OS Final Exam, 21st, June 2021 Spring

1. Describe the following terminologies (20 Points)
   ① Deadlock
   ② Polling and Interrupt
   ③ DMA (Direct Memory Access)
   ④ Virtual Memory

2. Consider the following snapshot of a system (15 Points)

	Allocation	*Max*	*Available*
P0	0 0 1 2	0 0 1 2	2 7 4 3
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

Please answer the following questions using the ***Banker's*** algorithm

1) Is the system in a safe state?

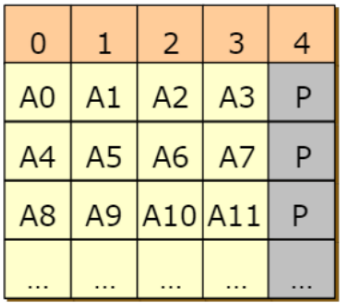
2) If a request from process P1 arrives for (0, 2, 1, 0), can the request be granted immediately?

3. Consider the following page reference string
   1, 2, 3, 4, 2, 1, 5, 6, 2, 3, 7, 6, 3, 2, 1, 2, 3, 8, 10
   How many page faults would occur for the 1) ***LRU replacement***, 2) ***Optimal replacement*** algorithm. Assuming ***four*** frames. (10 pts)

4. Draw on-Disk Structure of UNIX "File System", and describe each part. (10 Points)

5. Explain the difference between Contiguous Allocation and Linked Allocation on Disk Space (10 Points)

6. Describe what is the RAID(Redundant Array of Independent Disks) and give a detailed description of the following RAID level 4 (10 Points)



0	1	2	3	4
A0	A1	A2	A3	P
A4	A5	A6	A7	P
A8	A9	A10	A11	P
...	...	...	...	...

7. Describe the operation of **SCAN** and **LOOK** disk scheduling algorithm for the following I/O request in the disk Queue (10 Points)

   Queue: 98, 185, 33, 122, 15, 120, 66, 70, 25
   Dist Head start at 50

8. Describe what is difference between Direct I/O and Memory Mapped I/O. (5 Points)

9. Draw the I/O System Layers and describe detailed operation. (10 Points)