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Operating Systems
Test 3

1. Address binding is the mapping of data to its physical location. This is done in three ways :-
- Compile time
- Run time
- Load time

For compile time address binding, the compiler is required to interact with the Operating System Memory Manager to perform compile time address binding.

For load time address binding, it is done by the operating memory manager.

For Runtime address binding, this is done by if dynamic linking is required.

2. Pros :-
- It will be easier to install and implement.
- These non-volatile memories are replaceable.
- Doesn't require continuous power supply. (Non volatile)
- No transfer of data required to different memories.

Cons :-
- Will make the system extremely slow.
- Will not allow system to load high priority processes in a fast manner.
- Will be very expensive.

Ans 3: Blocking I/o is an I/o mechanism that hangs the thread until the input is provided. It is same as Synchronous IO.

Non blocking I/o means that if the input is not given immediately, the thread returns an error and doesn't do anything.

Asynchronous I/o means that Input is taken on a separate thread a (in background) and the original thread continues with the process.

Ans 4: If two entries in the page table point to the same page frame, users OS need not make copies of the data. If the referencing is same, changes made to the original file can be propagated to other references as well.

This will hence, decrease the amount of time needed to copy the data (since no copying is required, only referencing is done).

Also, updating a byte would result in updating the byte to physical memory as well. This can be a problem if the two data values were needed to be kept isolated.

Ans 5. No the operating system need not know the whether the data is signed or unsigned. It can decide for itself whether the data is signed or not using the Most Significant Bit in the data value. Also, since OS operates on 2's complement arithmetic, all the signed as well as unsigned arithmetics are handled automatically.

Ans 6.

a) True, because a Preemptive scheduler requires to stop a process midway or may need to trigger traps due to faults in code like division by zero, which requires trap signals and interrupts.

b) True, the Unix shell supports buffer cache that is the "in memory" representation of disk blocks.

c) True, it is possible to implement Content switching using TLB by storing the state in TLB (only if it's a single state.

d) False, because Non blocking IO requires separate threads and ability to continue process even after not providing IO which isn't possible in a blocking device.

e) True, because it gives maximum throughput and minimum average waiting time & turn around time. but it is not practically implementable because we may not know the burst time for every process.

Ans 7:- When the interrupt occurs, the Operating System first saves the current state, pauses the process Ahead and then redirects the PC to interrupt location. The Interrupt then executes its own chain of commands.

For IO, the above sequences of operation occurs.
For DMA, OS has no role in the transfer of data. The data from memory is directly accessed by other devices.

Ans 8:- Most operating Systems provide each process its own address space.

This has the following advantages:-
- Isolation of Program Instructions
- No memory leaks.
- No Absolutely private and secure data manipulation & st

There are some disadvantages:-
- Libraries and modules need to be loaded separately.
- No access to shared code and data.
- No way to share process's own code, data and results.