papergrid

Date: / /

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Q4

A) avg Turnaround = avg seek time + rotation time + transfer time
= 0 + 0

→ current position = 110

110 → 136 → 78 → 20 → 500 → 516 → 630
→ 925 → 1150 → 1173 → 1425 → 1500 → 1650

(55 TF)

Avg seek time = ((136-110) + (136-78)
+ (78-20) + 500-20 + 516-500
+ 630-516 + 925-630 + 1150-925
+ 1173-1150 + 1425-1173 + 1500-1425
+ 1650 - 1500) / 12

= 1772 / 12 = 147.67 //

B) i) total dist =
32 + 58 + 1037 + 657 + 16 + 1002 + 525
+ 500 + 275 + 500 + 1022 + 610
= 6280 //

ii) 125, 110, 78, 20, 136, 500, 516, 630, 925, 1150,
1173, 1425, 1500, 1650
dist = 32 + 58 + 116 + 364 + 16 + 114 + 295 + 225 + 23 + 152
+ 75 + 150 = 1720 //

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3 b)

1	2	3	1	4	3	1	2	4	3	6	5	7	3	1	2	4	5	1	2	3	4
1	1	1		1						1	1	7					1	1			
	2	2		2						2	2	2					2	2			
		3		3						3	3	3					4	4			
				4						6	5	7					7	5			

= 9 page faults
Using optimal algorithm

c) # of unique items = 7

∴ 7 frames will generate least # of faults
(7 or more)

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Q3 a)

i)

1	2	3	1	4	3	1	2	4	3	6	5	7	3	1	2	4	5	1	2	5	4
1	1	1	1							6	6	6	1	1	1	1					
	2	2		2						2	5	5	5	2	2	2					
		3		3						3	3	3	3	3	3	5					
				4						4	4	7	7	7	4	4					
F	F	F		F						F	F	F	F	F	F	F					

= 11 page faults

ii)

1	2	3	1	4	3	1	2	4	3	6	5	7	3	1	2	4	5	1	2	5	4
1	1	1	1							6	6	6	6	1	1	1					
	2	2		2						2	5	5	5	5	2	2					
		3		3						3	3	7	7	7	7	4	4				
				4						4	4	4	3	3	3	3	5				

= 12 page faults

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Q2)

e) Program size = 640 kB

pages = $\frac{640 \times 2^{10}}{2^{14}}$ = 40960 pages

PT = $\frac{40960}{2^{12}}$ = 10 pages

=) 1 Page directory

Memory required = 40960 + 10 + 1
= 40971 frames

f) For solving 2 memory access problem for Intel processor, TLB (Translation lookside Buffer) which is an associative register for performing parallel comparisons. This results in faster access times than using page tables.

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Q2

a) Page size = 2^{14}

PTE = 4B, directory = 16B

PTE = $2^{19}/2^2 = 2^{17}$ entries

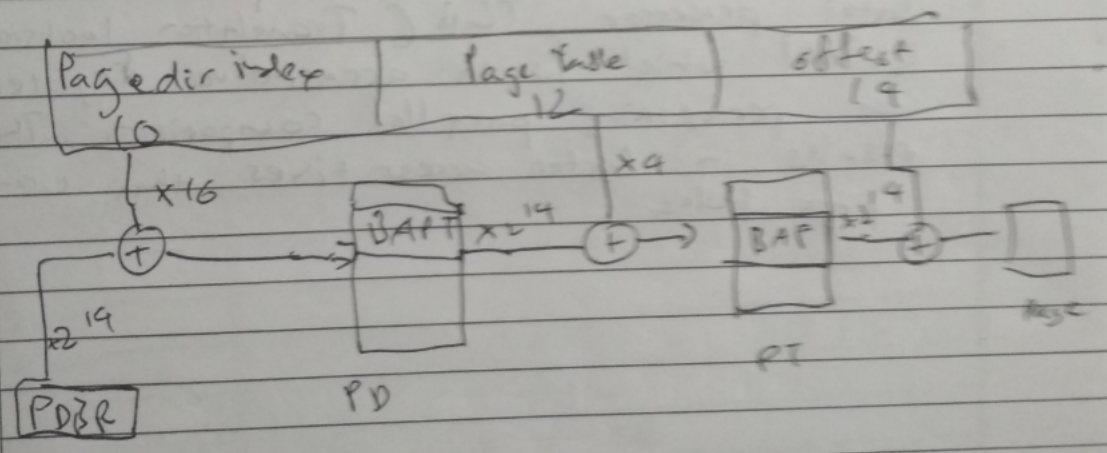
PDE = $\frac{2^{19}}{2^4} = 2^{15}$ entries

logical address space = $2^{19} \times 2^{17} \times 2^{16}$

$= 2^{52}$

$= 64$ GB

b)



c) Total address space = 36 bits

Bits for PT offset = 19 bits

Minimum # of bits for PDBR = 36 - 19 = 22 bits

d) Total # pages = $2^{17} \times 2^{15} = 2^{32}$ pages

PT entries PD entries

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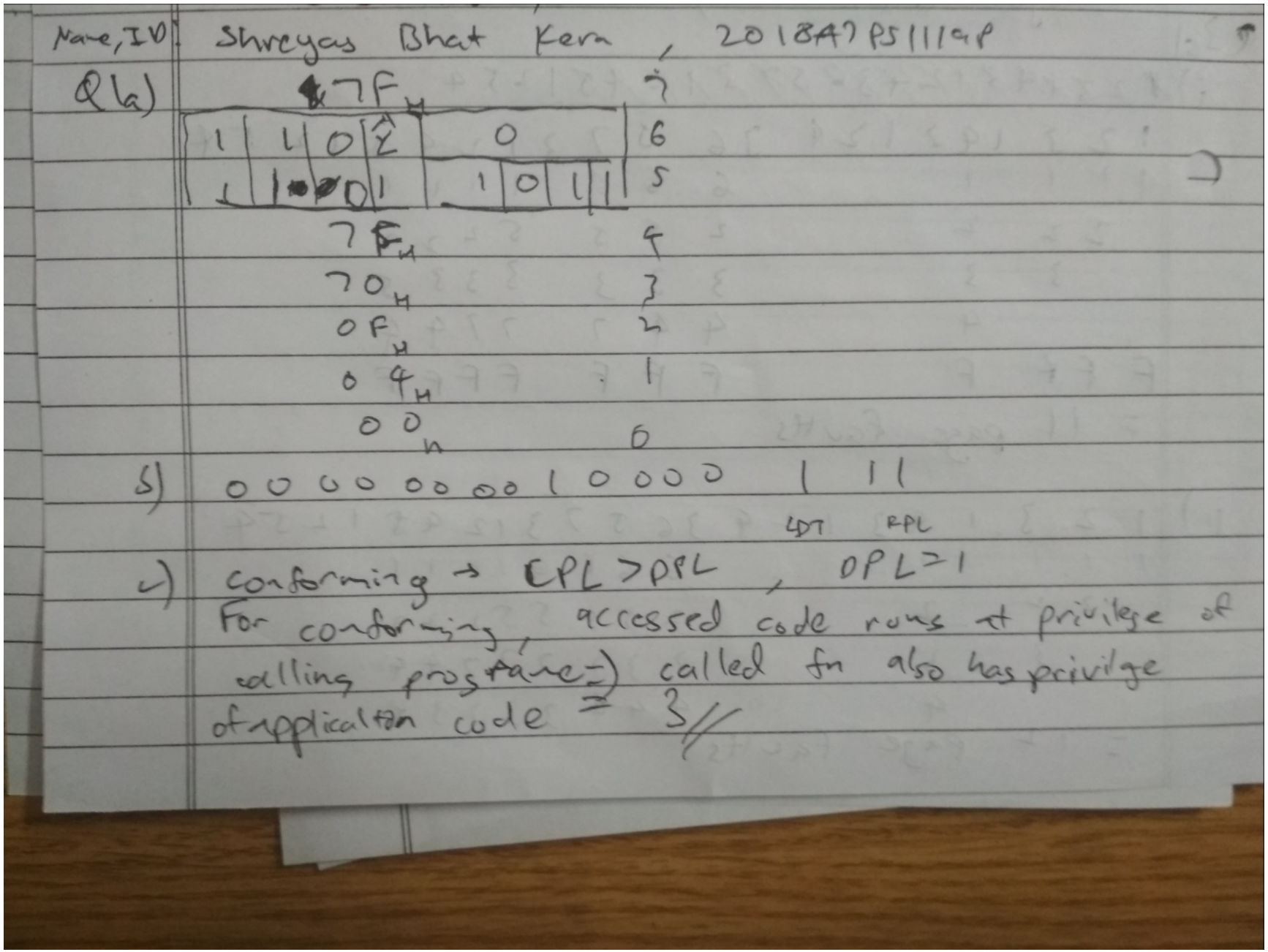
Q1a)



b) 0 0 0 0 0 0 0 0 1 0 0 0 0 | 1 1

LDT RPL

c) Conforming → CPL > RPL, DPL = 1

For conforming, accessed code runs at privilege of calling prog/fn ⇒ called fn also has privilge of application code = 3 //