Solving Problem 1A

- The goal is to find the minimum amount of $a \times a$ tiles needed to cover a rectangular area of $n \times m$.
- I also think about having a convenient notation for referring to these squares and rectangles. How about having a capital letter denoting the name for the region, followed by its dimension inside parenthesis? $S(a \times a)$. Then if I want to refer to any specific cell, I can say R(n ×m)[i][j], where i and j refer to row and column respectivelly. If I want to refer to a subregion of R, I can say $R(n \times m)[i..r][j..c]$.
- Let $A(n \times m)$ be the rectangular region to be covered, let $B(a \times a)$ be the tile covering A.
- The first thing that goes through my head is trying to fit the largest square made up of $a \times a$ squares that can fit inside the rectangular $n \times m$ area.
- Even better than finding the greatest $C(k \times k)$ that fits in A is finding the greatest rectangle $C(r \times c)$, perfectly coverable by $S(a \times a)$, that fits inside R.
- How can I find the largest rectangle $C(r \times c)$ that is coverable by $B(a \times a)$ in $A(n \times m)$ in terms of a, n, and m?
- I can easily see there are four scenarios to consider when placing $B(k \times k)$ in $A(n \times m)$.
  - Case 1: $C(r \times j)$ fits perfectly within $A(n \times m)$: This case happens when $n = ka$ and $m = ka$. Solving for k we have that $k = n/a$ and $k = m/a$ and $n = m$.
  - Case 2: $C(r \times j)$ fits perfectly column-wise but not row-wise:
  - Case 3: $C(r \times j)$ fits perfectly row-wise but now column-wise:
  - Case 4 $C(r \times j)$ does not fit perfectly within A: