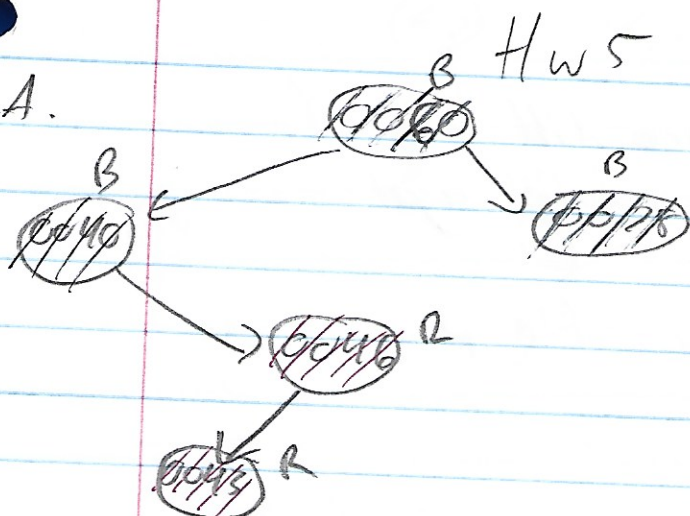


1A.



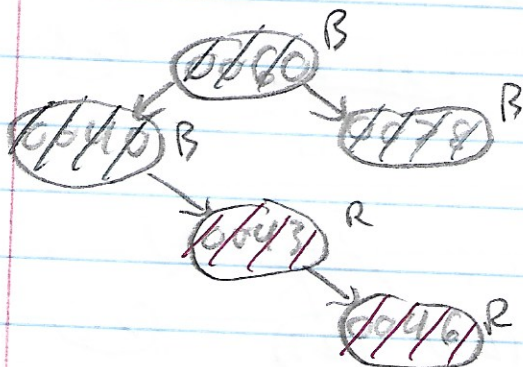
B. Inserted node and parent are both red, z's uncle y is black, z's parent is a right child and z is a left child.
 \therefore Property 4 (if a node is red, then both its children are black) is violated

Case 2b seen after regular binary search tree insertion

Steps to fix!

- node z = parent of z
- Single rotate right of z

After correction:



Continued



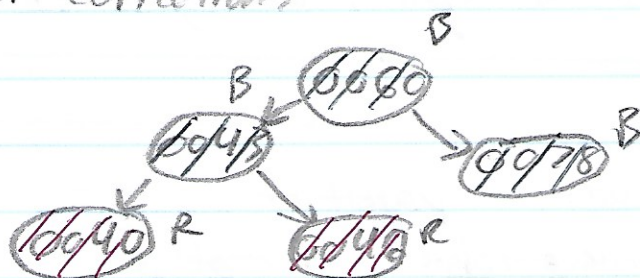
C. parent and child are still both red,
 \therefore Property 4 is violated again

Case 3b seen after first fixup

Steps to fix:

- parent of z is now black
- the parent of z's parent is now red
- Single left rotation of the parent of the parent of z

After correction:



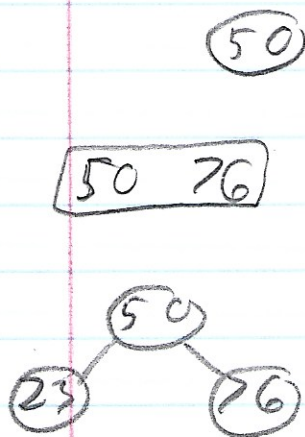
2A.

↓

B.

↓

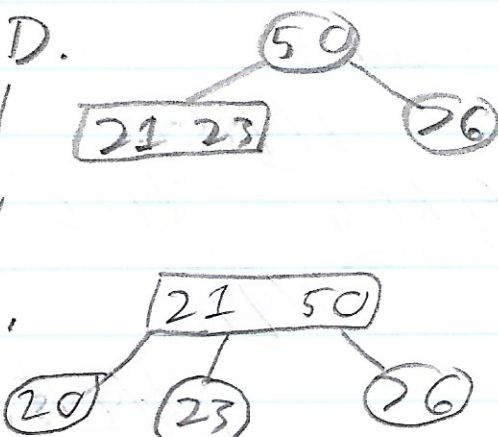
C.



D.

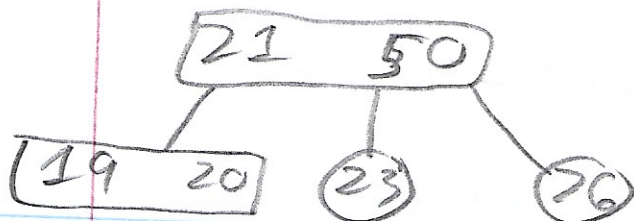
↓

E.

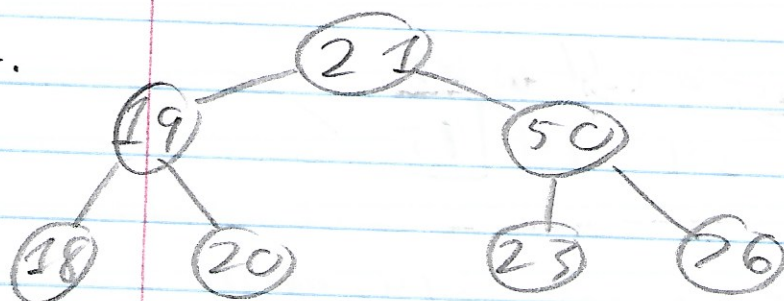


continued →

F.



G.



3. $LCM(A[1 \dots n])$:

$lcm \leftarrow A[0]$

for $i \leftarrow 1$ to n do:

$lcm \leftarrow (A[i] * lcm) / (gcd(A[i], lcm))$

return lcm

4 $A.p(x) = 4x^4 + 5x^3 - 2x^2 - 4x + 7$

$= x(4x^3 + 5x^2 - 2x - 4) + 7$

$= x(x(4x^2 + 5x - 2) - 4) + 7$

$p(x) = x(x(x(4x + 5) - 2) - 4) + 7$

B. $p[0 \dots n] = [4 \ 5 \ -2 \ -4 \ 7]$

at $x=2$,

C.

x	p	n	i
2	4	4	0

2	5	13	1
---	---	----	---

2	-2	24	2
---	----	----	---

2	-4	44	3
---	----	----	---

2	7	95	4
---	---	----	---

$p(2) = 95$

Continued
→

D. $p(x) = 4x^4 + 5x^3 - 2x^2 - 4x + 7$

$$x-2 \mid 4 \quad 5 \quad -2 \quad -4 \quad 7$$

$$x=2 \mid \begin{array}{r} 0 \times 2 \quad 8 \quad \times 2 \quad 26 \quad \times 2 \quad 48 \quad \times 2 \quad 88 \\ 4 \quad 13 \quad 24 \quad 44 \quad [95] \end{array} \checkmark$$

5. Left Right Binary Exponentiation ($a, b(n)$):

prod $\leftarrow 1$

for n in $b(n)$:

prod \leftarrow prod \ast prod

if $n == 1$:

prod \leftarrow prod $\ast a$

return product

I pledge my honor that I have abided
by the Stevens Honor System.

Brandon Patton