

COMPUTER AIDED ENGINEERING DESIGN (BFF2612)

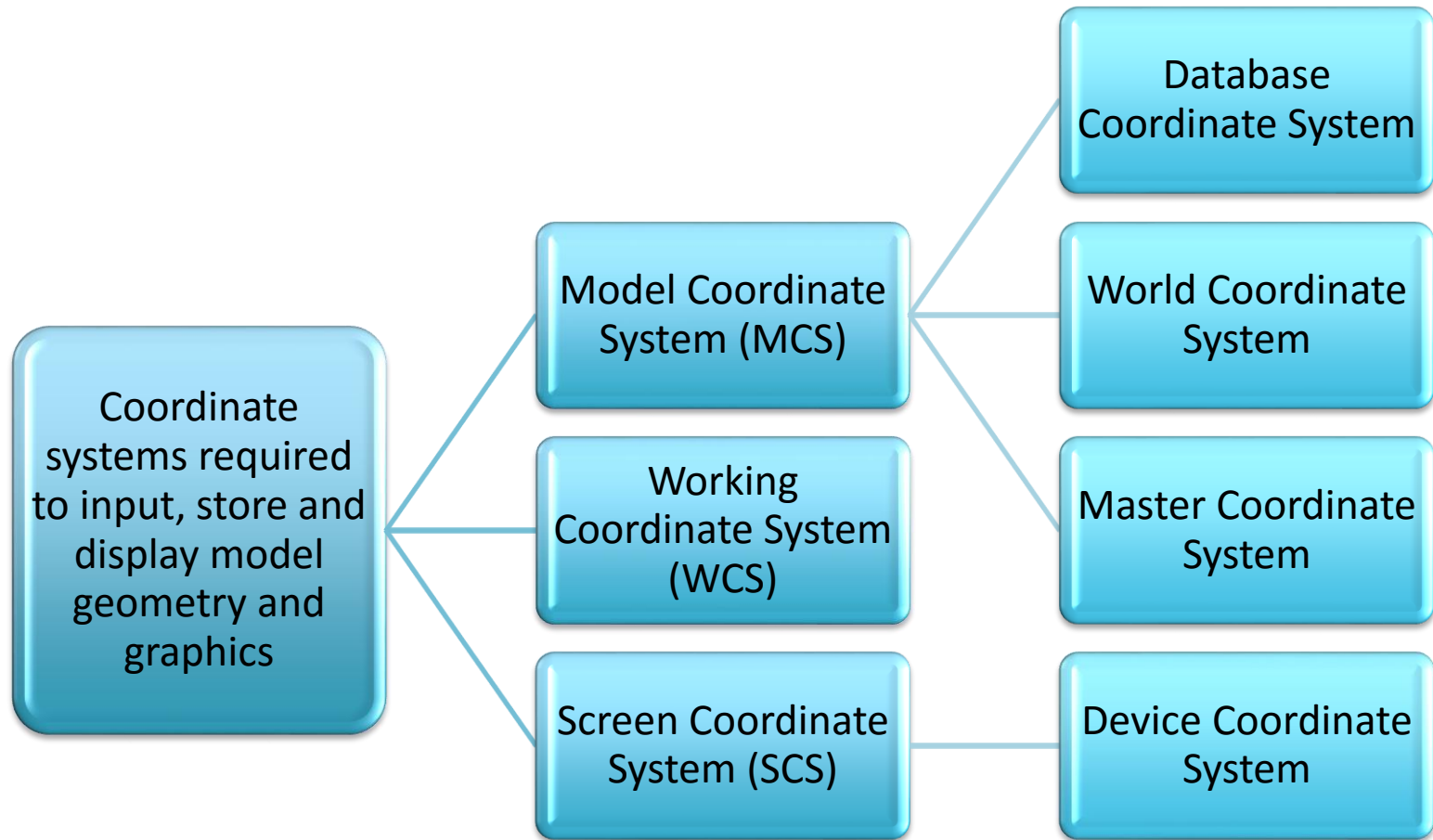
PART DESIGN Sketching Concept and Sketcher Workbench

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Computer Aided Engineering
Design: Dr Nizar

COORDINATE SYSTEMS



MODEL COORDINATE SYSTEMS

- The reference space of the model. With respect to all the model geometrical data stored.
- Cartesian system - forms the default coordinate system
- Origin can be arbitrarily chosen by the user.

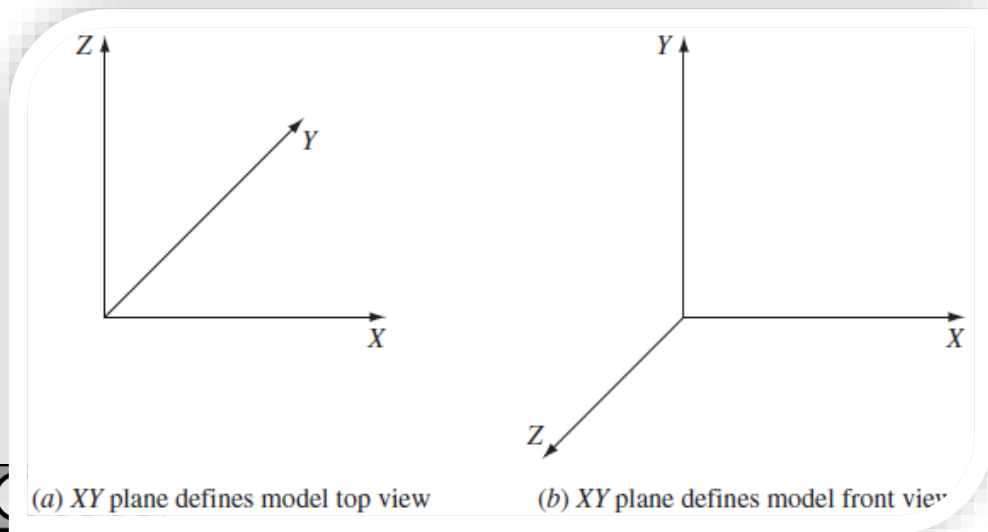


Figure (a) = XY plane is horizontal plane

XY = model top view

XZ = model front view

YZ = model right side view

Figure (b) = XY plane is vertical plane

XZ = model top view

XY = model front view

YZ = model right side view



SKETCHING AND SKETCH PLANES

- A sketch status is a very important issue to the sketcher.
- If a sketcher (profile) is not correctly defined, a valid solid cannot be generated from it.
- Sketchers provide CAD designers with various sketching entities and tools such as lines, arc, circles and so on.
- Sketchers provide geometric constraints and relationships.



SKETCHING AND SKETCH PLANES

- If we need sketch planes beyond the standard Top, Front, and Right offered by a sketcher, we must create them.
- A new sketch plane is considered geometry that is not part of the model under construction (but it is part of the model's geometric definition).
- It is referred to as a datum plane, which is part of the model reference geometry.

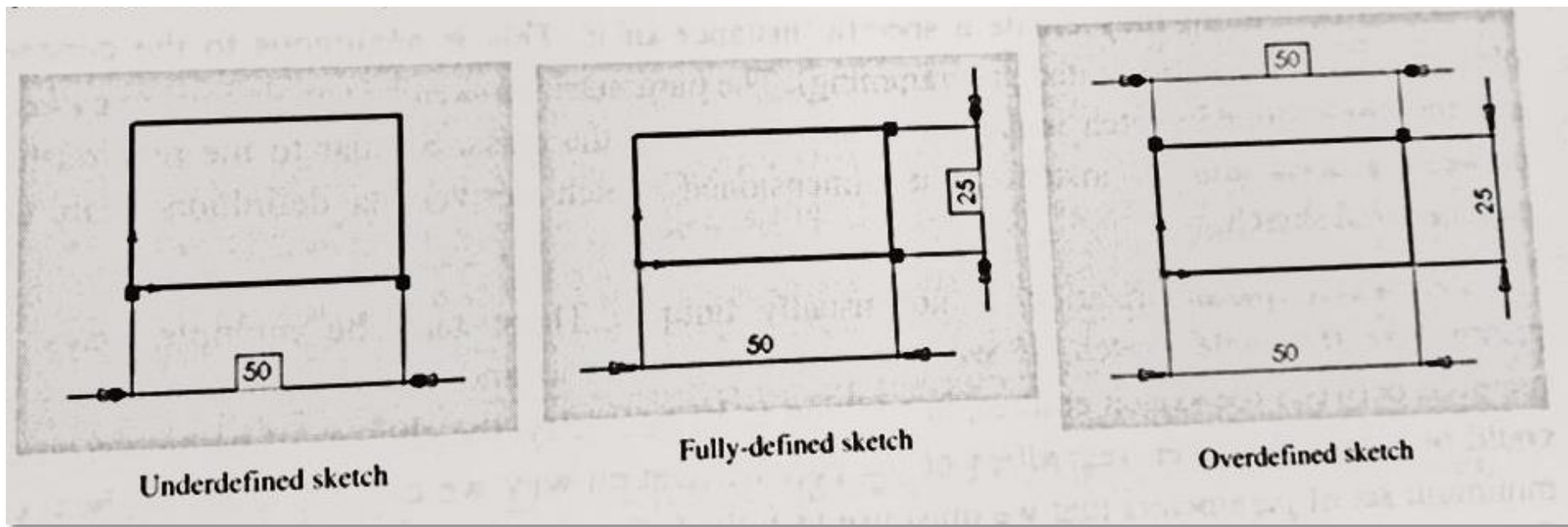
CONSTRAINTS

- Part of sketch definition.
- Can be dimensional (length equals to a number) or geometrical (two lines are always perpendicular).
- Can use equations for more elaborate constrains.

Example of geometrical constraint:

The length of a line could be set to be twice the length of another line. When the value of the later length changes, the length of the former line changes as well, thus maintaining the geometric constraint.

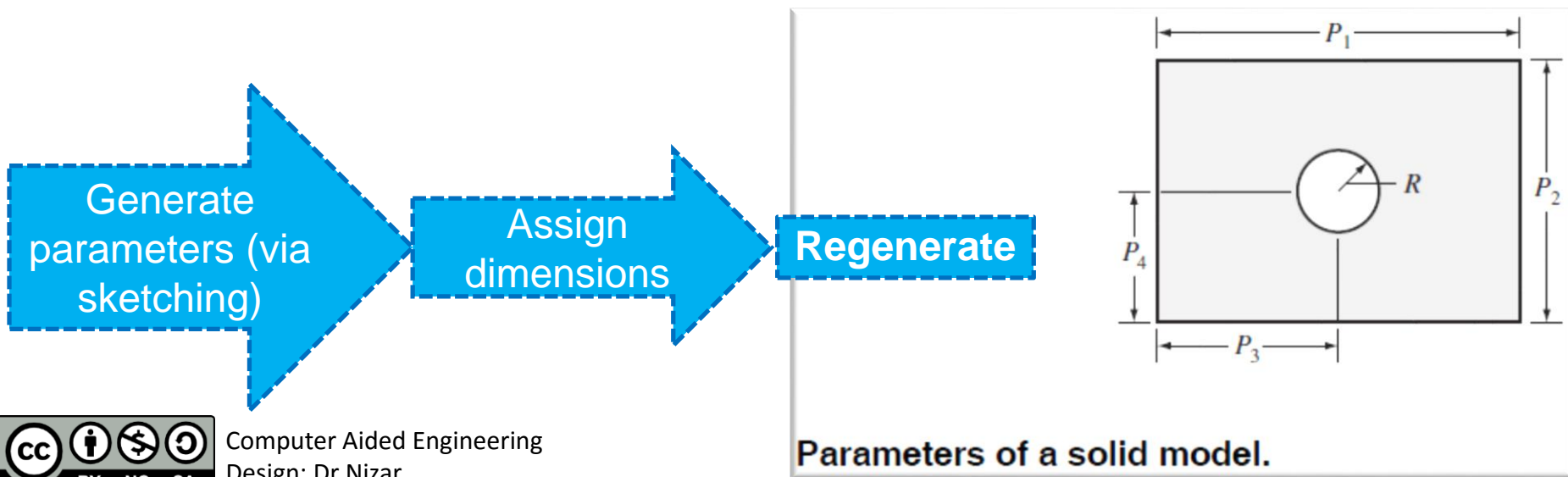
DIMENSIONAL CONSTRAINTS



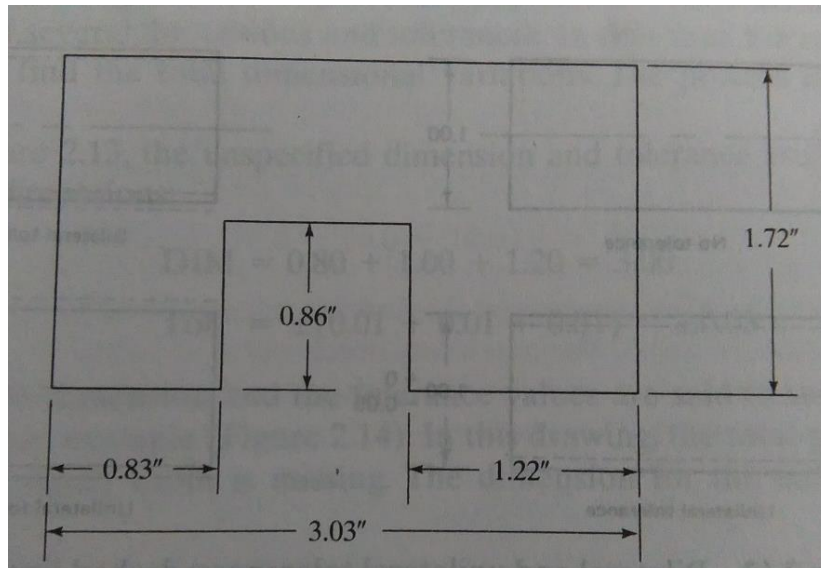
***Useful in relating sketch entities together.**

PARAMETERS AND DIMENSIONS

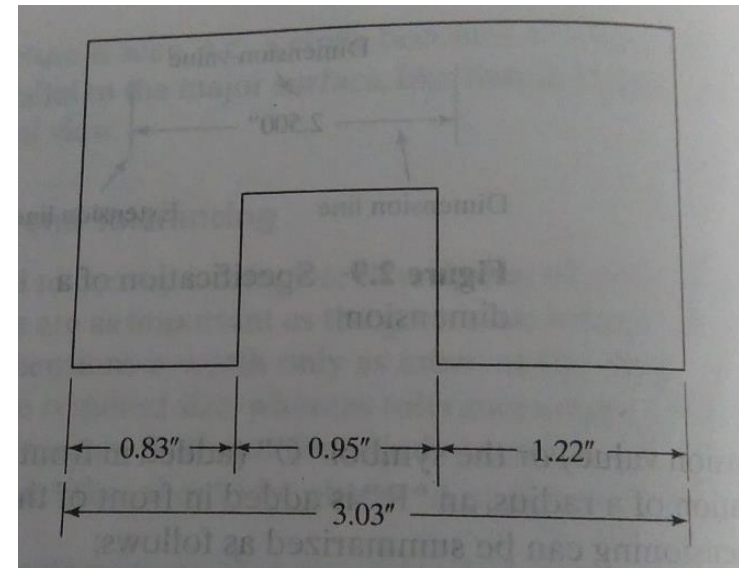
- **Parameters** are the generalization of the sketch definition.
- They create a template of the sketch.
- **Dimensions** are the specification of the sketch definition.
- They create a specific instance of it.



DIMENSIONS



Adequate dimensions



Redundant dimension and incomplete dimensions

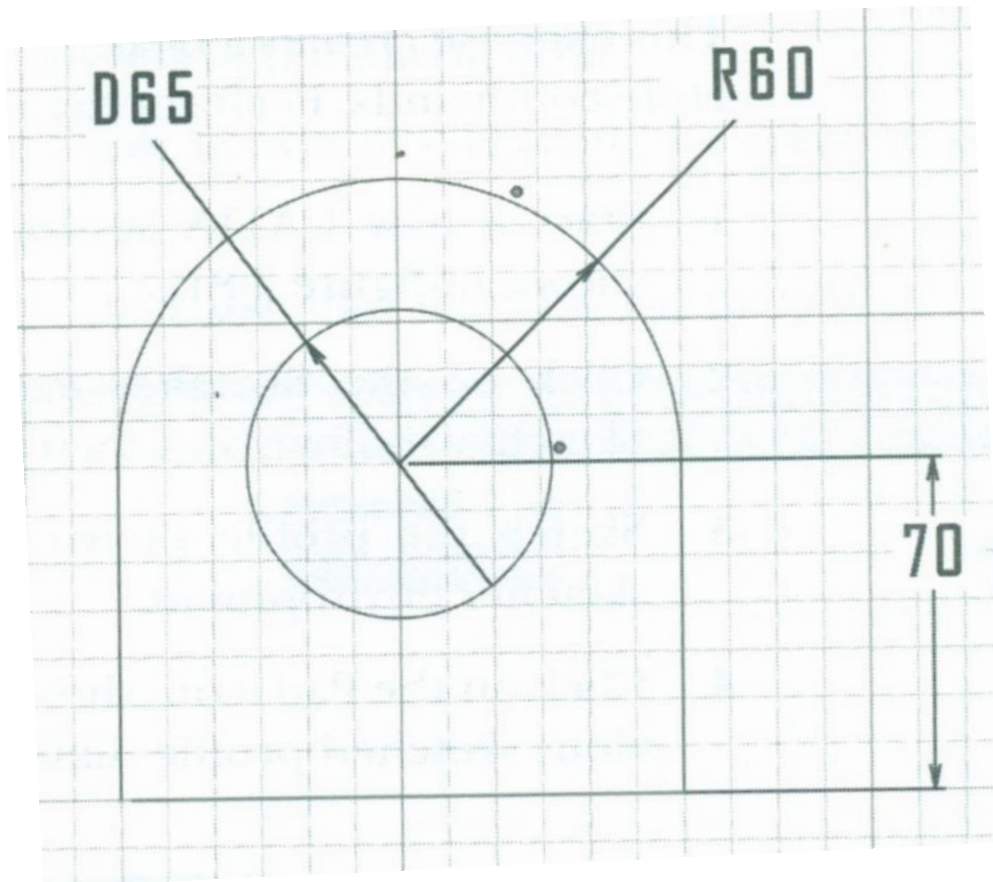
CLASS EXAMPLE



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EXAMPLE 1

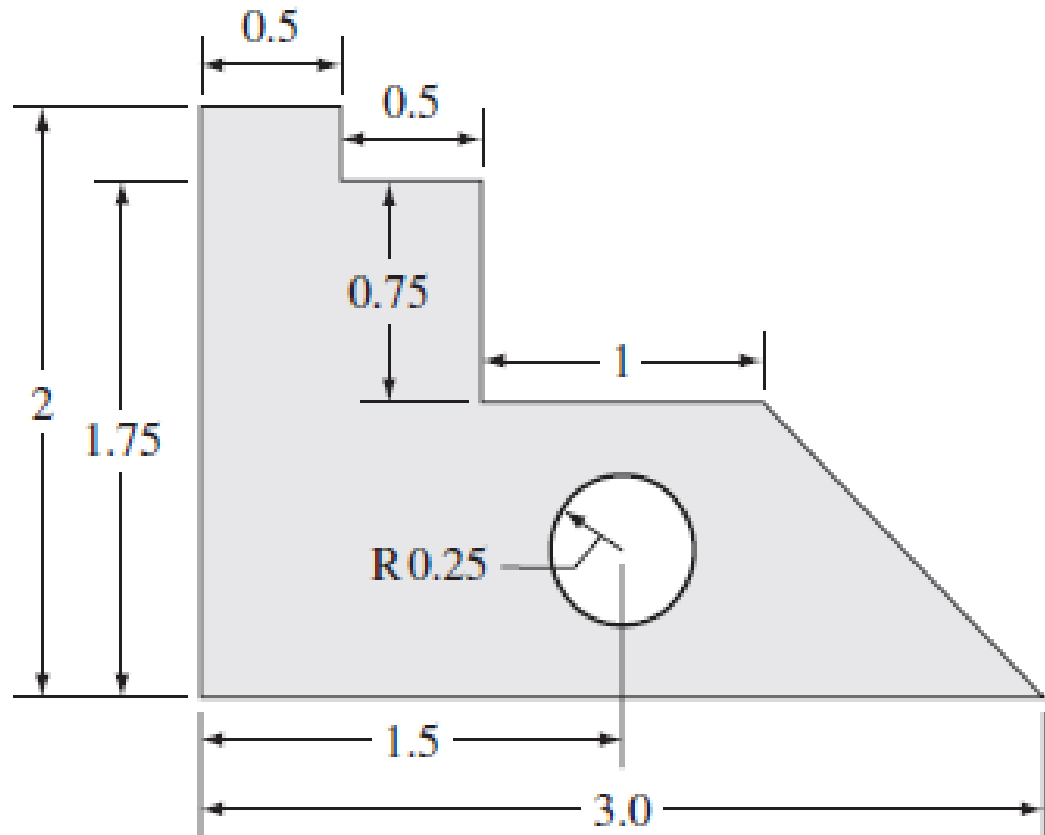
- Unit in mm
- Create a sketch on YZ plane
- Circle centre at (0,0,0)
- The geometry is symmetrical along both Y and Z axes
- Sketch must be fully defined



Try to use mirror operation as well for this example

EXAMPLE 2

- Unit in inch
- Create a sketch on YZ plane
- Sketch must be fully defined



Have any questions?



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Thank you
and Have a nice day!



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