CS 577: Introduction to Algorithms 11/16/15

Homework 7 (Rubric)

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Problem 3 [10 points]

- [4 points] for an explicit reasonable specification for the memoization table
  - [2 points] for a reasonable specification that is only implicit
- [2 points] for a recurrence that correctly determines the maximum number of sculptures
- [2 points] for a recurrence that correctly determines the maximum number of sculptures and the minimum number of frayed edges
- [1 point] for a correctness argument
- [1 point] for run-time analysis

One common solution strategy was as follows. Compute the maximum number of sculptures that can fit inside the $A \times B$ paper using the strategy from the model solution, but save auxiliary information about the optimal sequence of cuts for each entry $\text{OPT}(i, j)$. This auxiliary information is then used to compute the optimal frayed edge count for any later entry that refers to $\text{OPT}(i, j)$. This strategy does not work for computing frayed edges because there is no single optimal sequence of cuts for any entry–the optimal sequence could depend on which sides of the $i \times j$ rectangle are frayed. For example, an optimal solution when no edges are frayed might include many vertical cuts, but if both the top and bottom edges are frayed, it may be eclipsed by one that replaces the vertical cuts with horizontal cuts instead.