1. Add element [1]. It does not violate the RBT rule.

Diagram

Description automatically generated

1. Add element 13.5 and 2 consecutive red elements exist now (14, 13.5). We shall do double rotation on 13,14,13.5

Diagram

Description automatically generated

1. Double rotation result is below. Notice parent is black, and children are red.

A picture containing text, whiteboard, outdoor

Description automatically generated

1. Add element 14.5 in corresponding position. But we can see 2 consecutive red nodes there.

Diagram, engineering drawing

Description automatically generated

1. Since there is red uncle exist for 14.5, we push blackness of parent into children:

Diagram

Description automatically generated

1. Now add element 9 finally. 9 has red uncle, thus we collapse grandparent black color into children and change grandparent color.

Diagram

Description automatically generated

1. If we see 7 and 10, they are violating rule. We should double rotate on 5,10,7.

Diagram

Description automatically generated

1. Double rotation done. And resulting final Red Black tree is shown below.

Diagram

Description automatically generated

Part2:

Diagram

Description automatically generated