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Geometric Range Search

kd-Tree: Performance

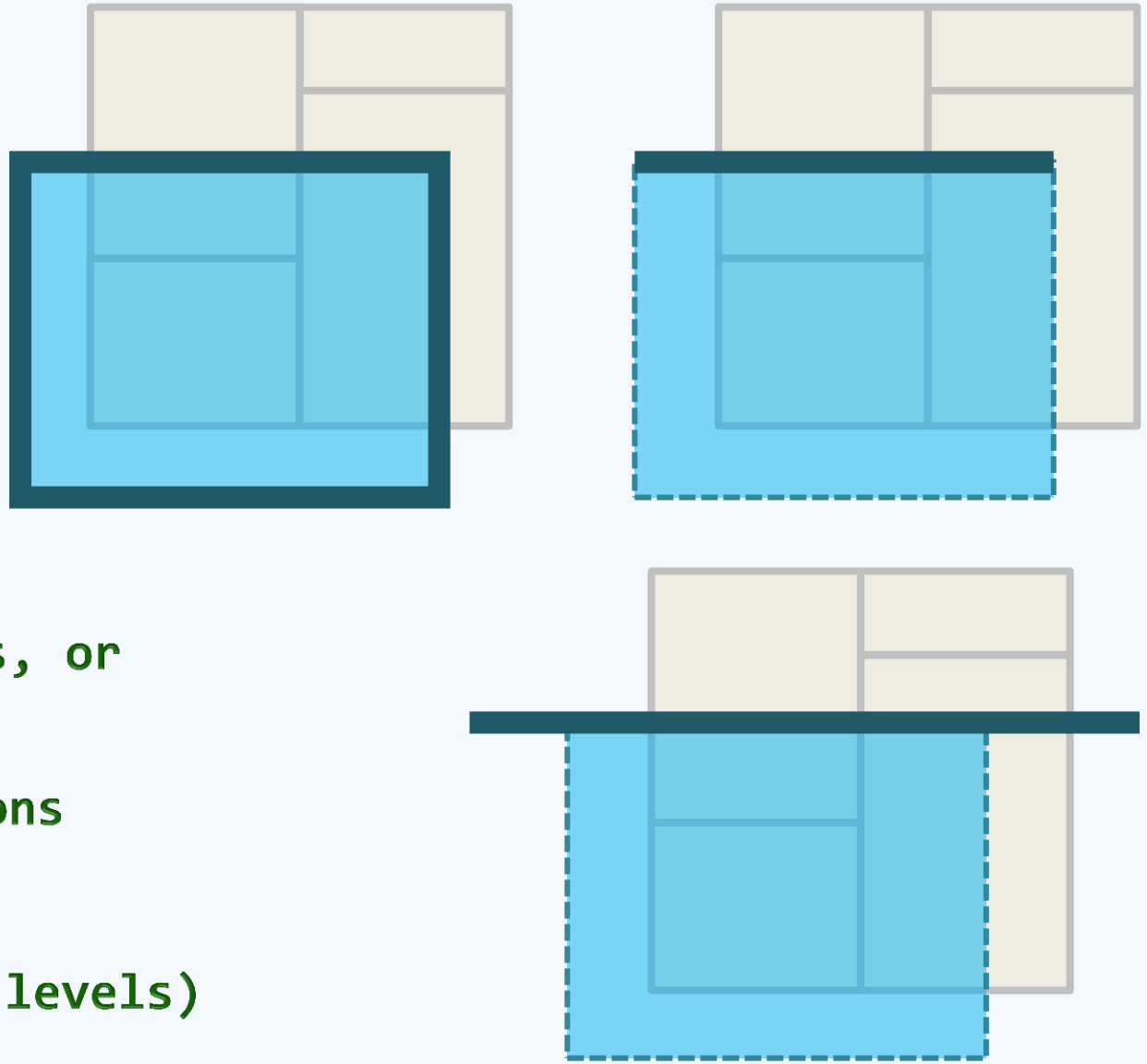
- Query Time

Junhui DENG

deng@tsinghua.edu.cn

❖ Claim:

Report + Search = $O(r + \sqrt{n})$



❖ The searching time depends on

- the number of recursive calls, or
- Q(n), the number of sub-regions

intersecting with R (at all levels)

- For each node,

  no more than 2 of

  its 4 grandchildren

  will recurse

- Recurrence

  - Q(1) = $O(1)$

  - Q(n) = 2 + 2*Q(n/4)

- Solve to Q(n) = $O(\sqrt{n})$