Quizlet 3146 Test 3 Questions

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1. **If you have physical main memory of 32KB (2^15) and a page frame size is 8KB(2/13), how many physical page frames are there?**	2^15/2^13 = 2^2 = 4 page frames
2. **if you have 4 physical pages (0-3 as the computer sees it), how many bits does it take to represent a physical page frame number?**	01 = 1, 10 = 2, 11 = 3, 10 = 4 --- so it takes 4 bits to represent 4 physical page frames
3. **How do we ensure process protection for only accessing memory within its memory partition? (For static partitioning)**	By checking the base address of the partition it was allocated + the partition size and comparing it to the memory address it is attempting to access
4. **What are the pros of static memory partitioning**	Very simple
5. **What are the cons of static memory partitioning**	It can cause internal fragmentation which can cause under utilization of memory It can also cause some processes that are LARGER than any partition to not be allocated at all into memory
6. **What is internal fragmentation?**	When a process is allocated to a memory partition that is larger than the process size and causes a gap of unused space between partitions
7. **What is swapping?**	When all partitions are full with processes so a process is taken out of memory and back onto the disk to make room for the new process
8. **What is the difference between static equal-size and unequal-size partitioning?**	Equal: -- equal size partitions -- can lead to LARGER internal fragmentation Unequal: --unequal size partitions --can lead to SMALLER internal fragmentation
9. **What are the policies of partition placement?**	First Fit (FF) Next Fit (NF) Best Fit (BF) Worst Fit (WF)
10. **What is First Fit? (Partition Placement)**	Scans the list and chooses FIRST free space that is large enough for that partition pros: Simple; fast (need not traverse entire list every time) cons: partitions can crown early regions of main memory and not distribute equally
11. **What is Next Fit? (Partition Placement)**	Similar to first fit but starts the scanning where the PREVIOUS scan ended to distribute the partitions more equally throughout memory
12. **What is Best Fit? (Partition Placement)**	Scans the entire list and chooses the smallest free space large enough for the process Cons: Has to scan the entire memory every time, and can leave many small unusable free spaces
13. **What is Worst Fit? (Partition Placement)**	Like best fit but now we choose the LARGEST free space Pros: Leaves larger free spaces Cons: Slow and still has to scan the entire memory
14. **What are the pros and cons of dynamic memory partitioning?**	Pros: More flexible than static Cons: Management is more complex and has EXTERNAL fragmentation
15. **Internal fragmentation and external fragmentation vs. static and dynamic memory partitioning**	static = internal fragmentation dynamic = external fragmentation
16. **How does a program specify memory addresses in DYNAMIC partitioning**	DOES NOT use absolute memory address like static partitioning but uses offsets of start address of 0 dubbed logical address
17. **what is logical address space**	The range of logical addresses a process needs to fit inside memory in which a system translates those relative offsets to absolute address to place it in memory
18. **What is physical address space**	The range of absolute addresses of process
19. **What is the translation from logical to physical address space**	We maintain base address and limit for process and add base address to logical address issued by program and check to see if absolute address is within that limit of that partition

20. **Cons of relative addressing**	Process does not have to be mapped to same physical partition all the time and partition relocation is possible Makes sense for DYNAMIC partitioning
21. **What is compaction?**	Moving processes and relocating them to maximize free space Cons: can get expensive doing this over and over
22. **What is non-contiguous allocation?**	Splitting processes into smaller parts to fit into smaller free space partitions
23. **What is needed for non-contiguous allocation?**	A more sophisticated memory management mechanism to maintain info for multiple parts of processes
24. **What is paging?**	A non-contiguous allocation mechanism that divides PHYSICAL memory into PAGE FRAMES and LOGICAL memory into PAGES of equal size to the page frames so the process can be mapped from pages to page frames
25. **What are page tables?**	OS maintained page to page frame mappings; each process has its own page table
26. **What is the memory management unit?**	The part of OS that takes care of mapping, address translation, etc.
27. **How are logical process addresses translated to physical main memory addresses in paged systems?**	Logical: -- page number -- offset within page Physical: -- page frame number -- offset within frame
28. **What is inside a page table entry structure?**	Page frame number Present/absent flag Protection bits; is read/ read write/ etc. Modified flag Referenced flag caching related flag
29. **What is a TLB**	Translation Look-Aside Buffer is a memory cache that stores recent pages to speed up access to most common page entry tables
30. **What is optimal page replacement policy?**	Gets rid of the page that will not be used for the longest time in the FUTURE (i.e. if you already know what page requests will be in the future, and will only work if future requests are known.)
31. **What is First in First Out page replacement policy (FiFO)?**	Evict the page that has been in the main memory the LONGEST i.e. the first page that was put into main memory will be the first one to be put out of main memory --Provides fairness but doesn't take page usage into account
32. **What is the Second Chance page replacement policy?**	A modified version of FIFO where each page now has a reference bit: 1. Bring in the new pages to main memory and set page reference bits to 0. 2. When there are no empty spots left, look at the oldest page in memory and if reference bit is 0 then evict page for new page. 3. IF page requesting to be put into memory is the same as a page already in memory, set that bit to 1. 4. Reset reference bit to 0 and make it the newest page in memory in your page list
33. **What is the Least Recently Used page replacement policy (LRU)?**	Evict the page that has been used least recently -- Works pretty well for programs that contain locality of reference