

CLRS 15.2-3

Peter Danenberg

September 10, 2008

Thanks, Fiona Gwendolyn Ginn Nielsen [1]; prove that $P(n) \geq c \cdot 2^n$:

$$P(n) = \sum_{k=1}^{n-1} P(k)P(n-k) \tag{1}$$

$$\geq \sum_{k=1}^{n-1} c2^k \cdot c2^{n-k} \tag{2}$$

$$= c^2 \sum_{k=1}^{n-1} 2^k 2^{n-k} \tag{3}$$

$$= c^2 \sum_{k=1}^{n-1} 2^n \tag{4}$$

$$= c^2 (n-1) 2^n \tag{5}$$

$$\geq c \cdot 2^n \tag{6}$$

References

- [1] Fiona Gwendolyn Ginn Nielsen. DM02 Opgaver fra ugeseddel 7. <http://www.glyn.dk/dm02/pdf/uge07opgaver.pdf>, October 2003.