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COP4600

HW 4.1

1. /etc/passwd

/./etc/passwd

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3. Early UNIX loaded the program to memory with the magic number 0. This is a branch instruction that pointed to an address above the header so that the header would not run, no need to know the size of the header. Can read the file directly into the new process’ address space and run it at 0.

5. Systems that support random-access files do not need operation to rewind files like that in systems that support sequential files. If the file needs to be read it would just randomly access byte 0.

9. Propose an alternative way to do random access without having the system call would be to add an extra parameter to the read system call that gives an address to read from in the file. The read then acts as a seek function in the file looking for what is needed.

11. Contiguous allocation of files leads to disk fragmentation, as mentioned in the text, be-cause some space in the last disk block will be wasted in files whose length is not an integral number of blocks. This would be considered external fragmentation as it wasted storage between files and not inside them.

12. The effects of a corrupted data block for a given file for:

(a) contiguous: Only the corrupted data block is affected while the remaining data blocks can be read without a problem.

(b) linked: The corrupted block cannot be read and all the location data from beyond corrupted block is gone.

(c) indexed (or table based): Only the corrupted data block is affected.

15. A modern device that requires file storage and for which contiguous allocation would be the smart phone. A smart phone can record many files in a flash disk, nonvolatile storage medium. When the phone is turned off, the data file still remains intact. Pictures in the camera mode are recorded in sequence until the storage is full.

17. For a given class, the student records are stored in a file. The records are randomly accessed and updated. Assume that each student’s record is of fixed size. The most appropriate allocation schemes would be table/indexed and contiguous but linked allocation is not as useful when it requires multiple disk reads for a given record.

18. A file whose size varies between 4 KB and 4 MB during its lifetime. The most appropriate allocation schemes would be both linked and table/indexed allocation. Table/indexed is efficient for random-access scenarios while contiguous is ineffective due to the changing file size.

19. For the i-node of Fig. 4-13, the number of bytes of data could be stored inside the i-node is 9k bytes long if there is a bit left over somewhere among the attributes where the signal to address-block pointers hold data. If there is no bit left over then it would be 8k byte long.