

RB-Insert(T, z) (Pre: key[z] has been set)

```
1. y←nil
2. x←root[T]
3. while x ≠ nil
4.     y←x
5.     if key[z]<key[x]
6.         x←left[x]
7.     else
8.         x←right[x]
9. p[z]←y
10. if y = nil
11.     root[T]←z
12. else if key[z]<key[y]
13.     left[y]←z
14. else
15.     right[y]←z
16. left[z]←nil
17. right[z]←nil
18. color[z]←red
19. RB-Insert-Fixup(T, z)
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RB-Insert-Fixup(T, z)

```
1.  while color[p[z]] = red
2.      if p[z] = left[p[p[z]]]
3.          y←right[p[p[z]]]
4.          if color[y] = red
5.              color[p[z]]←black      ) case 1
6.              color[y]←black         )  "
7.              color[p[p[z]]]←red     )  "
8.              z←p[p[z]]              )  "
9.          else
10.         if z = right[p[z]]
11.             z←p[z]                  ) case 2
12.             LeftRotate(T, z)       )  "
13.             color[p[z]]←black      ) case 3
14.             color[p[p[z]]]←red     )  "
15.             RightRotate(T, p[p[z]]) )  "
16.     else
17.         y←left[p[p[z]]]
18.         if color[y] = red
19.             color[p[z]]←black      ) case 4
20.             color[y]←black         )  "
21.             color[p[p[z]]]←red     )  "
22.             z←p[p[z]]              )  "
23.         else
24.             If z = left[p[z]]
25.                 z←p[z]              ) case 5
26.                 RightRotate(T, z)   )  "
27.                 color[p[z]]←black   ) case 6
28.                 color[p[p[z]]]←red  )  "
29.                 LeftRotate(T, p[p[z]]) )  "
30. color[root[T]]←black
```