LECTURE # 3

CAD/CAM COURSE

TOPIC OF DISCUSSION

CAD/CAM HARDWARE & SOFTWARE

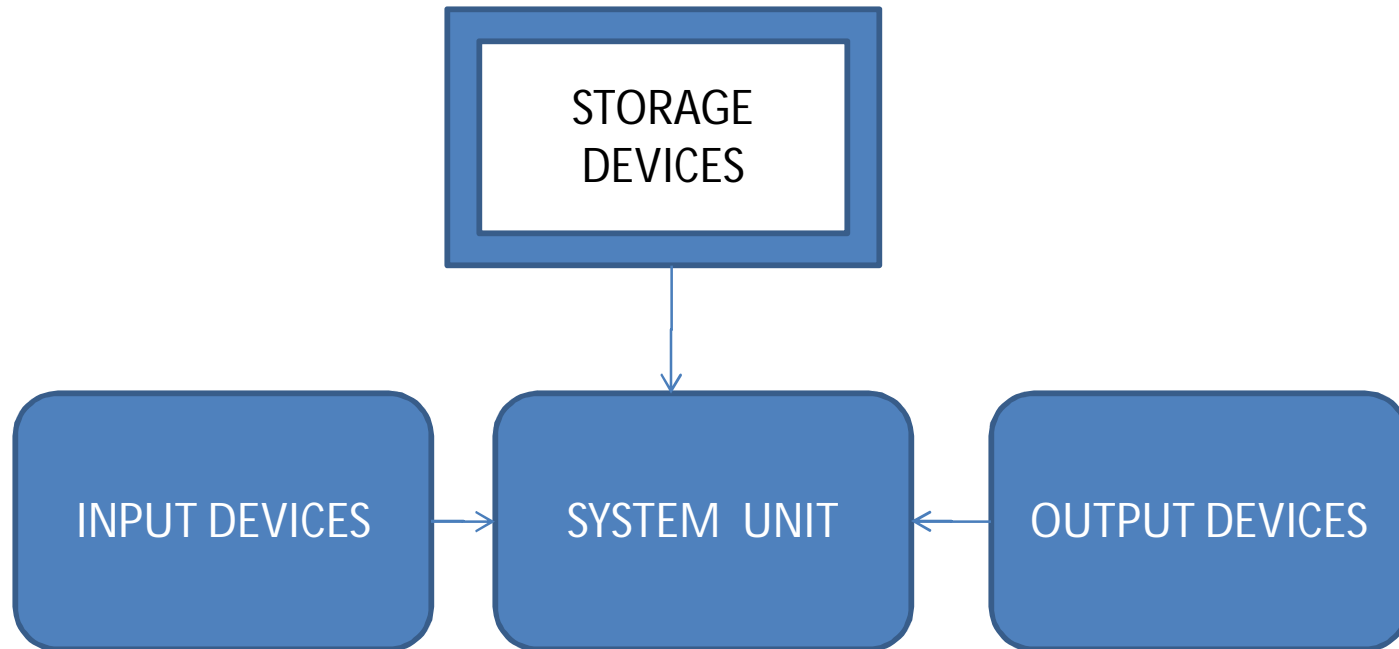3/25/2011

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BASIC STRUCTURE OF A COMPUTER HARDWARE

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                    ┌─────────────────┐
                    │  STORAGE        │
                    │  DEVICES        │
                    └────────┬────────┘
                             │
                             ▼
┌──────────────┐    ┌────────────────┐    ┌─────────────────┐
│ INPUT DEVICES│──▶ │  SYSTEM  UNIT  │ ◀──│ OUTPUT DEVICES  │
└──────────────┘    └────────────────┘    └─────────────────┘
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BASIC STRUCTURE OF A COMPUTER HARDWARE- CONTD

a. Input Devices

- ❑ Keyboard
- ❑ Mouse
- ❑ Trackball, Joystick
- ❑ Touch Pad
- ❑ Thumbwheel
- ❑ Light-Pen
- ❑ Digitizer

b. Output Devices

- ❑ LCD
- ❑ 3D Printing Machine
- ❑ Printers
- ❑ Plotter

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c. System Unit Components

- ❑ Motherboard
- ❑ Processor
- ❑ RAM
- ❑ Cards (graphic, Video etc.(
- ❑ LAN
- ❑ Ports & Connectors
- ❑ Buses & Slots
- ❑ Power Supply etc.

d. Storage Devices

- ❑ Hard disk
- ❑ Floppy
- ❑ CD ROM
- ❑ DVD ROM
- ❑ Pen Drive

BASIC STRUCTURE OF A COMPUTER SOFTWARE

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                    ┌─────────────────────────┐
                    │   CAD/CAM APPLICATION   │
                    │       SOFTWARE          │
                    └─────────────────────────┘
                                │
              ┌─────────────────┴─────────────────┐
              ▼                                     ▼
   ┌──────────────────────┐            ┌──────────────────────┐
   │   CAD APPLICATION    │            │   CAM APPLICATION    │
   │      SOFTWARE        │            │      SOFTWARE        │
   └──────────────────────┘            └──────────────────────┘
      │        │        │                  │       │        │
      ▼        ▼        ▼                  │       ▼        ▼
  ┌───────┐┌────────┐┌─────────┐          │  ┌─────────┐┌─────────┐
  │MODELING││ANALYSIS││DRAFTING │          │  │ANALYSIS ││ CONTROL │
  └───────┘└────────┘└─────────┘          │  └─────────┘└─────────┘
                                           ▼
                              ┌─────────────────────┐
                              │        PART         │
                              │    PROGRAMMING      │
                              └─────────────────────┘
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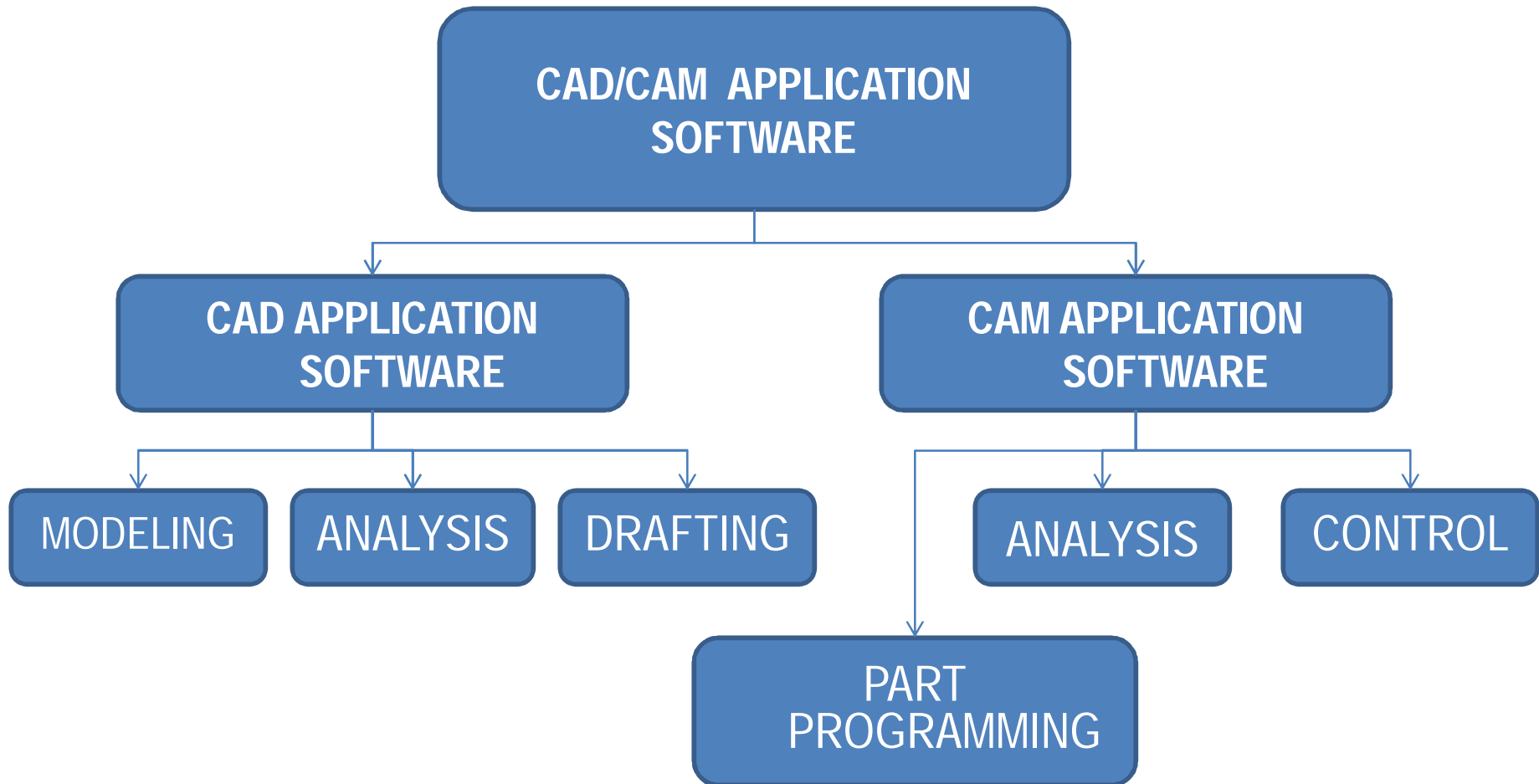
CAD/CAM SOFTWARES

- The CAD application software may be of modeling, analysis or drafting type

- The CAM applications is used for generating the CNC part program or to simulate motion and control the machine

- The modeling application software can generate 2D and 3D models using softwares like Pro/E, Solid Edge, Solid Works, Inventor, Neoform etc.

- These models are analyzed using various application software for specific function. ANSYS, NASTRAN are some of the examples of such softwares

PARTS OF CAD/CAM SOFTWARE

CAD/CAM software consist of following parts;

1. Type of a software

2. Data Structure

3. Database

4. Database Management System (DBMS)

5. Coordinate Systems

1. TYPE OF SOFTWARE

➢ The different kinds of software are being used in a typical CAD/CAM environment for distinct applications

➢ These applications may be design/modeling, analysis, drawing, documentation and manufacturing

➢ Modeling is crafting a virtual model. The model may be of wire frame, surface model or solid model.

➢ Feature based modeling; variational modeling and parametric modeling etc are some of the techniques

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- Operating conditions are simulated in Analysis. The analysis may be stress analysis, fracture analysis, heat transfer etc.

- Once the model is ensured to be safe the actual working conditions, production drawings are to be generated

- These drawings can be generated using Computer Aided Drafting & Documentation (CADD)

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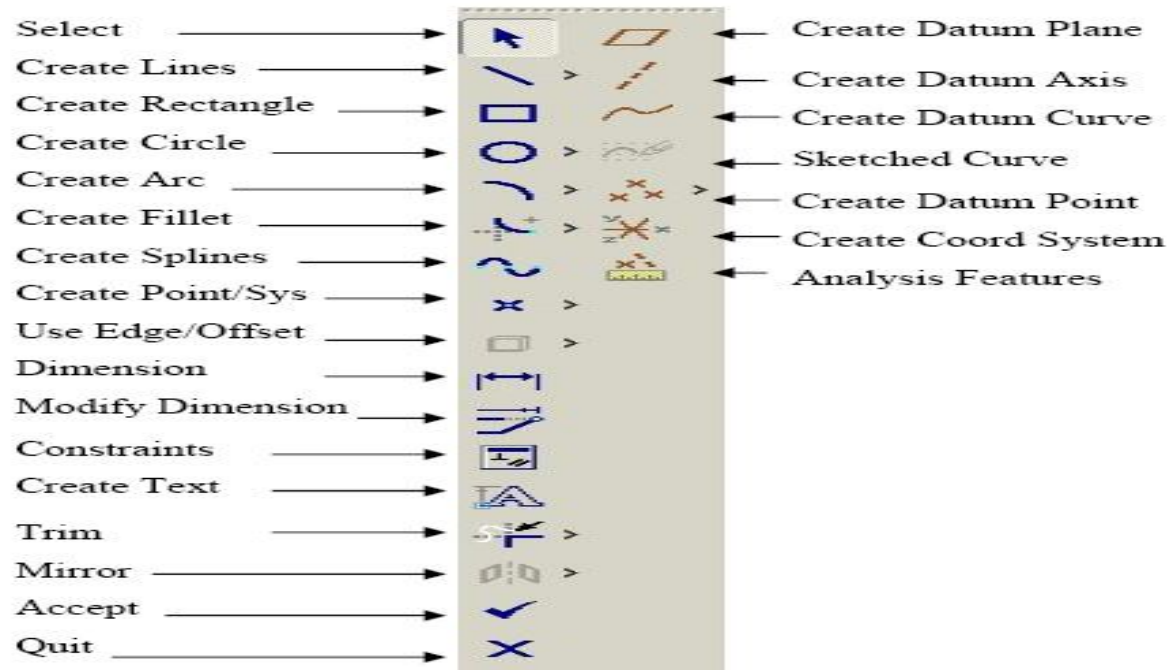
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- CAM also uses geometric data of the model and can generate NC part programs and process plan using appropriate software

- This can also be done computer aided robot programming and automation

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2. DATA STRUCTURE

The data in terms of CAD/CAM may be basic entities or primitives, which are used to make the part or model

Select	Create Datum Plane
Create Lines	Create Datum Axis
Create Rectangle	Create Datum Curve
Create Circle	Sketched Curve
Create Arc	Create Datum Point
Create Fillet	Create Coord System
Create Splines	Analysis Features
Create Point/Sys	
Use Edge/Offset	
Dimension	
Modify Dimension	
Constraints	
Create Text	
Trim	
Mirror	
Accept	
Quit	

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- Data structure is a way of storing data in a computer so that it can be used efficiently

- A well designed data structure allows a verity of critical operations to be performed, using as little resources, both execution time and memory space, as possible

- Different kind of data structures are suited to different kinds of applications, and some are highly specialized to certain task

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3. DATABASE

- A database is a collection of information stored in a computer in a systematic way

- The CAD/CAM database of software may include the part libraries, the geometric relationships, material properties, analysis algorithms etc.

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4. *DATABASE MAMAGEMENT SYSTEM (DBMS)*

- An approach used to manage a database is known as database management system

- A user can interact with the software only through database management system

DATABASE → DBMS → USER

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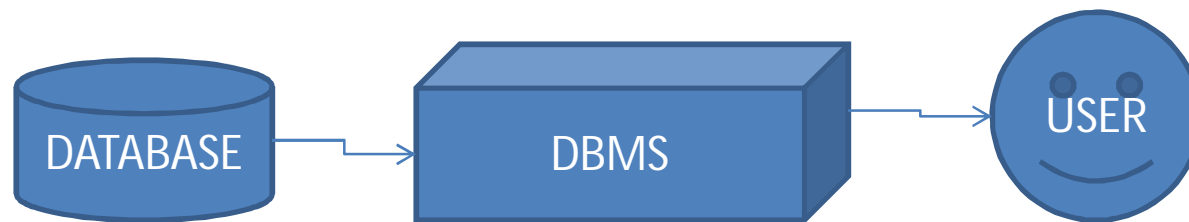
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5. ***COORDINATE SYSTEM***

- *World Coordinate System*

  ➢ Software Default

- *User Coordinate System*

  ➢ Define by user

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