Εργασία 2 Δομές Δεδομένων

Όνομα: ΕΡΙΠΑΡΕΛΗΣ ΔΗΜΗΤΡΙΟΣ

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Άσκηση 2:

Α. $F_1(n) = 2000n = \Theta(n)$

Β. $F_2(n) = 50n + \log n = \Theta(\max(50n, \log n)) = \Theta(50n) = \Theta(n)$

Γ. $F_3(n) = 2^{3000n \cdot \log n} = \Theta(2^{3000n \cdot \log n})$

Δ. $F_4(n) = 2^{300 \cdot \log n} = 2^{\log n^{300}} = n^{300} = \Theta(n^{300})$

Ε. $F_5(n) = n^4 = \Theta(n^4)$

Ζ. $F_6(n) = 6n^4 + n = \Theta(\max(6n^4, n)) = \Theta(6n^4) = \Theta(n^4)$

Η. $F_7(n) = n \cdot \log n \cdot 2^{n+5} = 2^{n+5} \cdot 2^{\log n} \cdot 2^{\log(\log n)} = 2^{n+5+\log n+\log\log n}$

Ισχύει $F_7(n) = O(F_3(n))$ διότι $n+5+\log n+\log\log n =$

$= \Theta(\max(n, 5, \log n, \log\log n)) = \Theta(n) = O(3000n \log n)$

Θ. $F_8(n) = 2^{2^n} = \Theta(2^{2^n})$ μη $F_3(n) = O(F_8(n))$ διότι $3000 \cdot n \cdot \log n = O(2^n)$

Ι. $F_9(n) = 2^{2^{\log n}} = 2^n = \Theta(2^n)$ μη $F_9(n) = O(F_7(n))$

Κ. $F_{10}(n) = 2^{2^{n+\log n}} = 2^{2^n \cdot 2^{\log n}} = 2^{2^n \cdot n}$ μη $F_8(n) = O(F_{10}(n))$

διότι $2^n = O(n \cdot 2^n)$

Άρα τη αύξουσα σειρά: $\underbrace{A=B}_{\Theta(n)} < \underbrace{E=Z}_{\Theta(n^4)} < \Delta \; (\Theta(n^{300})) < I \; (\Theta(2^{2^n})) < H < \Gamma \; (\Theta(2^{3000 \cdot n \cdot \log n})) < \Theta \; (\Theta(2^{2^n})) < K \; (\Theta(2^{2 \cdot 2^n}))$

$H: \Theta(2^{n+5+\log n+\log\log n})$