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ClassWork 7:

1. `T(n) = 8 * T(n / 2) + n`

   $log_2(8) = 3$ & $d = 1$, decomposition dominant $\implies \Theta(n^3)$

2. `T(n) = 6 * T(n / 3) + n^2`

   $log_3(6) < 2$ & $d = 2$ recombination dominant $\implies \Theta(n^2)$

3. `T(n) = 3 * T(n / 4) + n^3`

   $log_4(3) < 2$ & $d = 3$ recombination dominant $\implies \Theta(n^3)$

4. `T(n) = 0.5 * T(n / 2) + n`

   $a < 1$ we cannot apply master theorem

5. `T(n) = 4 * T(n / 4) + √n`

   $log_4(4) = 1$ & $d = 1/2$ decomposition dominant $\implies \Theta(n)$

6. `T(n) = T(n) + n/2`

   $b = 1$ we cannot apply master theorem

7. `T(n) = 5 * T(n / 5) + n/5`

   $log_5(5) = 1$ & $d = 1$ neutral $\implies \Theta(n \log n)$

8. `T(n) = 3 * T(n / 4) + n^0.9`

   $log_4(3) < 0.9$ & $d = 0.9$ recombination dominant $\implies \Theta(n^{0.9})$

9. `T(n) = 64 * T(n / 4) + n^3`

   $log_4(64) = 3$ & $d = 3$ $\implies \Theta(n^3 \log n)$

10. `T(n) = 64 * T(n / 8) + n^n`

    $d = n$ asymptoticaly will always be larger (recomposition) $\implies O(n^n)$