Answers to the exercises for chapter: Page breaking

1. In enforcing the same values for the x_i and u_j values, the proof used that
   $$(d+1)^+(d-1)^2 > 2d^2.$$
   The general requirement for the badness function is
   $$f(n+1) + f(n-1) > 2f(n),$$
   which is satisfied for polynomial badness functions that increase faster than linear. The statement is that $f(n)$ is less than the average of the surrounding values, so in fact any convex function would work.
2. Linearity is used in constructing partial badness, counting only the part of the reference arc to the boundary of the (i, j) block. That would not work for non-linear badness functions.
   You can see the same use of linearity in the fact that badness gets updated by $W(t_i, f_j)$ when a new block is placed. This means that each unit distance contributes the same amount, in other words that the badness is linear in the distance.
3. Look at the relation
   $$B_{ij} = \min(B_{i-1,j}, B_{i,j-1}) + R_{ij}.$$
   Starting at $i = N$, $j = M$, find for each ij point the minimum of $B_{i-1,j}$ and $B_{i,j-1}$; that must have been the previous step.