1. 10,000,000 \* 100 bytes = 1,000,000,000bytes

= 8,000,000,000 bits

= 8,000,000 Kb

= 8,000 Mb

= 8 Gb

Size of data 8Gb < Disk size 64Gb. Therefore, data can fit on disk.

1. Remaining main memory space = 64Mb – 1Mb = 63Mb

Remaining main memory space 63Mb < Size of data 8Gb. Therefore data cannot fit in main memory.

1. 10,000,000 records / 2,000 records per page= 5,000 pages

Exhaustive search = B(D+RC)

= 5000pages ( 0.015 secs disk access W/R time +2000 records per page (10-7 secs average process time) )

= 5000 (0.015+0.0002)

= 5000 (0.0152)

= 76 secs

= 1min 16 secs

1. a) 10,000,000 records / 100 records per page= 100,000 pages

Exhaustive search = B(D+RC)

= 100,000pages ( 0.015 secs disk access W/R time +100 records per page (10-7 secs average process time) )

= 100,000 (0.015+ 0.00001)

= 100,000 (0.01501)

= 1501 secs

= around 25 mins 1 secs

b) 10,000,000 records / 10,000 records per page= 1,000 pages

Exhaustive search = B(D+RC)

= 1000pages ( 0.015 secs disk access W/R time + 10,000 records per page (10-7 secs average process time) )

= 1000 (0.015+0.001)

= 1000 (0.016)

= 16 secs

1. Yes, however by increasing the page number and decreasing the records number per page, the time consumed for an exhaustive search in file stored as heap will increase.

Can the number of records/page be increased further? No as buffer size of 1Mb (1,000,000) in main memory can only fit 10,000 records at 100 bytes each

1. From question 3, exhaustive search time = 76 seconds

Time to search particular record = B(D+RC)/2

= 76 seconds / 2

= 38 seconds

1. Time to insert a particular record = 2D+C

= 2 (R/W time) + Process time

= 2 (0.015secs) + 10-7 secs

= 0.03 + 0.0000001 secs

= 0.0300001 secs

= 300,001 \* 10-7 secs