Amey Thakur SE-Comps B-50

Practice Test OS

Class: SE B - 50 **Date: 07/05/2020** **Time: 10 AM to 11AM**

Q.1. Explain Unix iNode structure in detail.

Q.2. Explain Interrupt driven IO and discuss the advantages of Interrupt driven IO over-programmed IO.

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Q1.

- I node is a data structure that keeps track of all the information about a file.
You keep your information in a file and the OS stores the information about a file in an I-Node

- Data structures that contain information about files in UNIX file system that are created when a file system is created
Each file has an I-Node and is identified by an I-Node number (I-Number) in the file system where it resides. I-Nodes provide important information on files such as user and group ownership, access mode (read, write, execute permission) and type.

- The I-Node contains the following piece of information
  - Mode / permission (protection)
  - Owner ID
  - Group ID
  - Size of file
  - No. of hard links to the file
  - Time last accessed
  - Time last modified
  - Time I-Node last modified

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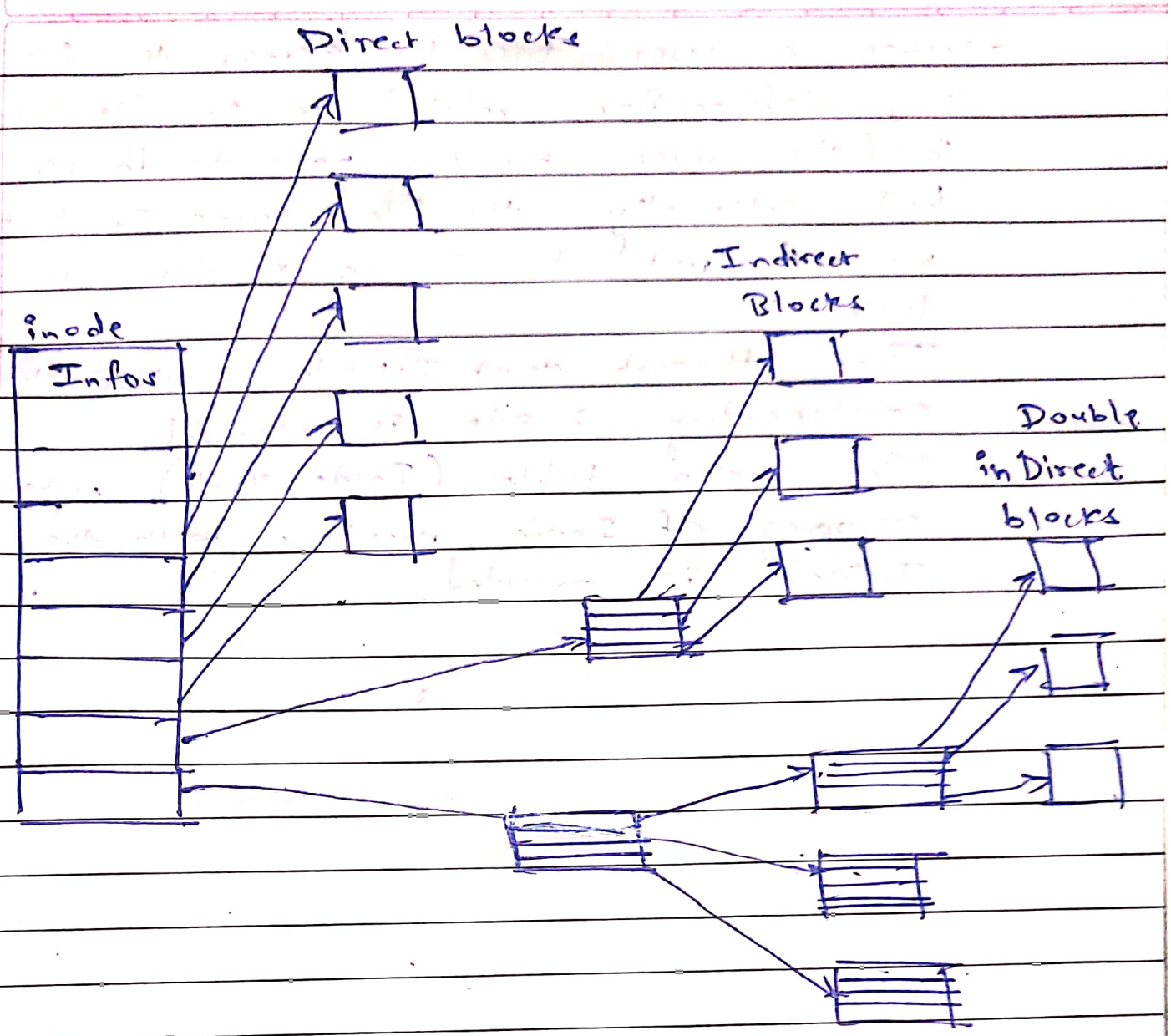

- When a file is created inside a directory then the file name and I-node number are assigned to file.
- These 2 entries are associated with every file in a directory.
- The user might think that the directory contains the complete file and all the extra information related to it but this might not be the case always. So we see that the directory associates a file name with its I-Node number

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- When a user tries to access the file or any information related to the file then he/she uses the file name to do so but internally the file name is first mapped with its I node number stored in a table.
Then through that I-Node number the corresponding Inode is accessed.
There is a table (Inode Table) where this mapping of Inode numbers with the respective Inodes is provided.

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Q2.

- When CPU issues I/O command in support of process two possibilities exist.
- Interrupt driven IO is an alternative scheme dealing with IO.
Interrupt IO is a way of controlling Input/Output activity whereby a peripheral or terminal that needs to make or receive a data transfer sends a signal.
This will cause program interrupt to be set.
- At a time appropriate to the priority level of the IO interrupt. Relative to the total interrupt system, the processor enters an interrupt service routine.
- The function of the routine will depend upon the system of interrupt levels and priorities that is implemented in the processor.

- Basic operation of Interrupt.

1. CPU issues read command
2. I/O module gets data from peripheral whilst CPU does other work
3. I/O module interrupts CPU.
4. CPU requests data
5. I/O module transfers data.

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- Design issues

There are two main problems for interrupt IO which are:

- There are multiple I/O modules, how should the processor determine the device that issued the interrupt signal?

- How does the processor decide which module to process when multiple interrupts have occured?

- There are four main ways to counter these problems which are

1. Multiple Interrupt lines
2. Software poll
3. Daisy chain (Hardware poll, Vectored)
4. Bus Arbitration (Vectored)

Advantages of Interrupt driven IO

→ It is fast

→ It is efficient

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