QUIZ 1 SOL

1. **[2+3] What is system call and how it is different from API call? What kind of services the OS provide by sys_calls?**

ANS: (Part A:2 Marks) Any one of the bellow:

- *A* **system call** is a programmatic way in which a computer program requests a service from the kernel of the operating system it is executed on.
- A system call is a way for programs to **interact with the operating system**.
- A computer program makes a system call when it makes a request to the operating system's kernel.
- System call **provides** the services of the operating system to the user programs via Application Program Interface (API)

System call **provides** the services of the operating system to the user programs via Application Program Interface (API), System calls are essential for the proper functioning of an operating system, as they provide a standardized way for programs to access system resources. API runs at user mode but system call run at kernel mode, API invokes to the system calls. Example write API invokes write_sys_call.

Part (B) Service Provides by OS for Process creation and management (end, abort, create, terminate), Main memory management (allocate, and free memory), File Access, Directory, and File system management (create, open, close, delete, read files,s, etc.) : Device handling(I/O), Protection, Networking, etc.

2. **[4 Marks] Provide all the scenario, in which a process can enters to ready queue.**

ANS: There many way a job can enter to ready state (a) New job created to LTS put into Ready queue, (b) time quatum elapsed (c) waitting child process finished, (d) waiting I/O finished for the process, (e) high pririty job came, (f) interrupt came

3. **[2+2+2 Marks] Given 5 jobs with arrival time 0, 1, 1, 3, 5 and execution time 2, 8, 9, 7, 5 respectively. Calculate average waiting time if scheduled using**
   (a) FCFS (b) SRT (c) RR with q=2

ANS: FCFS sequences 2, 8, 9, 7, 5. Start time of tasks 0, 2, 10, 19, 26, ==> waiting times (0-0)+(2-1)+(10-1)+(19-3)+(26-5) ==> Avg Waiting timw=(0+1+9+16+21)/5=47/5=**9.4**

SRT Sequence: 2, 8, 5, 7 , 9 Start time of task 0, 2, 10, 15, 22 ==>Waiting time (0-0)+(2-1)+(10-5)+(15-3)+(22-1)=0+1+5+12+21 ==> Agv waiting time=39/5=**7.8**

RR : A B C D E B C D E B C D E1 B C D1 C1
Waiting time: 0+(1+3*2+3*2+3*2-1)+(4-1+3*2+3*2+2*2-1+1)+(6-3+3*2+3*2+3*2-1)+(8-5+3*2+3*2)=72, Agv waiting time=72/5=**14.4**

4. **[8 marks] Given N independent jobs without pre-emption (ai=0) with each job have some weight/price/priority wi associated with it need to be executed on one processor and goal is to minimize ∑wi.Ci, where Ci is completion time. Find an optimal approach to solve the same.**

ANS:

- Calculate processing time to weight ratio
- Rank jobs in increasing order of pi/wi and schedule accordingly
- The Weighted Shortest Processing Time First rule is Optimal for 1|∑wiCi