CS 380, RB-INSERT-FIXUP(T, z)

To insert into a tree T a node z (you) whose color by default is RED:

1) Is your parent RED?
   YES
   a. Is your parent the left child of your grandparent?
      YES:
      i. Consider your uncle (the right child of your grandparent)
      ii. Is your uncle RED?
         YES
         1. Change your parent to BLACK
         2. Change your uncle to BLACK
         3. Change your grandparent to RED
         4. Restart process with your grandparent as starting node z
      iii. NO
      1. Are you the right child of your parent?
      YES
         a. Set node z to your parent
         LEFT-ROTATE (T, z) around your parent
      2. NO
         a. Change your parent to BLACK
         b. Change your grandparent to RED
         c. RIGHT-ROTATE around your grandparent
         RIGHT_ROTATE( T, z.p.p))
   b. Is your parent the left child of your grandparent?
      NO:
      i. Consider your uncle (the left child of your grandparent)
      ii. Is your uncle RED:
         YES
         1. Change your parent to BLACK
         2. Change your uncle to BLACK
         3. Change your grandparent to RED
         4. Restart process with your grandparent as starting node z
      iii. NO
      1. Are you the left child of your parent?
      YES
         a. Set node z to your parent
         RIGHT-ROTATE (T, z) around your parent
      2. NO:
         a. Change your parent to BLACK
         b. Change your grandparent to RED
         c. LEFT-ROTATE around your grandparent:
         LEFT-ROTATE (T, z.p.p)

2) Is your parent RED?
   NO
   Set the Color of the root to black, HALT.