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**COMPUTER HARDWARE ASSIGNMENT**

**Electronic chip fabrication process:**

An integrated circuit is also called chip or microchip. It is a semiconductor wafer in which millions of components are fabricated. The steps in manufacturing integrated circuits are:

STEP 1: **wafer production:**

Wafer is a round slice of semiconductor material such as silicon. Silicon is preferred because of its characteristics, it is more suitable for manufacturing IC. First purified polycrystalline silicon is created from the sand, then it is heated to produce molten liquid. A small piece of solid silicon is slowly pulled from the melt, the liquid cools to form single crystal ingot. It is cut using wafer slicer to form a thin round wafer. When the wafer is cut the surface is damaged, but it can be smoothened by polishing. The wafer is cleaned using high purity low particle chemicals, it is then exposed to ulter pure oxygen.

STEP 2: **masking:**

Photolithography is used to protect some area of the wafer when working on another. It includes masking with a photographic mask and photo etching, a photoresist film is added on the wafer. The wafer is then aligned to a mask using photo aligner then it is exposed to ultraviolet light through mask. Generally, there are automatic tools for alignment purpose.

STEP 3: **etching:**

it removes material selectively from the surface of wafer to create patterns which are defined by etching mask. Either wet or dry, etching can be used to remove the unmasked material. Isotropic etching is used to perform in all directions, anisotropic etching is faster in one direction. Wet etching uses solvent for removing materials, it is suitable for transfer pattern with submicron feature size. Dry etching uses gases to remove materials, it is strongly anisotropic but less sensitive.

STEP 4: **doping:**

The silicon wafer is then bombarded with ions in order to alter it’s conductive properties, this is referred to as doping. To alter the electrical character of silicon, atom with one less electron than silicon such as boron and atom with one electron greater than silicon such as phosphorous are introduced in this area.

STEP 5: **metallization:**

it is used to create contact with silicon and to make interconnections on chip. A thin layer of aluminum is deposited over the whole wafer because it is a good conductor and has good bond with silicon.

The processes will be repeated for each successive layer until all integrated chip are completed.

Each wafer contains hundreds of chips, those chips are separated and packaged by a method called scribing and cleaving.