Q1 of 5 (8 pts) Prove that $\sum_{k=1}^{n} k^{1/4} = \Theta(n^{5/4})$. 
Q2 of 5 (4 pts) Discuss the advantages and disadvantages of a linear array of size $n$ as compared to a hypercube of size $n$. Be very clear and concise.
Q3 of 5 (4 pts) Draw a mesh-of-trees of base size 16.
Q4 of 5 (8 pts) Give an asymptotically optimal algorithm to sum a set of \( n \) values on a PRAM of size \( n \). Initially, there exists one such value in each of the first \( n \) memory locations. When complete, the sum of these values should be in memory location \( n + 1 \). State and justify the *asymptotic running time* of your algorithm and *asymptotic cost* of your algorithm.

a. Algorithm (4 pts)
b. Asymptotic Running Time of Your Algorithm (2 pts)
c. Asymptotic Cost of Your Algorithm (2 pts)
Q5 of 5 (6 pts) Draw an optimal combinational circuit to determine the minimum of 8 input items.