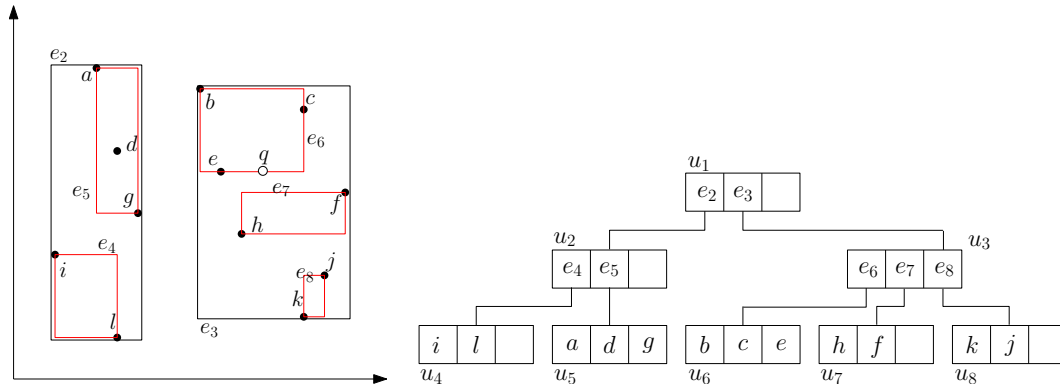# WST540: Exercise 6

Problem 1. Consider the following R-tree:

Suppose that we apply the best-first algorithm to find the nearest neighbor of the query point q as shown in the picture. List the nodes in the order that they are visited by the algorithm.

Problem 2. Repeat the above by finding the 2 nearest neighbors of q.

Problem 3. Calculate the z-values of the black points in the following figure (the data space has domain $[0, 7]$ on each dimension):
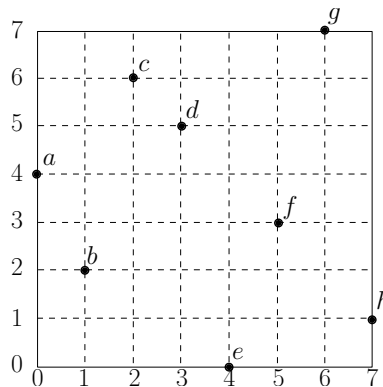
Problem 4. Consider that we create an R-tree on the points in the previous problem using the method discussed in our lecture. Show the leaf MBRs of the R-tree.

Problem 5. Consider that a server hosts a 1d hidden dataset D which contains 8 points as shown below. We want to discover the entire D by issuing range queries in the way described in class. Suppose that the value of k is 4, such that whenever the query result has more than 4 points, the server always returns the first 4 points alphabetically (e.g., for a query with range $[2, 7]$, the server returns c, d, e, f). Give the queries that need to be issued by our algorithm.