

Fall 2017
Assignment #5
Sample solutions

1) A) $R = 30 + 9 + 9 + 40 + 9 + 8 + 1 + 4 + 4 + 1 = 115$

B) $bfr = \text{floor}(b/r)$
 $= \text{floor}(1024/115) = 8$
 $= \text{ceiling}(3,000,000/8) = 375,000 \text{ blocks}$

C) i) $ri = (SSN + P)$
 $= 9 + 8 = 17$
 $bfri = \text{floor}(b/ri)$
 $= \text{floor}(1024/17) = 60$
ii) $r1 = 375,000 \text{ blocks}$
 $b1 = \text{ceiling}(r1/bfri)$
 $= \text{ceiling}(375,000/60) = 6250 \text{ blocks}$
iii) $r2 = 6250 \text{ blocks}$
 $b2 = \text{ceiling}(r2/bfri)$
 $= \text{ceiling}(6250/60) = 105 \text{ blocks}$
 $r3 = b2 = 105 \text{ entries}$
 $b3 = \text{ceiling}(r3/bfri)$
 $= \text{ceiling}(105/60) = 2 \text{ blocks}$
 $r4 = b3 = 2 \text{ entries}$
 $b4 = \text{ceiling}(r4/bfri)$
 $= \text{ceiling}(2/60) = 1 \text{ block}$

This indicates that the index has $x=4$ levels because the fourth level only contains one block which must be the top index level.

iv) $\text{total} = b1 + b2 + b3 + b4$
 $= 6250 + 105 + 2 + 1 = 6358 \text{ blocks}$

v) $\text{total} = x + 1 = 5$