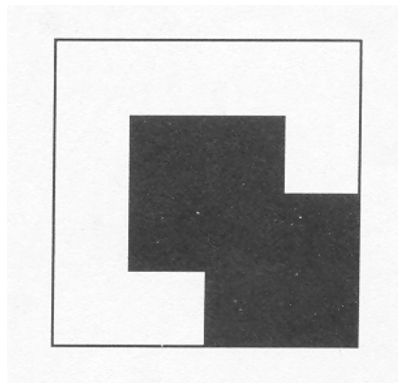


Tutorial 9: Spatial Data Structures

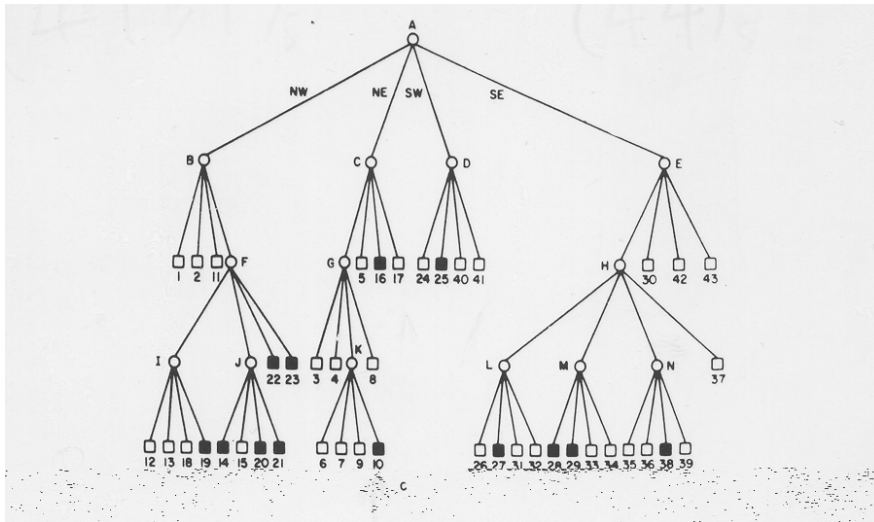
Semester 1, 2004

Question 1: For a given shape (a polygon):



- (a) Find a quadtree representation.
- (b) Find the location codes
 - a. As the concatenation of base 5 digits
 - b. As decimal representation

Question 2: Consider the following quadtree:



- (a) Find the location code for nodes: 43 and 39.
- (b) Find the node with location code 96.

Question 3: Draw the shape described by the following location codes:

12, 13, 14, 2, 411, 42

Assume that they are concatenation of base 5 digits.

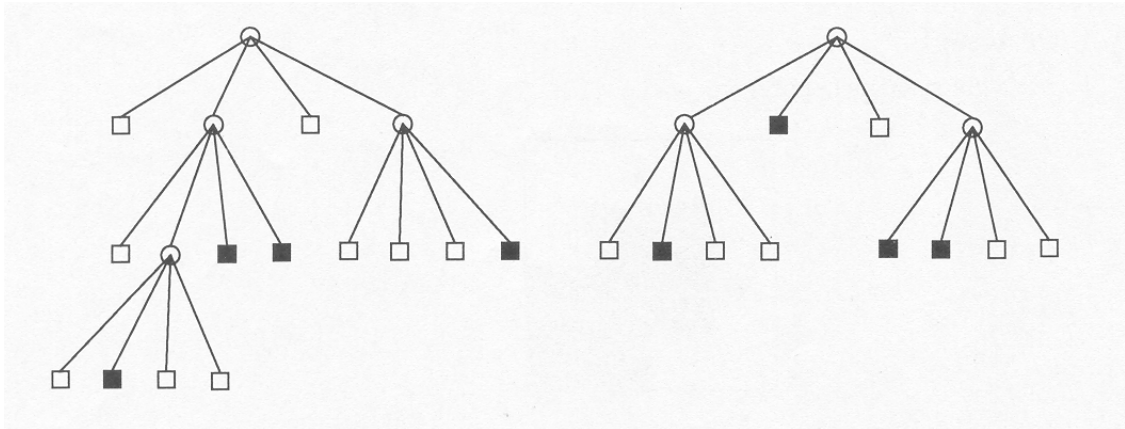
Question 4:

A location code describes a region of space. What properties are held between two regions of space if their location codes are A and B?

- (a) $A = B$?
- (b) A is a prefix of B?
- (c) B is a prefix of A?
- (d) None of the above hold?

Question 5:

For the given two quadtrees, compute the union and intersection of the regions they represent. [Note: Do your computation on the graphs, then convert the graphs to regions and check your results.]



Question 6: Describe three common kinds of spatial queries.