

BLG 335E, Analysis of Algorithms I

Project 4 Report

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OUTPUT OF MY CODE:

```
[[sahino15@ssh algohw4]$ g++ main.cpp
[[sahino15@ssh algohw4]$ ./a.out input.txt
      (r)Alex-13-M
    └──(b)Blair-11-F
      (r)Casey-35-F
    └──(b)Dane-14-F
      (b)Evan-18-M
        (r)Fran-30-M
  (b)Glen-29-F
    (b)Hayden-28-M
    └──(b)Izzy-27-M
      (b)Jude-26-F
        (r)Kelly-24-F
    └──(r)Leah-23-F
      (b)Morgan-22-M
        (b)Naomi-21-F
          (r)Ogden-20-M
            (b)Parker-19-M
              (r)Quinn-18-M
            (r)Ryan-17-F
              (r)Shane-16-M
                (b)Taylor-14-F

3rd woman: Dane
4th man: Hayden
[[sahino15@ssh algohw4]$
```

- 1) To correctly update a person's name, firstly I would implement a delete operation, which can be implemented in $O(\log N)$. Then, I would delete the person that I want to update from the tree and insert the updated version. Since both deletion and insertion are in $O(\log N)$, update operation will also be in $O(\log N)$.
- 2) To correctly increment the ages of all people in the Red-Black tree, I would implement a traversing method, which could be either in-order, pre-order or post-order. As I traverse each node, I would increment the age of that node.