2003 Operating System Final (CLD)

1. What is thrashing?
2. Simply describe the following page replacement algorithms
   1. FIFO algorithm
   2. Optimal algorithm
   3. LRU algorithm
   4. Counting algorithm
3. How do we guarantee no cycles in a general graph directory?
4. Describe the process to perform DMA transfer.
5. Consider the following disk I/O request:

with head start at , and cylinders in the disk. Draw the head movement in following scheduling algorithms

* 1. FCFS
  2. SSTF
  3. SCAN
  4. C-SCAN

# Answers

1. Total size of locality < total memory size.  
   Processes 的 frames 不足  
   → 不斷的 swap in/out memory frames  
   → CPU 使用率低落  
   → OS 為增加 CPU 使用率而增加 degree of multiprogramming  
   → 更多的 processes 搶奪 frame 資源  
   → 更差勁的 CPU 使用率  
   → 惡性循環
   1. Replace the page which is the oldest in the memory.
   2. Replace the page which will not be used for longest period of time.
   3. Replace the page which is the least recently used.
   4. Replace the page which reference time is the highest or the lowest.
   5. Only allow links to file instead of subdirectory (只允許 link 到文件)
   6. Garbage Collection
   7. 建立新 link 時進行 cycle detection algorithm