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On-line Algorithms
Problems for December 8

The exercise and example numbers referred to below are from the textbook.

- Do Exercise 6.1.
- Do Exercise 6.4 . To prove that the algorithm is k-competitive, do a proof similar to that for Double-Coverage (Theorem 10.2 in the textbook). The pages can be mapped to points on the line, in the order defined by the permutation. To define distances for the weighting for the matching, define intervals from pages PERM has in fast memory, to pages OPT has in fast memory. The intervals should all go in the same direction, so some will wrap around (extend to the last relevant point and start again with the first relevant). The weight of an interval should be the number of pages in the interval which OPT has in its fast memory. The potential function is just the minimum weight matching, where the edges in the graph are the intervals.
  Further hint: A minimum weight matching can be found in which no interval is strictly contained in another.
- Do Exercises 6.5 and 6.6.
- Work out Example 8.5.
- Apply Yao's principle correctly to Example 8.4 in the textbook, using the distribution given there. You will not get as good a result as the one from Example 8.5.