and manage the interactions between the processing

Q22. Explain the elements of an image processing system.

Ans: Oct./Nov.-18, Set-2, Q2(a)

Components of an Image Processing System: The general block diagram of an image processing system and its elements is as shown in figure (1).

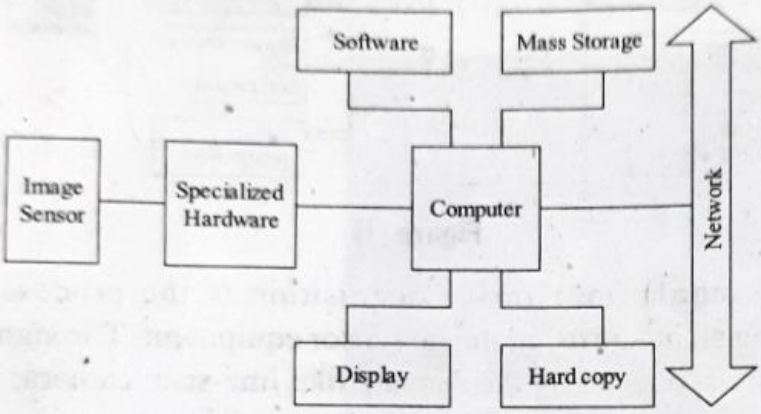

Figure (1)

The first element is the image sensor which is used to obtain the digital image. It consists of a sensing device which converts the incident light energy into its proportional electrical signal and a digitizer to convert the analog electrical signal to digital signal. For example, the image sensor of the digital camera consists of the sensing device that produces an electrical output proportional to the incident light and a digitizer that converts these outputs to a digital data.

A specialized hardware is used to improve the speed of the image processing system and it is used only for special applications. It consists of a digitizer and an ALU unit. A digitizer is used to get a digital data from the sensor output and an ALU unit is used to perform primitive operations like addition, subtraction, division, etc., on the images. This unit perform functions that require fast data throughputs which cannot be handled by a main computer and is called as front-end subsystem.

The computer used can be either a PC or a super computer. For dedicated applications, specially designed computers are used to achieve the desired level of performance. A software that consists of specialized modules are required by computer to perform the specific task. The memory required to store the image is large and hence a mass storage is required to store the images. The digital storage used for an image processing system consists of,

1. Short-term storage is used during the processing of images. The computer memory (RAM, ROM) or a frame buffer can be used as short-term storage.

2. On-line storage is used when frequent recall of images are required. Magnetic disk or optical media storage can be used as on-line storage.

3. Archival storage is used to store the images which are accessed frequently in magnetic tapes and optical disks stored in juke boxes can be used for archival storage.

To represent the image on the screen, display is used. Colour monitors are usually used now a days, it is driven by the output of images and graphic card which is an integral part of the computer. In order to record image permanently, hard copy devices such as laser printers, film camera, inkjet units etc., are used. For the purpose of communication between several computers, a network is used to connect them. The bandwidth required to transmit images is large and hence a good network architecture is required specially for communication with remote sites through internet.