Assignment 5
Charles Winkelman + Phil Lane

Run Time Results

Run 1
41.2185314580 seconds to read the records
6773 reports are available for IL on and after the date 2022-09-08
0.0000357080 seconds to calculate this using children count fields
6773 reports are available for IL on and after the date 2022-09-08
0.0041042090 seconds to calculate this using recursive method

Run 2
41.1500405420 seconds to read the records
Enter the state (e.g., IL): IL
Enter the date (e.g., 2022-09-08): 2022-09-08
6773 reports are available for IL on and after the date 2022-09-08
0.0000546250 seconds to calculate this using children count fields
6773 reports are available for IL on and after the date 2022-09-08
0.0041237500 seconds to calculate this using recursive method

Run 3
43.9177708330 seconds to read the records
Enter the state (e.g., IL): IL
Enter the date (e.g., 2022-09-08): 2022-09-08
6773 reports are available for IL on and after the date 2022-09-08
0.0000554580 seconds to calculate this using children count fields
6773 reports are available for IL on and after the date 2022-09-08
0.0045309580 seconds to calculate this using recursive method

Run 3
47.8031073750 seconds to read the records
Enter the state (e.g., IL): IL
Enter the date (e.g., 2022-09-08): 2022-09-08
6773 reports are available for IL on and after the date 2022-09-08
0.0000368330 seconds to calculate this using children count fields
6773 reports are available for IL on and after the date 2022-09-08
0.0017410000 seconds to calculate this using recursive method

Run 4
41.5138918330 seconds to read the records
Enter the state (e.g., IL): IL
Enter the date (e.g., 2022-09-08): 2022-09-08
6773 reports are available for IL on and after the date 2022-09-08
0.0000510830 seconds to calculate this using children count fields
6773 reports are available for IL on and after the date 2022-09-08
0.0023359580 seconds to calculate this using recursive method

Run 5
41.2291172910 seconds to read the records
Enter the state (e.g., IL): IL
Enter the date (e.g., 2022-09-08): 2022-09-08
6773 reports are available for IL on and after the date 2022-09-08
0.0000543330 seconds to calculate this using children count fields

6773 reports are available for IL on and after the date 2022-09-08
0.0038791670 seconds to calculate this using recursive method

Run 6
41.1455057080 seconds to read the records
Enter the state (e.g., IL): IL
Enter the date (e.g., 2022-09-08): 2022-09-08
6773 reports are available for IL on and after the date 2022-09-08
0.0000493750 seconds to calculate this using children count fields
6773 reports are available for IL on and after the date 2022-09-08
0.0047155000 seconds to calculate this using recursive method

Run 7
41.1628558340 seconds to read the records
Enter the state (e.g., IL): IL
Enter the date (e.g., 2022-09-08): 2022-09-08
6773 reports are available for IL on and after the date 2022-09-08
0.0000527500 seconds to calculate this using children count fields
6773 reports are available for IL on and after the date 2022-09-08
0.0028342910 seconds to calculate this using recursive method

Time Complexity:

Phil:

Reader - O(N)
AddRecur - O(log(N))
GetRecur - O(log(N))

Charles:

search - worst case: O(N) best case: 0(1) average case: O(log(N))
Worst case would be a chain where each record is before its parent.
Best case would be all records are after their parent and the summation is done for us during insert.
Average is traversing the height of the tree in Nodes in a complete binary tree.

recurSearch - worst case: O(N) best case: O(log(N)) average case: O(N)
Average case involves visiting about half of the nodes in the tree to check if they are null or before date.