1. Review each of the following terms:

• page fault	• prefetching	• working set
• segment fault	• demand paging	
• replacement policy	• resident set	

2. A computer system uses virtual memory with paging with a page size of ~~2048 KB~~ 2 KB is operated with 2GB of physical memory. A virtual address is 24 bits.
   a. What is the size of the virtual address space?
   b. How many pages can be supported by this computer system?
   c. How many frames will there be?
   d. Convert page number and offset for the virtual addresses: 300, 4400, 3058, 8503, 10212.

3. A process generates memory requests in the order: 2,1,3,2,4,,3,5,6,8,2,1,3 and uses fixed allocation of 3 frames with local replacement strategy.
   a. Calculate the number of page faults this process generates if page replacement is:
      - LRU
      - FIFO
   b. Determine the working set for this process at each memory reference with $\Delta = 3$ and comment on whether or not the allocation is adequate.

4. The segment table for a process is shown below. The Tick column stores the time (based on the system clock) when a segment was loaded into memory. The Present bit is set to 1 if a segment is present in memory. The table stores the starting address (Base) in memory where a segment is loaded and the length of the segment. A logical address is 16 bits wide and a segment can be as long as 4096 bytes.

Segment	Tick	Present	Dirty	Base	Length
0	10	1	0	3000	8192
1	8	0	0	2000	4388
2	5	1	0	5126	4232
3	9	0	0	800	2048
4	7	1	0	4212	3048

   a. How many bits of the logical address represent the offset?
   b. How many segments can a process have and how many segments of this process are resident in memory?
   c. Translate the virtual address $4000F_{16}$ to a physical address
   d. Can the virtual address $2EEEF_{16}$ be translated to a physical address?