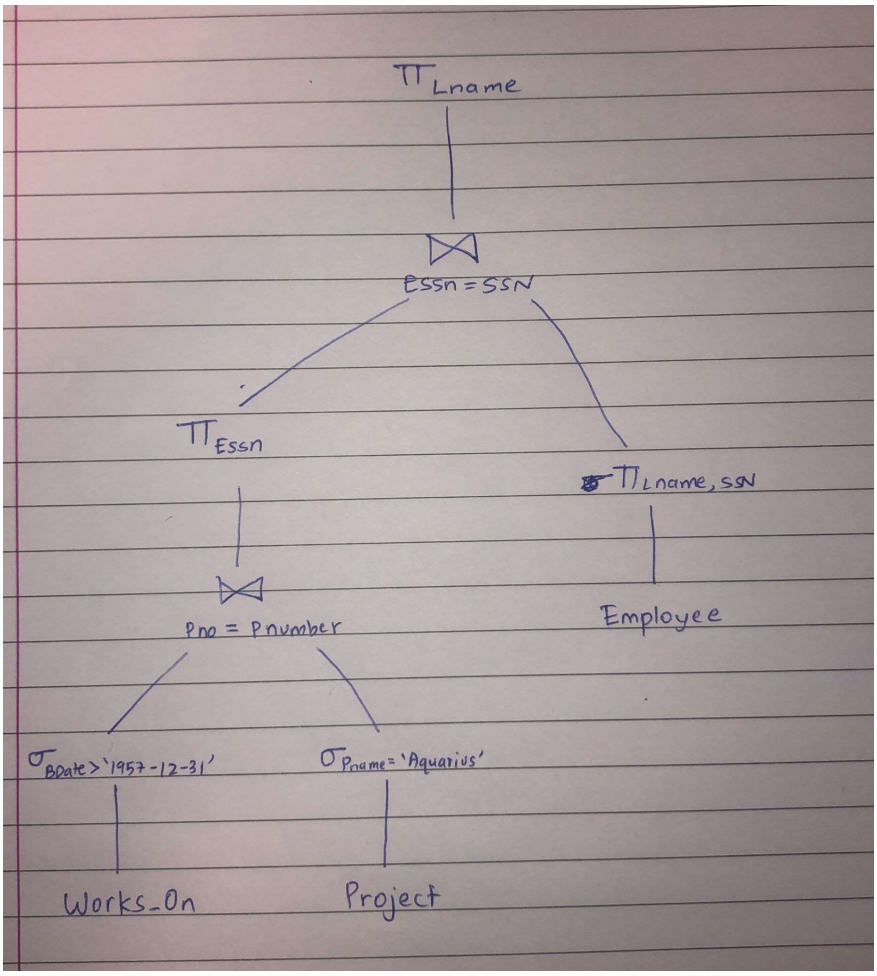
Q1.



Q2.

1. a) Reduction factor = 1/NKeys(Index) = 1/8 = 0.125
   b) Estimated size of selection result = size of all tuples * reduction factor = 40 bytes/tuple * 100 tuples/page * 1000 pages * 0.125 = 500000 bytes
   c) If the index is clustered, the best plan is to traverse the B+ tree of the index and then do a sequential search to find all tuples with title='CFO'.
   The cost for this is = (NPages(I)+NPages(R)) * Reduction factor = (50 + 1000) * 1/8 = 131.25
   d) The cost when there is an unclustered index is = (NPages(I)+NTuples(R)) * reduction factor = (50 + 1000*100) * 1/8 = 12506.25

2. a) Reduction factor = 1/10 = 0.1
   b) Estimated size of selection result = size of all tuples * reduction factor = 40 bytes/tuple * 100 tuples/page * 1000 pages * 0.1 = 400,000 bytes
   c) The best plan is to do a full file scan and the cost = total pages = 1000