

1. Determine the cost of splay operations to serve the following sequence of accesses using (a) working set bound, (b) dynamic finger bound and (c) unified bounds.

The universe is $1, 2, \dots, n$ (where n is a large integer). You can assume an overhead cost of $O(n^2)$ for inserting all these elements into a binary search tree first.

2. Can you give a dynamic (that uses rotations) offline (knows the future) binary search tree scheme that supports these requests in $O(1)$ amortized time?

The sequences are:

- $1, n/2, 2, n/2 + 1, 3, n/2 + 2, \dots$
- $100, 200, 300, 400, 500, n, 100, 200, 300, 400, 500, n, \dots$
- $100, 200, 300, 400, 500, n, 101, 201, 301, 401, 501, n, 102, \dots$