Part A Implementation

First I compiled and executed my code in SSH in order to see if there exist any error.

```
[sertbasn@ssh ~]$ g++ 040110078.cpp -o 040110078
[sertbasn@ssh ~]$ ./040110078 input.txt
```

Also I compiled and executed the same code on Windows command prompt. I got the below results.

```
C:\Users\nurefsan sertbas\Desktop>a.exe
insert edilen node: Glen F 29
insert edilen node: Ryan F 17
insert edilen node: Alex M 38
insert edilen node: Dane F 34
insert edilen node: Morgan M 22
insert edilen node: Blair F 36
insert edilen node: Jude F 26
insert edilen node: Casey F 35
insert edilen node: Evan M 32
insert edilen node: Izzy M 27
insert edilen node: Naomi F 21
insert edilen node: Parker M 19
insert edilen node: Taylor F 14
insert edilen node: Fran M 30
insert edilen node: Hayden M 28
insert edilen node: Kelly F 24
insert edilen node: Quinn M 18
insert edilen node: Leah F 23
insert edilen node: Shane M 16
insert edilen node: Ogden M 20

 Root NODE:
 Key: 29
 Colour: Black
 There is no parent
 Right Child: 36
 Left Child: 22


Left:
[14]    [16]    [17]    [18]    [19]    [20]    [21]    [22]    [23]    [24]
[26]    [27]    [28]

Right:
[30]    [32]    [34]    [35]    [36]    [38]
C:\Users\nurefsan sertbas\Desktop>_
```

It first reads input.txt file in a suitable form and create node then insert it into RBTree in a suitable place according to the algorithm. But I could not show the tree in any given syntax. I just apply the inorder traverse to show the keys of the nodes. It is shown in above figure.

Part B Report

1. In the case of updating age info of the nodes cause significant changes in the structure. Because we used age as a key in order to construct a tree. If we update age, key, the nodes location should be change. So I think the node should be deleted first then will be inserted with its new key again. We should care about that, in insert operation the main rule is about two consecutive reds. But in delete, the main rule is depending on the deleted node's color. If we delete red one the height does not change. Otherwise, if we delete black one the process will be complex due to the change in height of the tree.

2. If we update the gender of the person it does not affect the node's location. Because we kept gender info as a detail information. We determine the node's position according to its key. In this case first we should the related node then update only the gender info of it.