CS3.301: Operating Systems and Networks

IIIT Hyderabad

Quiz 6

1. Explain the positive and negative aspects of the inverted page table approach. When is it used?
2. A computer has a cache, main memory, and a disk used for virtual memory. If a referenced word is in the cache, 20 nsec are required to access it. If it is in the main memory but not in the cache, 60 nsec is needed to load it into the cache, and then the reference is started again. The cache hit ratio is 90%. What is the effective access time?
3. State two advantages of paged virtual memory over the base/limit register memory mapping method.
4. A small computer has 8-page frames, each containing a page. The page frames contain virtual pages A, C, G, H, B, L, N and F in that order. Their respective load times were 18, 23, 5, 7, 32, 19, 3 and 8. Their reference bits are 1,0,1,1,0,1,1, 0, and their modified bits are 1,1,1,0,0,0,1, 1, respectively. What is the order that enhanced-second chance considers pages, and which is selected?
5. Explain the problems if you swap a process with pending I/Os.
6. Developments in operating systems have generally occurred in an evolutionary rather than revolutionary fashion. For the following transition, describe the primary motivations of operating systems designers that led them to produce the new type of system from the old: Contiguous storage allocation systems to non-contiguous storage allocation systems.
7. Assume a page size of 4K bytes, and a page table entry takes 4 bytes. How many levels of page tables would be required to map a 64-bit address space if the top-level page fits into a single page?
8. What are dynamic loading and dynamic linking? Many modern OSs will dynamically load parts of the operating system. Give one example of a part of the operating system that would be a perfect candidate for dynamic linking, and give one example of a part you would not want to load dynamically.
9. In addition to hardware support such as page table and secondary memory, what software support is needed to implement demand paging? Explain clearly.
10. Two program versions, P, Ps and Pd, are developed using static and dynamic memory allocation, respectively. When attempting to execute Ps, an OS gives the message “Insufficient memory, can not run the program.” However, the same OS executes the program Pd without any difficulties. Explain why this happens.
11. Identify whether the following statement is TRUE or FALSE. If the statement is FALSE, correct it and justify the corrected sentence. If the statement is TRUE, justify it. Restrict the justification to a few (less than five) sentences: Global frame allocation algorithm gives better throughput than the local frame allocation algorithm.