Why does the “printing neatly” algorithm use cubes rather than squares?

Ask Question

In *Introduction to Algorithms*, 2nd ed. (Cormen, Leiserson, Rivest, and Stein), ch. 15, *Dynamic Programming*, problem 15-2 *Printing neatly* (a copy of which is here), the official solution given in *Instructor's Manual to Accompany Introduction to Algorithms, Second Edition*, is an algorithm that minimizes the extra spaces at the ends of lines ***cubed***.

My question is: why *cubed*? Why not squared? Or some other power?

optimization algorithms cubic-equations dynamic-programming

edited May 23 '17 at 12:39
Community ♦
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asked Jun 20 '16 at 15:48
Paul J. Lucas
108 ▲5

1 Answer

If you used first powers, it would have no selectivity as the total number of

spaces at the ends of lines is just the length of a line times the number of lines minus the length of the text. As you increase the power, you penalize large gaps at the end of the line more. It is really a question of taste. Would you rather have gaps of $10, 1, 1, 1, 1, 1, 1$ or $0, 8, 0, 0, 8, 0, 0$? Cubes will pick the second and squares the first.

swered Jun 20 '16 at 15:54

Ross Millikan
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1 So if you were to increase the power to 4, 5, or more, I imagine that there's a point beyond which it no longer matters (diminishing returns)? – Paul J. Lucas Jun 20 '16 at 15:59

1 Yes. If the power gets very high, you will only care about the largest value, so $9, 9, 9, 9, 9$ and lots of 1s will beat 10 and lots more 1s – Ross Millikan Jun 20 '16 at 18:41