9/5/21

Sreeratcha B
2019103585

OS Assignment
Paging

8.20) Page size = 1 KB = 1000 B

2^n = 1024 approx 1000 B

1024 = 2^{10}, So no of bits in the offset part is 10.

a) 3085

Binary : 00000011 0000001101

Page no : 00000011 = 3

Page offset : 0000001101 = 13

Page	offset
00000011	0000001101

b) 42095

Binary : 101001 0001101111

Page no : 101001 = 41

Page offset : 0001101111 = 111

Page	offset
101001	0001101111

c) 215201

Binary : 110100100010100001

Page no : 11010010 = 210

Page offset : 0010100001 = 161

Page	offset
11010010	0010100001

d) 650000

Binary : 1001111010 1100010000

Page no : 1001111010 = 634

Page offset : 1100010000 = 784

Page	offset
1001111010	1100010000

e) 2000001

Binary : 11110100001001000001

Page	offset
11110100001	00100000001

Page no : 11110100001 = 1953

Page offset : 00100000001 = 129

8.21) a) Page size = 2kB = 2000 B

2^n = 2048 approx 2000 B, m = 21 (given)

2048 = 2^{11}

2^m = no. of pages × 2^n

2^{21} = no. of pages × 2^{11}

No. of pages = 2^{21-11} = 2^{10} pages = 1024 entries

b) x = 16 (given)

No. of pages = 2^{16-11} = 2^5 pages = 32 entries

No. of entries in a conventional, single-level page table is 1024.

No. of entries in an inverted page table is 32.

8.23) a) Size of logical address space = 2^m

2^m = no. of pages × page size

= 256 × 4KB

= 256 × 4096

= 1048576

= 2^{20}

∴ m = 20

b) Size of physical address space = 2^x

2^x = no. of frames × frame size

= 64 × 4 KB

= 64 × 4096

= $2^6 \times 2^{12}$

= 2^{18}

$x = 18$

No. of bits in the logical address = 20

No of bits in the physical address = 18

8.25) a) Here, we have 2 memory accesses.

50 nanoseconds to access the page table followed by 50 nanoseconds to access the word in memory.

Hence, Total time = 50 + 50 = 100 nanoseconds.

b) The effective access time

= 75% × TLB hit-time + 25% × TLB miss-time

= 0.75 × (50 ns + 2 ns) + 0.25 × (100 ns + 2 ns)

= 64.5 nanoseconds

6.28)

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical address for the following logical address?

a) 0, 430

Physical address = Base + Offset

= 219 + 430

= 649

b) 1, 10

Physical address = 2300 + 10

= 2310

c) 2, 500

Illegal address since size of segment 2 is 100 and the offset in logical address is 500.

d) 3, 400

Physical address = 1327 + 400

= 1727

e) 4, 112

Illegal address since size of segment 4 is 96 & the offset in logical address is 112.

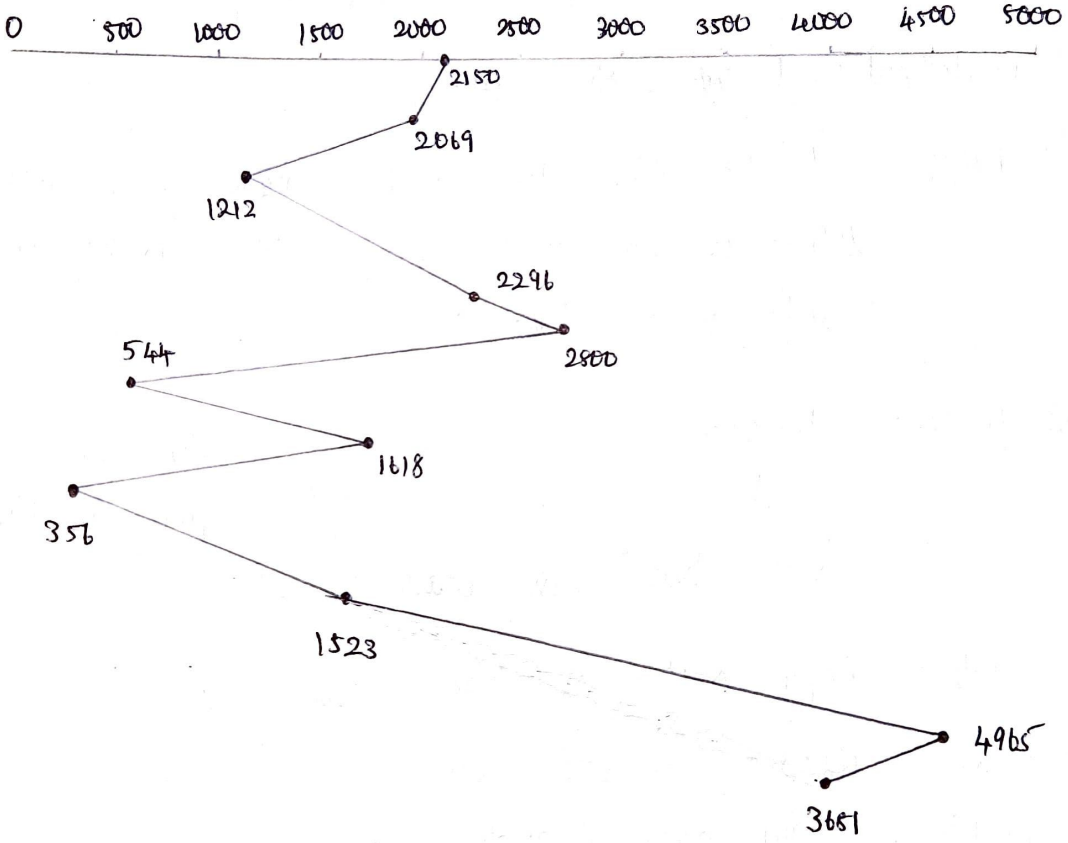
Disk Scheduling

10.11) No of cylinders = 5000 (from 0 to 4999)

current request : 2150 (head)

Pending requests = 2069, 1212, 2296, 2800, 544, 1618, 356, 1523, 4965, 3681

a) FCFS

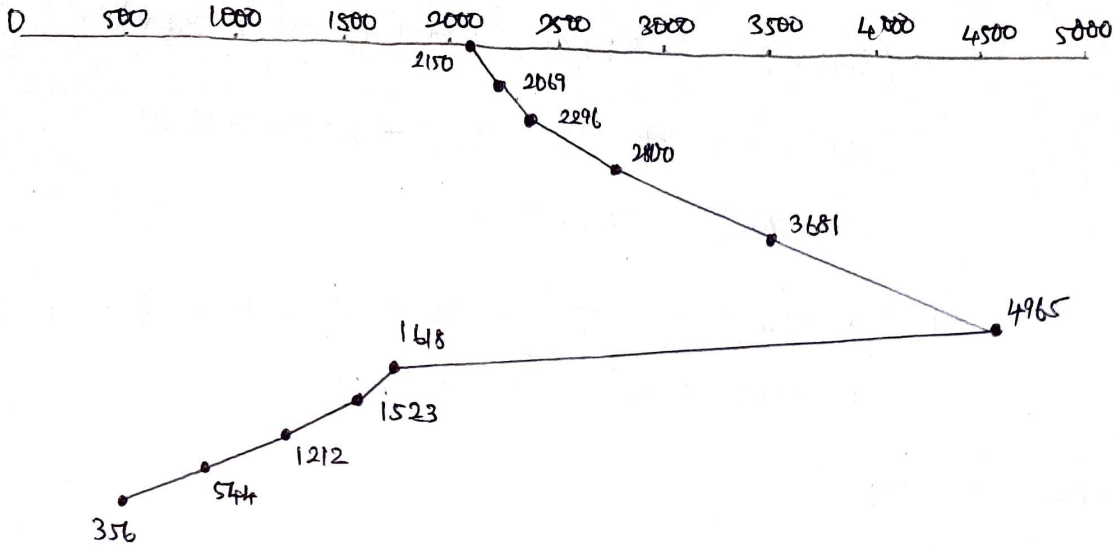


FCFS = |2150 - 2069| + |2069 - 1212| + |1212 - 2296|
+ |2296 - 2800| + |2800 - 544| + |544 - 1618|
+ |1618 - 356| + |356 - 1523| + |1523 - 4965|
+ |4965 - 3681|

= 81 + 857 + 1084 + 504 + 2256 + 1074 + 1262
+ 1167 + 3442 + 1284

FCFS = 13011

b) SSTF

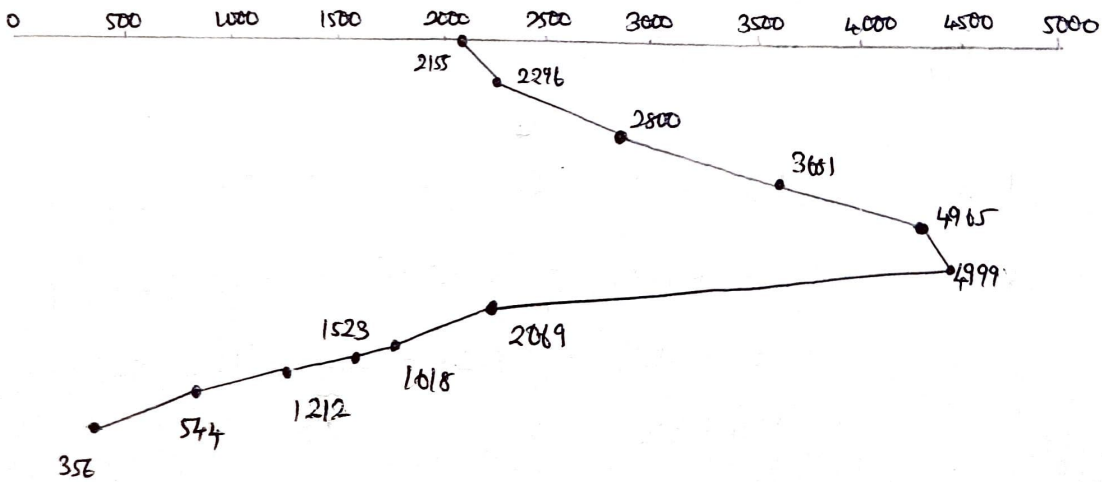


SSTF = |2150 - 2069| + |2069 - 2296| + |2296 - 2800|
+ |2800 - 3681| + |3681 - 4965| + |4965 - 1618|
+ |1618 - 1523| + |1523 - 1212| + |1212 - 544|
+ |544 - 356|

= 81 + 227 + 504 + 881 + 1284 + 3347 + 95 + 311
+ 666 + 188

SSTF = 7586

c) SCAN

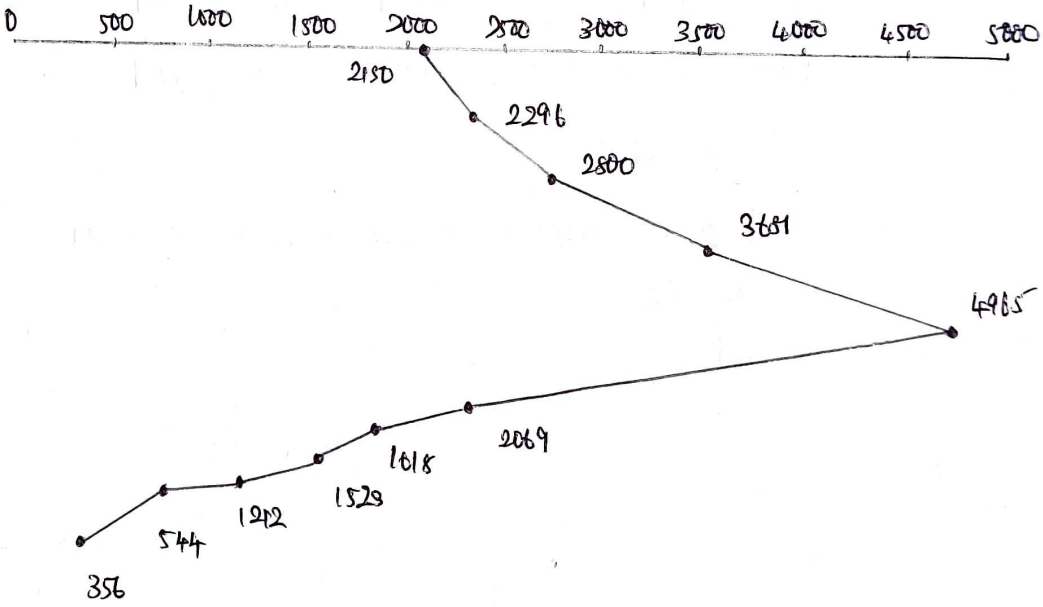


SCAN = |2150 - 2296| + |2296 - 2800| + |2800 - 3681|
+ |3681 - 4985| + |4985 - 4999| + |4999 - 2069|
+ |2069 - 1618| + |1618 - 1523| + |1523 - 1212|
+ |1212 - 544| + |544 - 356|

= 146 + 504 + 881 + 1284 + 34 + 2930 + 451 + 95 +
311 + 668 + 188

SCAN = 7492

d) LOOK

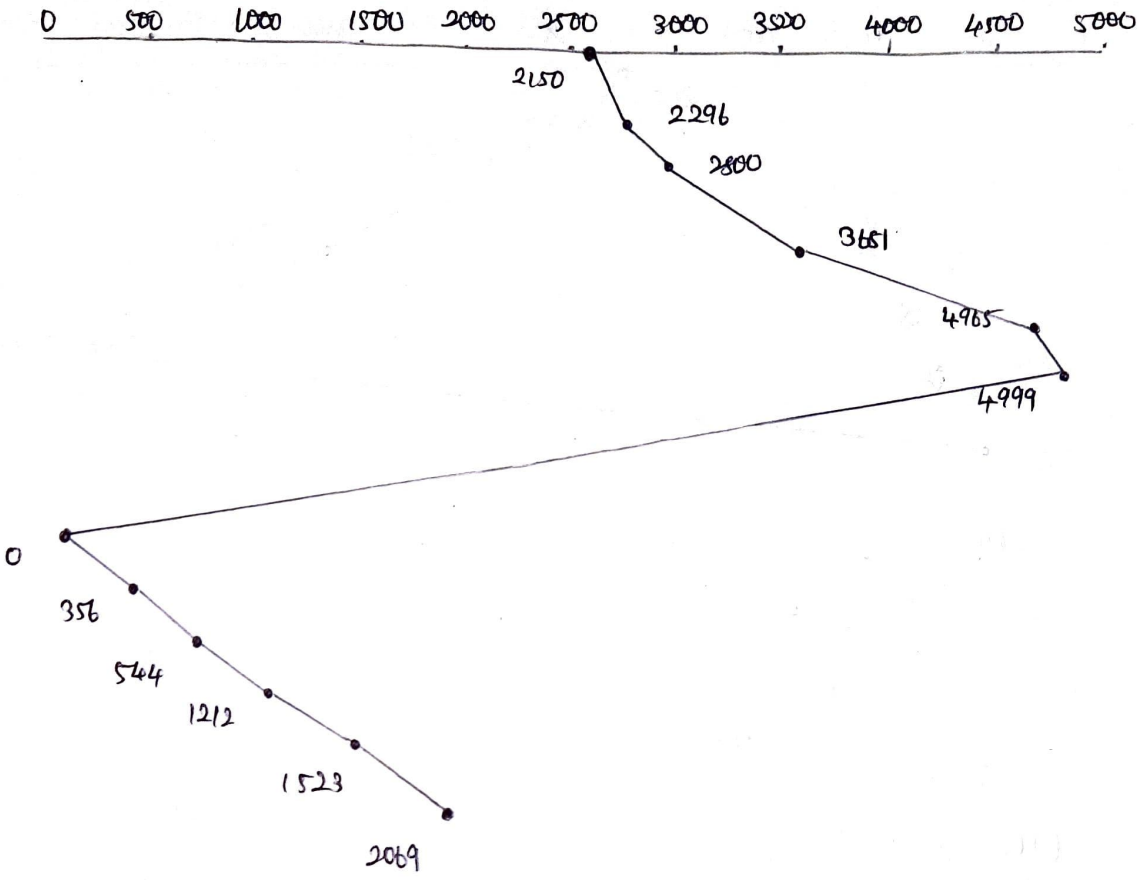


LOOK = |2150 - 2296| + |2296 - 2800| + |2800 - 3681|
+ |3681 - 4985| + |4985 - 2069| + |2069 - 1618|
+ |1618 - 1523| + |1523 - 1212| + |1212 - 544|
+ |544 - 356|

= 146 + 504 + 881 + 1284 + 1984 + 2896 + 451 + 95 +
311 + 668 + 188

LOOK = 7424

e) C-SCAN

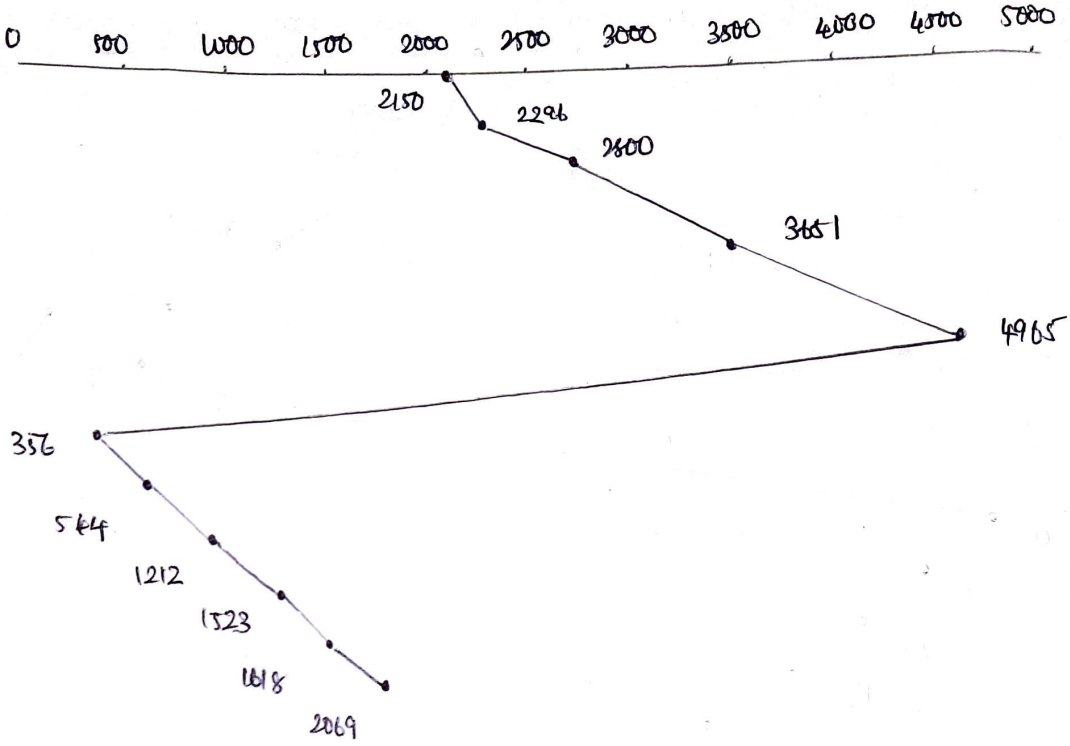


C-SCAN = |2150 - 2296| + |2296 - 2800| + |2800 - 3681|
+ |3681 - 4965| + |4965 - 4999| + |4999 - 0|
+ |0 - 356| + |356 - 544| + |544 - 1212| + |1212 - 1523|
+ |1523 - 1818| + |1818 - 2069|

= 146 + 504 + 884 + 1284 + 34 + 4999 + 356 + 188
+ 311 + 668 + 95 + 451

C-SCAN = 9917

f) C-LOOK



C-LOOK = |2150 - 2296| + |2296 - 2800| + |2800 - 3651|
+ |3651 + 4965| + |4965 - 356| + |356 - 544|
+ |544 - 1212| + |1212 - 1523| + |1523 - 1618|
+ |1618 - 2069|

= 146 + 504 + 851 + 1284 + 4609 + 185 + 311 + 668 + 95 + 451

C-LOOK = 9137