

19/20(2) COMP2721 Algorithms II (32882): coursework 4 again

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To all the students who completed coursework 4 or still struggle with it:

You all received the message by the Vice Chancellor saying that for levels 1 and 2 all instructor delivered teaching has finished. Therefore we cannot discuss coursework 4 (to be submitted by Monday 10am) in the tutorials, and I would like to guide your learning by the following hint.

The first nine sub-questions of question 2 have a similar pattern. You can sort them in a table with three rows and three columns. The rows are marked by the argument n' of T on the right side. These are $n'=n-1$, $n'=n/2$ and $n'=\sqrt{n}$. The columns are marked by the function f applied to $T(n')$ to obtain $T(n)$. These are $f(x)=x+1$, $f(x)=x*2$ and $f(x)=x^2$. On one diagonal the two operations cancel out: $f(n')=n$, in particular $(n-1)+1 = n$, $(n/2)*2 = n$ and $(\sqrt{n})^2 = n$. Do you obtain the same asymptotic growth rate for these combinations? What about the strips parallel to that diagonal?

For the row $n/2$ you can use $n=2^m$ to spot the pattern, because this implies $n/2 = 2^{m-1}$, $(n/2)/2 = 2^{m-2}$, $((n/2)/2)/2 = 2^{m-3}$ and so on. Similarly, for the row \sqrt{n} you can try $n=2^{2^k}$.

Hope this helps,

Haiko