

12-XA

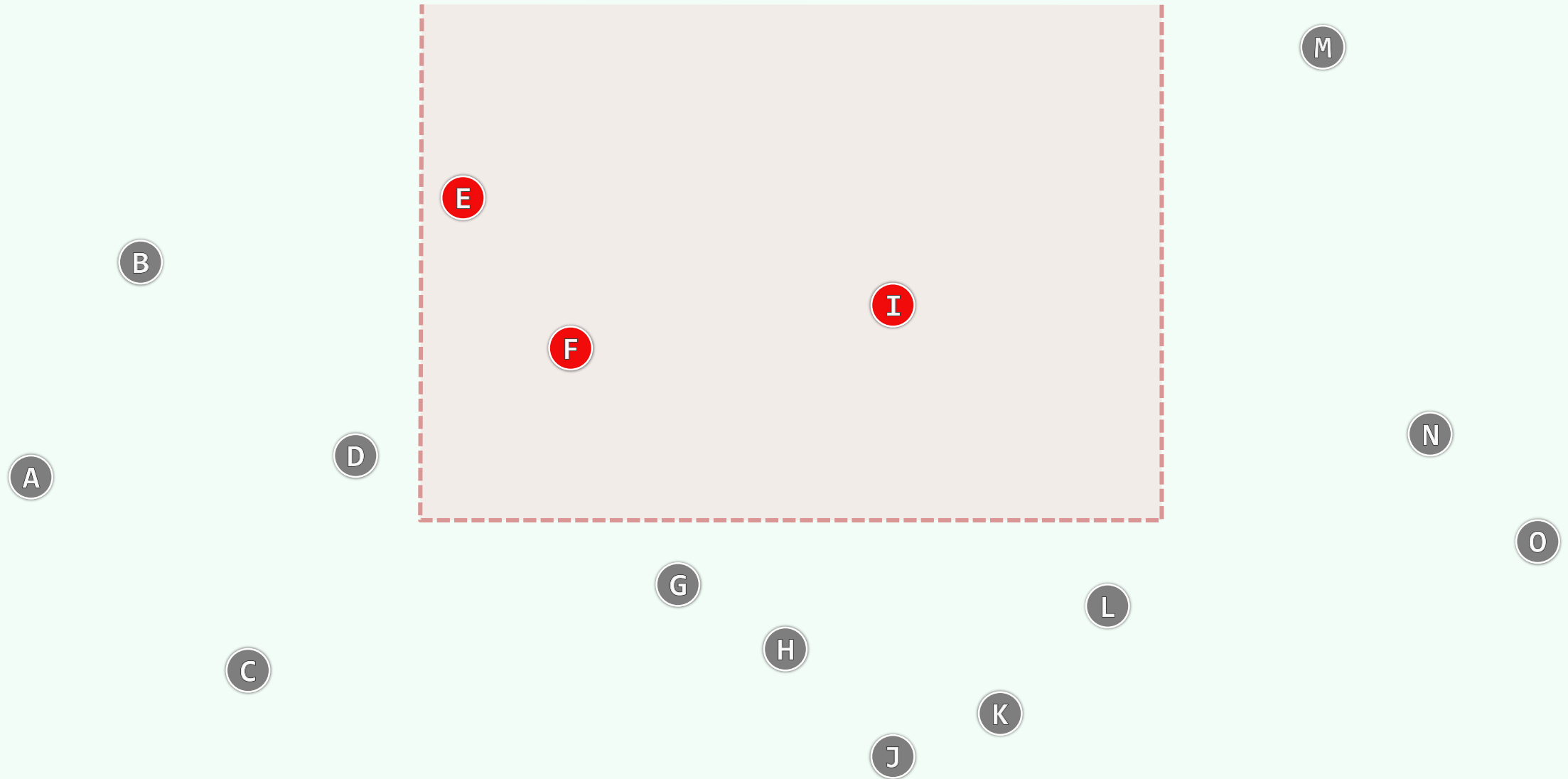
优先级队列

优先级搜索树

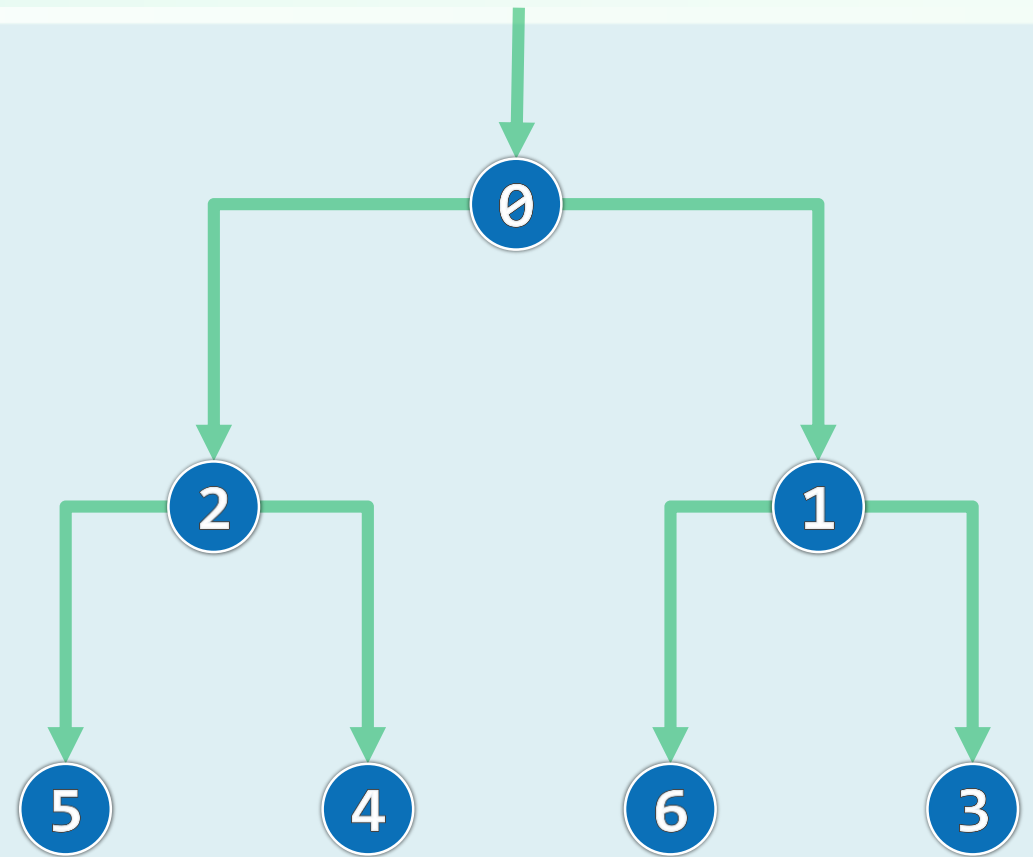
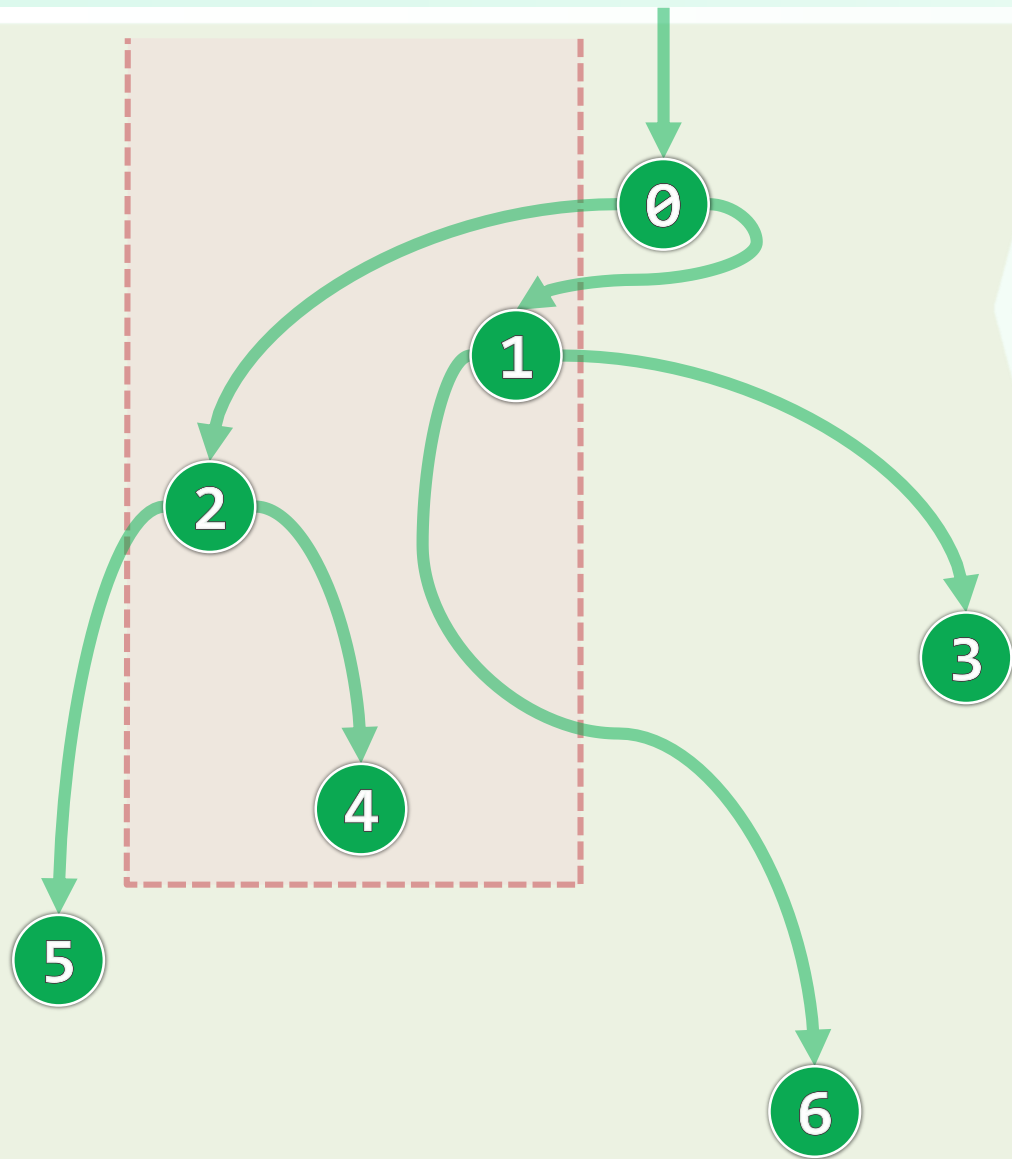
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Grounded Range Query

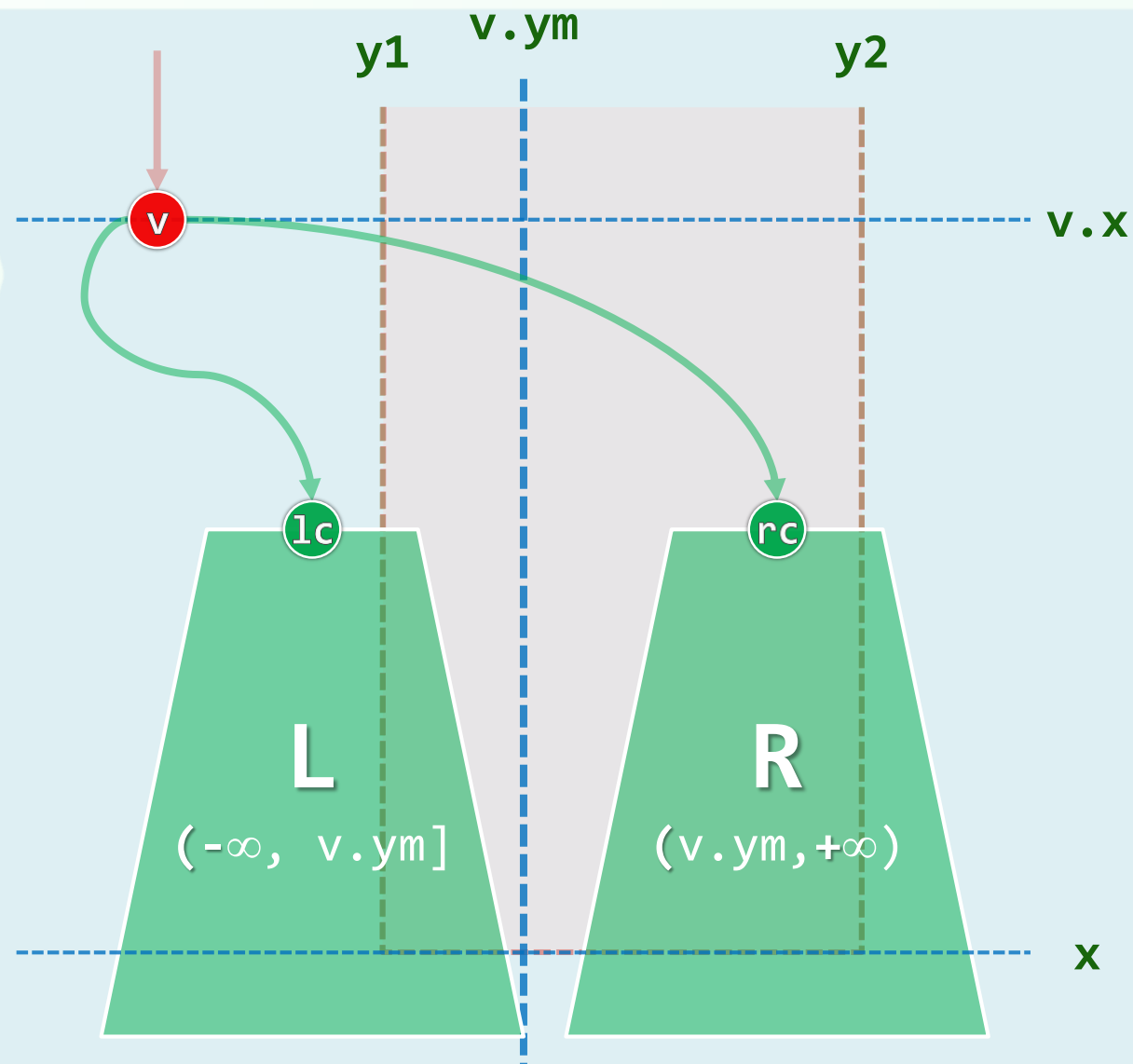


Priority Search Tree = BST + PQ

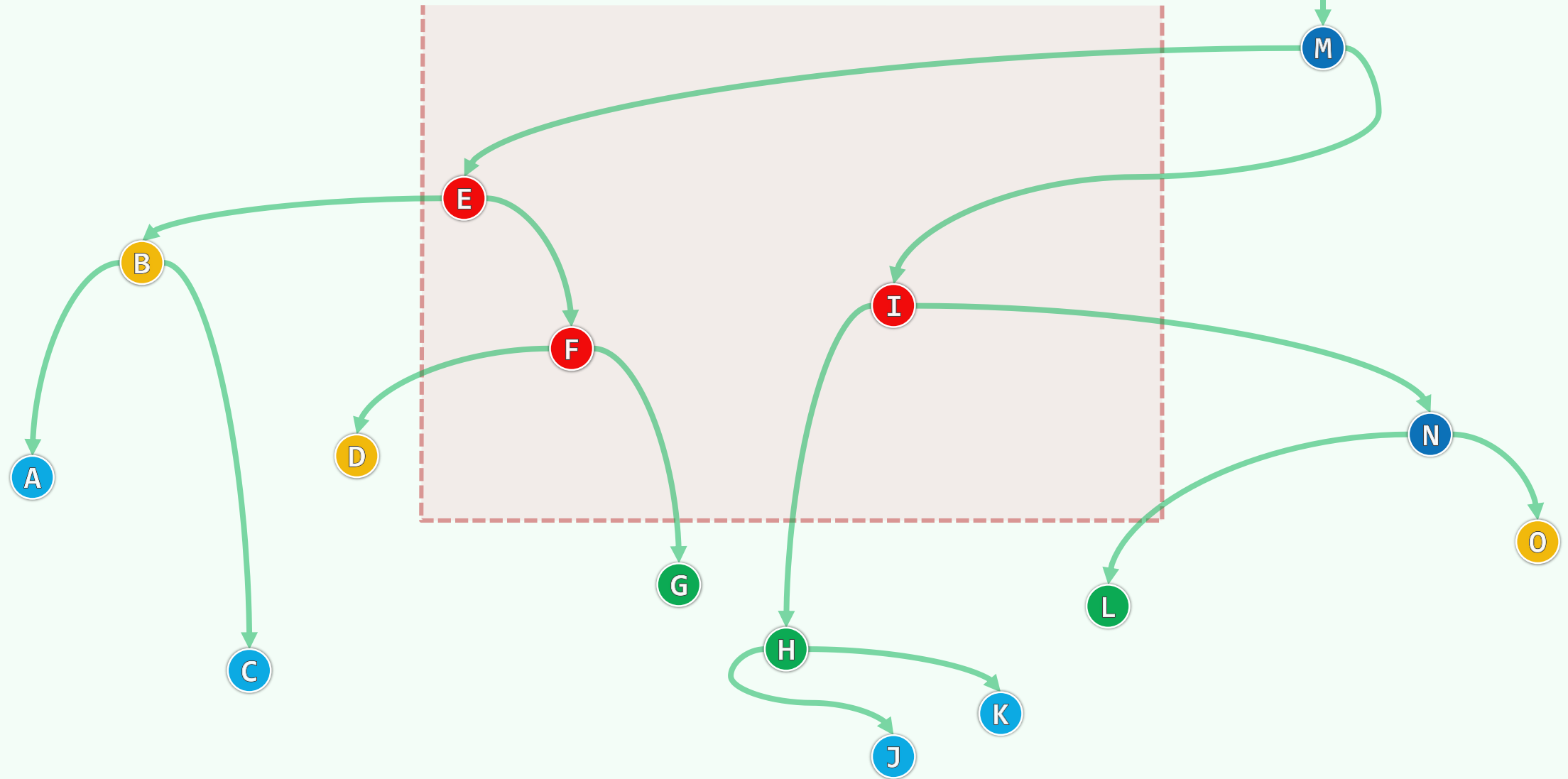


```
queryPST( PSTNode v, int x, int y1, int y2 )
```

```
    if ( !v || x < v.x )  
        return //pruned for bad X  
    if ( ( y1 < v.y ) && ( v.y < y2 ) )  
        output(v) //accepted  
    //else rejected for bad Y  
    if ( y1 ≤ v.ym )  
        queryPST( v.lc, x, y1, y2 )  
    //else pruned for bad Y  
    if ( v.ym < y2 )  
        queryPST( v.rc, x, y1, y2 )  
    //else pruned for bad Y
```



Example



Query Time

- P: Pruned with descendants due to bad Y
 - no more time cost
- A: Visited and accepted
 - exactly r = output size
- BY: Visited but rejected due to bad Y
 - no more than 2 for each level
 - altogether $\mathcal{O}(\log n)$
- BX: Visited but rejected due to bad X
 - having an A or BY parent
 - no more than $\mathcal{O}(r + \log n)$

