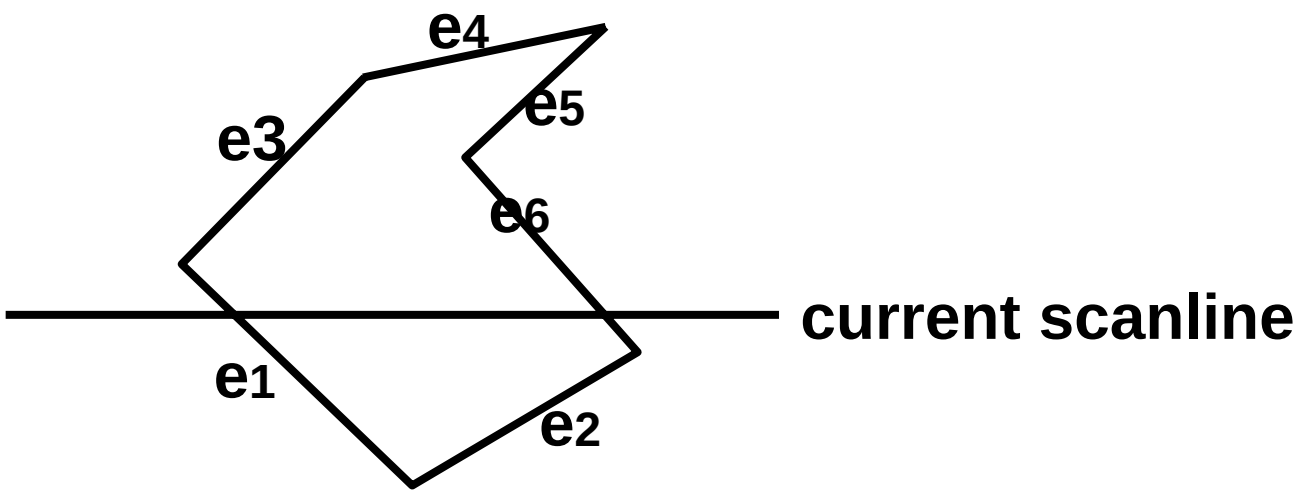
Scanline Fill

Peroformance Improvements

brute force: intersect all the edges with each scanline

1) Improvement 1:

find the ymin and ymax of each edge and intersect the edge only when it crosses the scanline



2) Improvement 2:

a) only calculate the intersection of the edge with the 1st scanline it intersects
b) calculate dx/dy
c) for subsequent scanlines, derive new intersections as x = x + dx/dy

3) Improvement 3:

change x = x+ dx/dy to integer arithmetic

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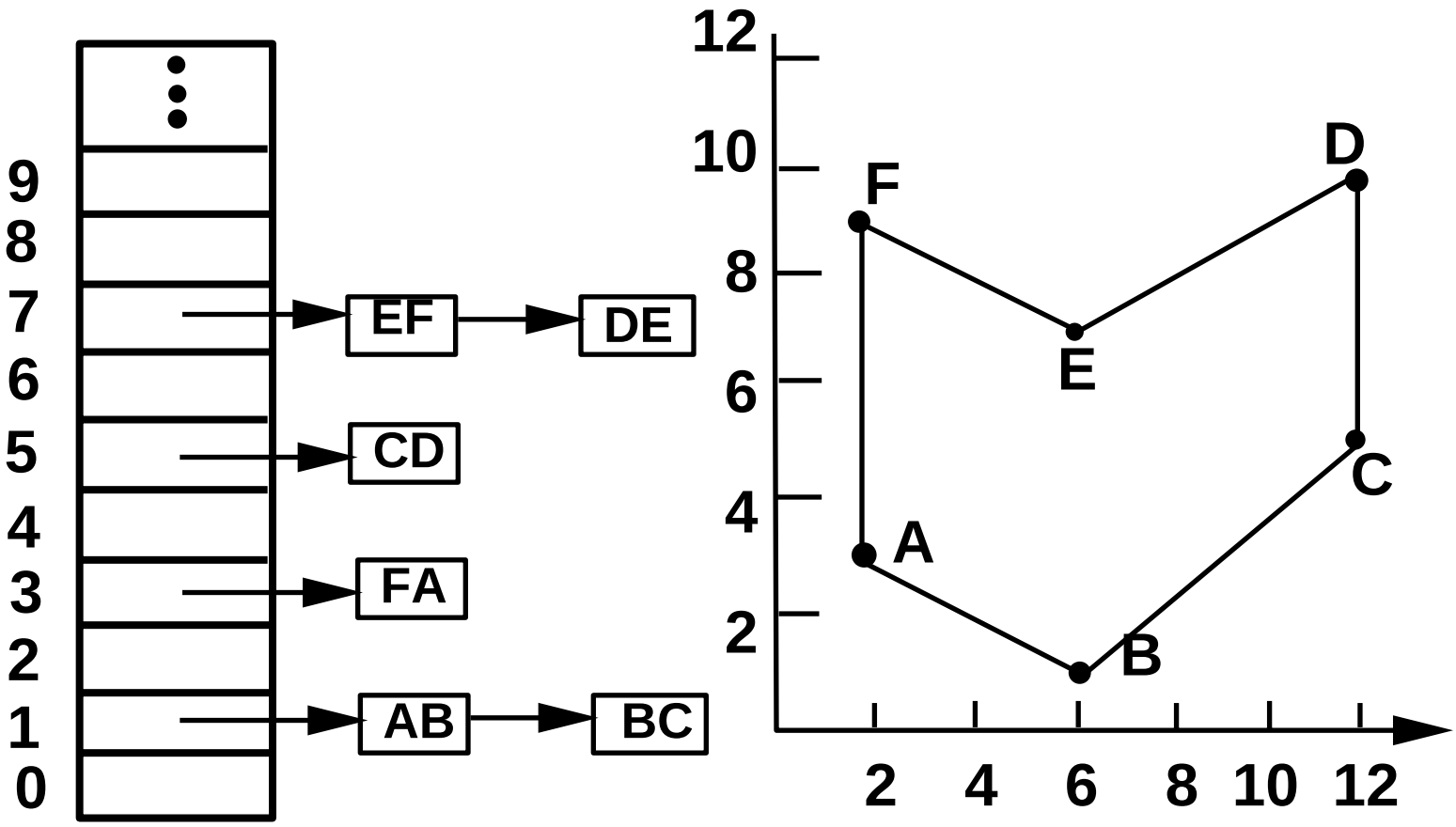
Data Structures

1. Edge Table

- keep a separate bucket for each scanline
- all edges sorted by their ymin and inserted into the table
- within each bucket, edges are sorted by increasing x of the ymin endpoint



Edge structure: ymax, xmin, dx/dy, next

AB: 3, 6, −2, BC

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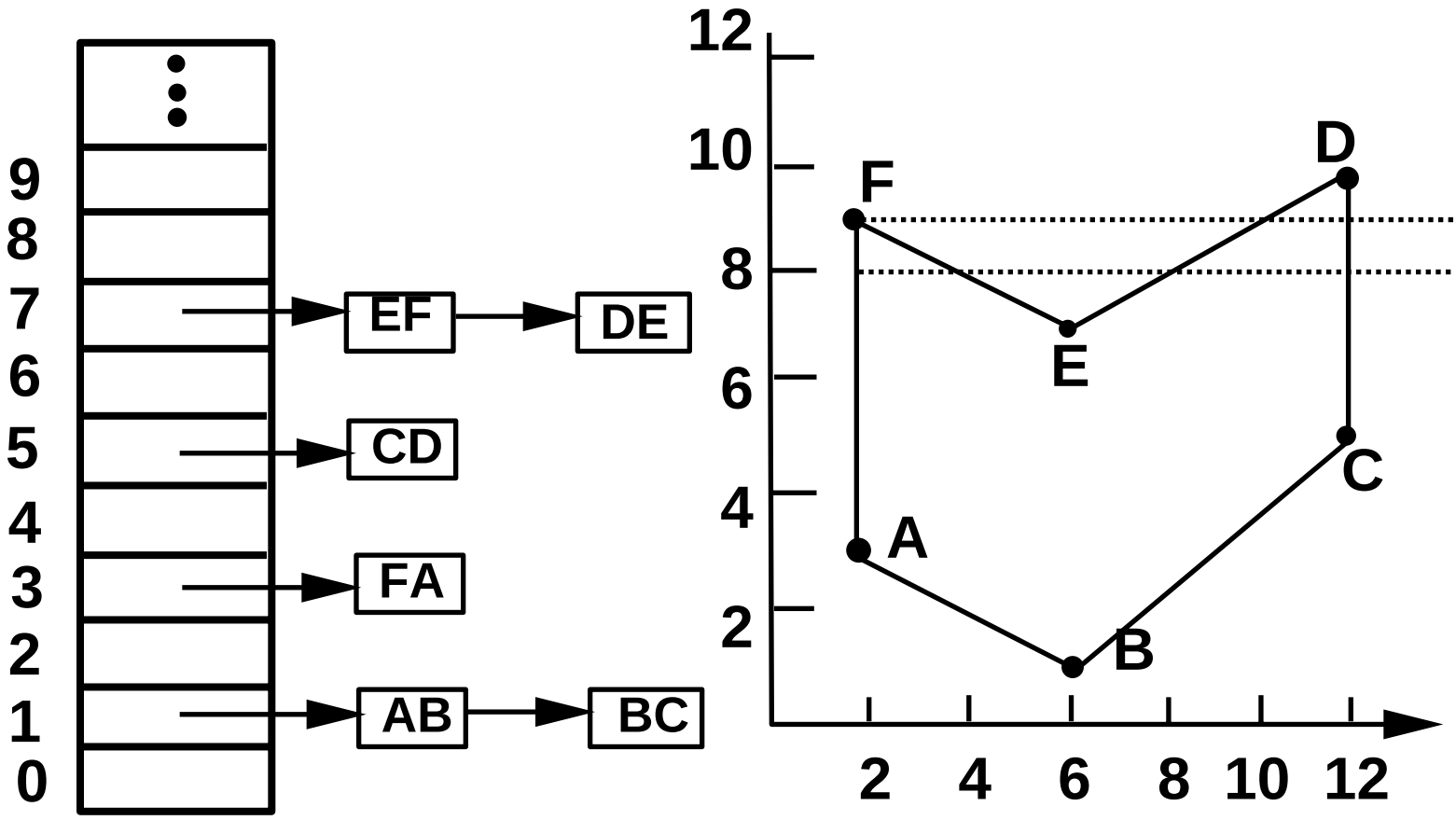
Data Structures (cont'd)

1. Active Edge Table

A list of edges that are active for current scanline, sorted by increasing x intersection



Scanline 8

FA –> EF –> DE –> CD

Scanline 9

DE –> CD

Scanline Fill

Algorithm

```
Construct the Edge Table (ET)

y = smallest y in the ET

Active Edge Table (AET) = NULL

for y = ymin to ymax

    Merge−sort ET[y] into AET by x value

    Fill between pairs of x in AET

    for each edge in AET

        if  edge.ymax = y
            remove edge from AET
        else
            edge.x = edge.x + dx/dy

    Sort AET by x value (as needed)

end scan_fill
```