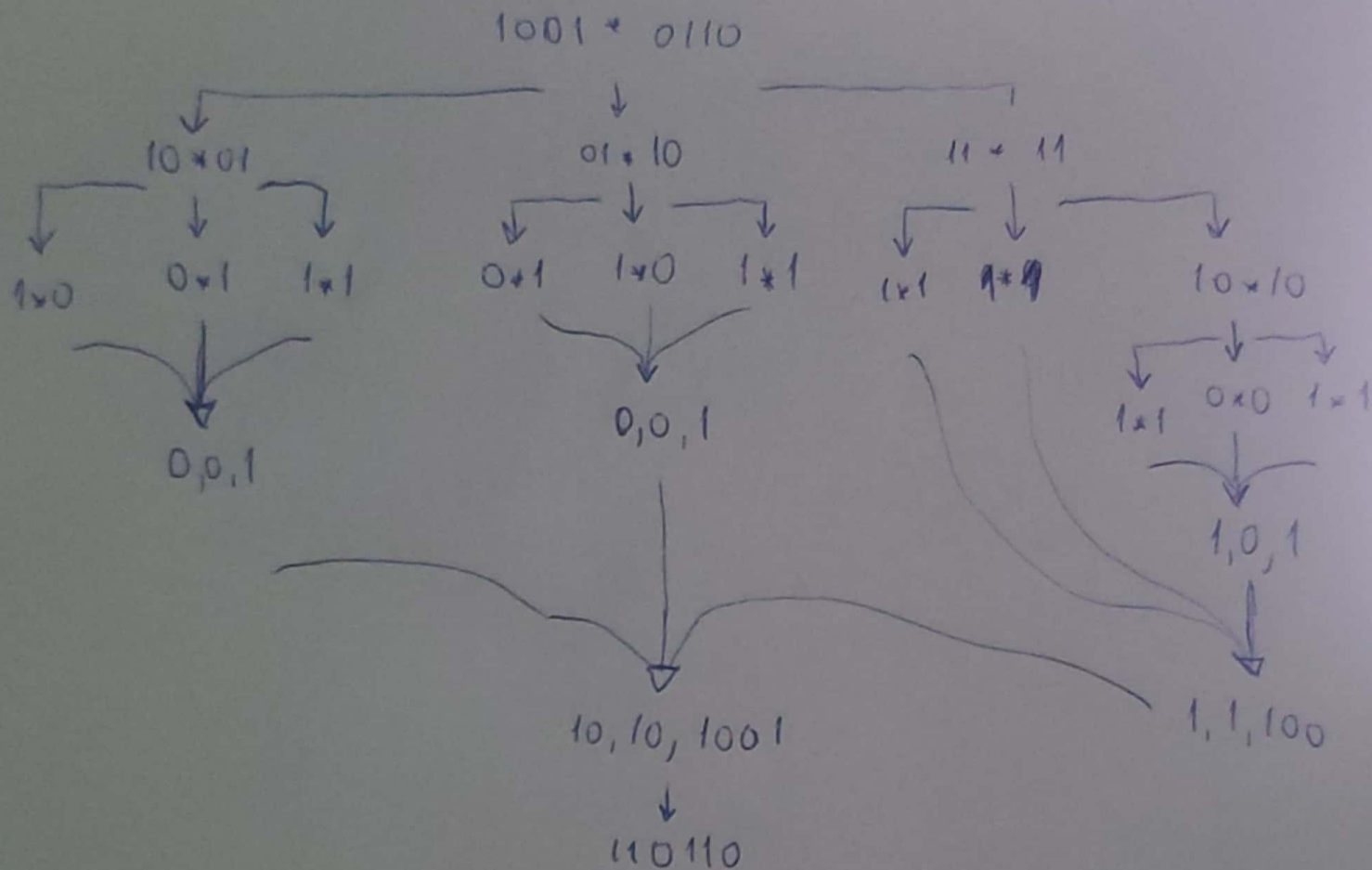


1)



2)

a) $T(n) = 5 \cdot T\left(\frac{n}{2}\right) + O(n) \quad ; \quad a=5, b=2, d=1$

$1 \leq \log_2 5 \rightarrow T(n) = O(n^{\log_2 5})$

b) $T(1) = O(1)$

$T(n) = 2 \cdot T(n-1) + O(1)$

$T(n) = 2(2 \cdot T(n-2) + O(1))$

$T(n) = 2^2 \cdot T(n-2) + 2O(1) + O(1)$

$T(n) = 2^k \cdot T(n-k) + \left(\sum_{i=0}^{k-1} 2^i \cdot O(1)\right)$

Let $T(n-k) = T(1) \rightarrow k = n-1$

$T(n) = 2^{n-1} \cdot T(1) + \left(\sum_{i=0}^{n-1} 2^i \cdot O(1)\right)$

$T(n) = 2^{n-1} \cdot O(1) + (2^{n-1} - 1) \cdot O(1)$

$T(n) = O(2^{n-1}) + O(2^{n-1} - 1)$

$T(n) = O(2^n)$

c) $T(n) = 9 \cdot T\left(\frac{n}{3}\right) + O(n^2)$

$a=9, b=3, d=2$

$2 = \log_3 9$

$T(n) = O(n^2 \log n)$

* O algoritmo (possui menor complexidade)