Lecture 8

AutoCAD
History, Basic concepts, Edit&View

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Exercise DrE-5

**Required:** Manufacturing drawing

- Students worked in groups to measure given part
- **Each student** has to submit **its own** hand made MANUFACTURING DRAWING by Friday week 8
  - completely describes given part with as many orthographic projections and/or cross sections as necessary
  - Has all required dimensions, tolerances and surface finishes
- That drawing will later in weeks 9-11 be redrawn using AutoCAD, then printed and submitted as exercise CAD-1

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Plan

- CAD systems and AutoCAD in general
- Philosophy of AutoCAD
- Model & Layout space, UCS
- Layer Technique
- Graphical & Textual window
- Options
- Drawing & Editing Commands

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History of CAD - Computer Aided Design

- 25 years ago, nearly every drawing produced in the world was done with pencil or ink on paper. CAD has fundamentally changed the way design is done.
- First Drafting systems started in 1957 by General Motors and 1960 by McDonell Douglas Automation Company.
- Autodesk started their first CAD system – AutoCAD in 1982.

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CAD systems in general (1)

- Consists of:
  - CAD User - Human
  - CAD Hardware
  - CAD Software

- Human: knowledge

- CAD Hardware use of Digital Computer:
  - CPU
  - Memory: *internal & external*
  - Storage: *mostly external*
  - Input devices
    - Keyboard, Mouse, Optical pen, Tablet, Scanner, Modem, Digitiser
  - Output devices
    - Computer screen (graphical&textual), Printer, Plotter, Modem
CAD systems in general (2)

- CAD Software:
  » System Software
  » Application Software

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CAD systems in general (3)

1. Information model:
   » Real world →
   → set of primitives
   - 2D
   - 2½ D
   - 3D Wireframe
   - 3D Surface
   - 3D Solid

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CAD systems in general (4)

2. Data model:
   Representation of primitives (Formal & Relational)

3. Memory model:
   Data representation and organisation

4. Memorising model:
   Physical data storage

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Philosophy of AutoCAD

- In early days AutoCAD was used as a drafting tool.
- Through the years and many releases it become a design tool.
- ‘Icon’ based environment - icons grouped in toolbars.
- AutoCAD screen contains two parts: graphical screen and textual (command) line.
- AutoCAD saves files in .DWG format but can import and export different formats (DXF, IGES).
- Model (2D) is made in a ‘MODEL SPACE’ drawings are generated in ‘DRAWING SPACE’.

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Design web AutoCAD Toolbars

Pull-down Menus

Standard Toolbar

Draw Toolbar

Modify Toolbar

Object Properties Toolbar

Graphics Cursor

Graphics Window

Command Line

Cursor Coordinate Display

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Model space

- There are two main domains within an Autocad, **MODEL space** and **PAPER space**.

- **MODEL space**
  - All drawing or 'modelling' is done in here
  - It is the main ‘modelling’ area in Autocad

- **PAPER space**
  - It is an area used to plot (print) the drawing created in the model space
  - It is actually a blank sheet in which a real object drawn in model space can be represented as a printable drawing in a proper scale.

**NOTE:**
Model space - 1:1; Paper space – any standard scale

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Coordinate Systems

World Coordinate System (WCS):
• Used to define global position of all objects as well as the other coordinate systems

User Coordinate System (UCS)
• Used to define the orientation of X, Y, and Z axes in 3D space.

The UCS determines the default placement of a geometry in the drawing

Run UCS Movie
• A layer can be thought of as a large piece of clear plastic on which a part or whole drawing is made.

• Layers are controlled by the **layer properties manager** button located on the object properties toolbar.
Graphical User Interface (GUI)

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Using Options
Using Command line
Drawing & Editing Commands

- Drawing Menu
- Modify (Edit) Menu

Play the Movie

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AutoCAD Tutorials

● **TUTORIALS** for week 9, week 10 and week 11 in SEMS IT laboratory room CM250 A

● Groups A & B:
  » Fridays 9,00 – 12,00

● Groups C, D & E:
  » Fridays 14,00-17,00

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