

Lecture 1

# BASICS OF ENGINEERING DRAWING

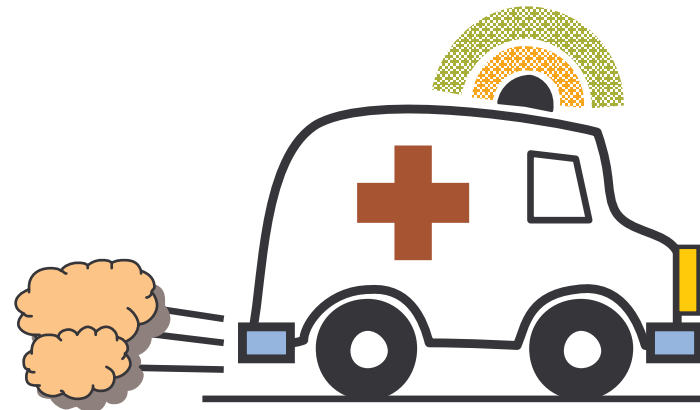


TA 101 : Engineering Graphics

2007-08 Semester II

January – May 2008

# SKETCHING VERSUS DRAWING



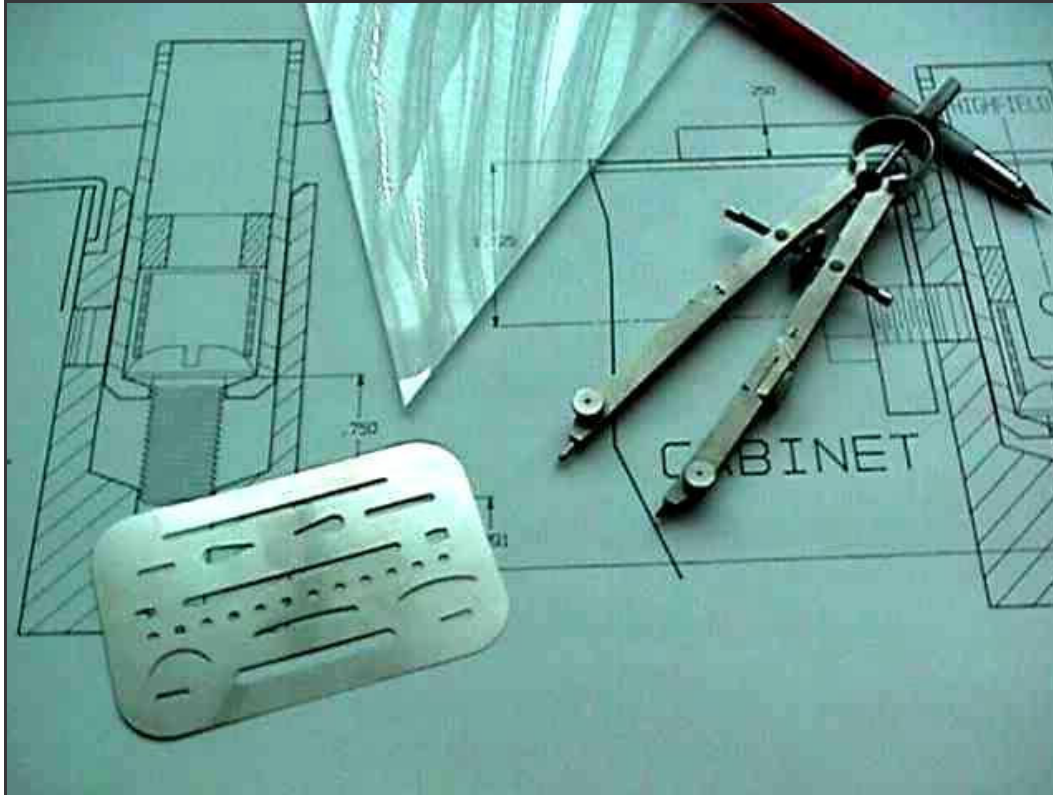
# OUTLINE

- Basics of Engineering Drawing

- Need

- Tools

- Tips



NEED

- Question 1

– I am a \_\_\_\_\_ Engineering student.  
Do I really need to learn drawing?

- Answer

– If you want to be an Engineer,  
and not just an engineering degree holder,  
you need to learn drawing.

- Question 2

– I am a 5-year MSc (Integrated) \_\_\_\_\_ student.  
Do I really need to learn drawing?

- Answer

– Engineering involves application of science.

### Who knows?

Some of you may fall in love with Engineering; like many other scientists who were originally science graduates, you may also pursue engineering careers in future.

- Why Engineering Drawing is necessary ?

- First skill of an engineer

- Plan the work

- Second skill of an engineer

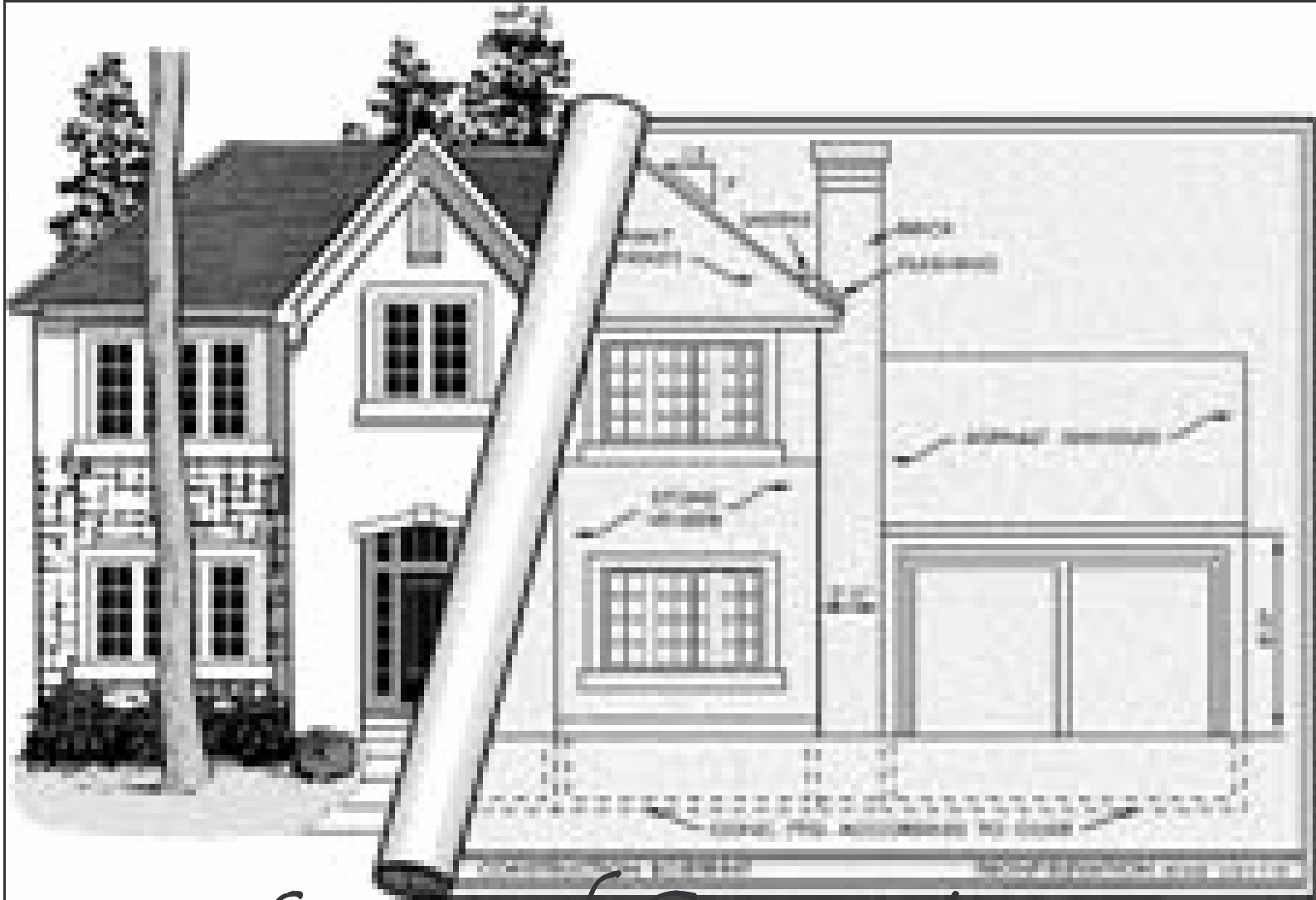
- To work the plan

- Both require maps/drawings/sketches



An engineer ...





# Sense of Geometry

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Big picture...



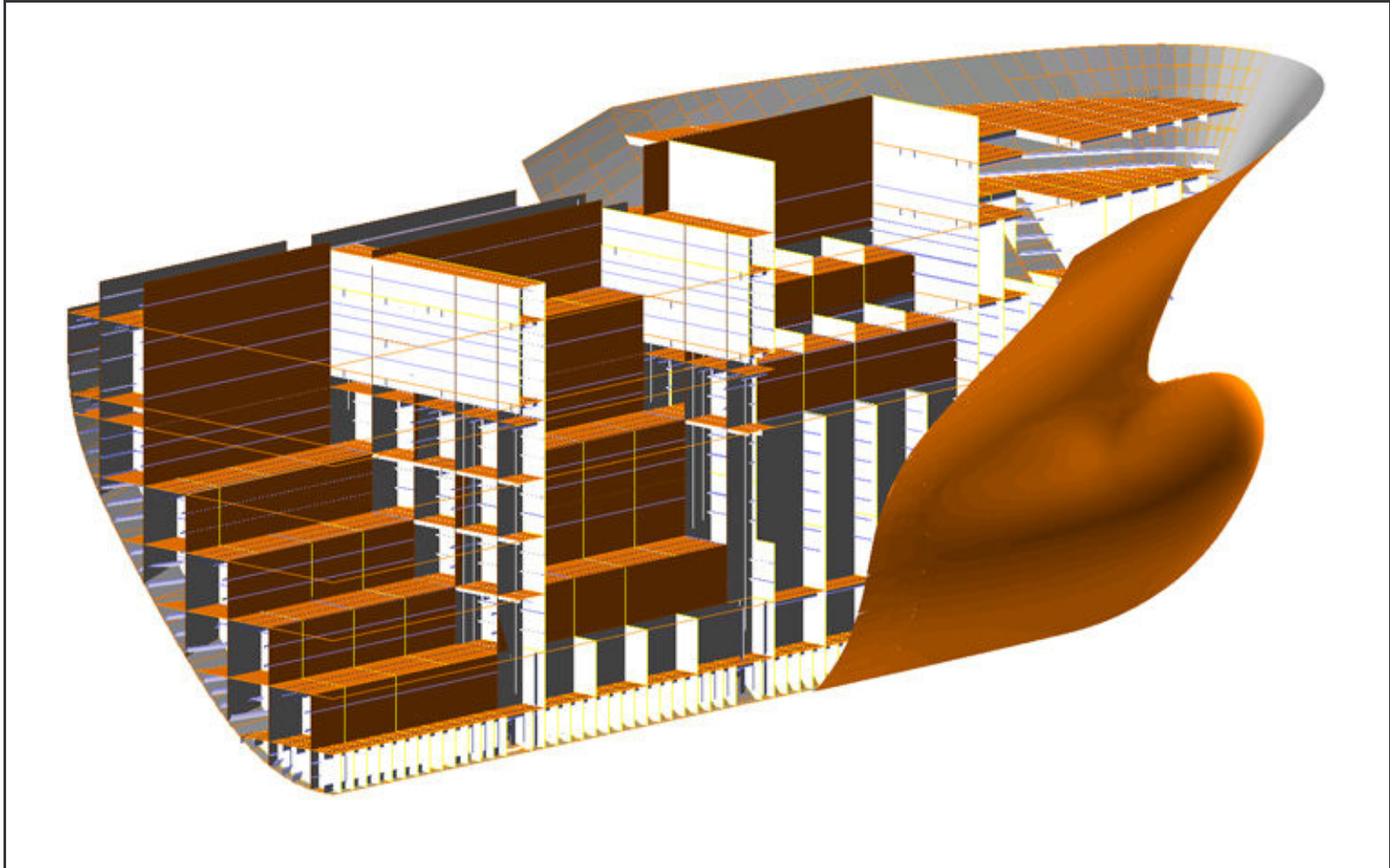
# Imagination

11

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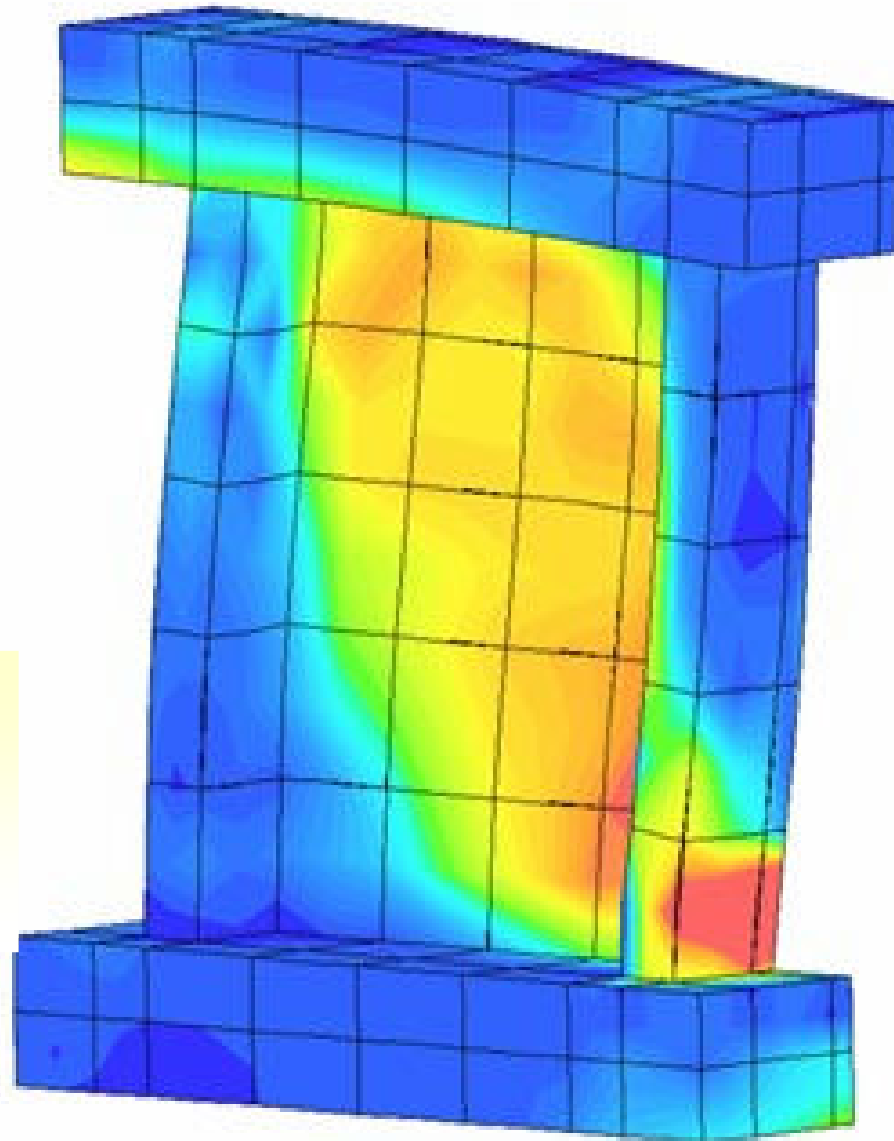


Feel both the  
seen & unseen  
surfaces



# Design Conception

# Analytical Capability





# Nerves for Execution

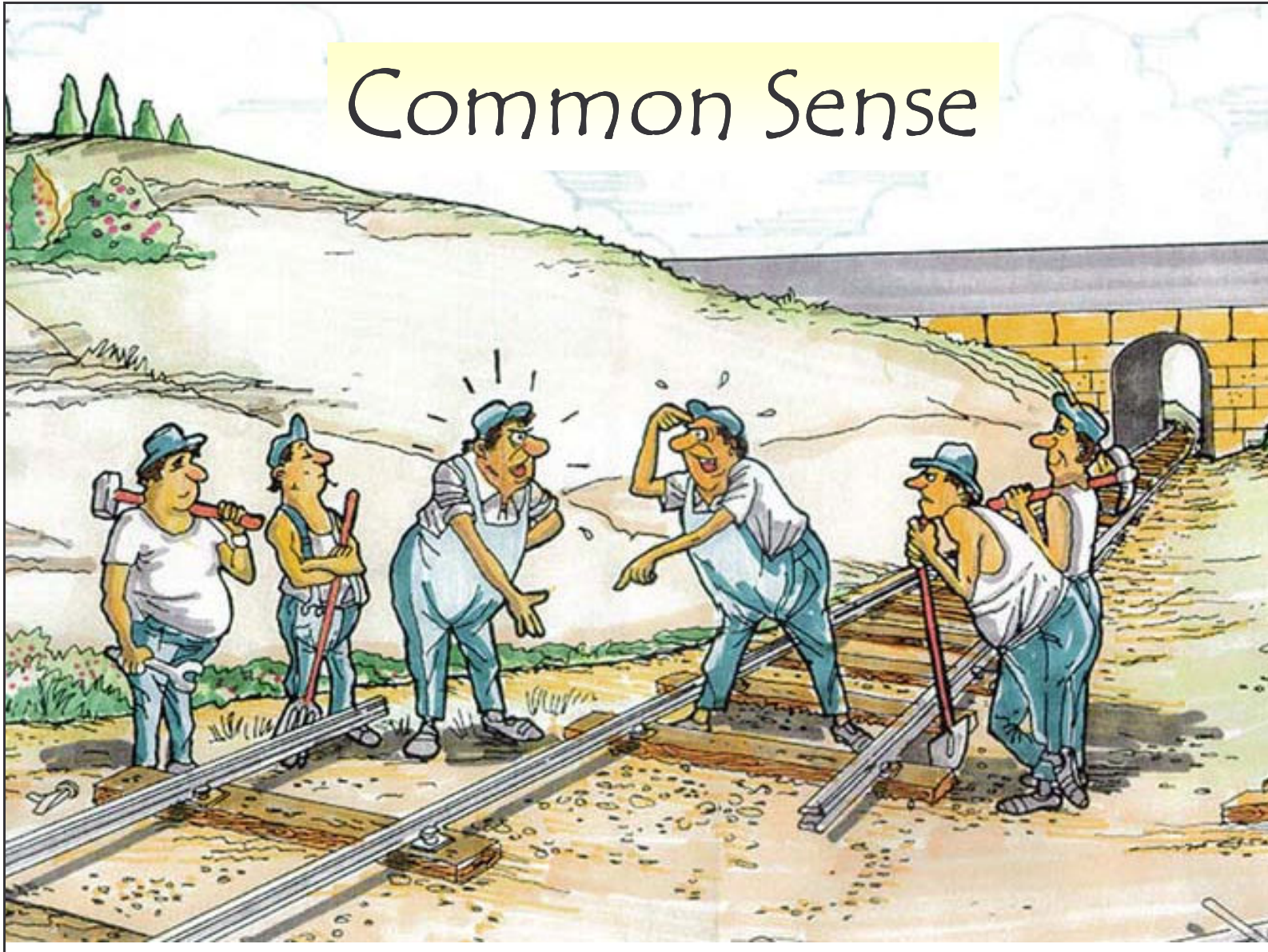




Respect for Safety...



# Common Sense





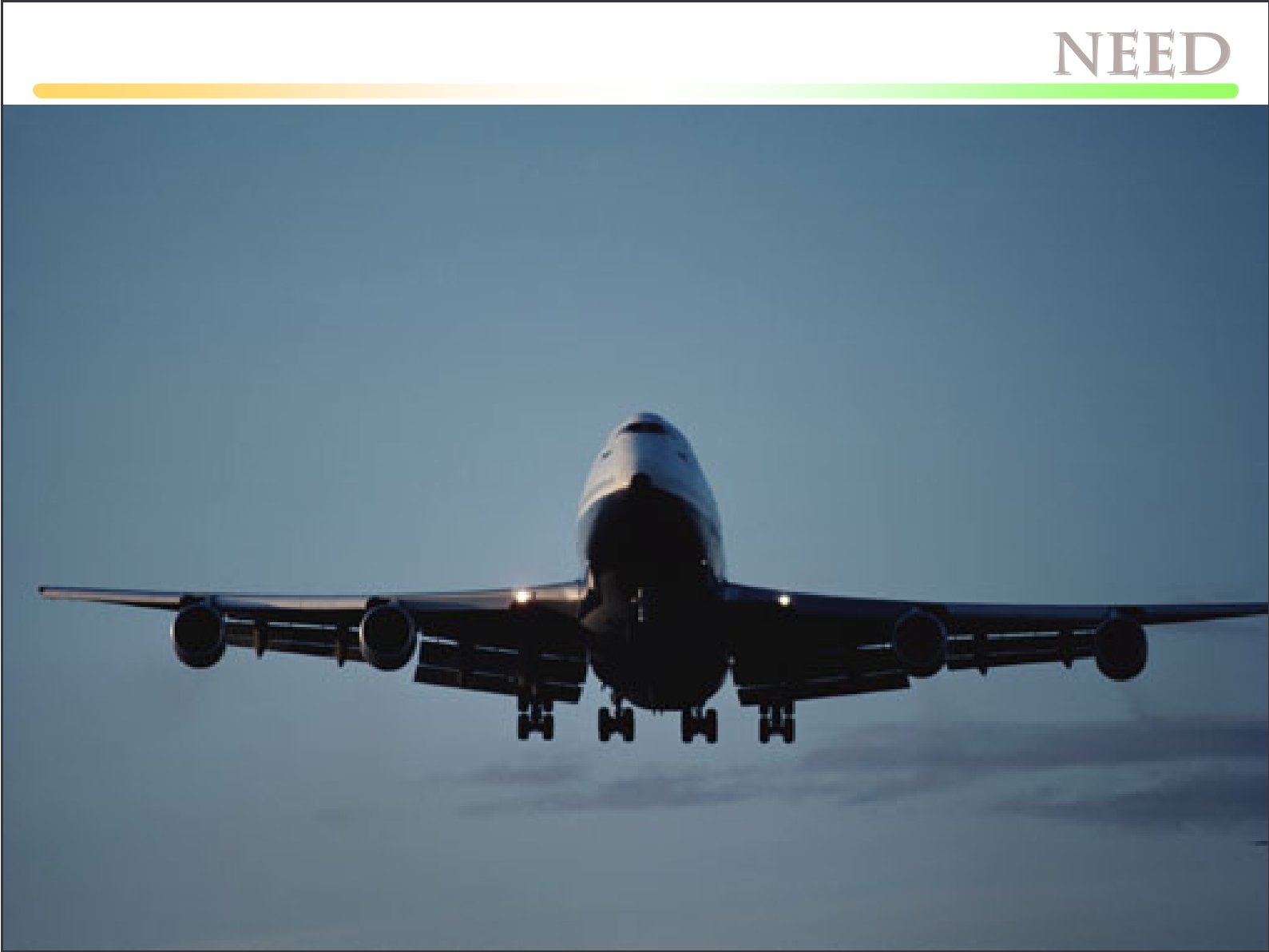


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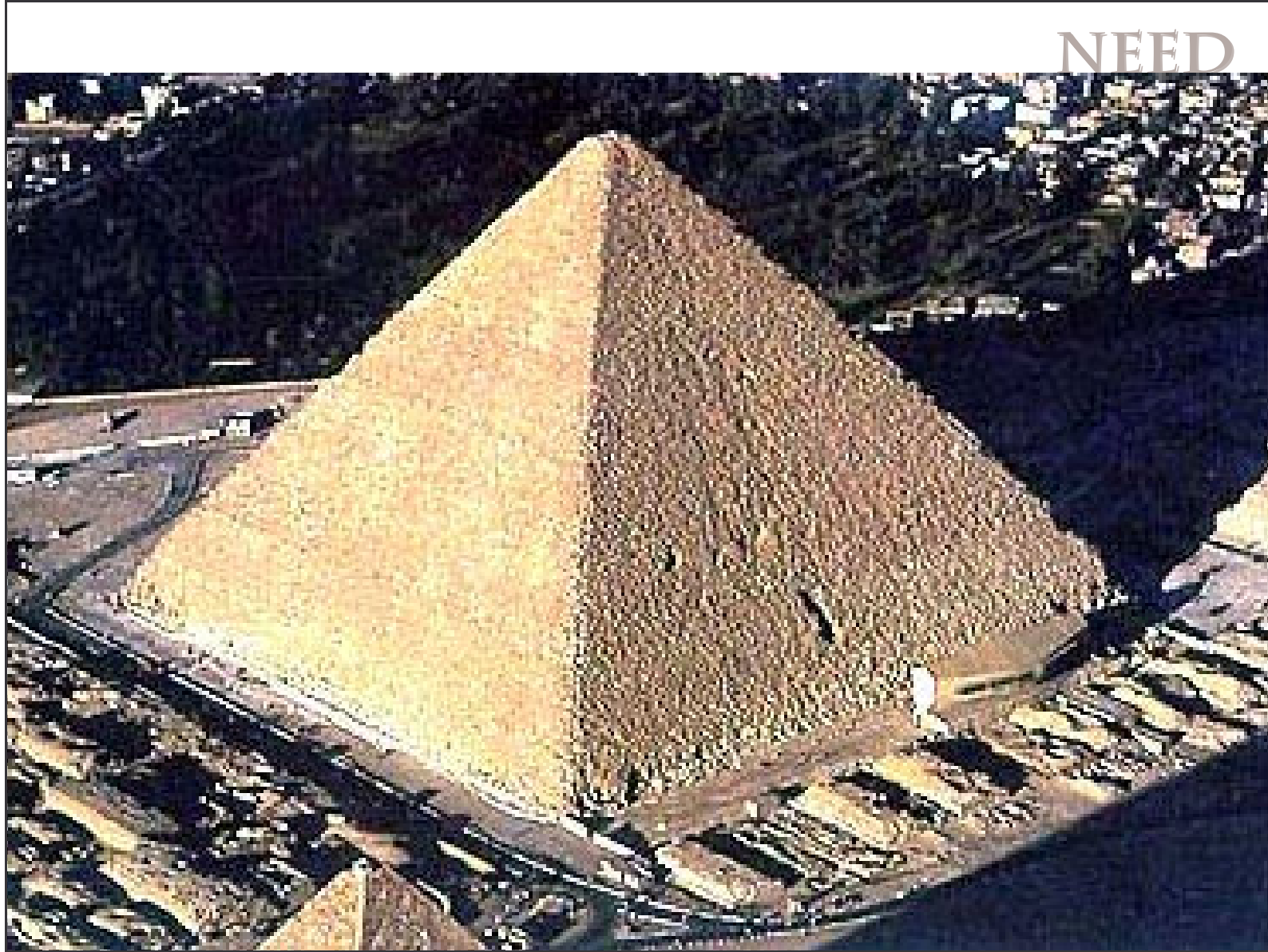
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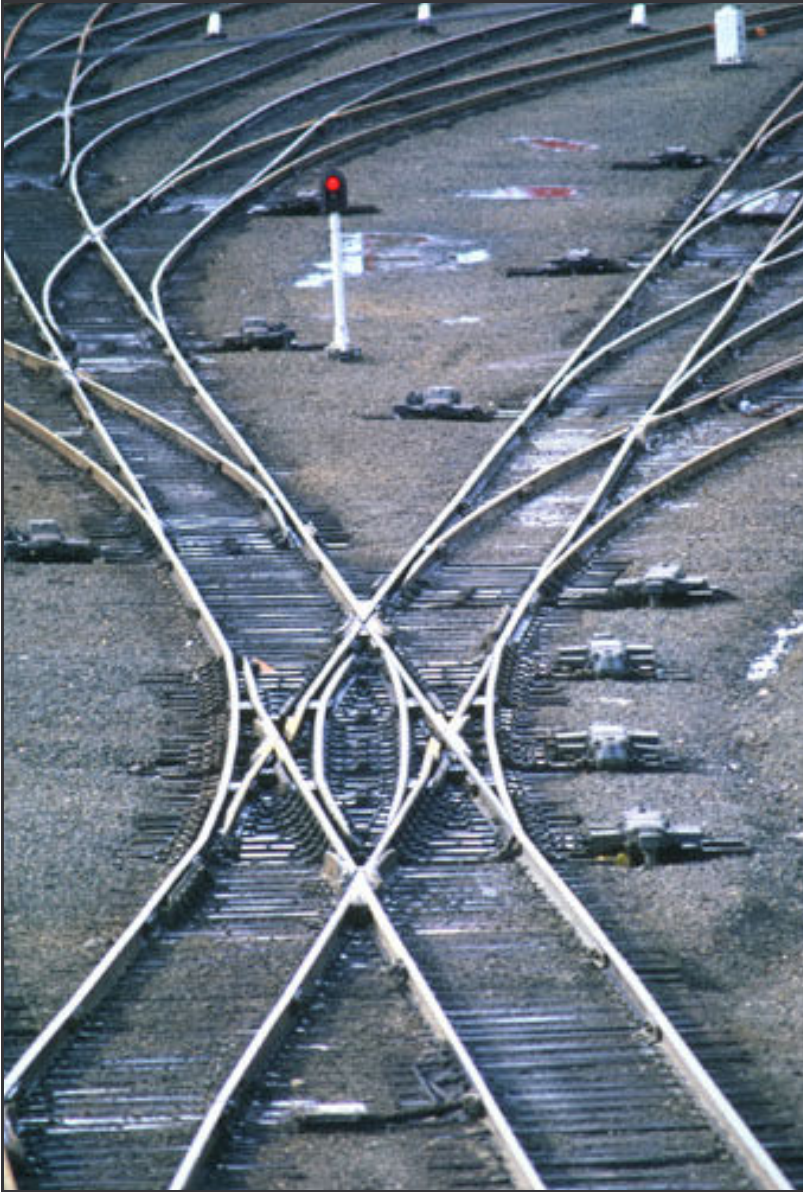


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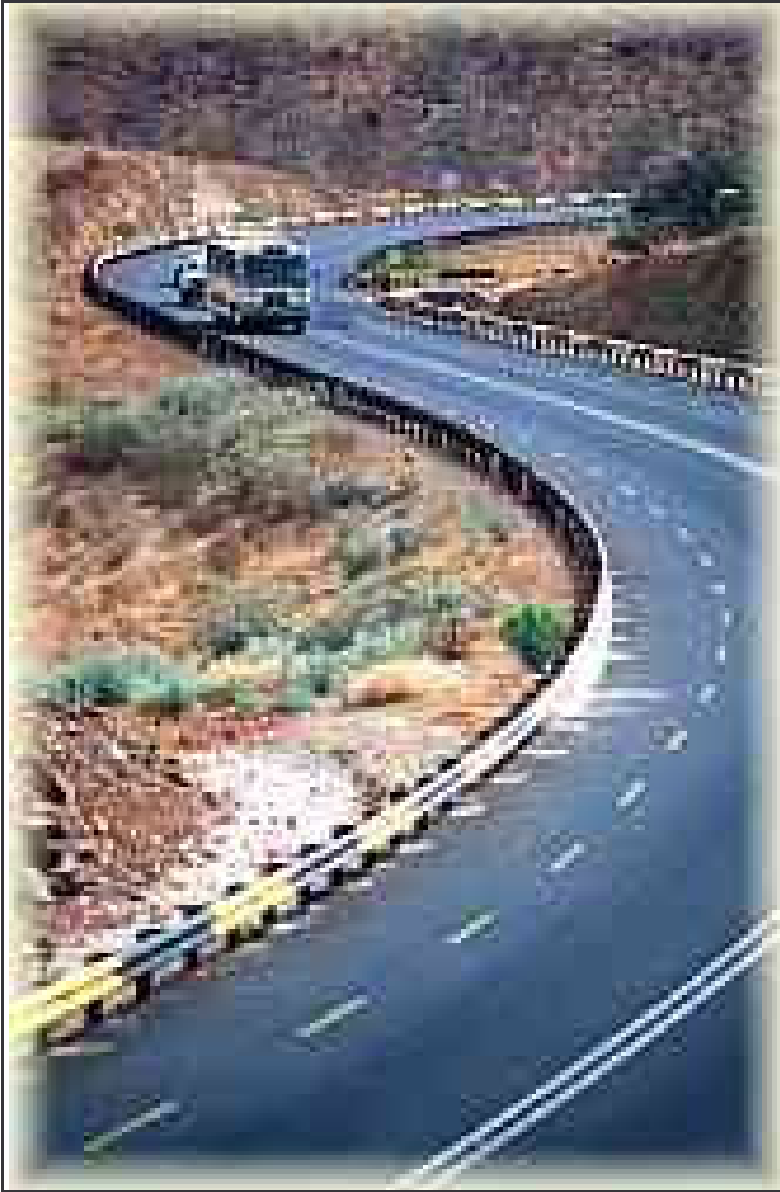




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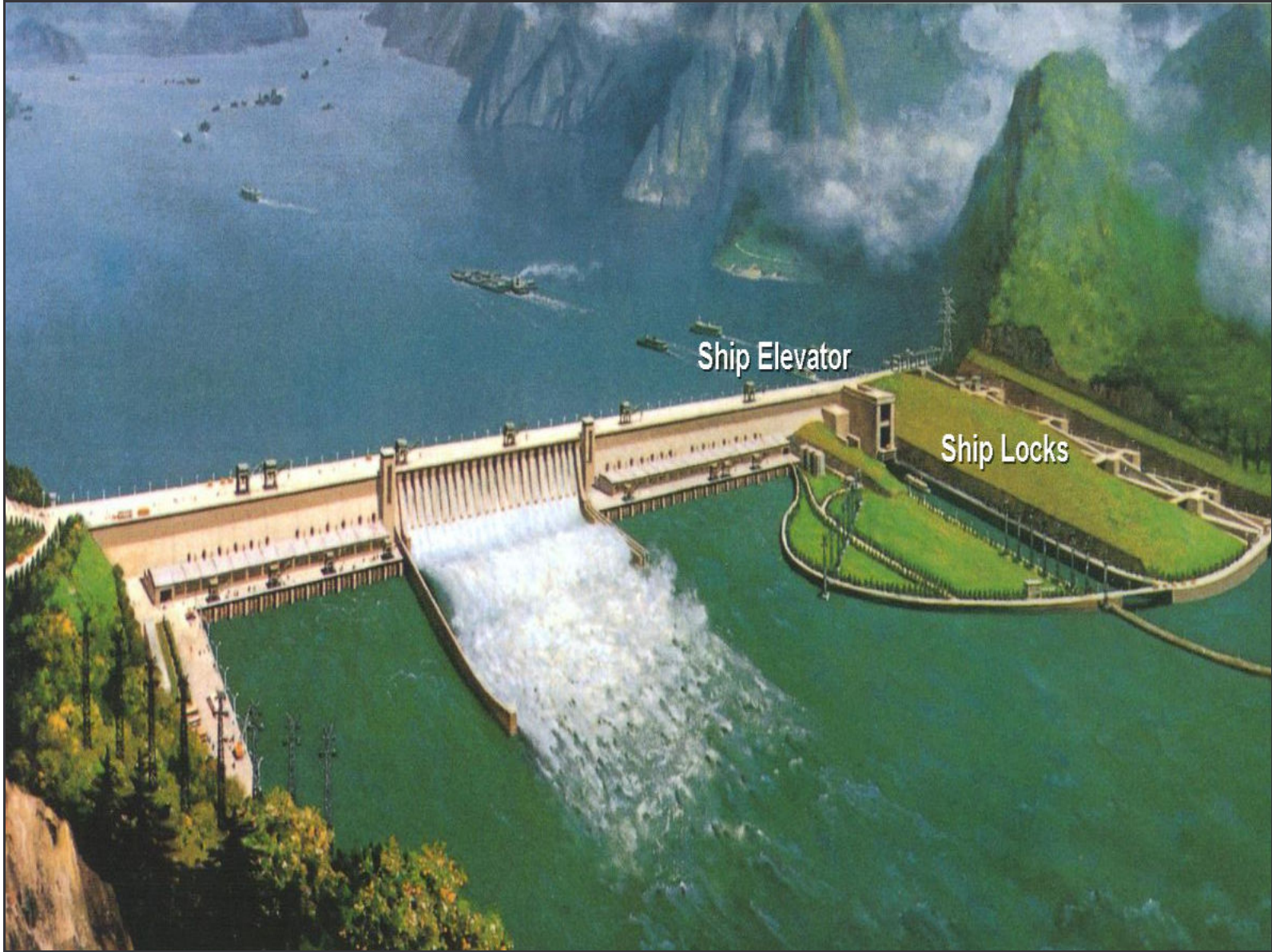


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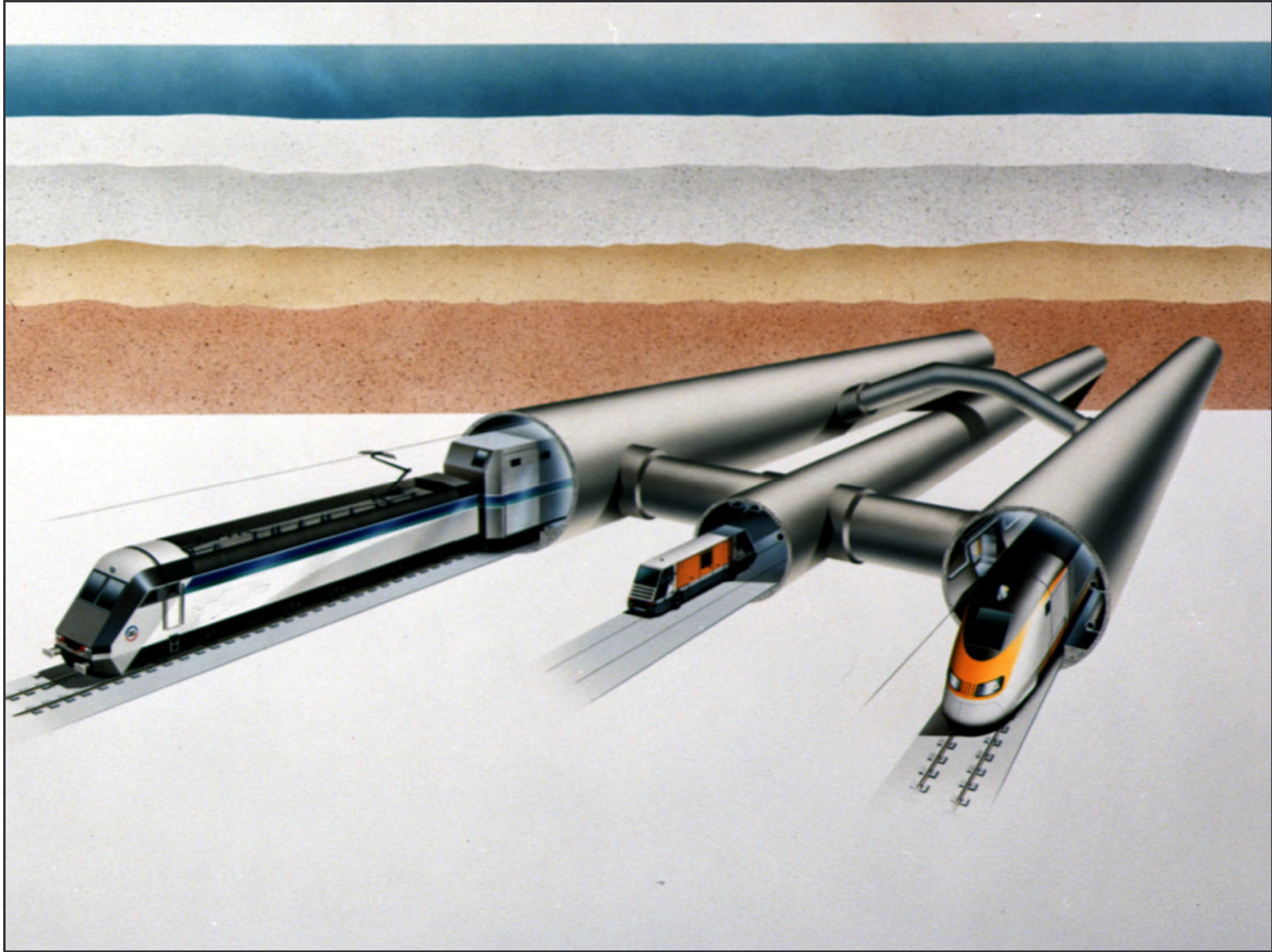




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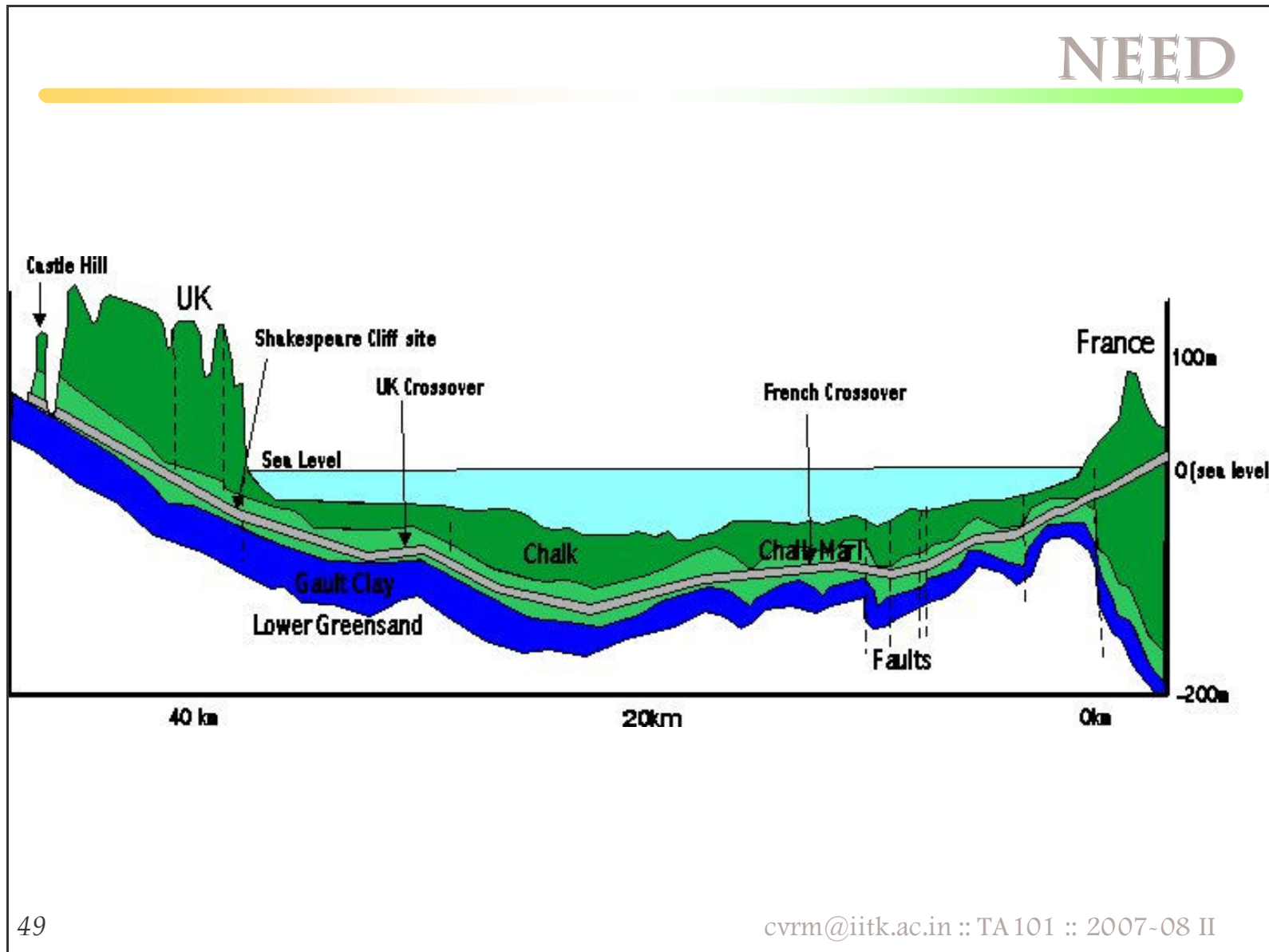


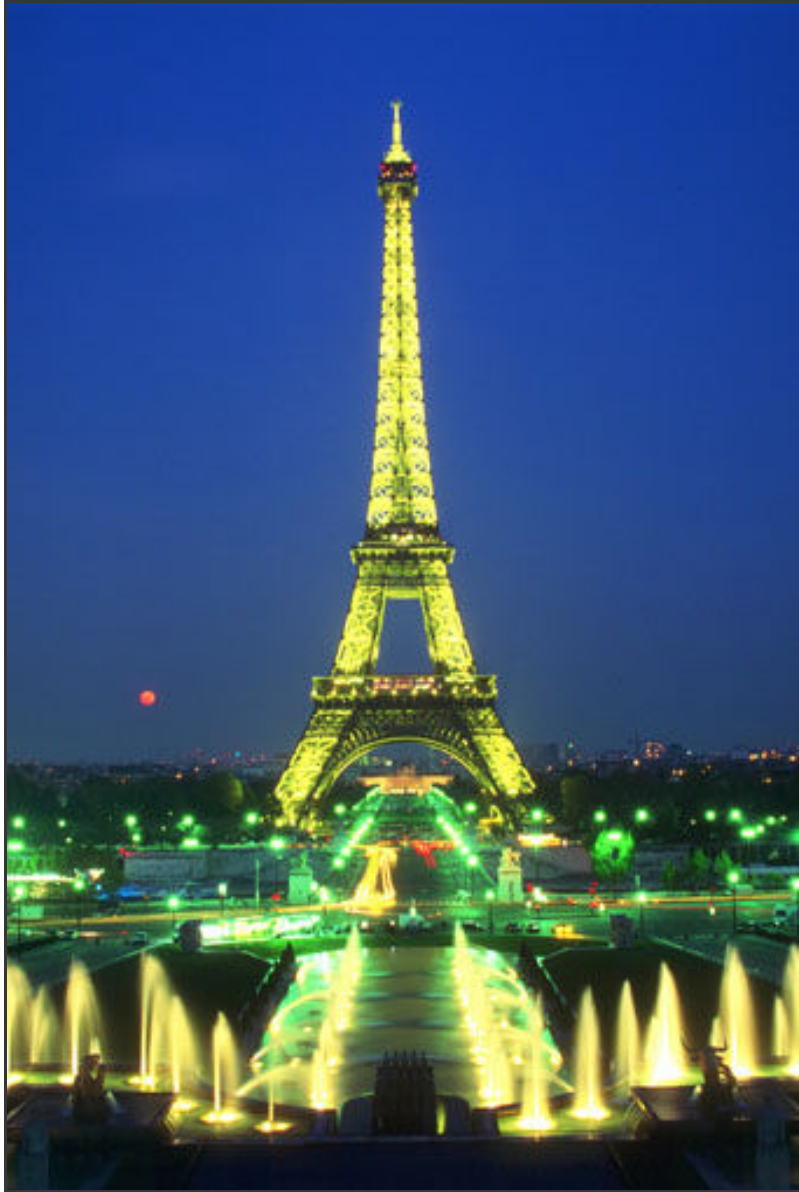
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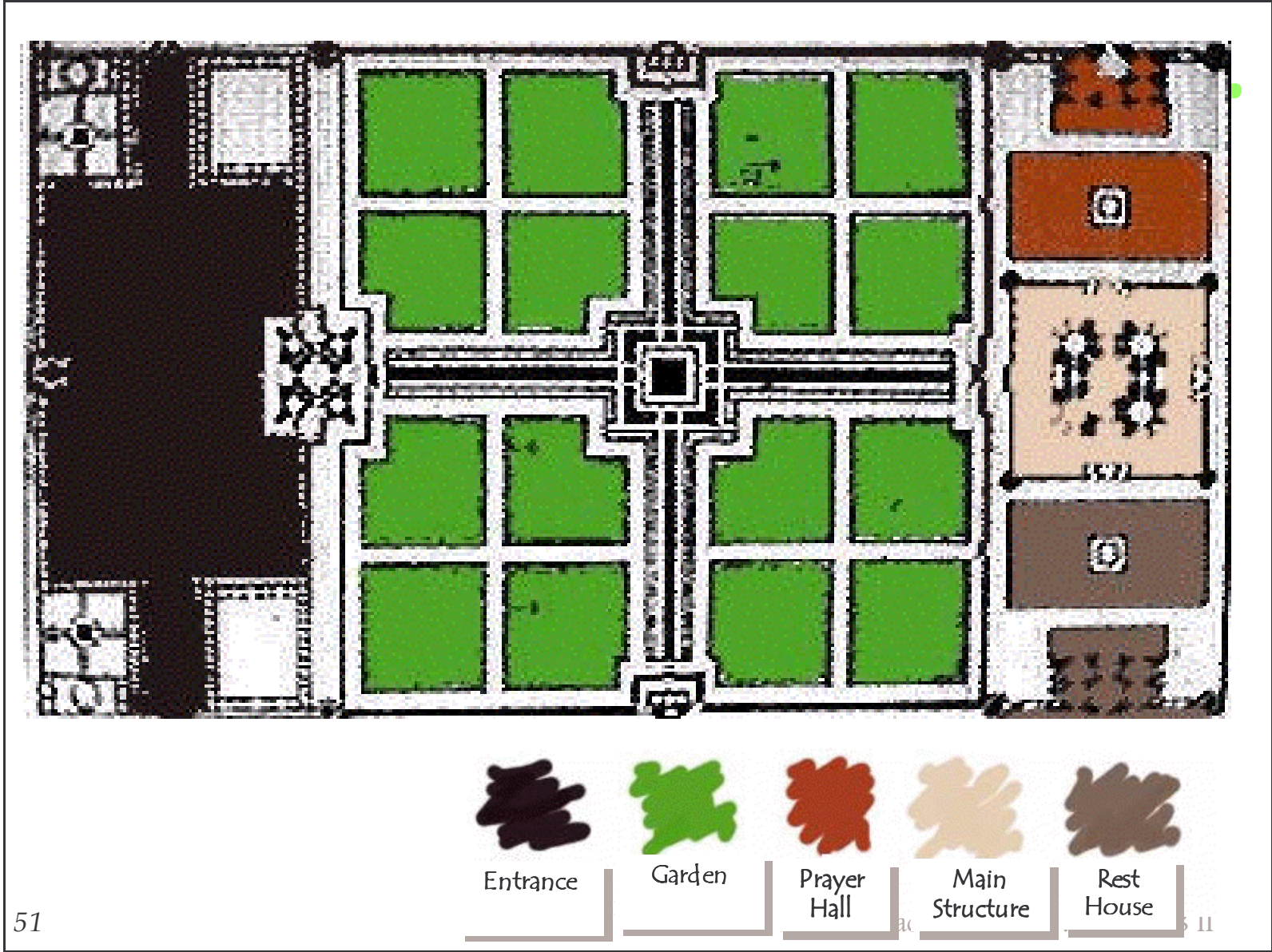




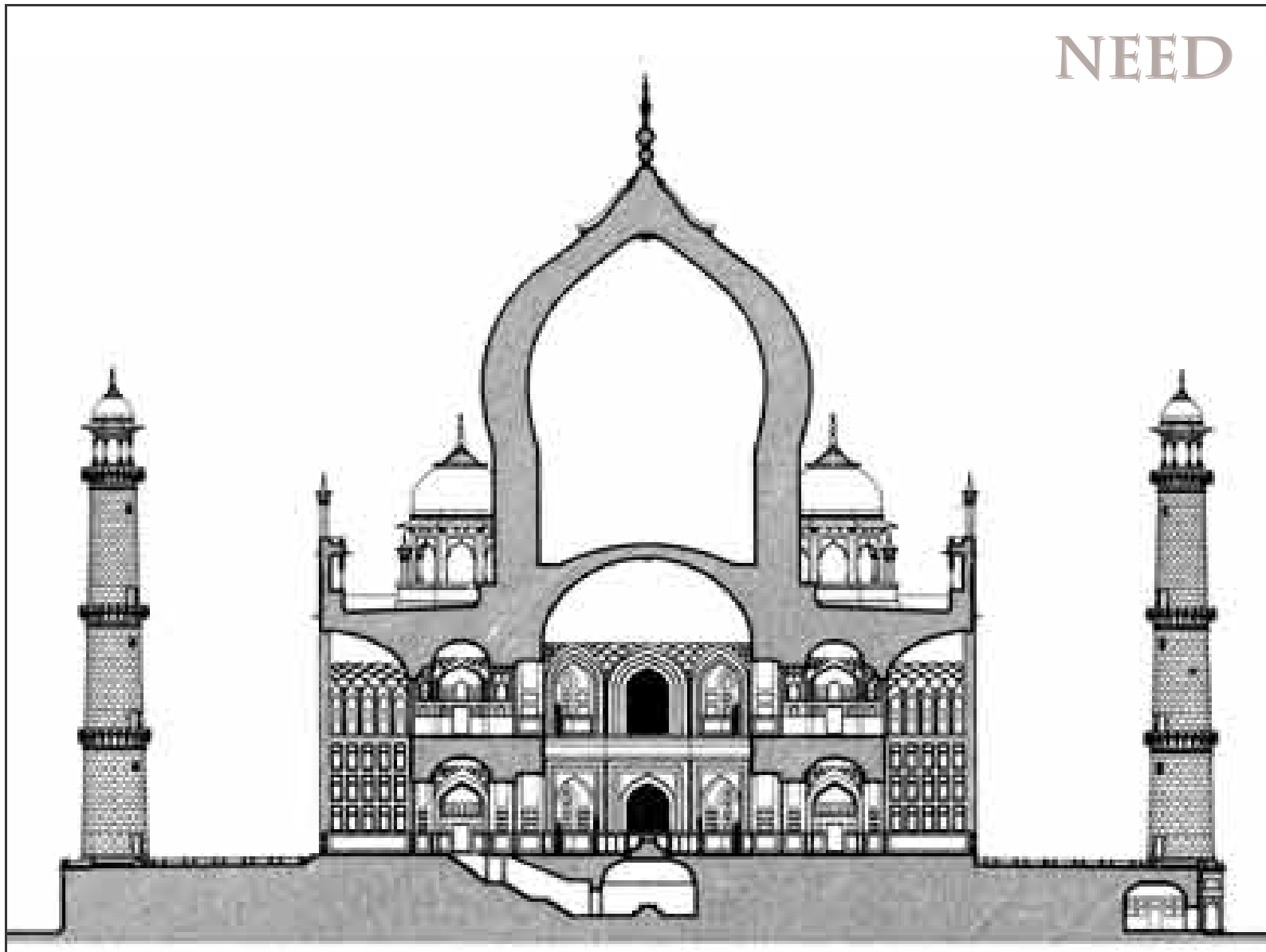
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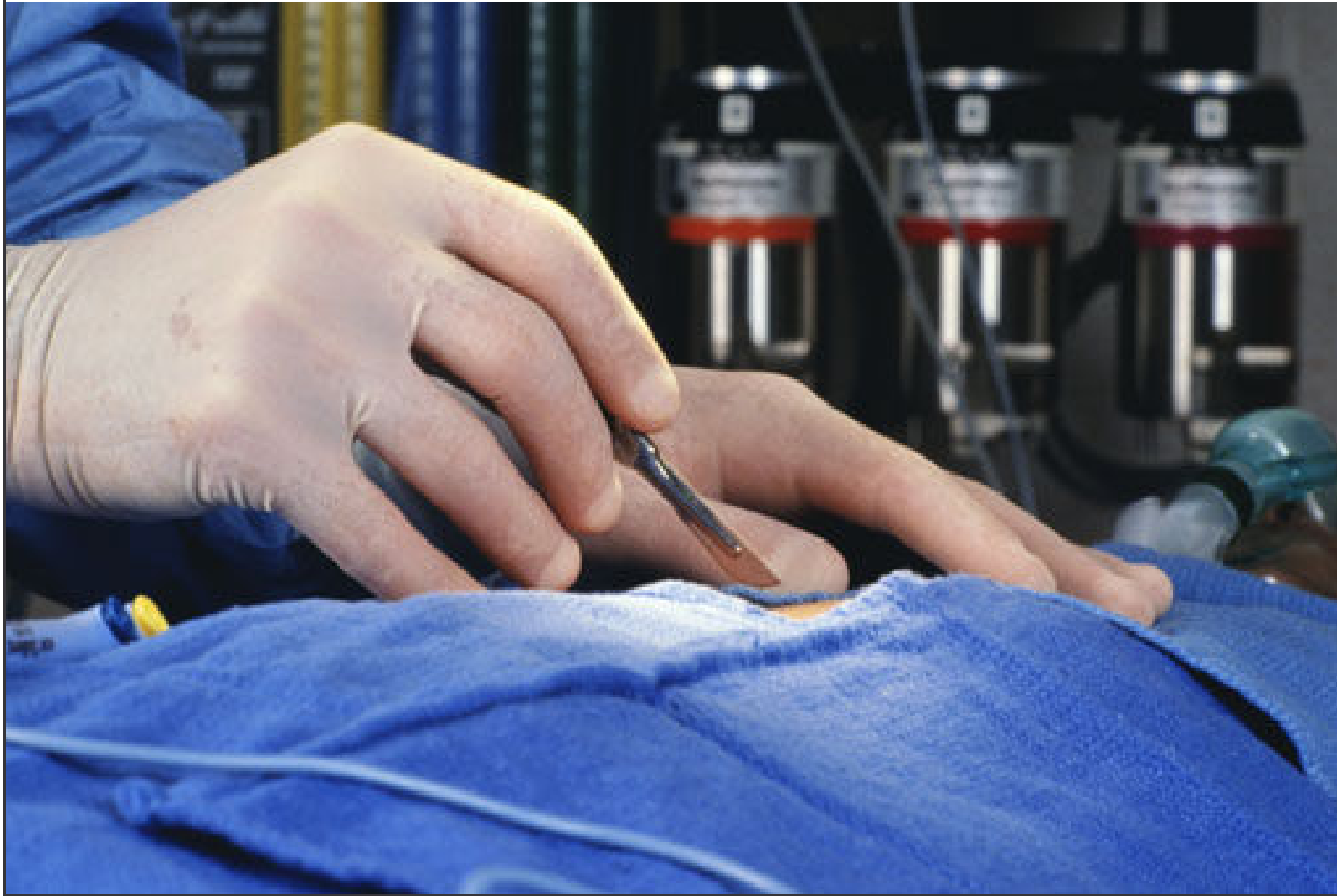
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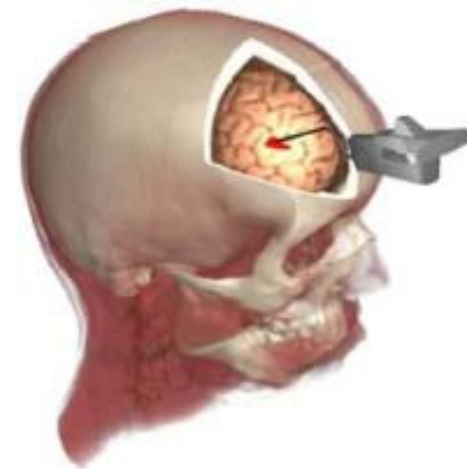
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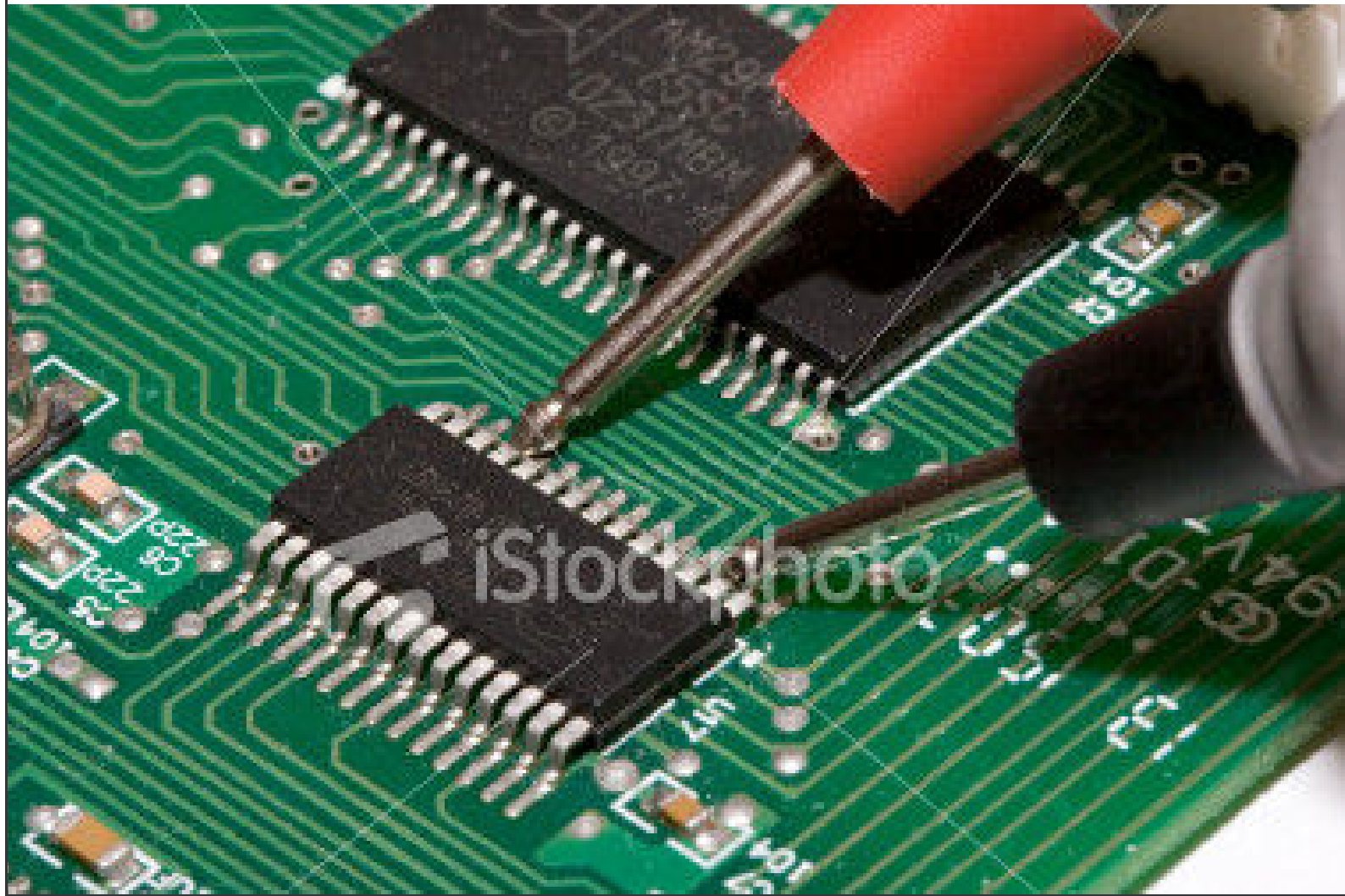
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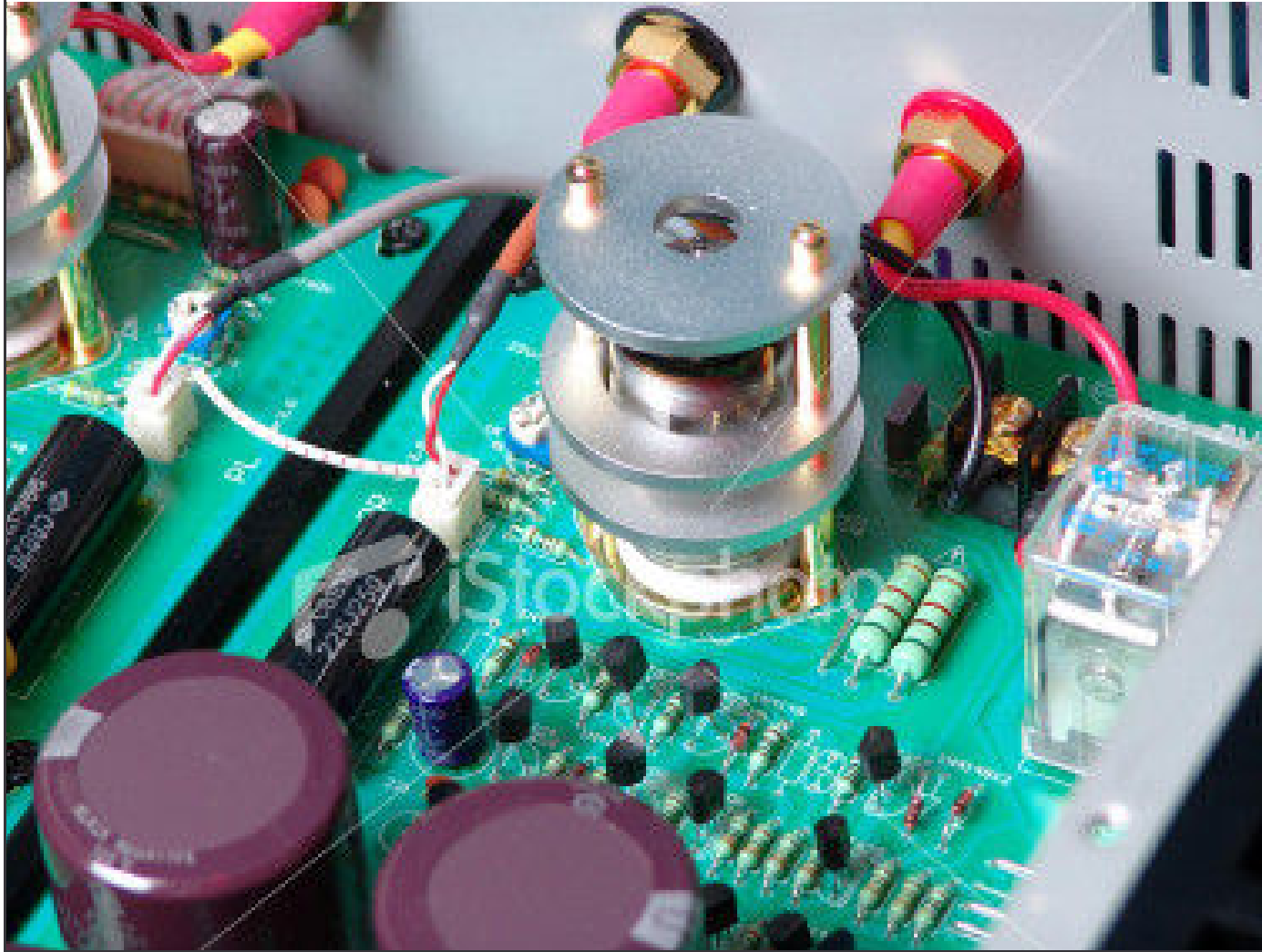
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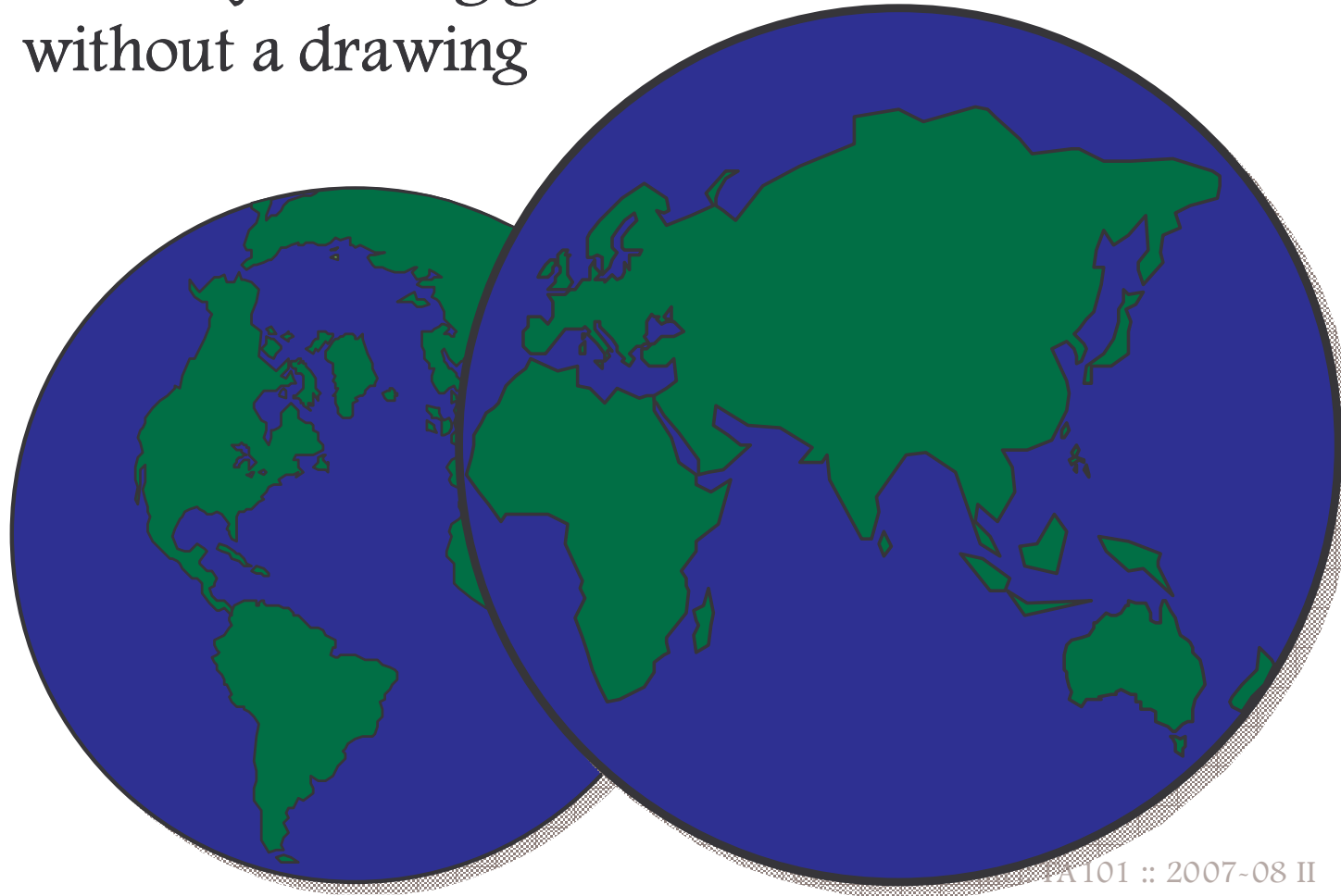


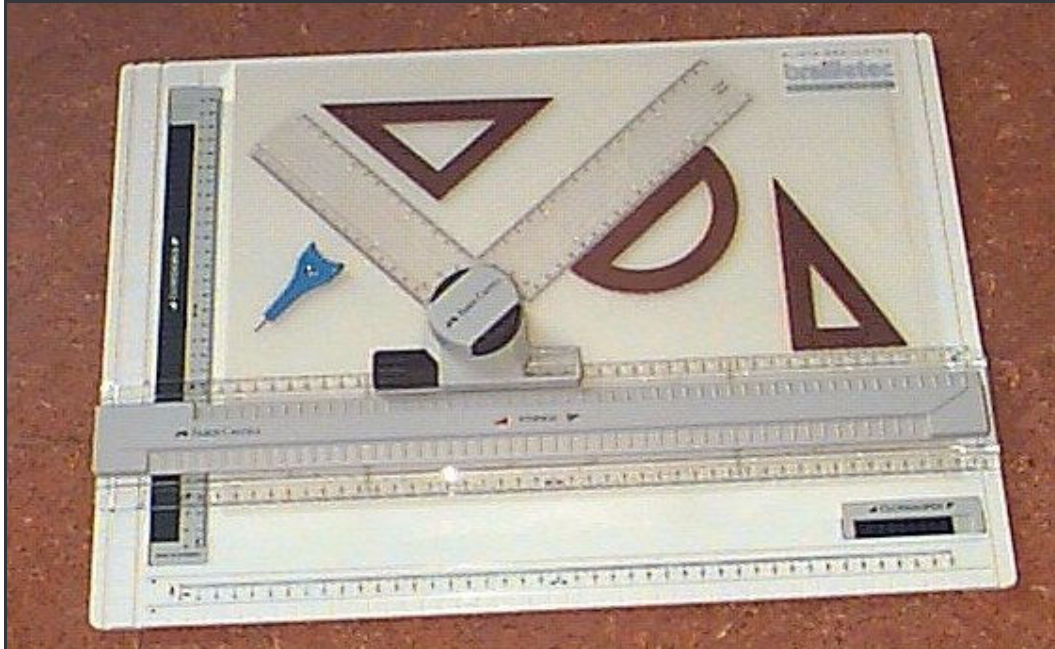
# NEED



07-08 II

- Virtually nothing gets made without a drawing





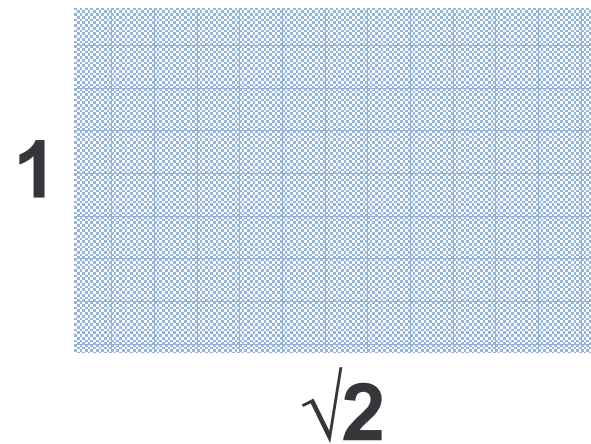
# TOOLS

- Drawing Paper

- Standard paper in India

- A-series

- Constant aspect ratio



- Drawing Paper...

- Standard paper in India...

- A-series

- A0, A1, A2, A3, A4, ...

- Each size following has half the area of the previous size

- ✓ Area of A0 = 1 m<sup>2</sup>                      841mm × 1189mm

- ✓ Area of A1 = 0.5 m<sup>2</sup>                      594mm × 841mm

- ✓ Area of A2 = 0.25 m<sup>2</sup>                      420mm × 594mm

- ✓ Area of A3 = 0.125 m<sup>2</sup>                      297mm × 420mm

- ✓ Area of A4 = 0.0625 m<sup>2</sup>                      210mm × 297mm

- ✓ ...

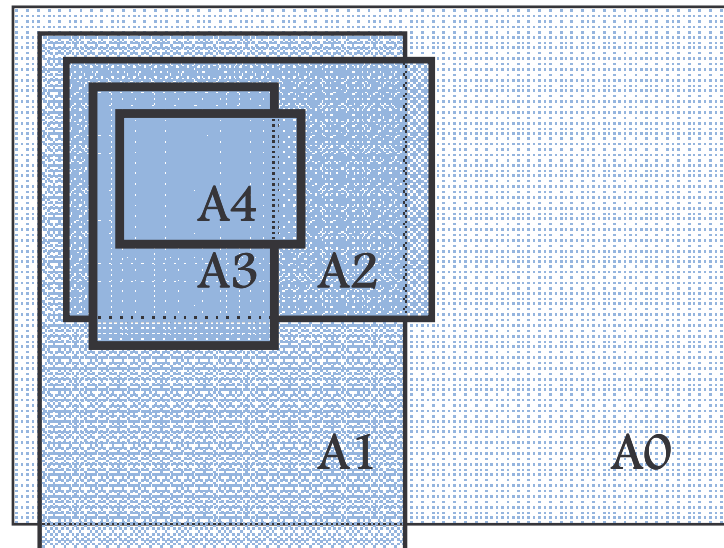


- Drawing Paper...

- Standard paper in India...

- A-series

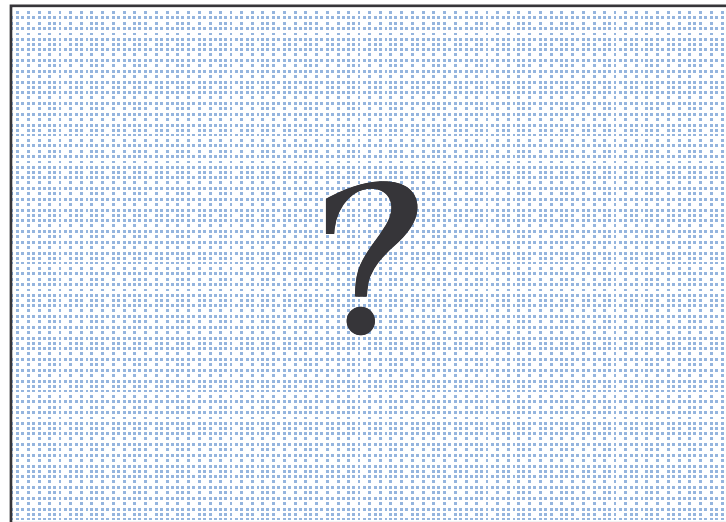
- One dimension common for subsequent sizes



- Question 1

- India uses A-series paper

- What are the other series of papers used elsewhere in the world?



- Question 2

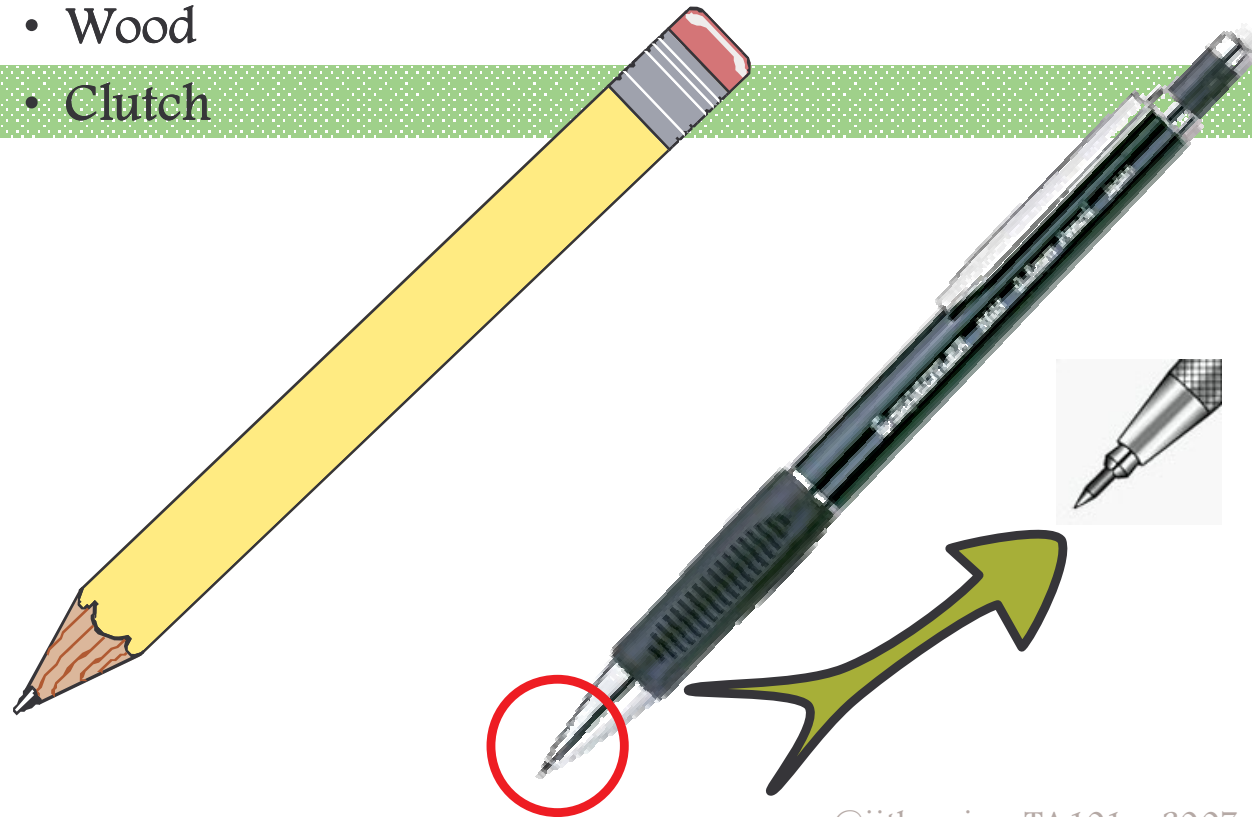
– What is the aspect ratio of the Flags of different countries ?



- Pencil

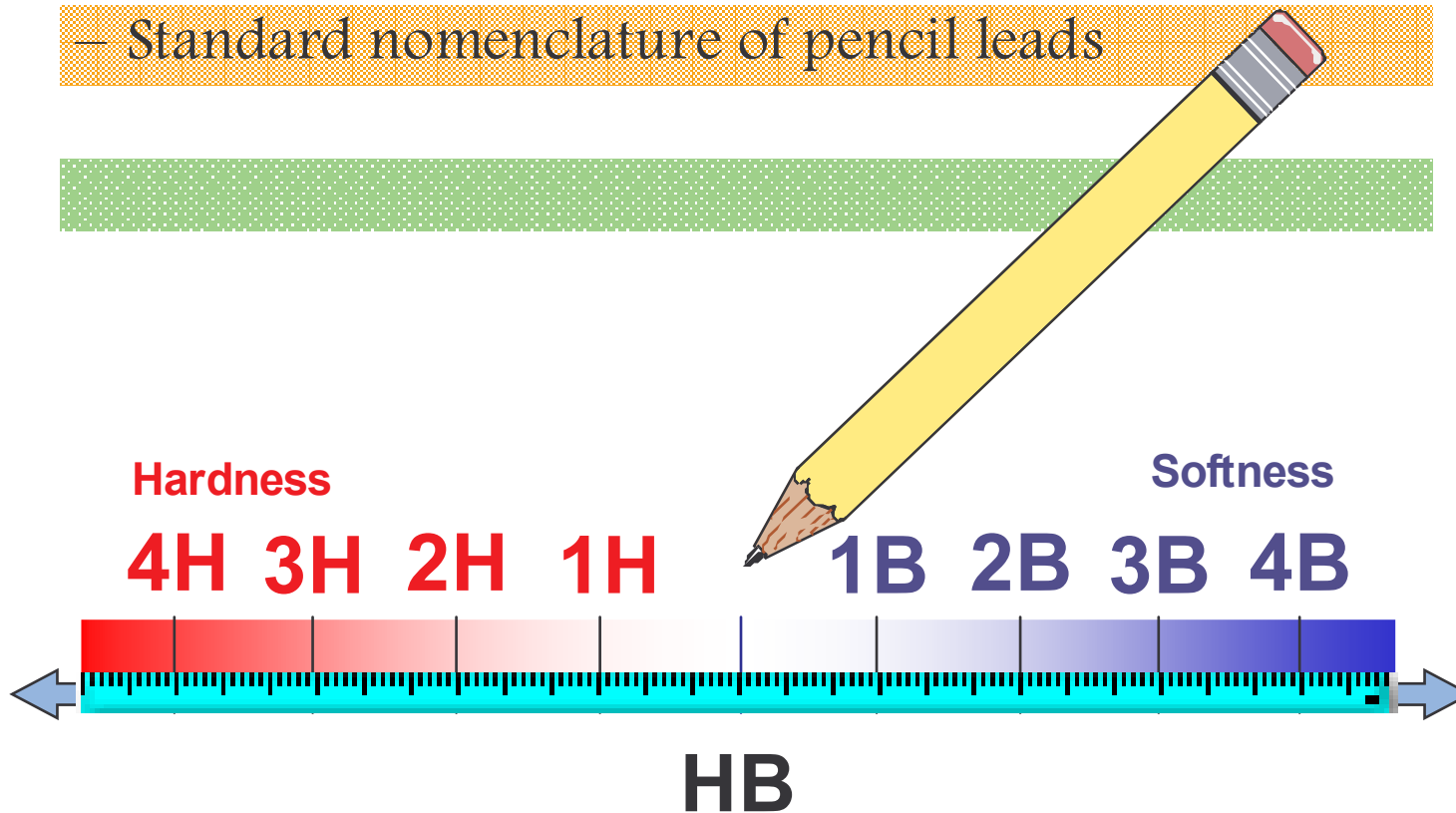
- Two types

- Wood
- Clutch



- Pencil Lead

– Standard nomenclature of pencil leads



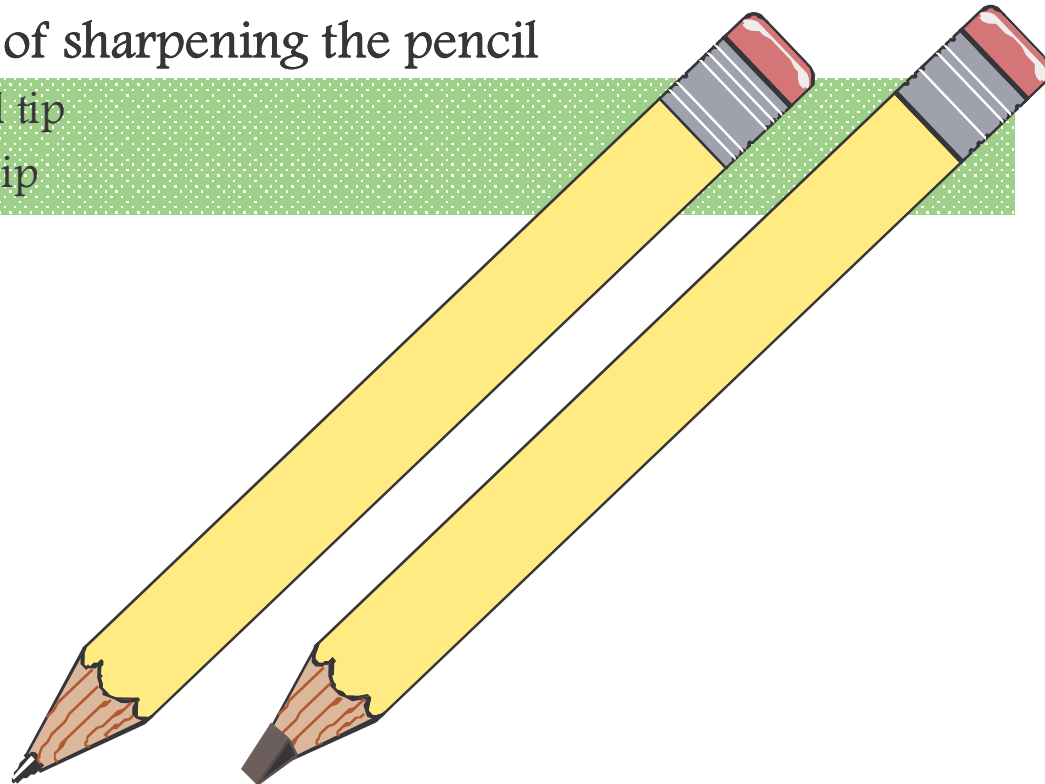
- Pencil...

- Wood Pencil

- Two ways of sharpening the pencil

- Conical tip

- Chisel tip





- Pencil...

- Wood Pencil

- Made with quality wood



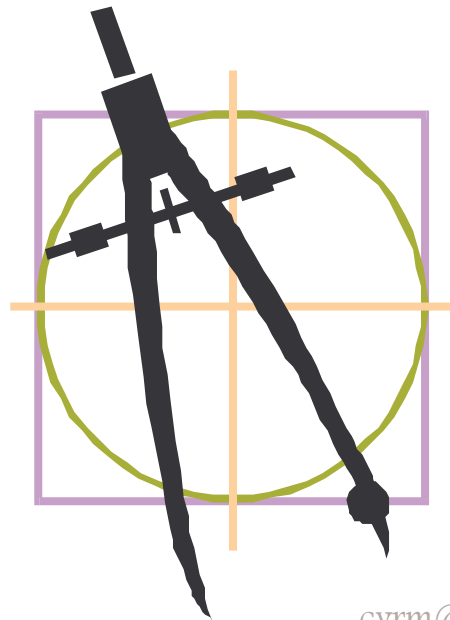
- **Compass and Divider**

- **Compass**

- Make circles

- **Divider**

- Mark sizes



- Compass and Divider...

- Need good quality

- Pointed tips

- Pencil leads

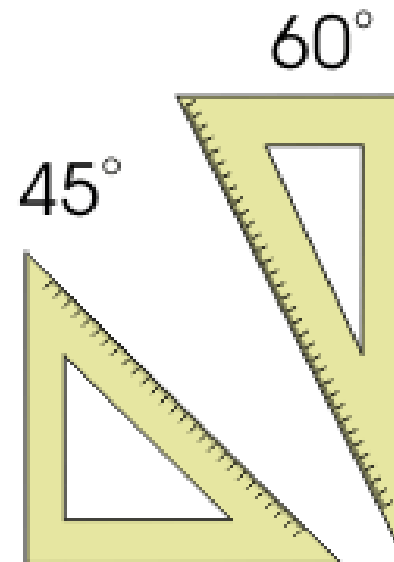


- Set squares

- Two standard ones

- $45^\circ$

- $30^\circ$ - $60^\circ$



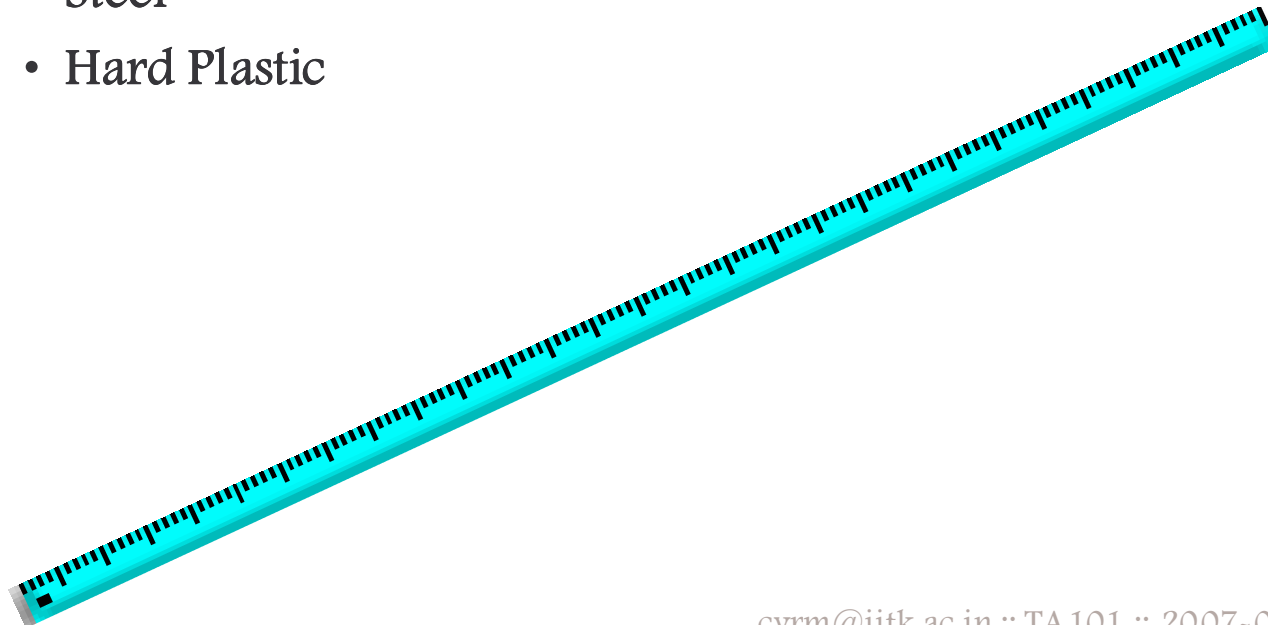
- Scales

- SI Scale

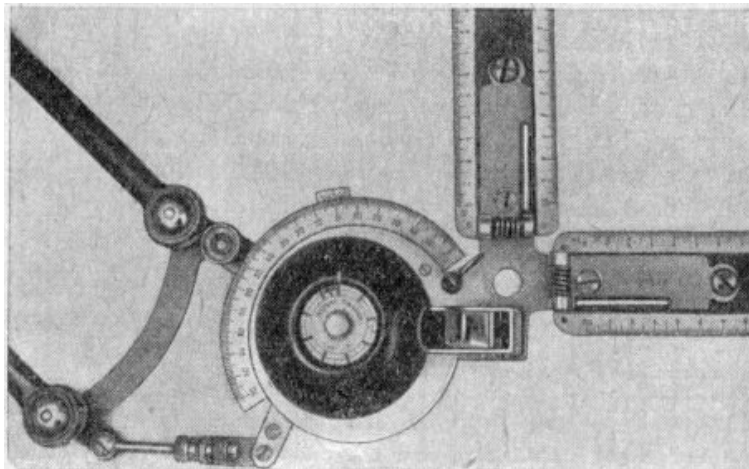
- Millimeters

- Material

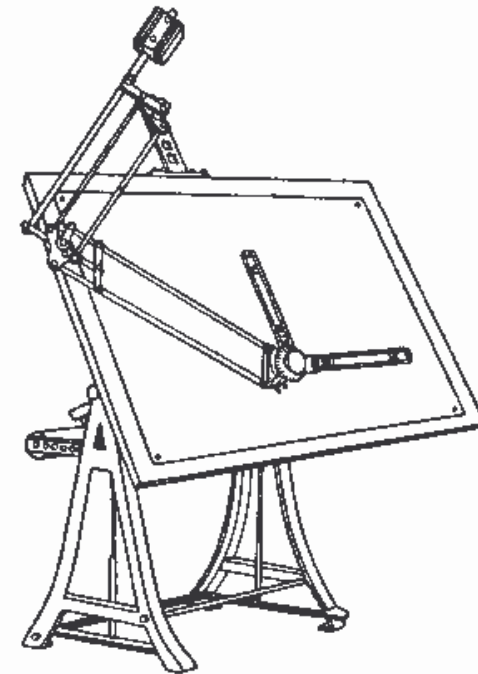
- Steel
    - Hard Plastic



- Drafter
  - Multiple facilities
    - Scales
    - Protractor
    - Parallel lines



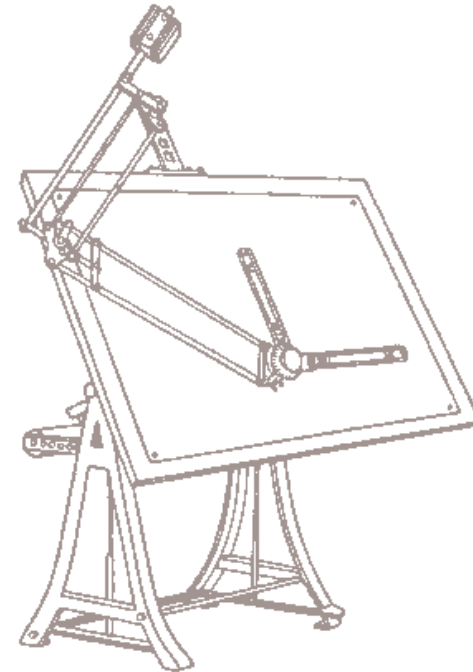
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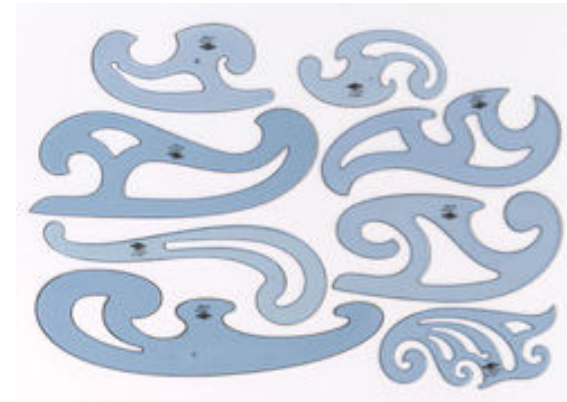
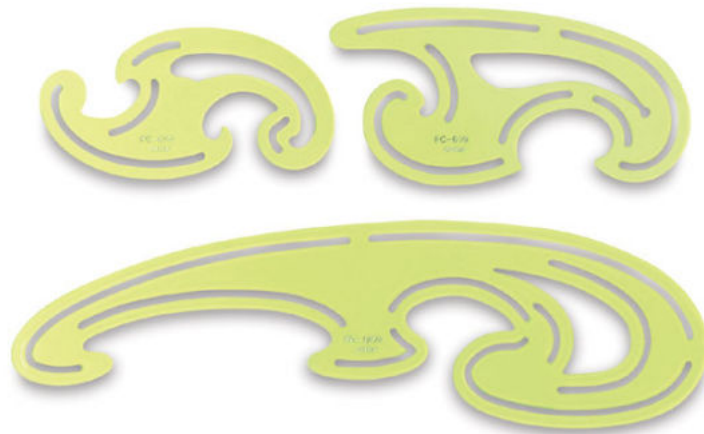
- Drafter...
  - Mini-drafter
    - For engineering studies
  - Regular drafter
    - For professional work



- French curves

- Size

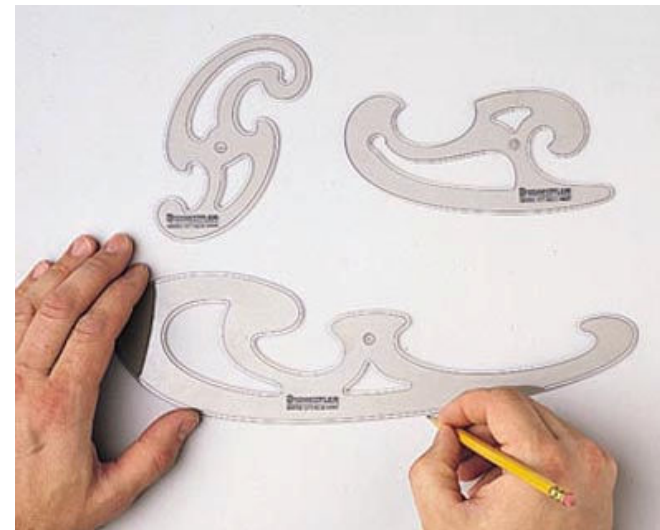
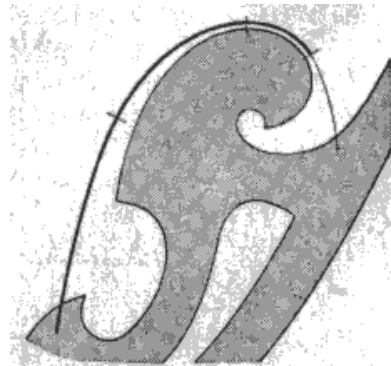
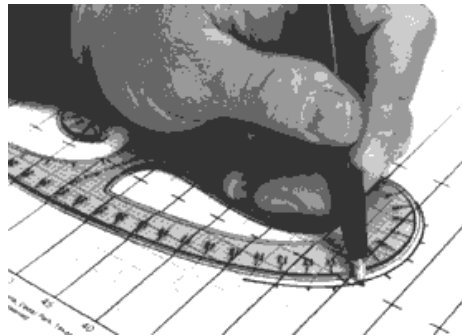
- Order of curves



- French curves...

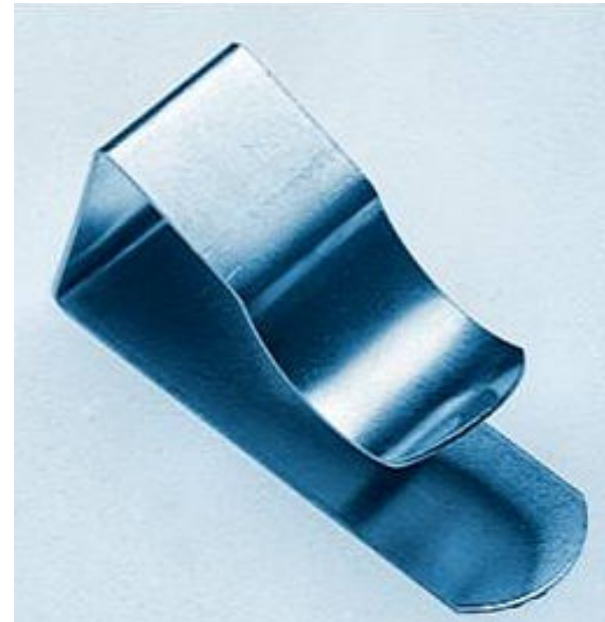
- Use

- At least three points to be connected need to touch any section of the French Curve



- Drawing Clip

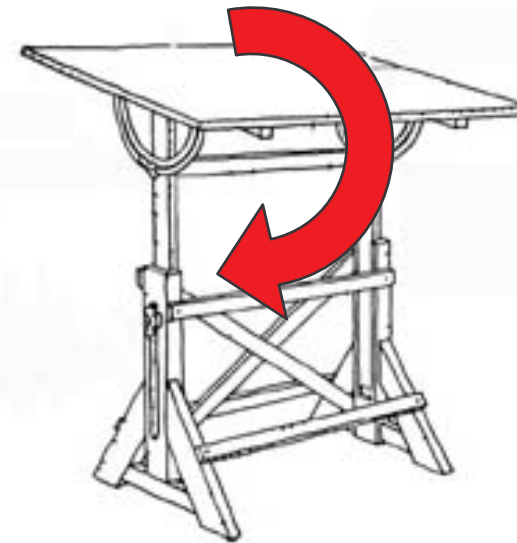
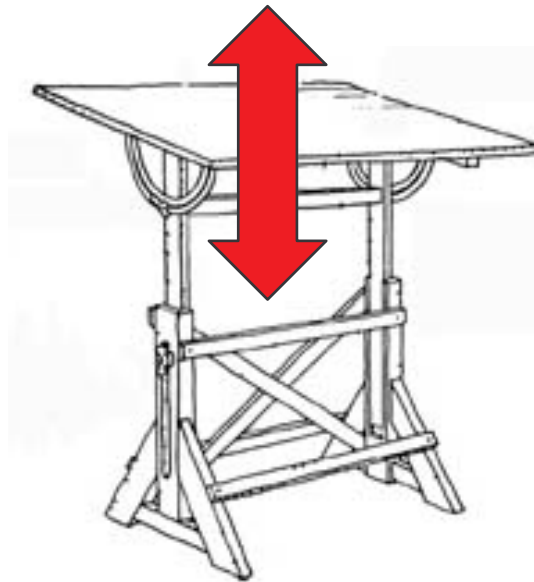
- Clamp the sheet on to the board

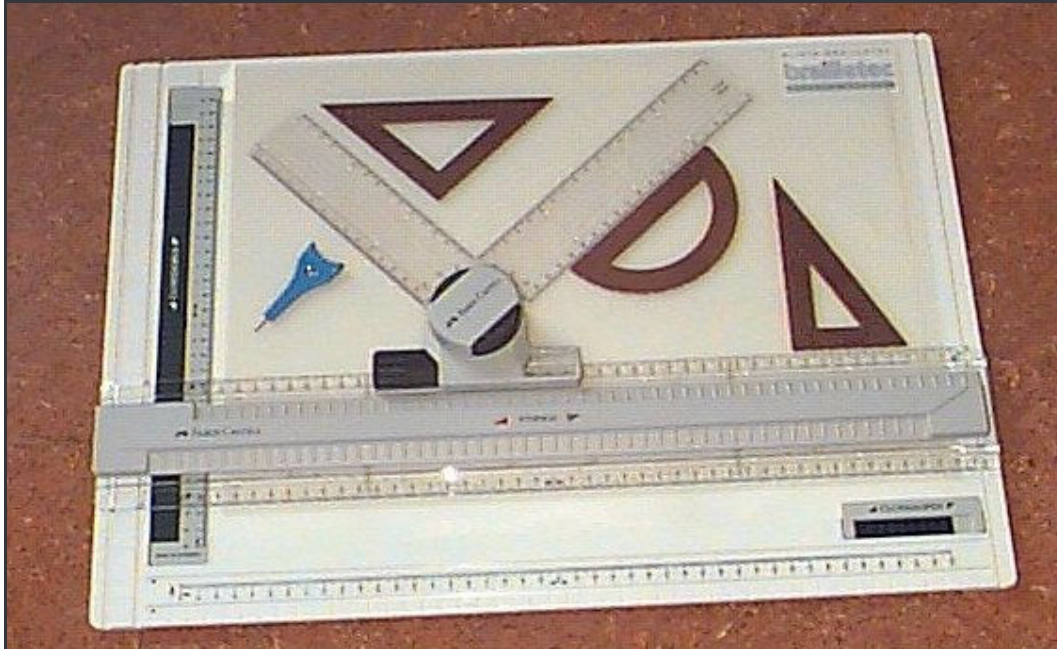


- Drawing Board Table

- Height and Tilt

- To be adjusted by the person using





TIPS

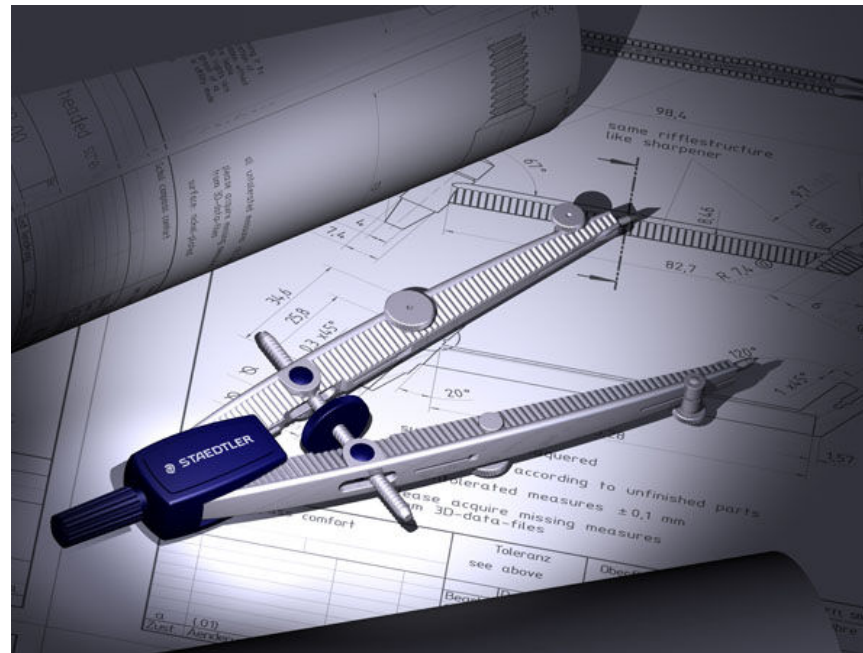


## TIPS

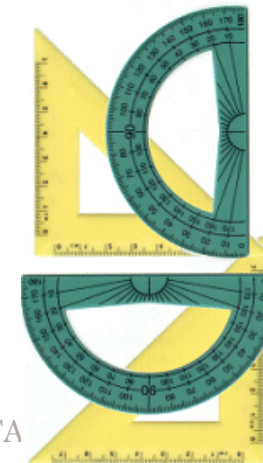
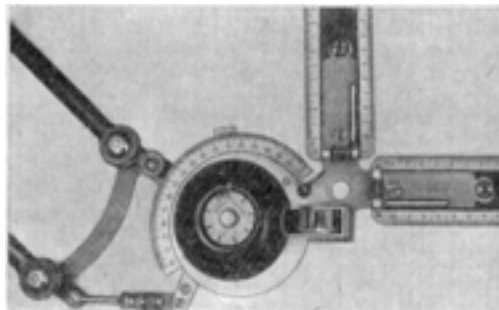
- Ensure correct posture of person while drawing
  - Erect back
  - Eyes at least  $\sim 450\text{mm}$  ( $\sim 18$  inches) from sheet
    - Either standing or sitting



- Use good quality instruments
  - This helps enhance accuracy of drawing

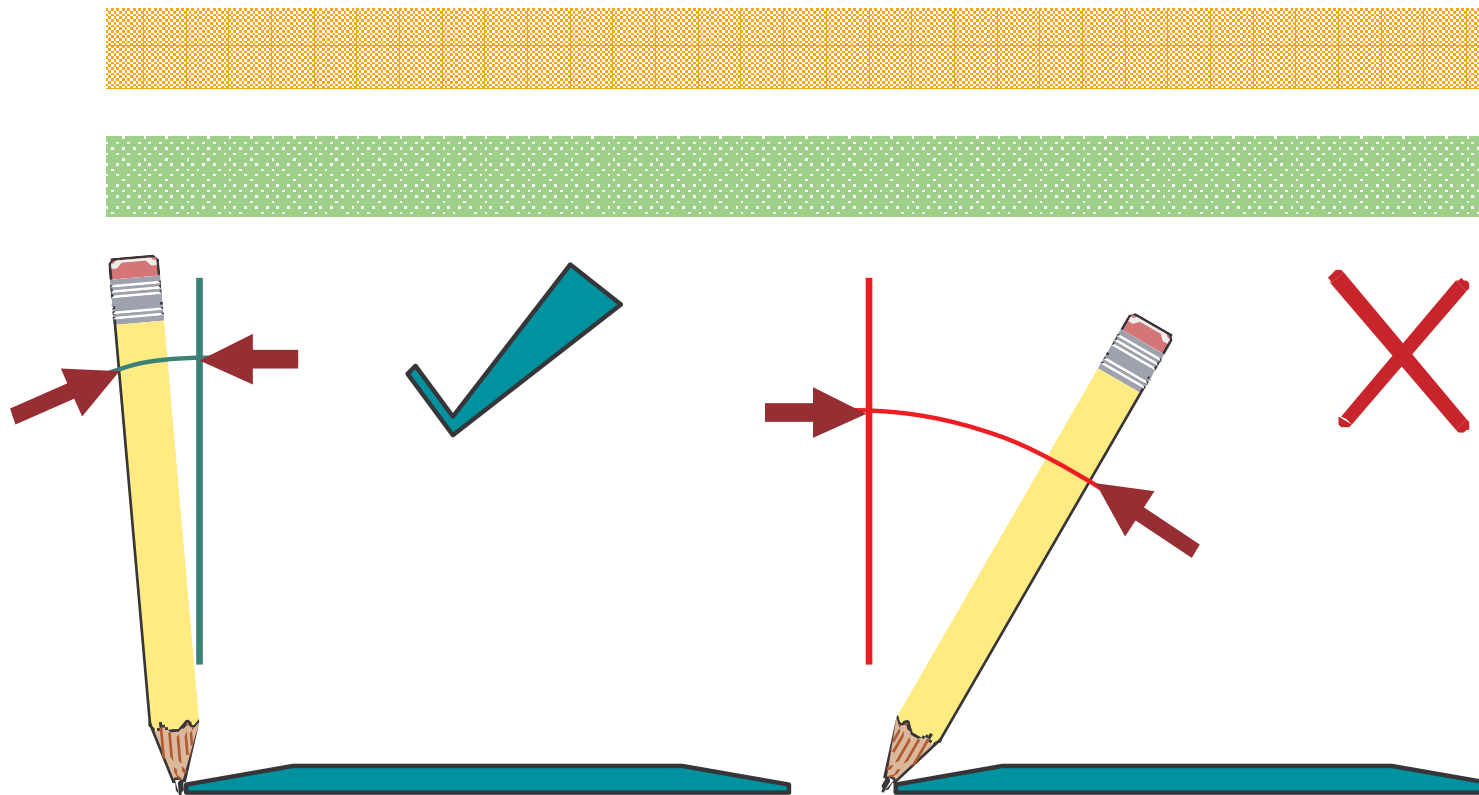


- Do not use both the drafter protractor & the separate protractor for seeking angles
  - Use EITHER the protractor on the drafter OR a separate protractor
    - Not BOTH
    - This will maintain consistency in measurement of angles
    - Separate protractor is more accurate



# TIPS

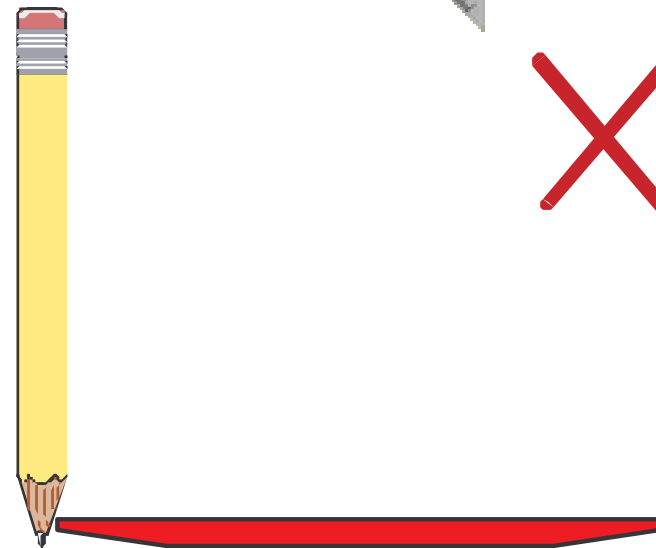
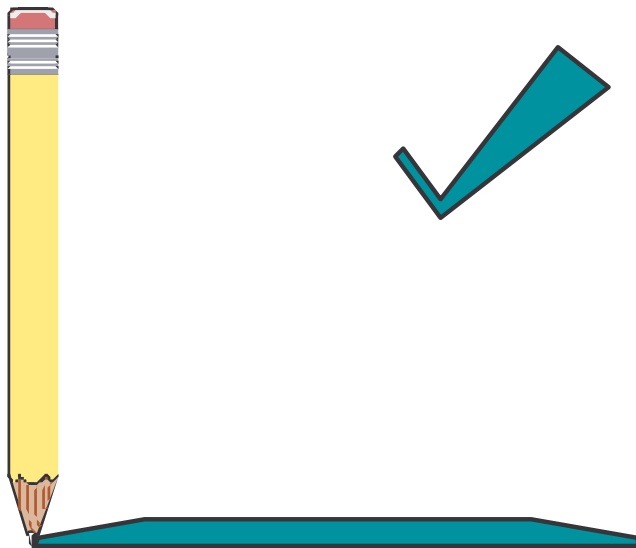
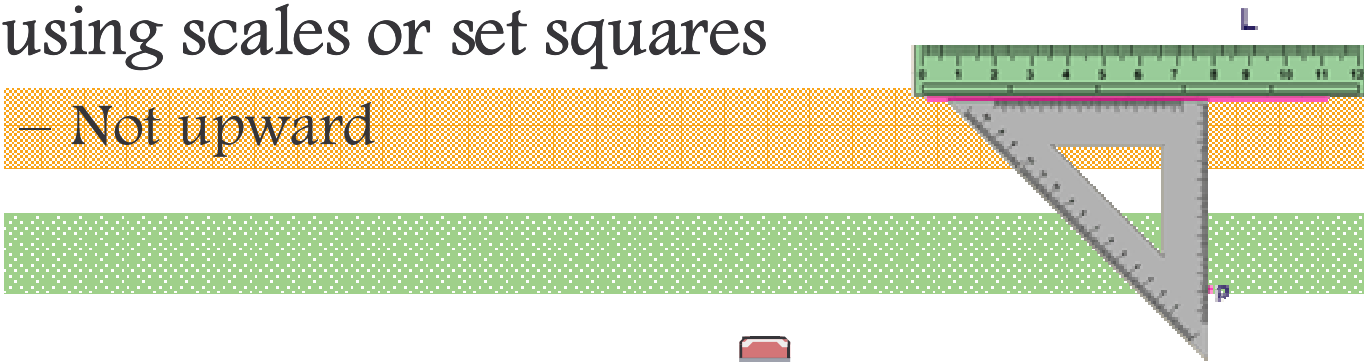
- Butt the pencil vertically against the straight edge



## TIPS

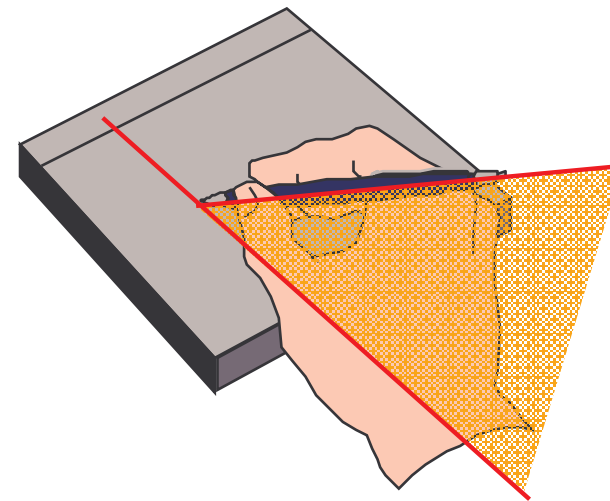
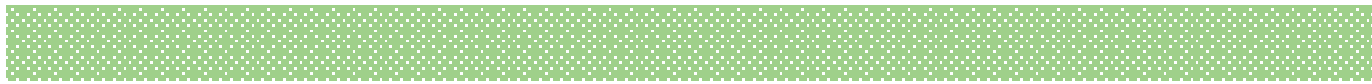
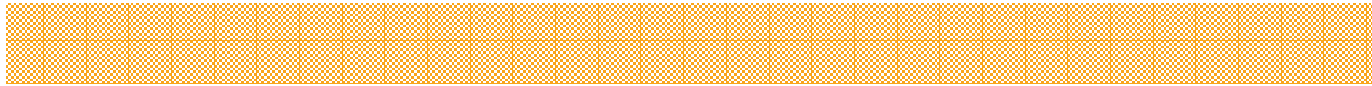
- Use the bevel edge downward for drawing lines using scales or set squares

– Not upward

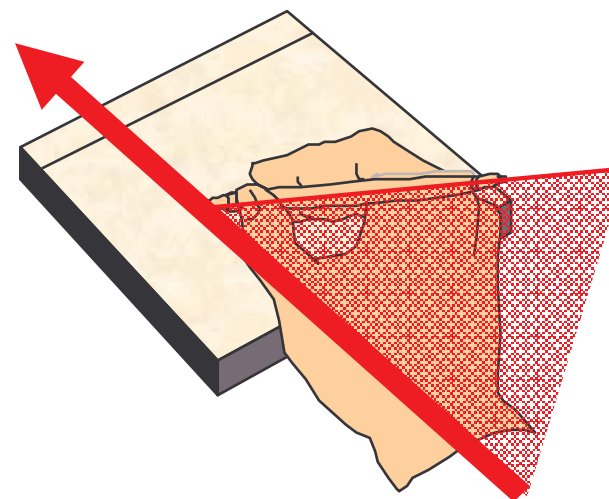
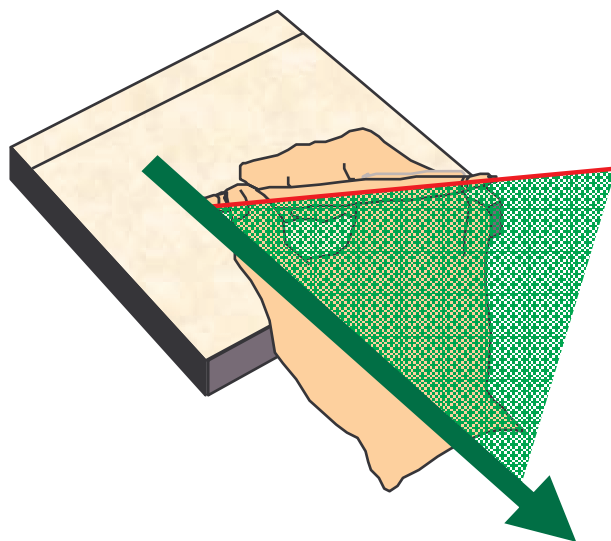


## TIPS

- Keep an acute angle between paper and pencil



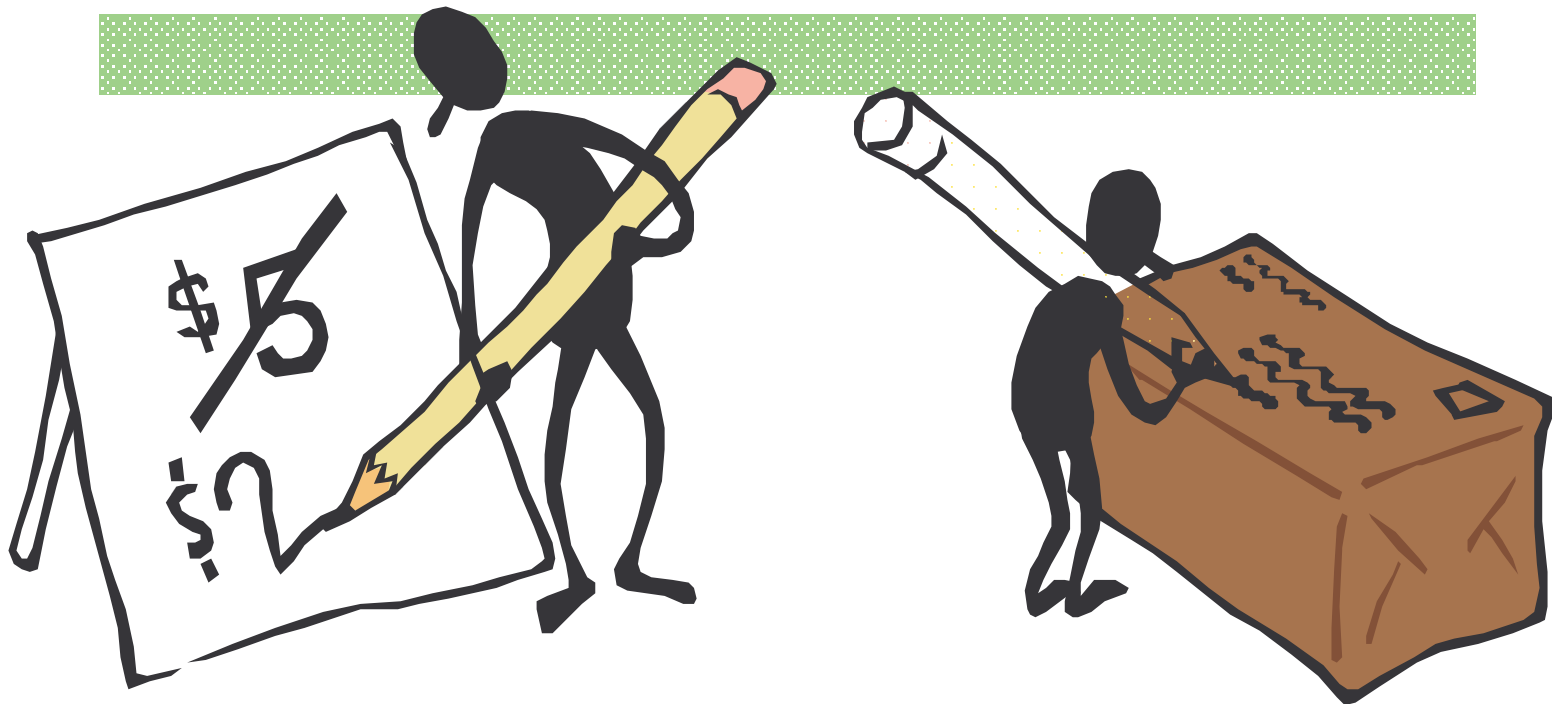
- Stroke the pencil in the acute angle direction
  - This will save the paper from tearing

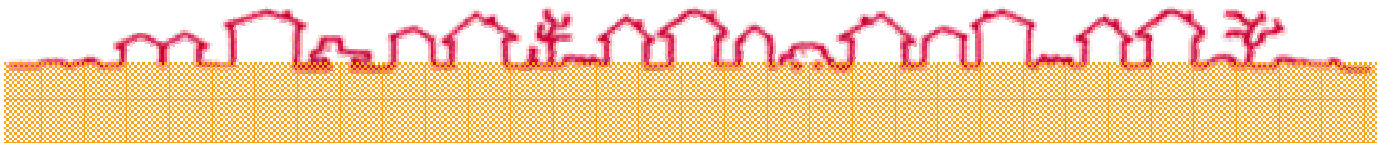




- Use pencils on all occasions of writing  
... in LIFE!!

– Write notes in all classes with pencils !!





Have a Great Day!!

