CS 351 – Quiz 1

Quiz 1 - Section 1,
September 28, 2009

Question:
s = 15 msec
r = 5 msec
btt = 0.80 msec
ebt = 0.83 msec
n = 100,000 (records in the file including deleted ones)
Blocking factor = 4
R (Record Size) = 300 bytes
B (Block size) = 2400bytes
a. T_F = ?
b. T_N = ?
c. T_I = ?
d. T_Y = ? (Assume that %25 of the records are deleted)
e. T_F = ? (after reorganization)

Solution:
a.   # of blocks = # of records / bf
        b = 100,000 / 4 = 25,000
        T_F = (b / 2) * ebt
        T_F = (25,000 / 2) * 0.83
        T_F = 10,375 msec

b. T_N = T_F = 10,375 msec

c. T_I = (s + r + btt) + 2r
        T_I = (15 + 5 + 0.80) + 2*5
        T_I = 30.8 msec

d. T_Y = (b_{before} * ebt) + (n_{active} / bf) *ebt
        n = 100,000 * 0.75
        n = 75,000
        T_Y = (25,000 * 0.83) + (75,000 / 4) * 0.83
        T_Y = 36,312.5 msec

e. T_F = (b_{after} / 2) * ebt
        b = 25,000 * 0.75
        b = 18750
        T_F = (18750 / 2) * 0.83
        T_F = 7,781.25 msec

Quiz 1 - Section 2,
September 28, 2009

Question:
s = 16 msec
r = 8 msec
btt = 0.5 msec
n = 200,000 number of records
R (Record Size) = 300 bytes
B (Block size) = 2400bytes
How long does it take to create a copy of this file? Assume that we have 10 mb memory available.

Solution:
Blocking Factor (bf) = B / R
bf = 2400 / 300
bf = 8
b (# of blocks) = n / bf
b = 200,000 / 8
b = 25,000

File size = b * B
$\qquad$ = 25,000 * 2400
$\qquad$ = 60,000,000
$\qquad$ = 60 Mb

To read, we need T_x
T_x = b * ebt
$\quad$ = 25,000 * 0,6
$\quad$ = 15,000 msec
$\quad$ = 15 sec

To write, we need T_X again
T_X = 15 sec

T_{copy} = 15 + 15
$\qquad$ = 30 sec

Also, we have (s+r) =>
2*(60 /10)*(s + r)
2*(60 /10)*(16 + 8) = 288 msec

T_{copy} = 30 + 0.288 = 30.288 sec

Question:
n = 120,000 number of records
R (Record Size) = 400 bytes
B (Block size) = 2400bytes
Assume that 20% of the records are deleted. Calculate time for Ty

Solution:
n_{after} = 120,000 * 0.80
  = 96,000

bf = B / R
bf = 2400 / 400
bf = 6

b_{old} = n_{before} / bf
b_{old} = 120,000 / 6
b_{old} = 20,000

T_Y = (Time needed for old file blocks) + (Time needed to write active records to the new file)
T_Y = (b_{old} * ebt) + (n_{active} / bf) *ebt
T_Y = (20,000 * 0.84) + (96,000 / 6) * 0.84
    = 30,240 msec