Strathmore
UNIVERSITY

FACULTY OF INFORMATION TECHNOLOGY
BBIT/BTC 3
BBT 3102/BTC 3104: OPERATING SYSTEM CONCEPTS CAT 1

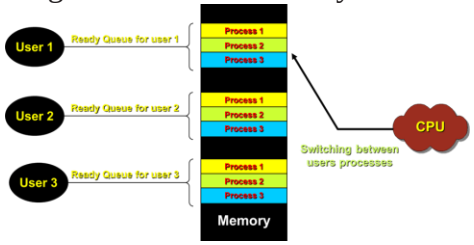
a) Diana owns a software development company. One of her clients requests for an operating system to be used in supporting mobile phone applications. Develop a short note advising her on the features she should incorporate in the OS and the best design approach to use clearly supporting your opinion. (6marks)

Solution
Light
Virtual memory support
Compatibility
Easy to use and learn
Robust
Flexibility
Portability
Speed
Best design approach-no single best approach but a combination is currently used eg layered and microkernel

b) When Oguda tried using his newly acquired mobile phone, he realized that he could not be able to open the browser and listen to an audio he had recorded earlier at the same time. Discuss in lengthy the above statement in relation to operating systems. (6marks)

Solution
It is supporting single tasking
Diagram to explain single tasking
Design should have been done such that supports multitasking
Explain multitasking with illustration
Multi-tasking versus single tasking:

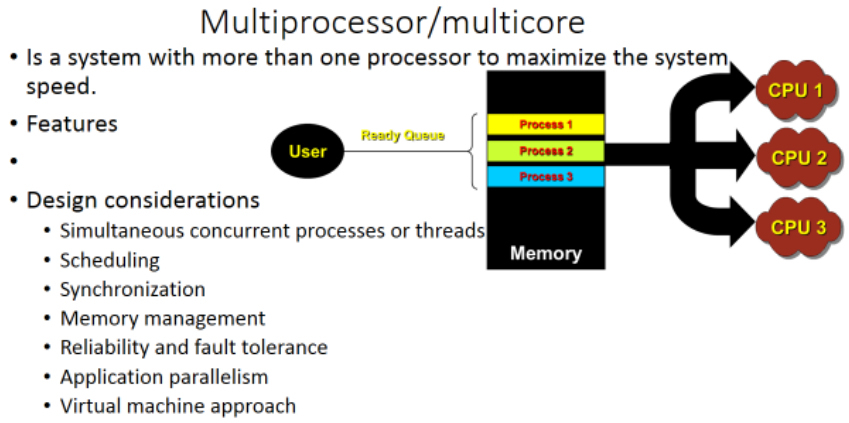
- Multi-tasking is an OS which can allow several tasks to be performed at the same time.
- Several of these will support multi-processing.
- Single task OS allows only one task at a time.



c) When using your desktop computer you note that the applications run faster than you expected. Briefly describe one of the possible processing capability you suspect your computer could be using. (4marks)

Solution

Multiprocessing using several cores



d) Develop simple programs to implement single and multi- tasking and processing. Use Java, assembly and machine languages. (8marks)

Solution

Machine

Examples of micro-operations for processor

Micro-operation	A	B	D	F	C_{in}	H	Function
$R_1 \leftarrow R_1 - R_2$	001	010	001	010	1	000	Sub R_2 from R_1
$R_3 - R_4$	011	100	000	010	1	000	Compare R_3 & R_4
$R_5 \leftarrow R_4$	100	000	101	000	0	000	Transfer R_4 to R_5

Java

p1-int a=20, b=30, s; s=a+b; System.out.println(s);
p2-int a=20, b=30, d; d=a-b; System.out.println(d);
p3-int a=20, b=30, p; d=a*b; System.out.println(p);

assembly codes

p1-mov ax,20; mov bx, 30; add ax,bx; out 199, ax;
p2- mov ax,20; mov bx, 30; sub ax,bx; out 199, ax;

p3- mov ax,20; mov bx, 30; mul bx; out 199, ax;

where p1, p2 and p3 are processing
single tasking

T1	T2	T3	Processor

Multi-tasking

P1t1	P2t1	P3t1	P1t2	P2t2	P3t2	P1t3	P2t3	P3t3	processor

single processing

P1	P2	P3	Processor

Multi-processing

P1t1	P2t1	P3t1	Processor 1
P1t2	P2t2	P3t2	Processor 2
P1t3	P2t3	P3t3	Processor 3

e) Using a simple Java program explain how the processor can be managed to obtain the required output. (6marks)

Solution

Java
int a=20, b=30, s; s=a+b; System.out.println(s); [2]
processor- registers (A-a and B-b)-to give input data, decoder (D-s) -to open output register, muxes (A and B)-to select the input registers, ALU (addition-F and Cin)-to perform the arithmetic or logic operation are controlled to give an output [2]
Assembly language
mov ax,20; mov bx, 30; add ax,bx; out 199, ax;