

Name, Surname : ANSWERS  
 Student ID :  
 Course Code : 480000600001357  
 Title : OPERATING SYSTEMS  
 Assessment :  Quiz  Midterm  Final  
 Date : 02.01.2018 17.00

[50 minutes]

Please ensure that your name appears on each booklet, together with the number of questions attempted.

Question Number Attempted	1	2	3	Total
Marks Awarded	28	40	32	100

1) RR (q=3) and FCFS are used such that at a decision point,

if the remaining time of the process is  $> K$ , then RR(q=3) is used;  
 else if the remaining time of the process  $\leq K$ , then FCFS is used for that process.

Process	CPU Burst Time	Arrival Time
P1	7	0
P2	6	3
P3	2	5
P4	7	9
P5	8	12
	<u>30</u>	

Which K is better, 7 or 6?  
 Show and explain briefly.

2) Show the page faults for LRU and FIFO algorithms on the reference string below. Evaluate the algorithms for different memory sizes, assuming 3-bins, 4-bins, initially empty. Which case is best?

1, 2, 5, 3, 2, 1, 4, 6, 5, 4, 2, 1, 2, 3, 2, 6, 3, 2, 1, 2, 3, 6, 4, 1, 5.

3) A paging system uses 8-byte pages and 6-bits for logical address space. The physical memory is 1Kbytes, The page table is given below. Find logical memory addresses for each physical address a, b, d, e. PAGE is the number of rows in the page table.

physical-memory	page-table																
6 a	$p \rightarrow (p+5) \text{ mod } \text{MAX}(\text{PAGE})$																
13 b	<table border="1"> <tr><td>0</td><td>5</td></tr> <tr><td>1</td><td>6</td></tr> <tr><td>2</td><td>7</td></tr> <tr><td>3</td><td>0</td></tr> <tr><td>4</td><td>1</td></tr> <tr><td>5</td><td>2</td></tr> <tr><td>6</td><td>3</td></tr> <tr><td>7</td><td>4</td></tr> </table>	0	5	1	6	2	7	3	0	4	1	5	2	6	3	7	4
0	5																
1	6																
2	7																
3	0																
4	1																
5	2																
6	3																
7	4																
47 d																	
56 e																	

8-byte pages  $\Rightarrow 8 = 2^3 \Rightarrow n=3$   
 6-bit logical address  $\Rightarrow m=6 \quad m-n=3$   
 1 Kbytes physical  $\Rightarrow 10 \text{ bit} \quad 2^3 = 8 \text{ PAGE}$

a) 6 physical, 10 bit

$0000000110$   
 7bit frame  $n=3$   
 $\rightarrow f=0 \Rightarrow p=3 \Rightarrow 011110$  (6 bits)  
 by page table

b) 13 physical

$0000001101$   
 $\rightarrow f=1 \Rightarrow p=4 \Rightarrow 100101$

d) 47 physical

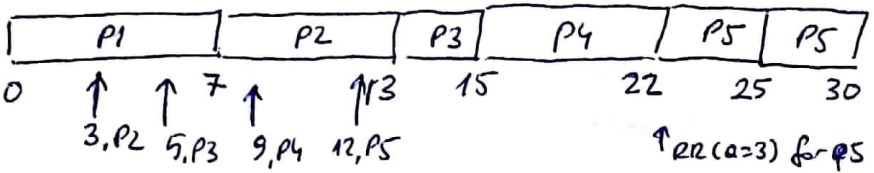
$0000101111$   
 $f=5 \Rightarrow p=0 \Rightarrow 000111$

e) 56 physical

$0000111000$   
 $f=7 \Rightarrow p=2 \Rightarrow 010000$

①

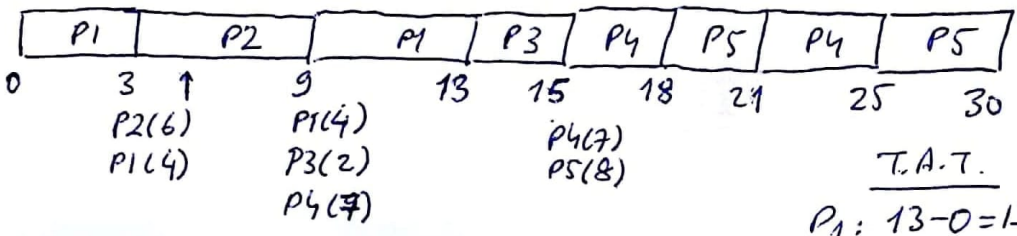
$K=7,$



T.A.T	WT
$P_1: 7-0=7$	0
$P_2: 13-3=10$	4
$P_3: 15-5=10$	8
$P_4: 22-9=13$	6
$P_5: 30-12=18$	10

WT<sub>tot</sub> = 5,6

$K=6,$



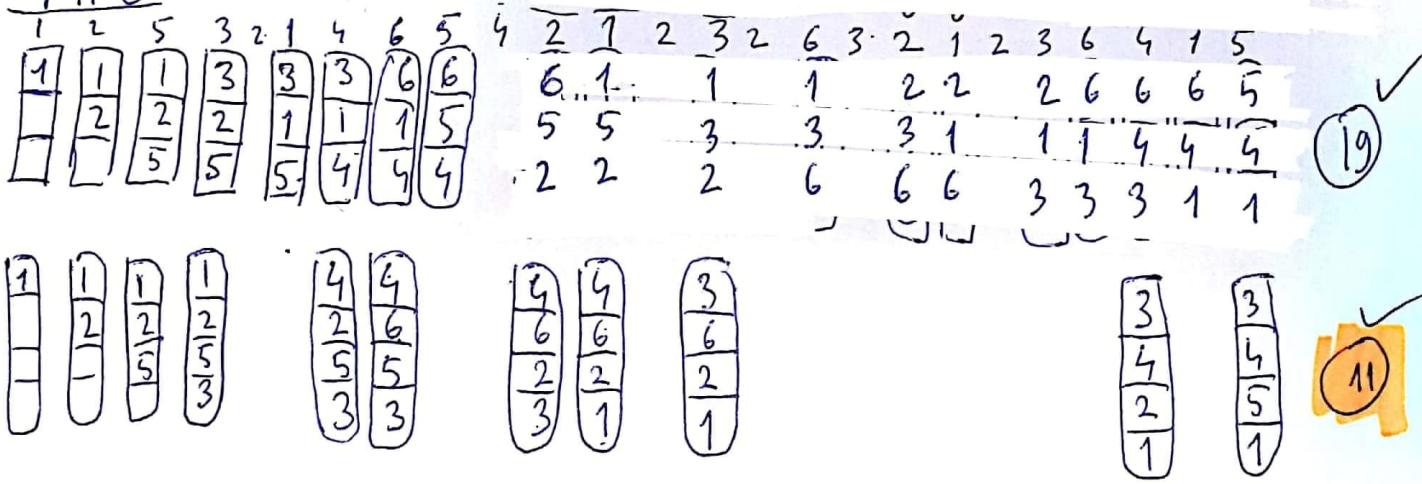
T.A.T	W.T
$P_1: 13-0=13$	6
$P_2: 9-3=6$	0
$P_3: 15-5=10$	8
$P_4: 25-9=16$	9
$P_5: 30-12=18$	10

WT<sub>tot</sub> = 6,6

$K=7 > K=6$

②

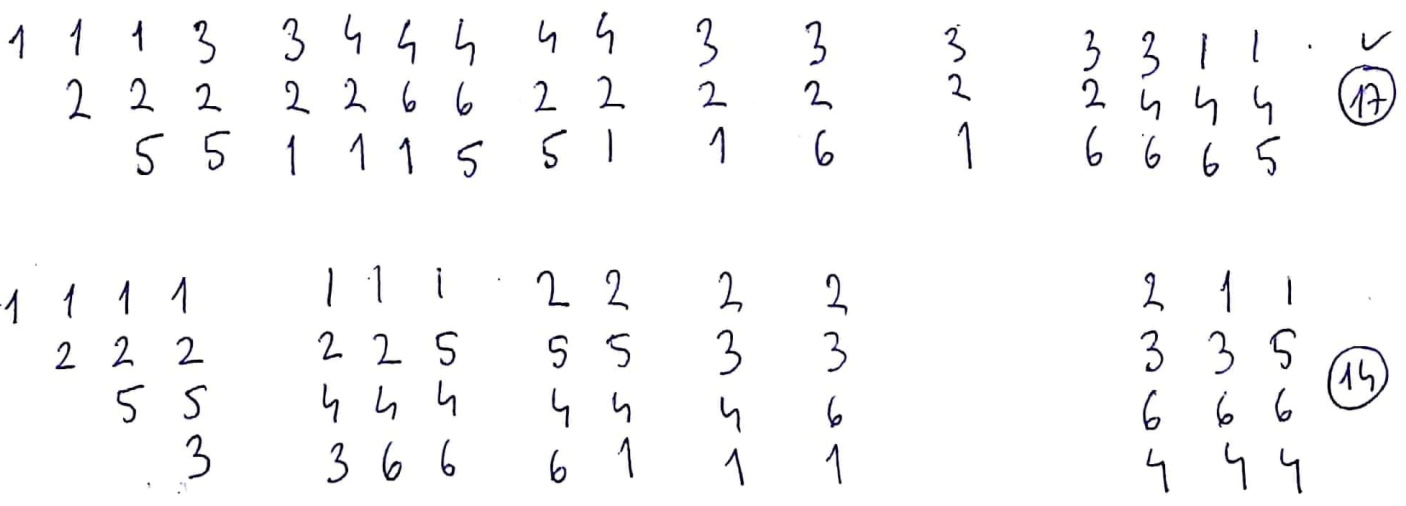
FIFO



19 ✓

11 ✓

LRU



17 ✓

15