Objective:
Introduction to points and lines in drafting and how are they used to construct a drawing.

Initial skill development of drafting lines (horizontal, vertical, at various angles of 45, 30 and 60 degrees)

Skills:

How to identify the correct drafting instruments and stationery for a given task?
How to align and format a sheet?
How to use drafting instruments?
How to sharpen a pencil?
How to draft lines at equal spacing?

Learning Outcome (on which the Assessment Rubric is based):

To learn to draft various types of lines of given/stated spacing, sharpness and/or intensities consistently, without focussing on the use/application of those line in the architectural drawings, at this stage.

Assessment Rubric:

Mandatory requirements - 100% completion of sheet with faculty studio signature.
                                 - Complete format with nameplate and dark border line.

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
No guidelines and/or improper use of instructed instruments. No consistency in instructed spacing, sharpness and/or intensity of lines.	Uneven spacing between instructed guidelines and start and end points of lines. Lack of consistency in instructed sharpness and/or intensity of lines. Unequal intensity from beginning of the line to the end of the line.	Clean sheet with equal instructed spacing between lines with guidelines. Lines with accurate starting and ending points and instructed sharpness and/or intensity. Light tone of lines throughout the sheet.	Clean sheet with equal instructed spacing between lines with guidelines. Sharp lines with accurate starting and ending point and instructed sharpness and/or intensity. Equal instructed intensity of lines from start to end.
D/E grade	**B/C grade**	**A grade**	**O grade**
45 – 60 marks	**61 – 80 marks**	**81 – 90 marks**	**91 – 100 marks**

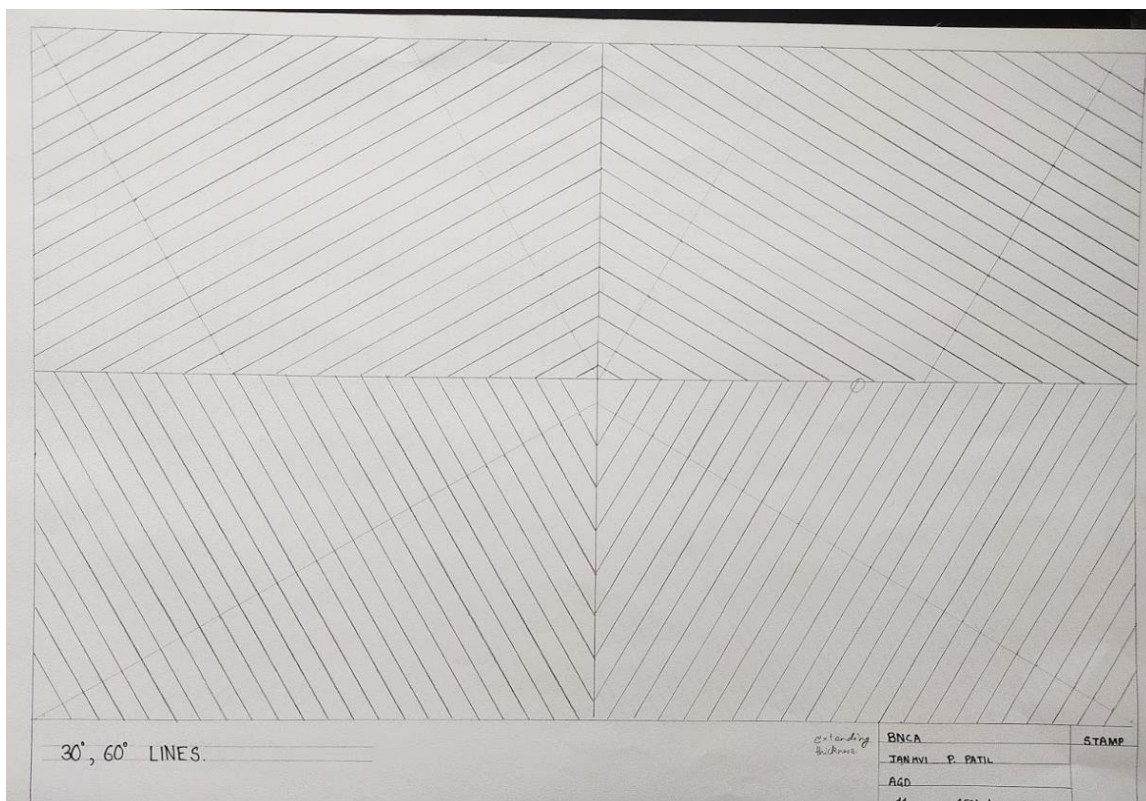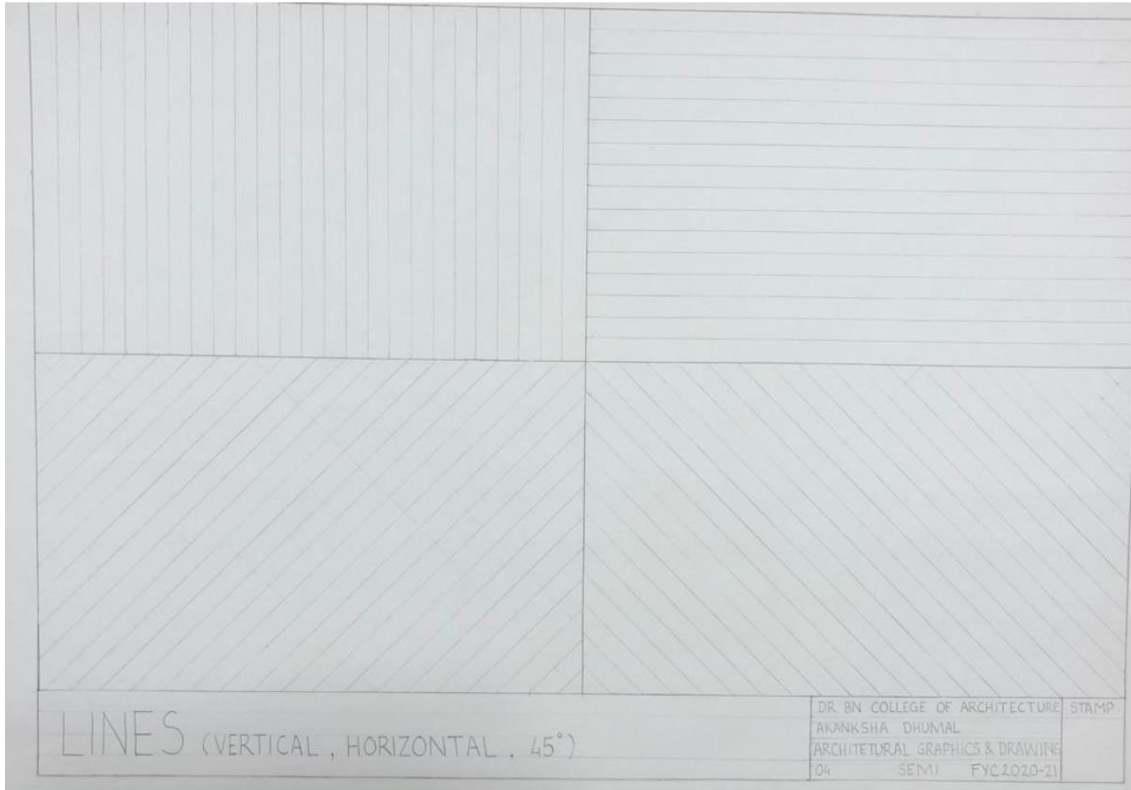**Deliverable:**
1 no. A1 sheet

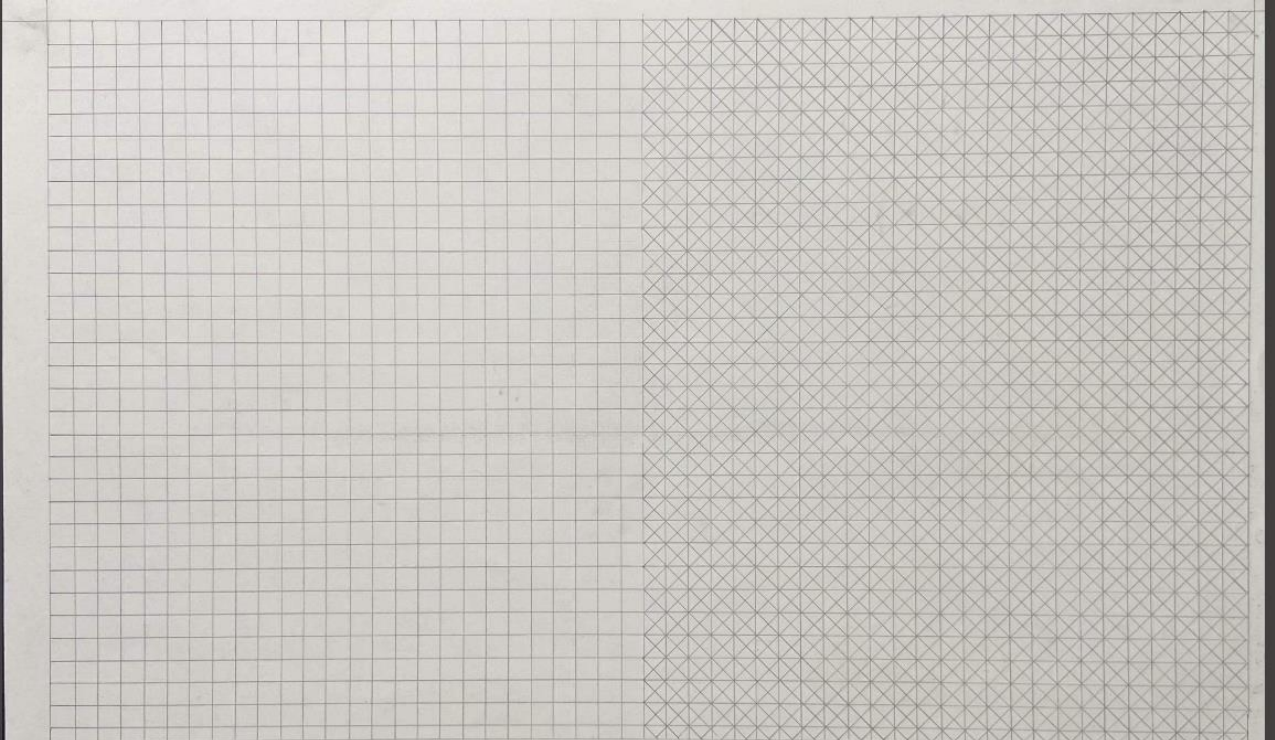**Material needed:**
Classwork:
A2/A3 cartridge sheet, tracing sheet, T-square, Set-squares, Pencil grade – HB, 2B, 4B
Homework:
A1 cartridge sheet, tracing sheet, T-square, Set-squares, Pencil grade – HB, 2B, 4B

Sample :

LINES (VERTICAL, HORIZONTAL, 45°)

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04   SEM I   FYC 2020-21

30°, 60° LINES.

extending thickness | BNCA | STAMP
JANHVI P. PATIL
A4D
11   SEM-1   2021-21

GRIDS

Objective:
Introduction to meaning of various line tones in a drawing.
Initial skill development of drafting lines at angles with tonal variation.

Skills:

What is a line tone and where do we see its application?
Which pencil to use from various grades of pencils to achieve a particular line tone?
How to use same pencil grade to achieve varying line tones?
How to regulate pressure on hands while drafting?

Learning Outcome (on which the Assessment Rubric is based):

Sheet 1:
To learn the need and application of various grade pencils and how different grade pencils could provide different tonal variations even with same hand pressure.
Sheet 2:
To learn how to use the same grade pencil in order to achieve different tonal variations with different levels of hand pressure.

Assessment Rubric:

Mandatory requirements - 100% completion of sheet with faculty studio sign.
                                           - Complete format with nameplate and dark border line.

Sheet 1 : Different grade pencils, same hand pressure

Sheet 2 - Same grade pencils, different hand pressure

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
No instructed guidelines and untidy sheet. No consistency in instructed spacing and/or sharpness of lines. Minimum tonal variation achieved.	Uneven instructed distance between lines and/or starting/ending point of lines. Lack of consistency in instructed sharpness of lines and four line tones. No uniformity in instructed intensity of lines from their start to end.	Clean sheet with equal instructed spacing between lines with guidelines and exact instructed starting and ending point for every line. Four distinct instructed line tones achieved but lack of instructed uniformity in consecutive lines in entire sheet. Lack of uniformity in intensity of lines from start to end.	Clean sheet with equal instructed spacing between lines with guidelines. Sharp lines with exact instructed starting and ending point. Instructed consistency in line tone from start to end. Four distinct instructed line tones achieved and maintained throughout the sheet.
D/E grade	B/C grade	A grade	O grade
45 – 60 marks	61 – 80 marks	81 – 90 marks	91 – 100 marks

Deliverables:
2 nos. A1 sheets
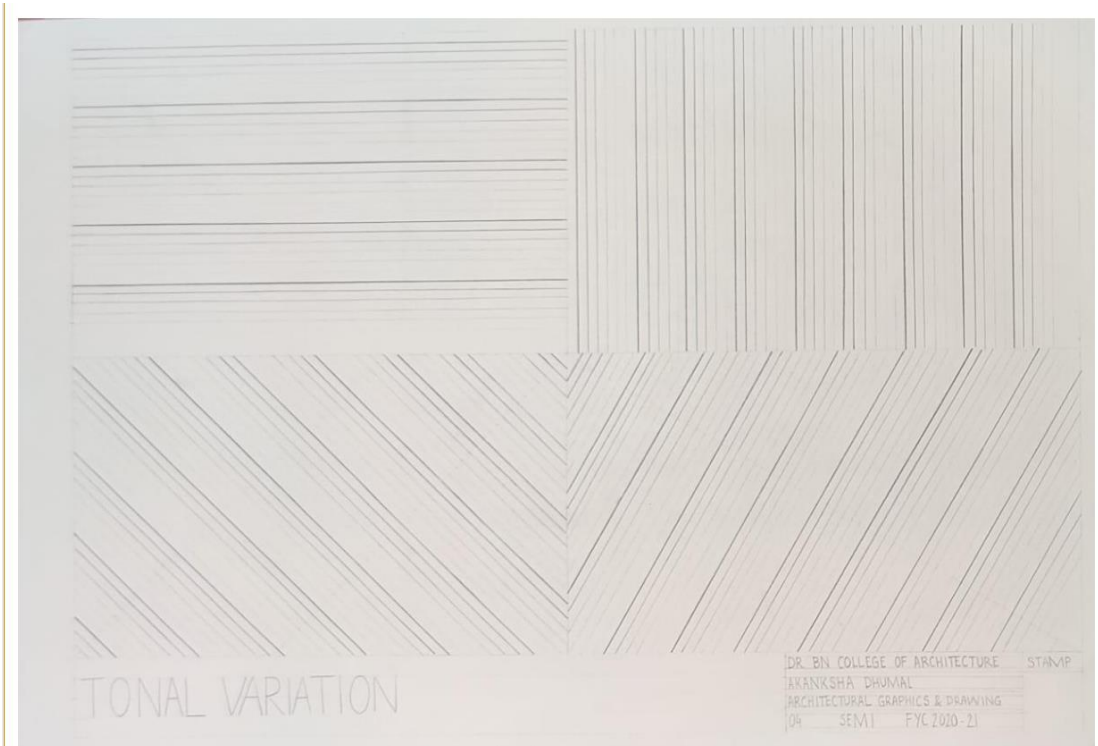
Material needed:
Classwork:
A2/A3 cartridge sheet, tracing sheet, T-square, Set-squares, Pencil grade – HB, 2B, 4B, 6B
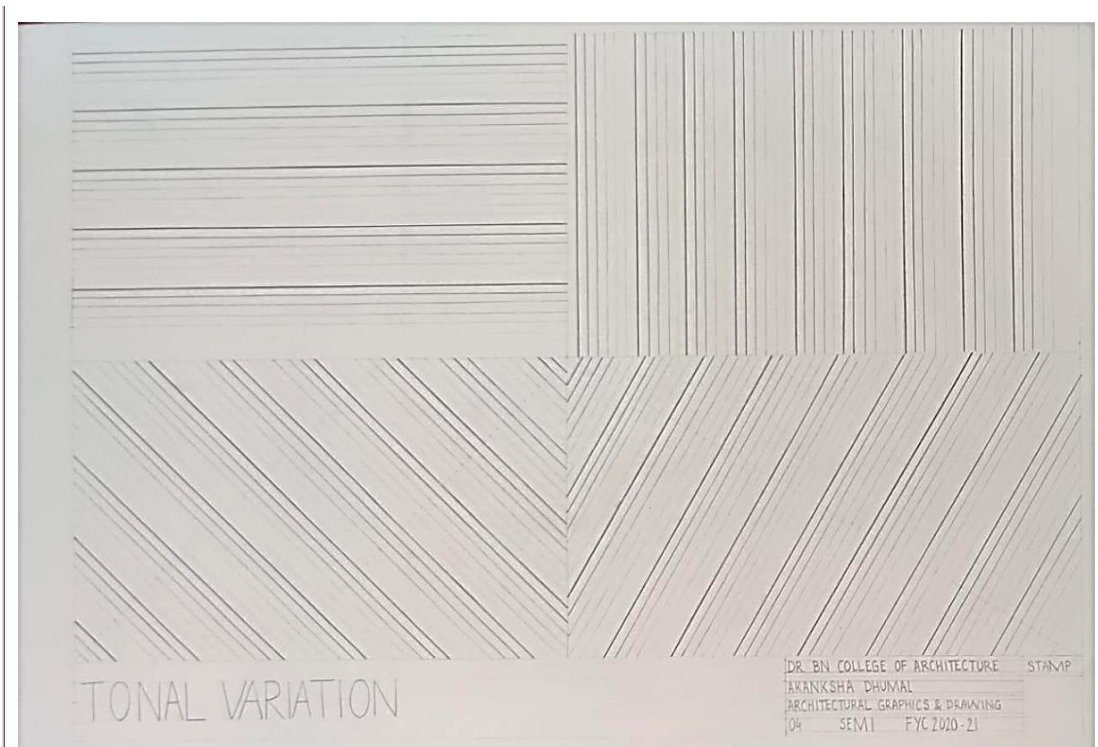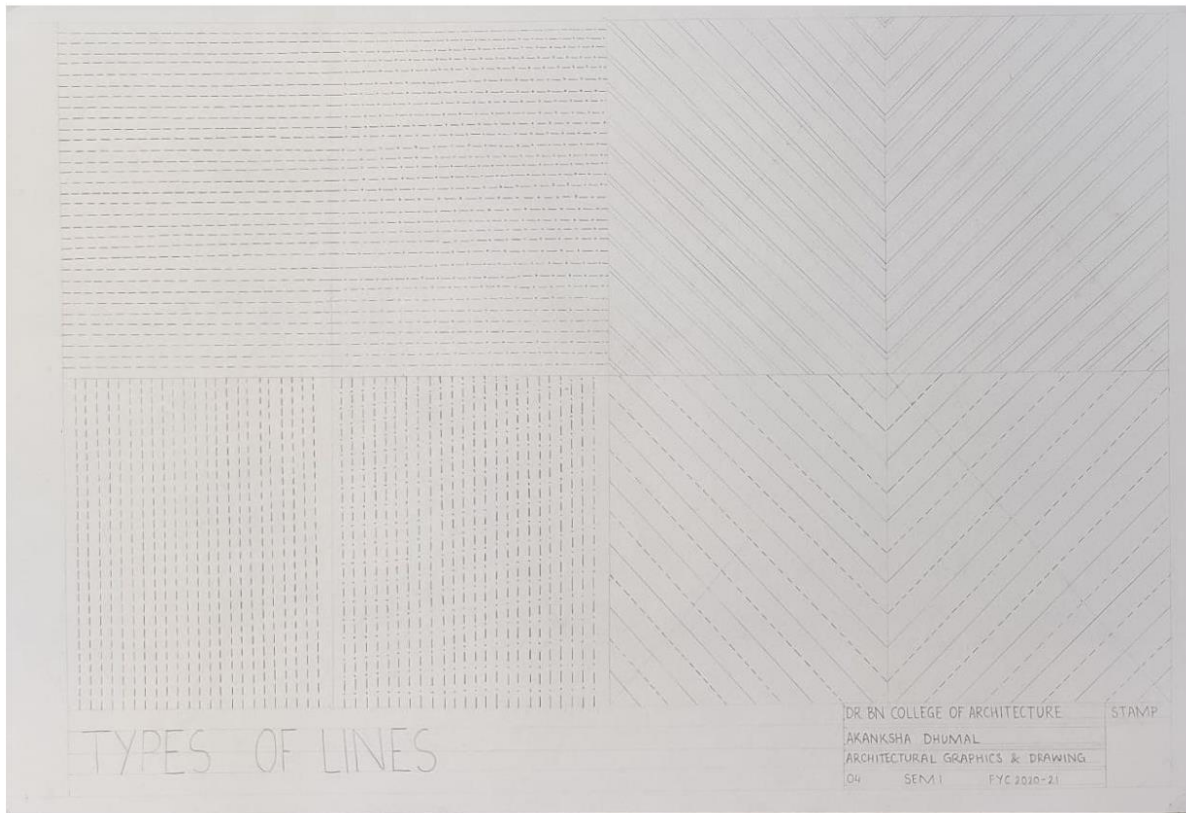**Homework:**
2 nos. A1 cartridge sheets, tracing sheet, T-square, Set-squares, Pencil grade – HB, 2B, 4B, 6B

Sample Sheets:
Sheet 1

Sheet 2

Objective:
Introduction to meaning of various line types in an architectural drawing.
Introduction to technical fonts for nomenclature on drawings.
Initial skill development of drafting various line types and lettering.

Skills:

Which line types and line tones are required while preparing an architectural drawing to communicate its meaning correctly?
Which font is used for technical drawings?
What is the hierarchy of lettering on a sheet?

Learning Outcome (on which the Assessment Rubric is based):

Sheet 1:
To learn to draw various line types with appropriate line tones, instructed consistency, accurate sharpness and/or intensity and uniformity, without focussing on the use/application of those line types in the architectural drawings, at this stage.
Sheet 2:
To learn to choose and apply different scales of lettering (technical fonts) for various instructed hierarchy of nomenclature on drawings.

Assessment Rubric:

Mandatory requirements - 100% completion of sheet with faculty studio sign.
                                    - Complete format with nameplate and dark border line.

Sheet 1 – Line Types

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
No instructed guidelines and untidy sheet. No consistency in instructed spacing, tone and sharpness of lines.	Uneven distance between lines and starting and ending point of line types. Lack of uniformity in instructed line type and line tone from start to end.	Clean sheet with sharp lines and exact starting and ending point. Lack of uniformity in instructed line type or line tone from start to end.	Clean sheet with instructed sharp lines and exact starting and ending point. Application of appropriate instructed line tone for every line type and uniformity in lines throughout the sheet.
D/E grade	**B/C grade**	**A grade**	**O grade**
45 – 60 marks	**61 – 80 marks**	**81 – 90 marks**	**91 – 100 marks**

Sheet 2 - Lettering

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
No instructed guidelines and untidy sheet. Inappropriate non-technical lettering font. Cursive lettering.	Uneven distance between instructed guidelines. No uniformity in letters and/or their proportions and/or spacing. Inclined lettering.	Clean sheet with neat guidelines. Slightly inclined lettering with no uniformity of letters in increasing text height.	Clean sheet with neat guidelines with consistent instructed spacing and line tone. Upright font with proper proportions and spacing between letters in all sizes of lettering. Consistency in lettering.
D/E grade	**B/C grade**	**A grade**	**O grade**
45 – 60 marks	**61 – 80 marks**	**81 – 90 marks**	**91 – 100 marks**

Deliverables:
2 nos. A1 sheets

Material needed:
Classwork:
A2/A3 cartridge sheet, tracing sheet, T-square, Set-squares, Pencil grade – HB, 2B, 4B, 6B
Homework:
2 nos. A1 cartridge sheets, tracing sheet, T-square, Set-squares, Pencil grade – HB, 2B, 4B, 6B

Sample

TYPES OF LINES

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ABCDEFGHIJKLMNOPQR
STUVWXYZ 1234567890
ABCDEFGHIJKLMNOPQRSTU
VWXYZ 1234567890 ABCDEFG
ABCDEFGHIJKLMNOPQRSTUVWXYZ
1234567890 ABCDEFGHIJKLMNOPQ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890 ABCDEFGHIJKLMNOPQR
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890 ABCDEFGHIJKLMNOPQRSTUVWXYZ 12
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890 ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890 ABCDEFGHI
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890 ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890 ABCDEFGHIJKLMNOPQRST

LETTERING 2 (VARYING SIZES)

ABCDEFGHIJKLMNOPQ
RSTUVWXYZ
1234567890
ABCDEFGHIJKLMNOPQ
RSTUVWXYZ
1234567890
ABCDEFGHIJKLMNOPQ
RSTUVWXYZ
1234567890
ABCDEFGHIJKLMNOPQ
RSTUVWXYZ
1234567890

ABCDEFGHIJKLMNOPQRST
UVWXYZ
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UVWXYZ
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UVWXYZ
1234567890

LETTERING 1

Objective:
Introduction to language of drawing with its conventions and annotations.
Develop the ability to read and comprehend a drawing.

Skills:

What are the contents of a nameplate?
What is the meaning of every different line in the drawing?
What does every symbol communicate in the drawing?
What are the conventions for various building elements and building materials?

Contents:

- Types of drawings – documentation drawing, working drawing, presentation drawing.

- Set of drawings – sequence and composition, hierarchy in lettering and scale.

- North symbol, road, trees, gate, entrance symbol, steps, graphical scale.

- Staircase – ground floor, first floor and terrace level and section through staircase.

- Toilet – plan and section with sanitary fitting indications and tile drop.

- Openings – door types (basic), window types (basic), arches, ventilator.

- Roof indications – inclined roof, vaulted roof.

- Line types, ground line in section, humans, materials in plan and section, levels in plan, elevation and section, open to sky indication, double height indication.

Material needed :

A5 book, A4 gridpad, tracing sheet, T square, Set squares, scale, Pencil grade – HB, 2B, 4B

Deliverables :

A5 doodle book - DRAWING DONE RIGHT.

Annotate in the WORKBOOK.

Read a drawing collectively in library.

Assessment Rubric:

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
Untidy linework and incorrect representation of annotations, only description in doodle book. Untidy sheet, No uniformity in line type and line tone. Inappropriate non technical font and dimension style. Improper application of material indications and conventions.	Untidy linework though correct representation of annotations and minimum footnotes in doodle book. No uniformity in line type and line tone. Non uniformity in font and dimension style/description Incomplete application of material indications and conventions.	Correct representation of annotations with footnotes in doodle book. Clean linework but improper line tones and line types. Technical font with improper method of writing description/ dimensions. Proper application of material indications and conventions.	Correct representation of annotations with clean linework and footnotes in doodle book. Clean linework with proper line tones and line types on sheet. Technical font for text with appropriate hierarchy and dimensions/ description. Proper application of material indications and conventions.
D/E grade	**B/C grade**	**A grade**	**O grade**
45 – 60 marks	**61 – 80 marks**	**81 – 90 marks**	**91 – 100 marks**

TREES - PLAN & ELEVATION

| ELEVATION | ELEVATION | ELEVATION | ELEVATION | ELEVATION | ELEVATION | ELEVATION | ELEVATION | ELEVATION | ELEVATION |
| PLAN | PLAN | PLAN | PLAN | PLAN | PLAN | PLAN | PLAN | PLAN | PLAN |

HUMAN FIGURES

ANNOTATIONS-2

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F.Y.B 20_21	ROLL NO-23.

BRICK		NORTH
STONE		LEVEL PLAN
CONCRETE	+600	LEVEL ELEVATION
TIMBER	+3000	
ACTUAL LINE	UP	UP
INVISIBLE LINE		ENTRANCE
SECTION LINE		TILE DROP
WINDOW		ARCH
VENTILATOR		RAMP
		DOOR
		TERRACE
		SUNLIGHT

ANNOTATIONS

Objective:
Introduction to the concept of scales in drawing.
Introduction to correlation between details of object to be dawn, intention of the drawing
to be prepared and choice of scale to represent the same.

Skills:

How to observe and measure a (small part of) a building?
How to choose an appropriate size of sheet for particular drawing?
How to decide a scale based on the intent of the drawing?
How to communicate and work as a group/ team?

Site visit :

Karve Samadhi in campus.

Work in groups of 3/4.

Assessment Rubric:

Mandatory requirements - 100% completion of sheet with faculty studio sign.

                              - Complete format with nameplate and dark border line.

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
Poor observation in reproducing a building as a drawing .	Poor observation in reproducing a building as a drawing on tracings.	Keen observation in reproducing a building as a drawing on tracings.	Keen observation in reproducing a building as a drawing on tracings.
Poor sketch work with proper units of measurements but incomplete cross check dimensions.	Average sketch work with proper units of measurements but incomplete cross check dimensions.	Average sketch work with proper units of measurements but incomplete cross check dimensions.	Methodical and clean sketch work with proper units of measurements and cross check dimensions.
No of intent reflected through the scale chosen for the drawing and size of paper.	No of intent reflected through the scale chosen for the drawing and size of paper.	Clarity of intent reflected through the scale chosen for the drawing and size of paper.	Clarity of intent reflected through the scale chosen for the drawing and size of paper.
Inconsistent use	Inconsistent use of	Inconsistent use of	Consistent use of

of line tone and line thickness in the drawing. Inorrect application of annotations in the drawing. No coordination between team members till completion of task.	line tone and line thickness in the drawing. Partially correct application of annotations in the drawing. Smooth coordination between team members till completion of task.	line tone and line thickness in the drawing. Correct application of annotations in the drawing. Smooth coordination between team members till completion of task.	line tone and line thickness in the drawing. Correct application of annotations in the drawing. Good coordination between team members till completion of task.
D/E grade	**B/C grade**	**A grade**	**O grade**
45 – 60 marks	**61 – 80 marks**	**81 – 90 marks**	**91 – 100 marks**

Deliverable : Tracings sheets as needed by students.

Material needed :
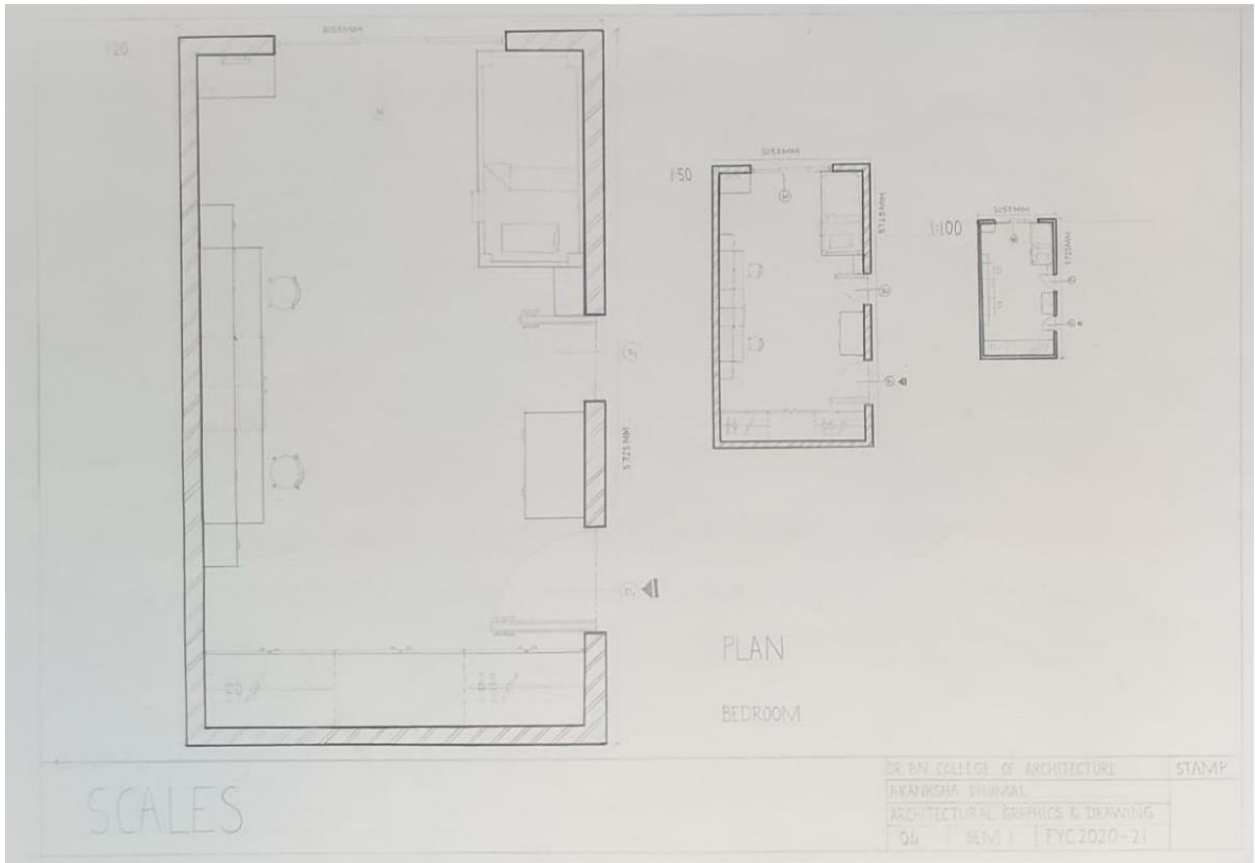
1:20

3053MM

1:50

3053MM

1:100

3053MM

PLAN

BEDROOM

SCALES

Objective:

Skills:

Assessment Rubric:

Mandatory requirements - 100% completion of sheet with faculty studio sign.

                          - Complete format with nameplate and dark border line.

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
D/E grade	B/C grade	A grade	O grade
45 – 60 marks	61 – 80 marks	81 – 90 marks	91 – 100 marks

Deliverable : 1 no. A1 sheet.

Material needed :

Sample :

Q1] DRAW A LINE PARALLEL TO AND AT A DISTANCE OF 60MM FROM A STRAIGHT LINE AT 30°?
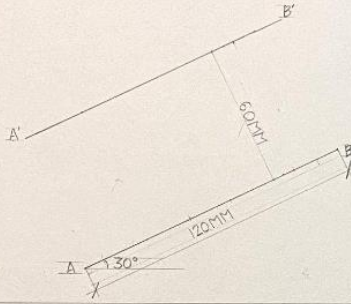
Q2] INSCRIBE A REGULAR PENTAGON IN A CIRCLE OF RADIUS 30MM
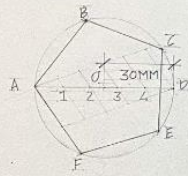
Q4] DRAW AN ARC OF 20MM BETWEEN THE GIVEN STRAIGHT LINES WHICH MAKE ∠50° BETWEEN THEM
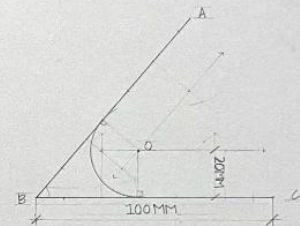
Q3] DIVIDE THE GIVEN LINE OF 15CM INTO 9 EQUAL PARTS.
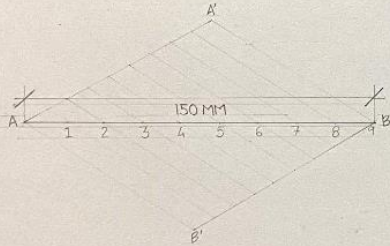
Q5] DRAW A CONTINUOUS CURVE OF CIRCULAR ARCS PASSING THROUGH 5 PTS NOT IN A STRAIGHT LINE.

PLANAR GEOMETRY

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Q6] INSCRIBE A POLYGON OF 7 SIDES IN A CIRCLE OF 50MM.
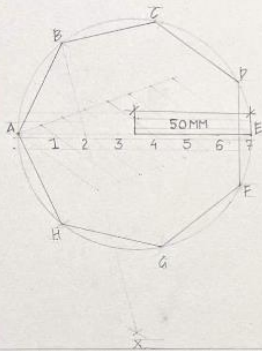
Q7] CONSTRUCT POLYGONS FROM 3-12 NO OF SIDES WITH LENGTH OF EACH SIDE 40MM
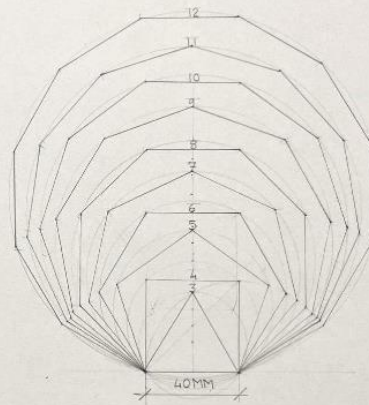
Q8] CIRCUMSCRIBE A CIRCLE ABOUT THE GIVEN TRIANGLE
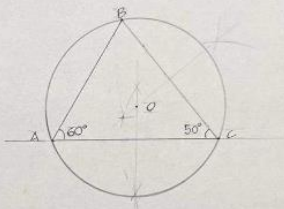
PLANAR GEOMETRY

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ARCHI. GRAPHICS & DRAWING
FYB - 20_21 | ROLL NO - 23

Objective:

To illustrate objects/ building elements using Orthographic projections system (plan, section and elevations)

Develop the ability to visualize an object / building element through verbal cues and/or written description and prepare a set of multiview drawings (plan, section, elevation) .

Skills:

How to represent simple objects with straight edges, curvilinear surfaces and inclined surfaces using orthographic projection method?

How to represent complex and composite forms using orthographic projection method?

Which additional pictorial methods (covered in assignment 5) can be used to communicate complex and composite objects effectively?

Content:

Simple objects with straight edges, curvilinear surfaces and inclined surfaces on a gridpad.

Verbal cues and/or written description of complex objects on a sheet.

Complete the drawing for composite objects on a sheet.

Draw plan, section, elevation and view of building elements like - steps , deepmala, chalukyan column, etc on sheets.

Assessment Rubric:

Mandatory requirements - 100% completion of sheet with faculty studio sign.

                        - Complete format with nameplate and dark border line. (Every
                        sheet shall have 2 objects and 1 building element.)

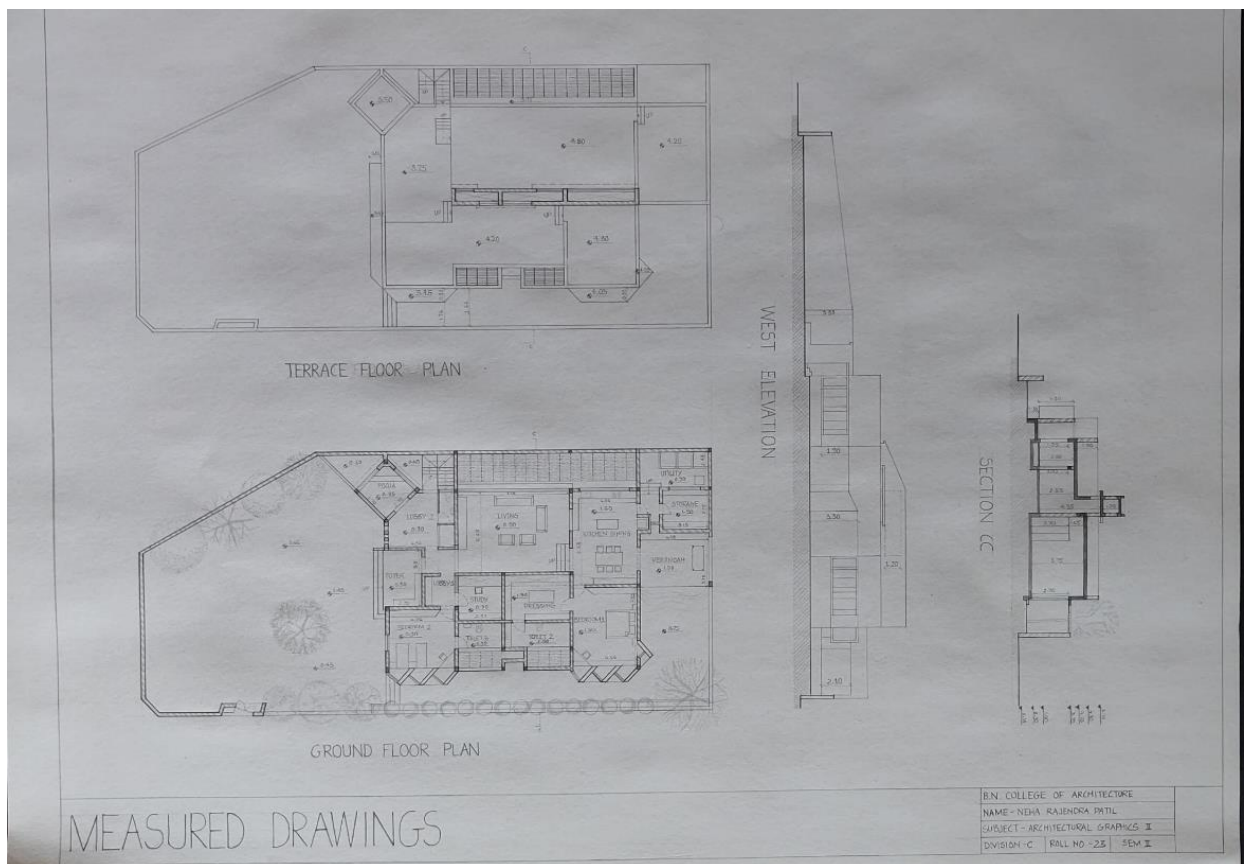| BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
All views together are not composed well.	Sheet not composed fitting all views together using different scales.	Clean sheet and clean composition with fitting all views together at varied scales.	Clean sheet and clean composition with fitting all views together at varied scales.
Guidelines and projection lines missing.	No clear guidelines for formation of object and projection lines.	Clear guidelines for formation of object and projection lines.	Clear guidelines for formation of object and projection lines.
Poor line quality and line tone.	No uniformity in line quality and minimal tonal variation achieved.	Uniformity in line quality with correct tone and thickness as per conventions.	Uniformity in line quality with correct tone and thickness as per conventions.
Improper nomenclature of the object with legible lettering.	Improper nomenclature of the object with legible lettering.	Improper nomenclature of the object with legible lettering.	Proper nomenclature of the object with legible lettering.
D/E grade	B/C grade	A grade	O grade
45 – 60 marks	61 – 80 marks	81 – 90 marks	91 – 100 marks

Deliverable : 3 nos. A1 sheet.
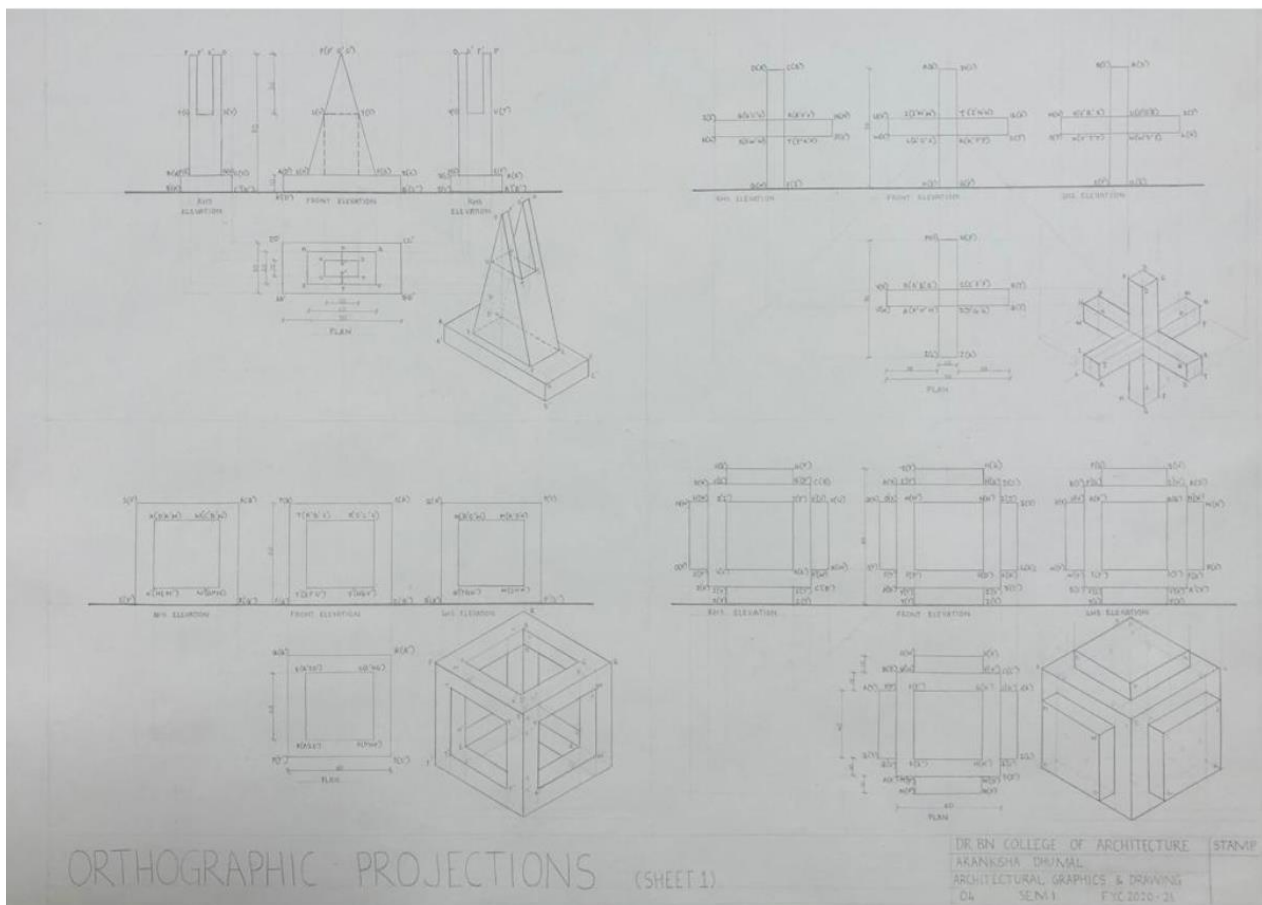
Sample :
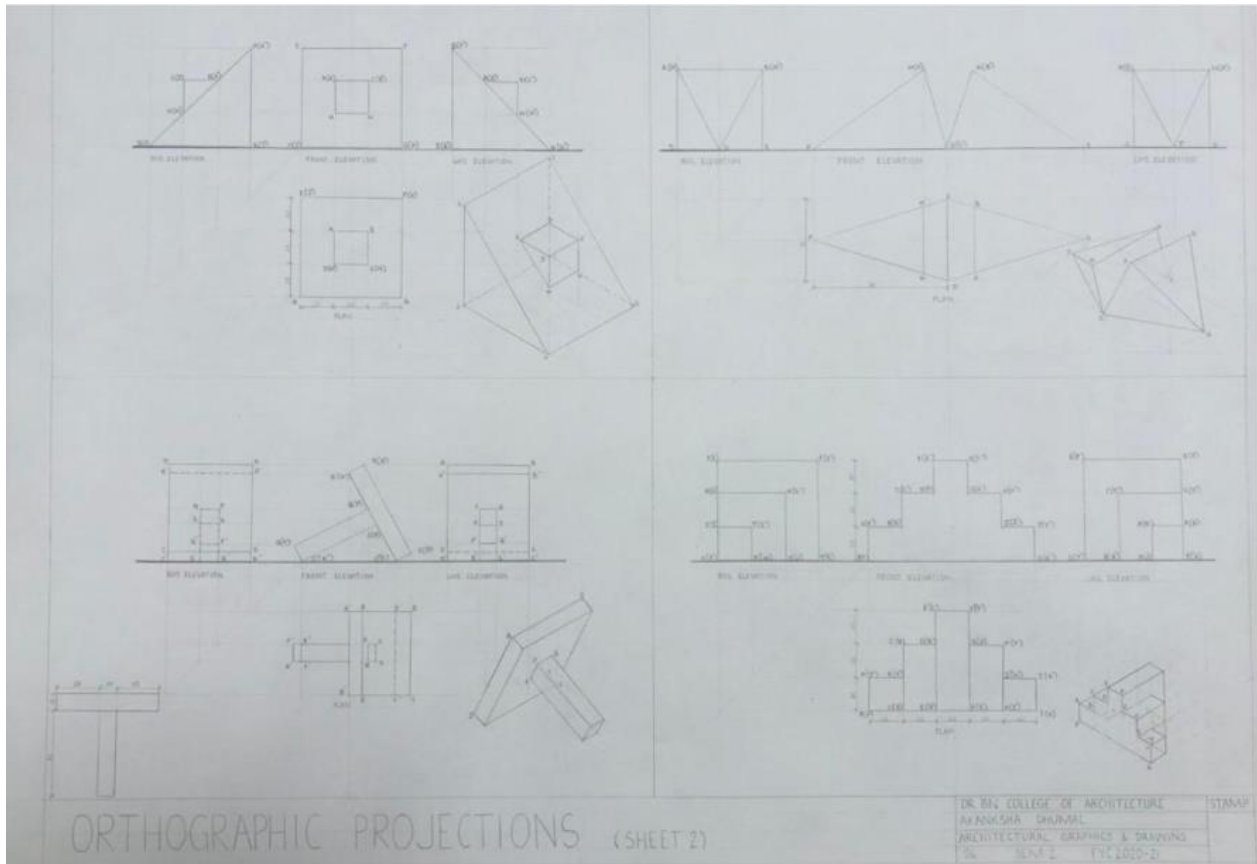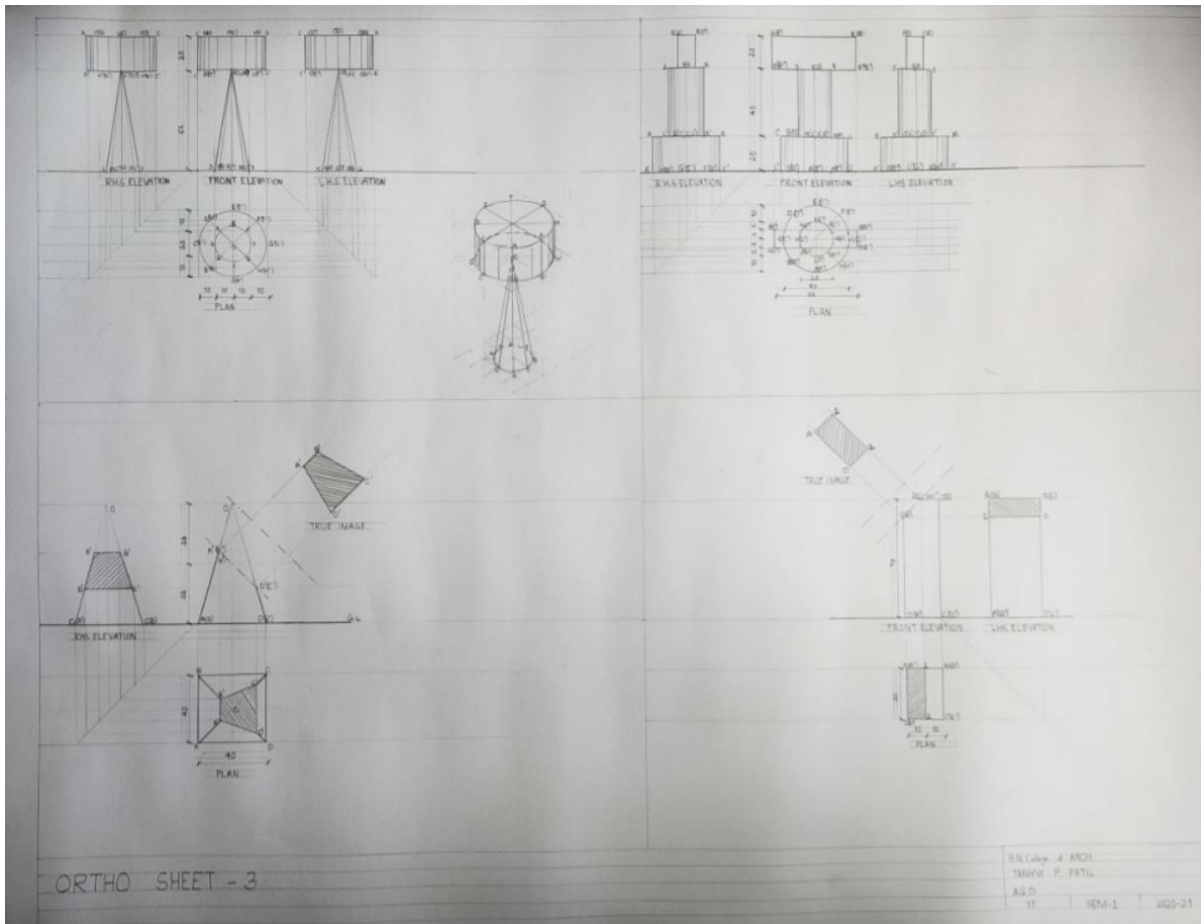
ORTHOGRAPHIC PROJECTIONS (SHEET 2)

ORTHO SHEET - 3
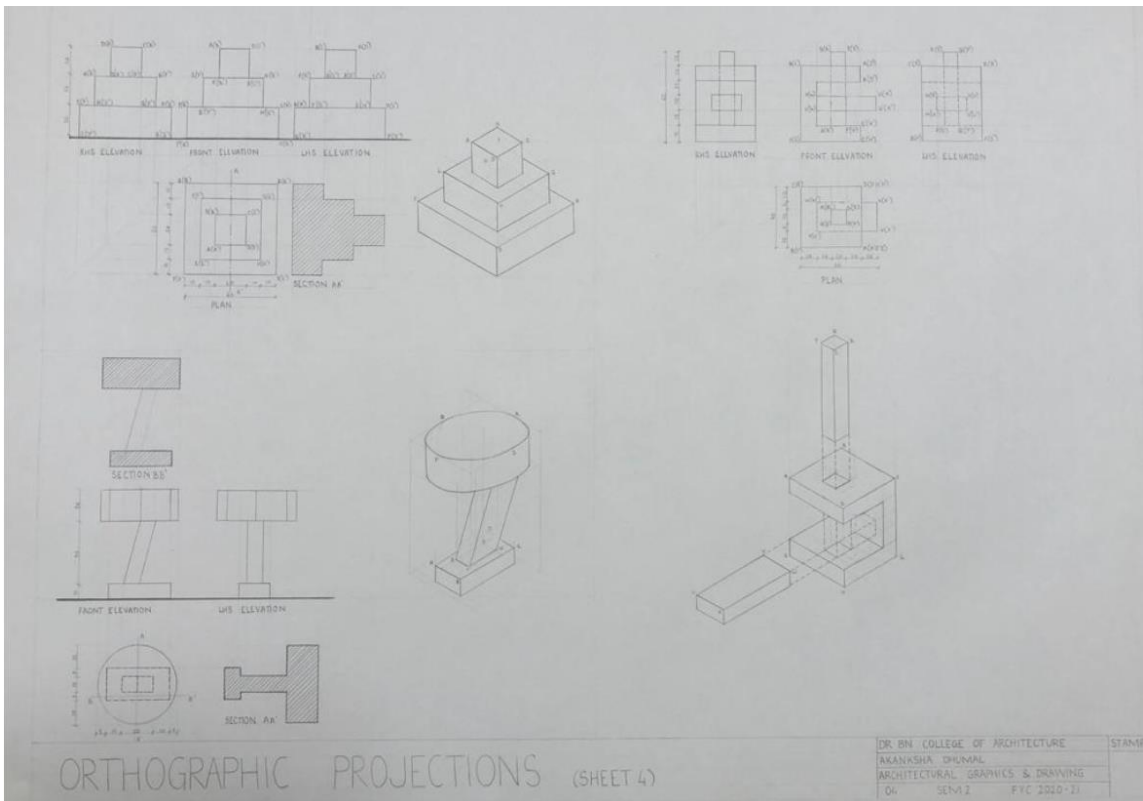
ORTHOGRAPHIC PROJECTIONS (SHEET 4)

Objective:

Enable students to prepare an entire set of architectural drawings for a small building. Apply knowledge from all previous sessions in one sheet as a culmination drawings.

Task: Reproduce the given set of drawings as is with –

1. Proper line quality – uniformity and consistency in tone and thickness
2. Proper annotations and conventions
3. Proper lettering and nomenclature

Assessment Rubric:

Mandatory requirements - 100% completion of sheet with faculty studio sign.

- Complete format with nameplate and dark border line.

BEGINNING	DEVELOPMENT	ACCOMPLISHED	COMPETENT
All views together are not composed well.	Sheet not composed fitting all views together using different scales.	Clean sheet and clean composition with fitting all views together at varied scales.	Clean sheet and clean composition with fitting all views together at varied scales.
Guidelines and projection lines missing.	No clear guidelines for formation of object and projection lines.	Clear guidelines for formation of object and projection lines.	Clear guidelines for formation of object and projection lines.
Poor line quality and line tone.	No uniformity in line quality and minimal tonal variation achieved.	Uniformity in line quality with correct tone and thickness as per conventions.	Uniformity in line quality with correct tone and thickness as per conventions.
Improper nomenclature of the object with legible lettering.	Improper nomenclature of the object with legible lettering.	Improper nomenclature of the object with legible lettering.	Proper nomenclature of the object with legible lettering.
D/E grade	**B/C grade**	**A grade**	**O grade**
45 – 60 marks	**61 – 80 marks**	**81 – 90 marks**	**91 – 100 marks**

Deliverable : 2 no. A1 sheet.

Follow-up Task:

Revisit Karve Samadhi in order to understand a building through a set of drawings as well as in reality.

Material needed :
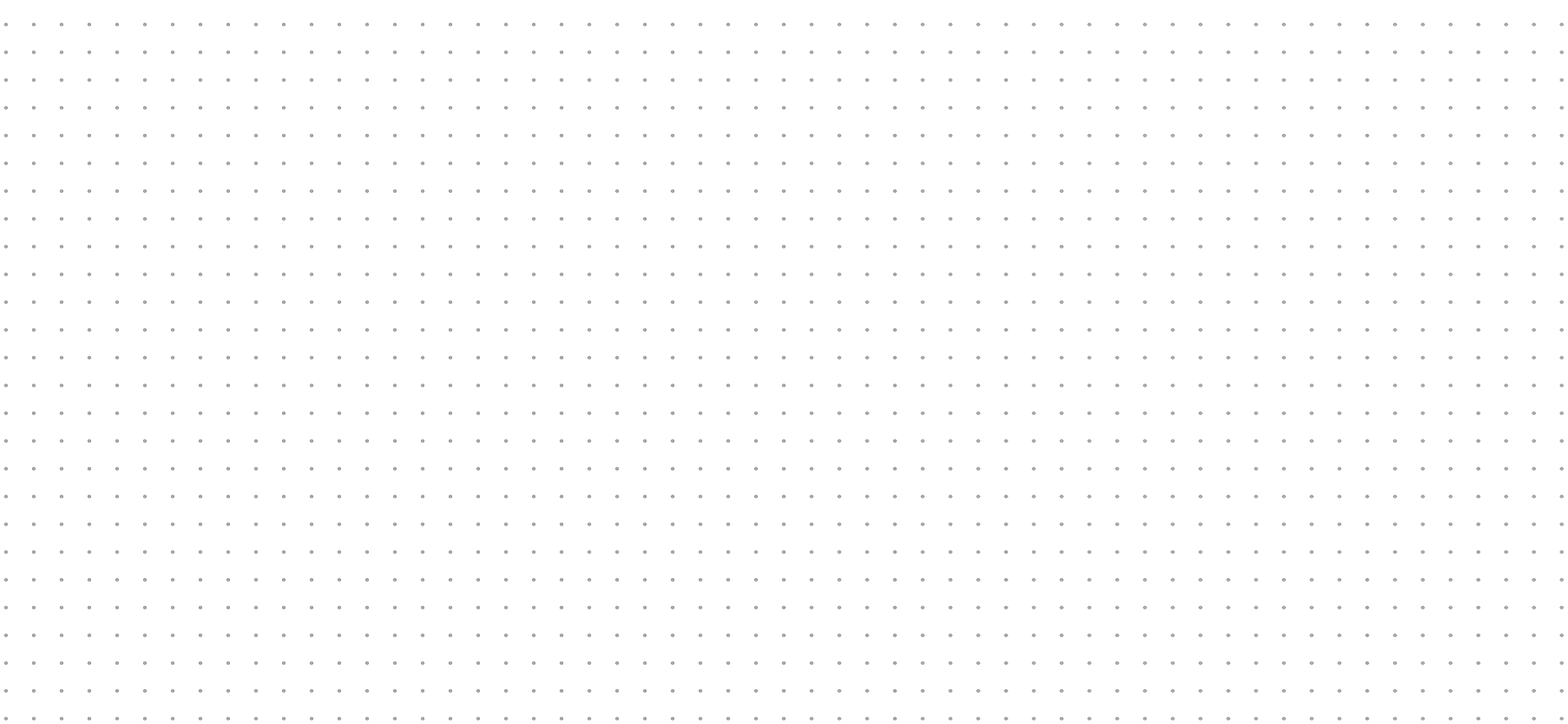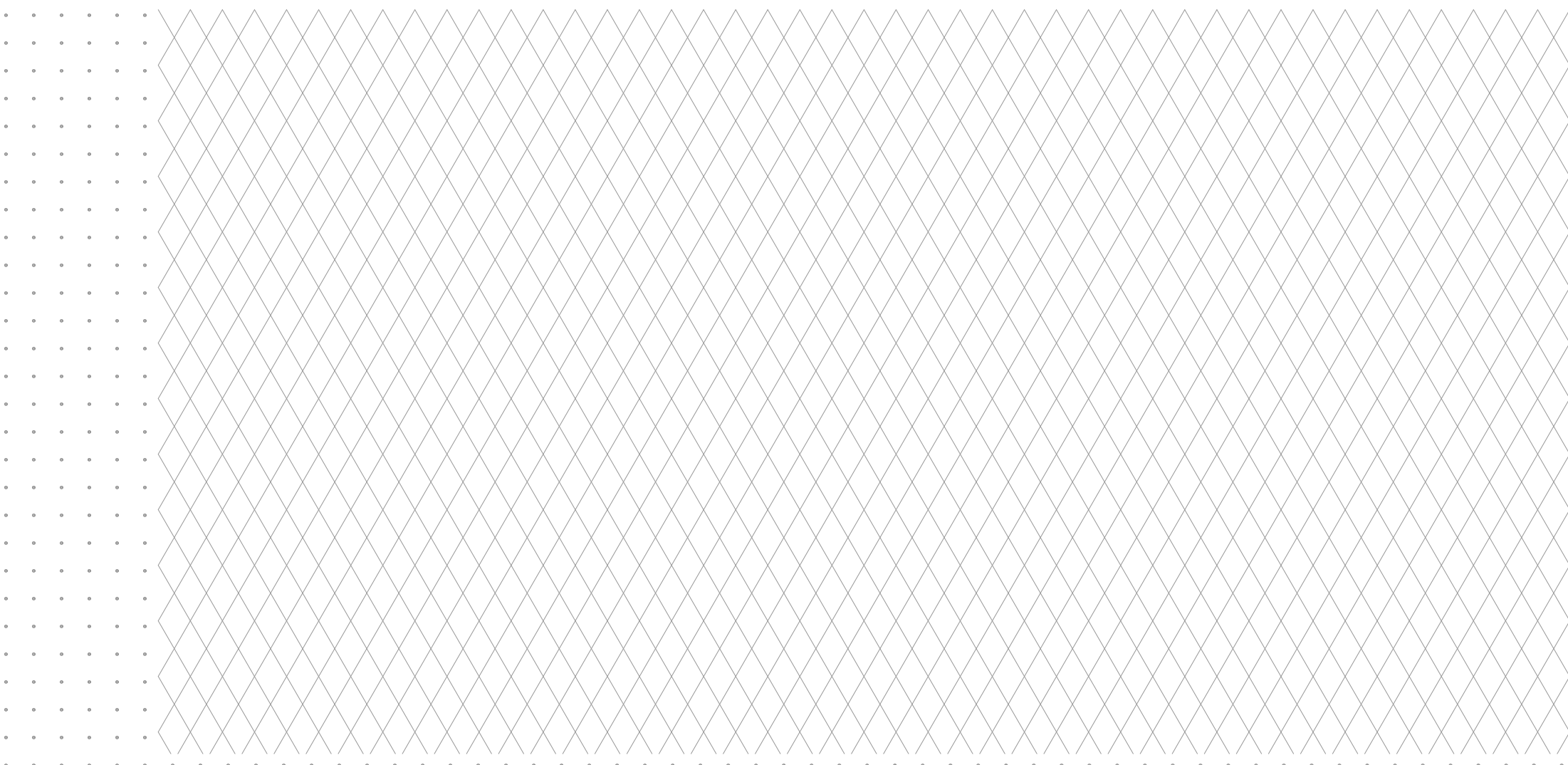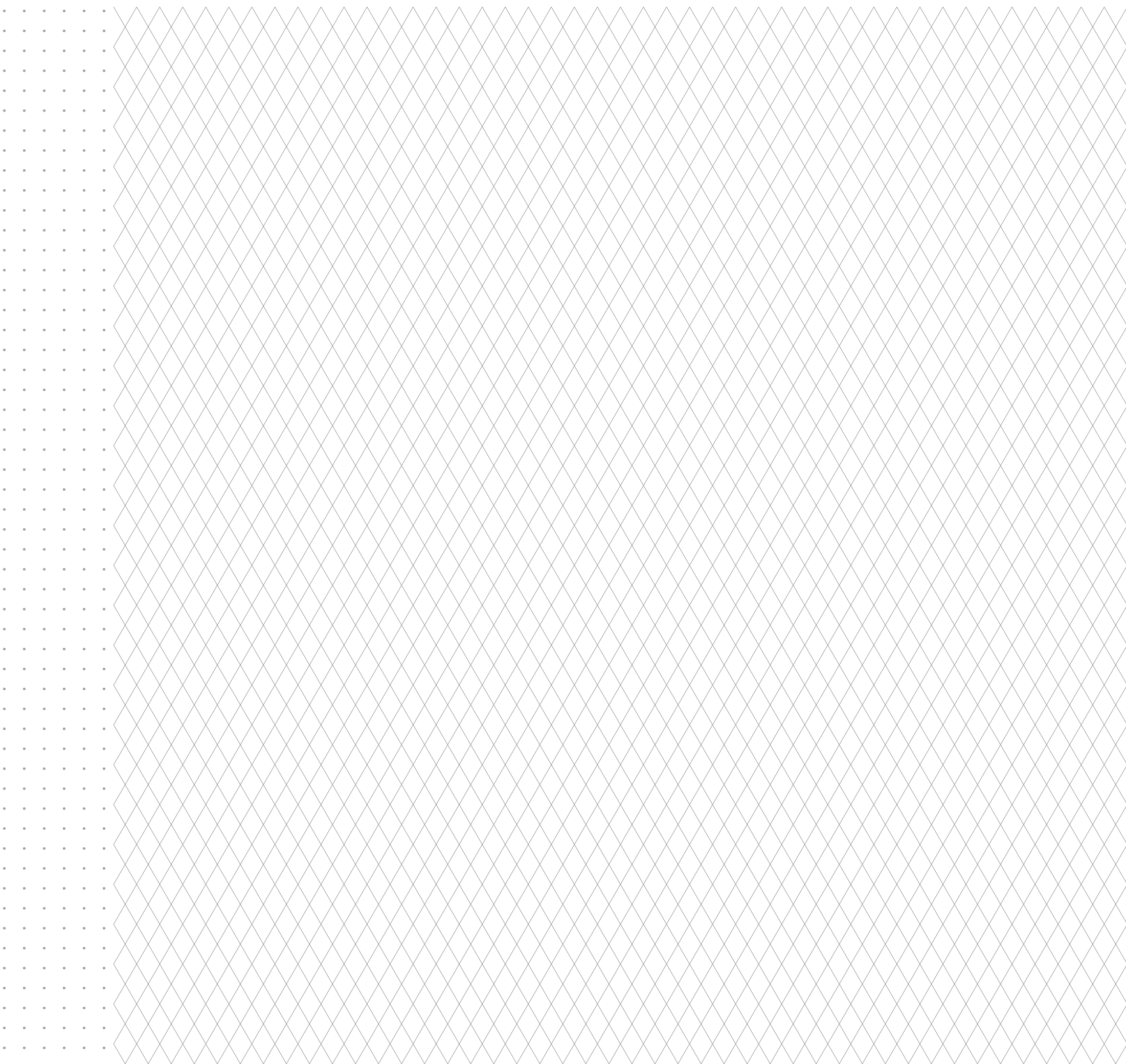
Sample:

B N C A
SKETCHING WORK BOOK

NAME

DIVISION

SIGN - STAMP
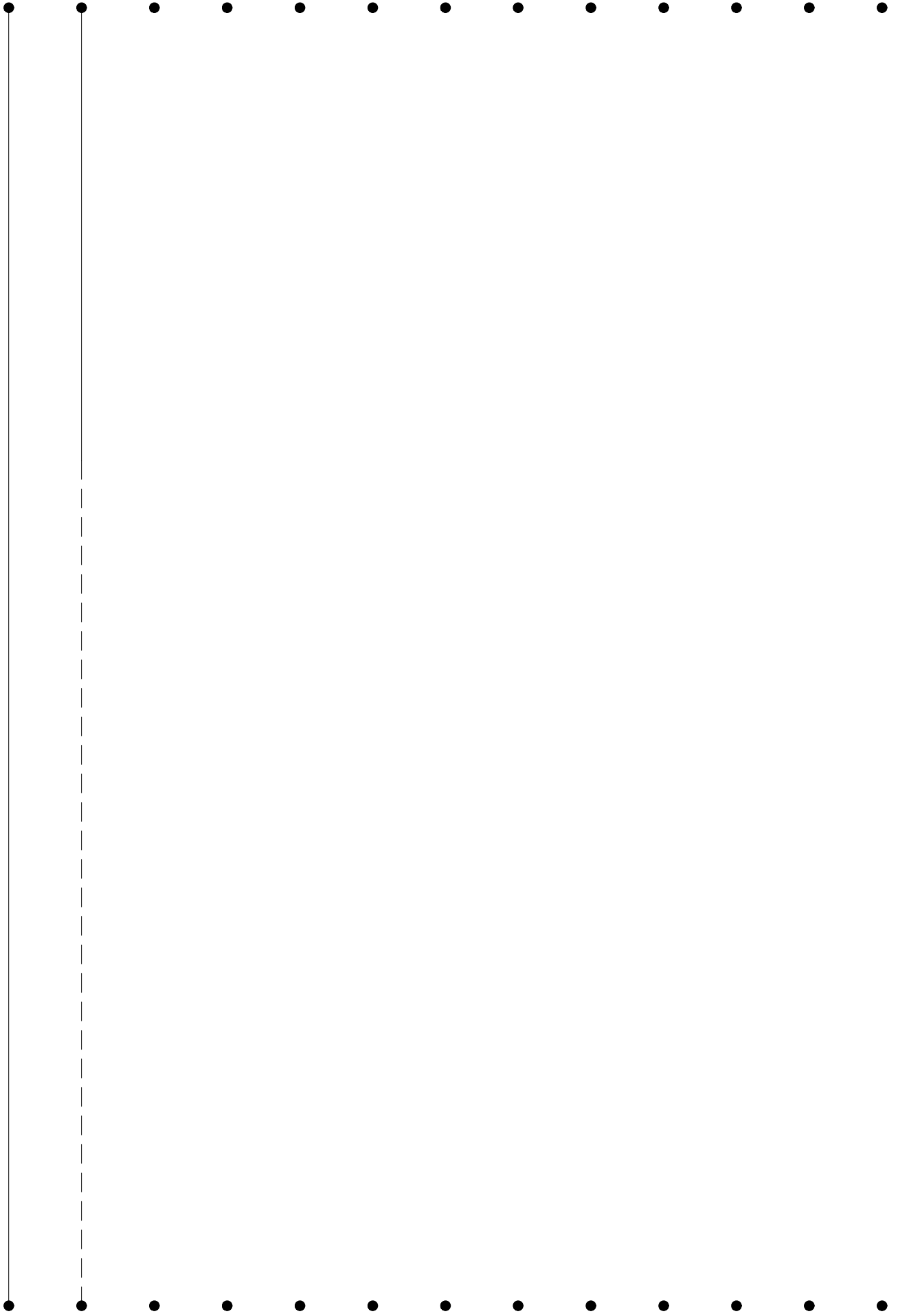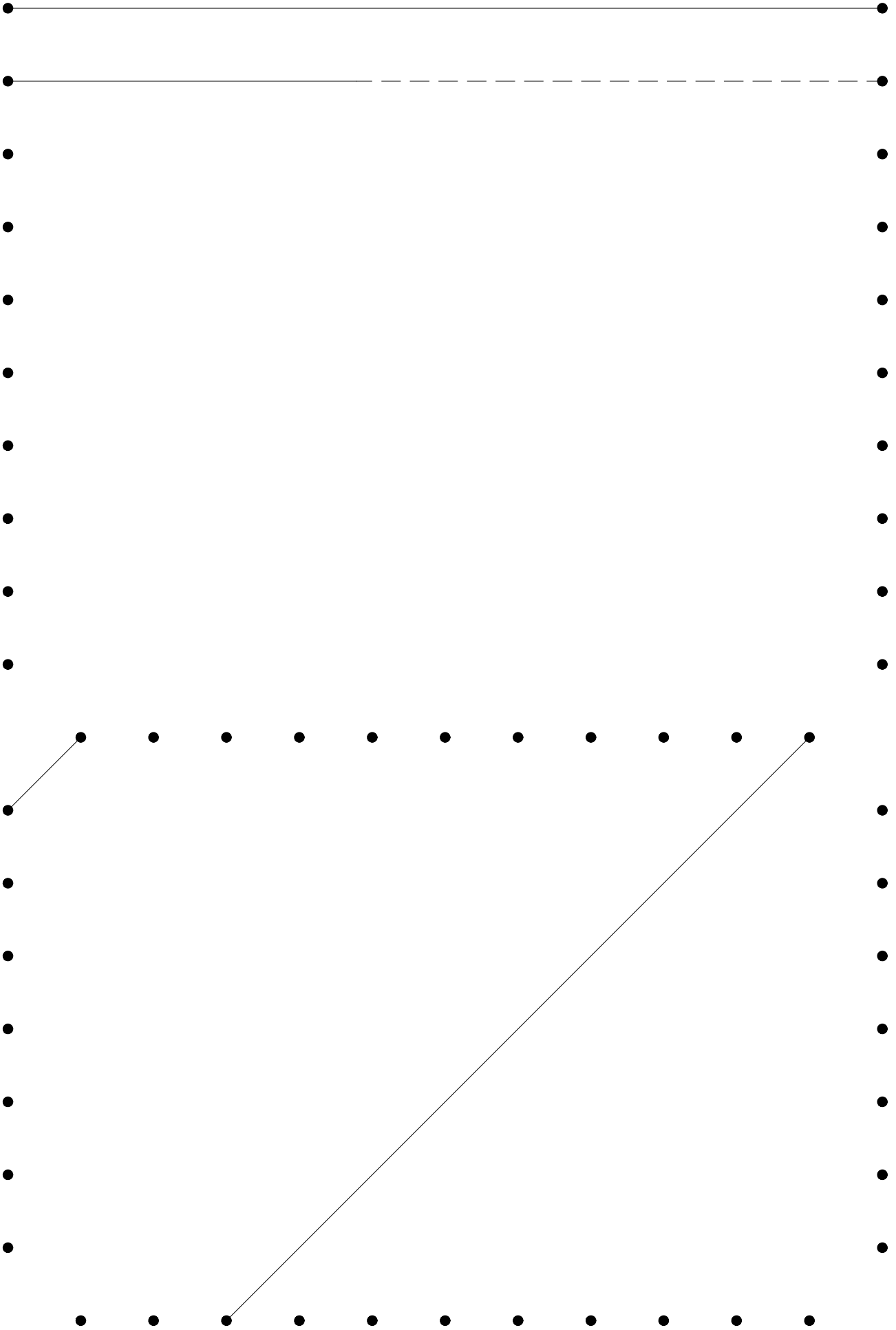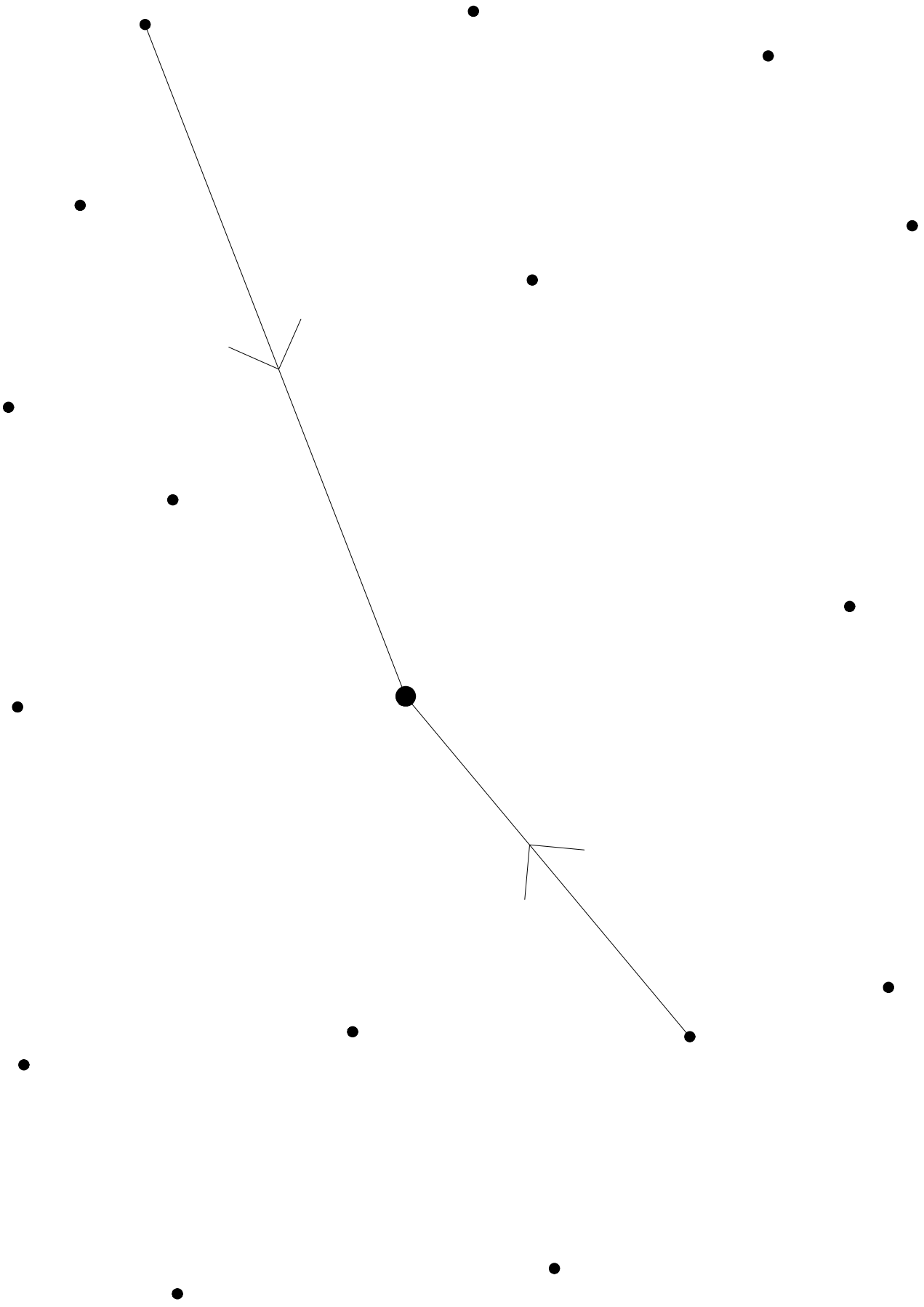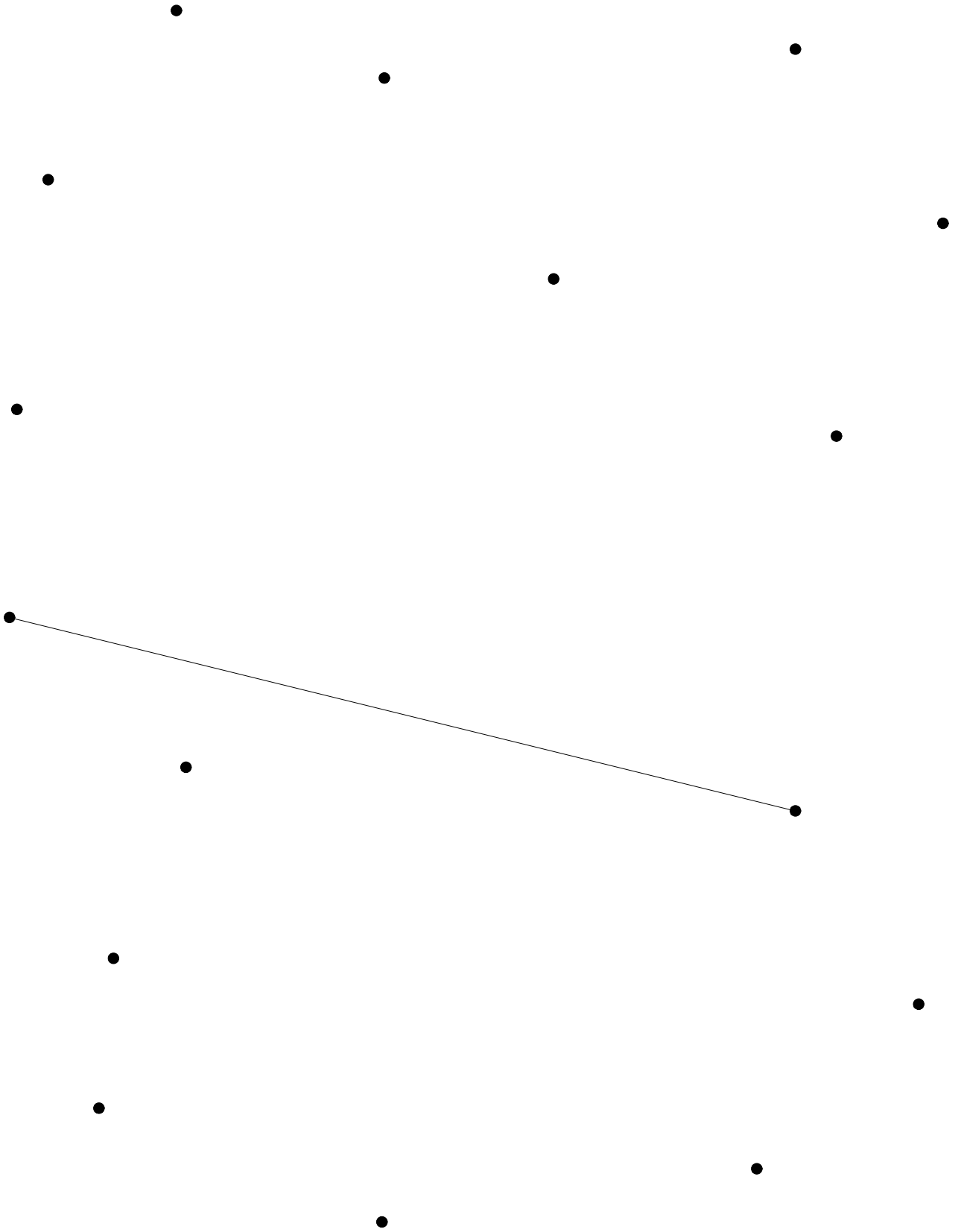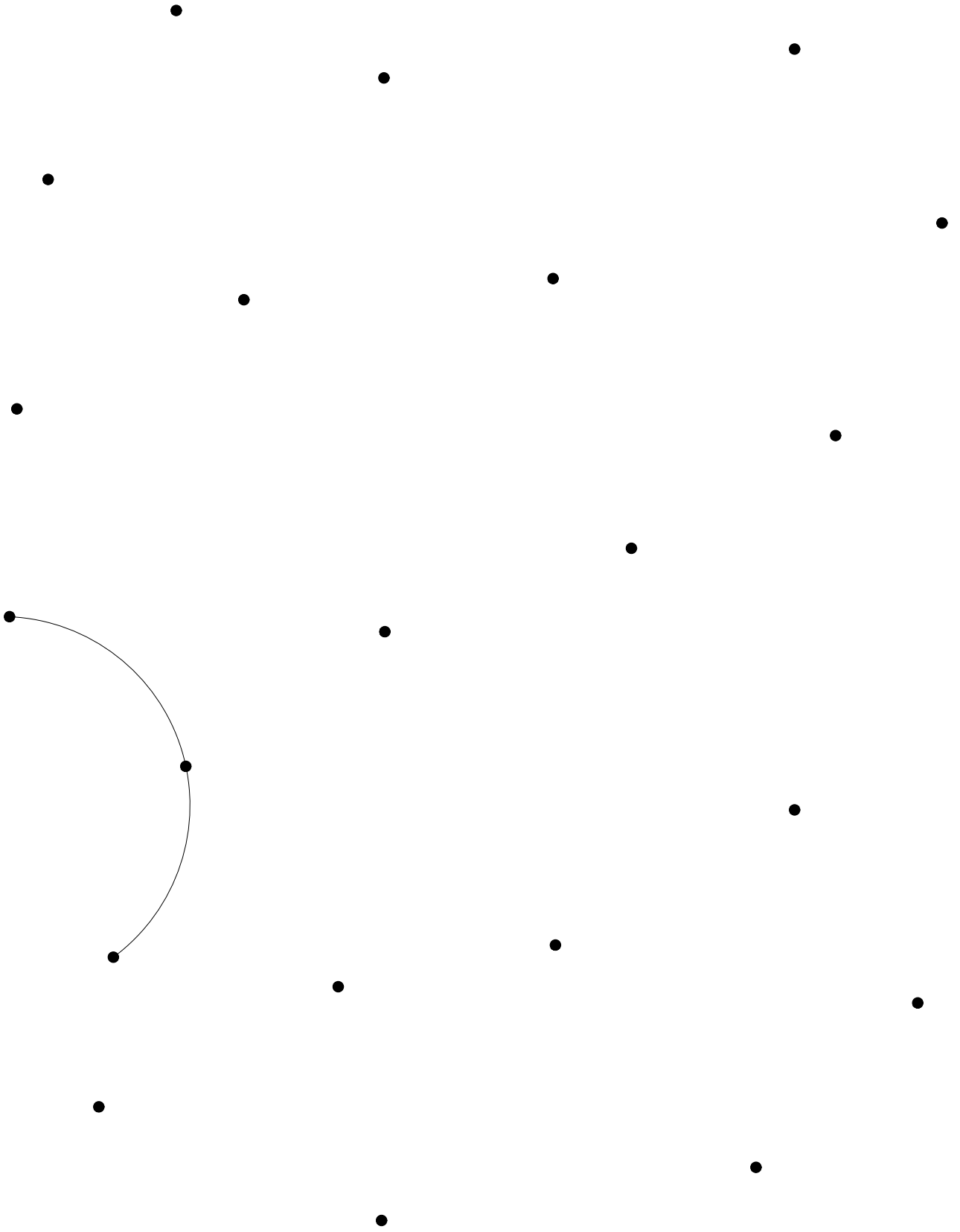
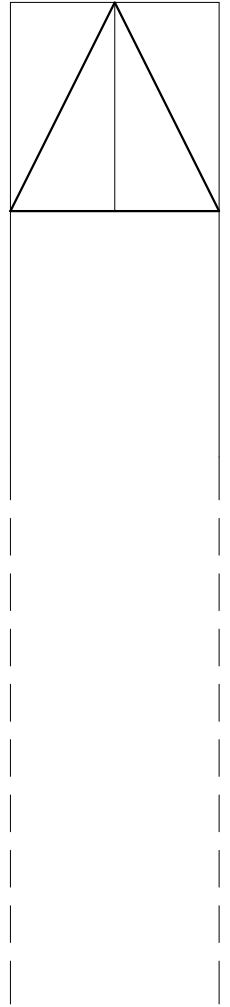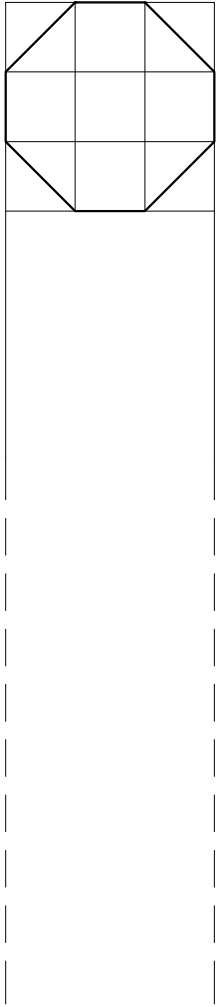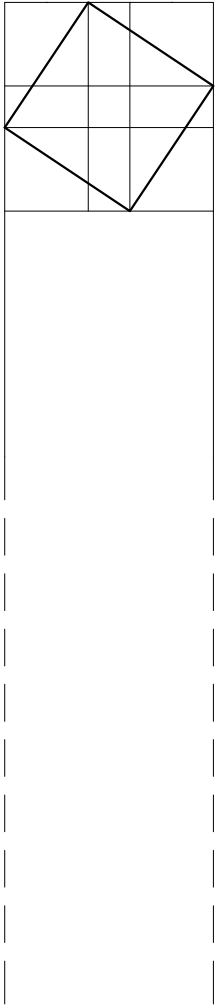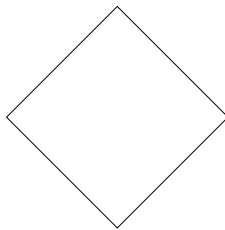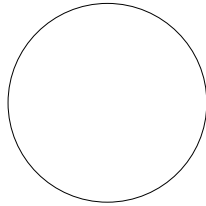DRAW SPIRALS WITH ARMS AS CLOSELY PLACED AS POSSIBLE.
START FROM CENTRE AND DRAW OUTSIDE

DRAW SPIRALS WITH ARMS AS CLOSELY PLACED AS POSSIBLE.
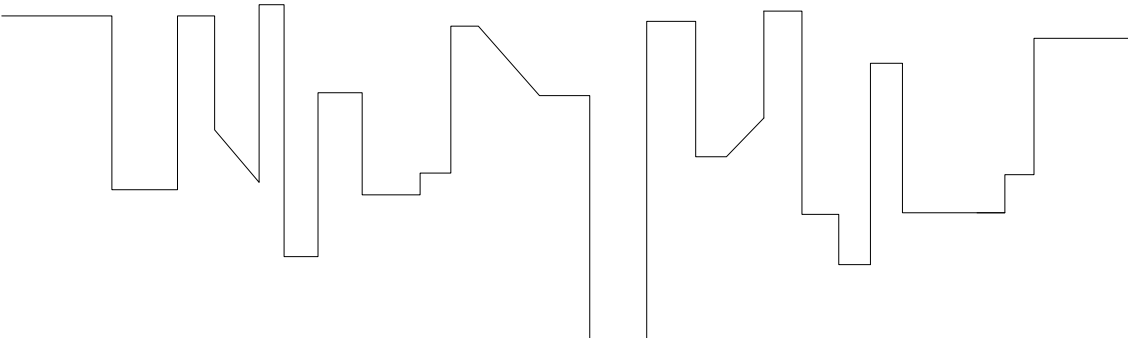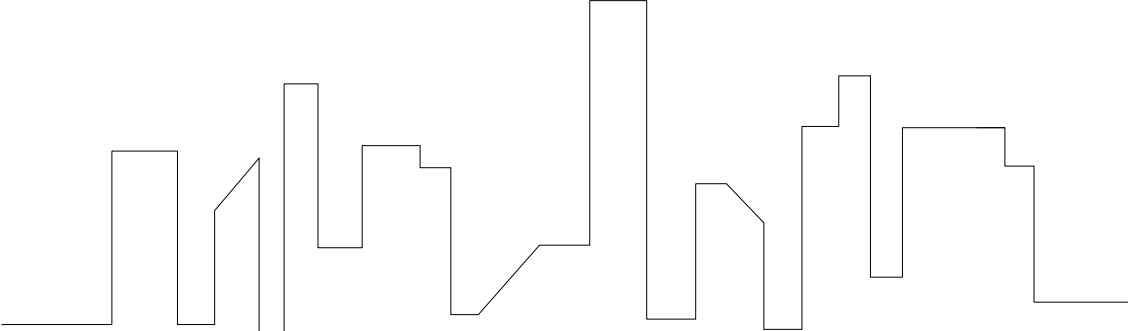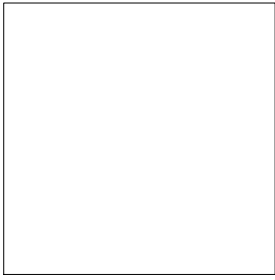START FROM OUTSIDE AND DRAW TO THE CENTRE
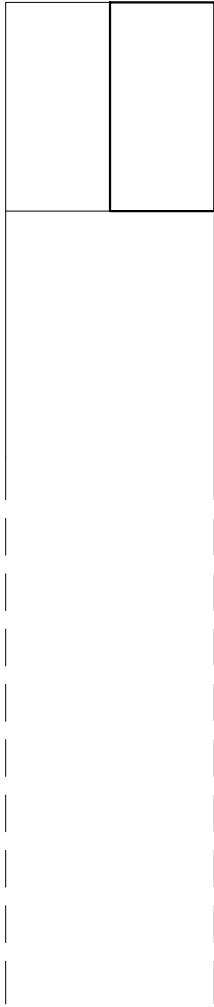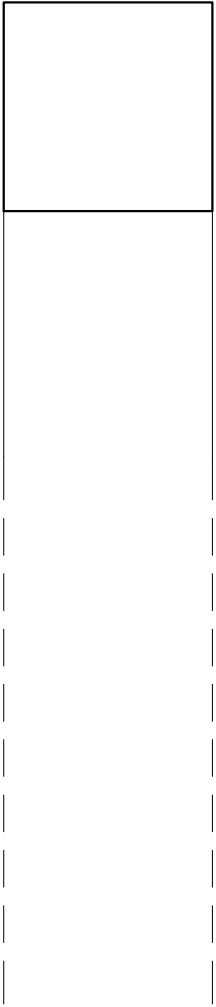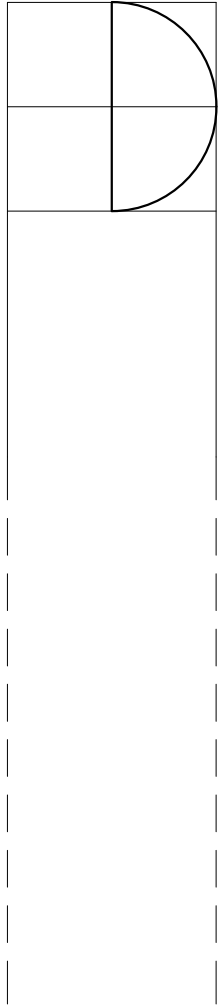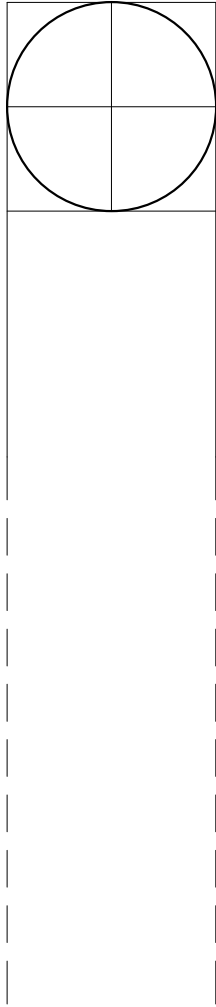
DRAW LINES RESPONDING TO THE SHAPES. IMAGINE THE SHAPES TO BE DISTURBANCES
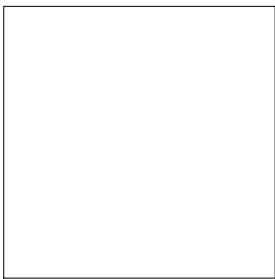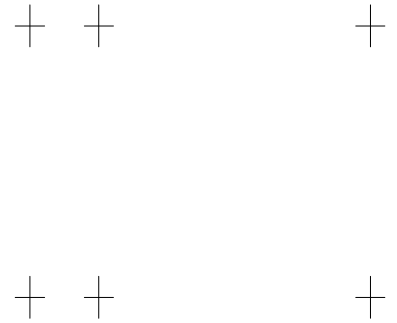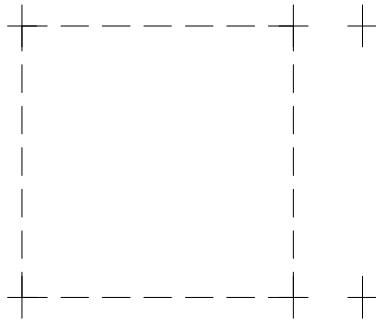IN THE FLOW OF LINES

RENDER THE IMAGINARY SKYLINE AND
ITS REFLECTION BELOW USING THE
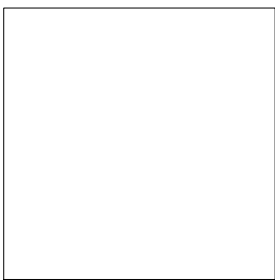SHAPES AND LINETYPES THAT YOU HAVE
PRACTICED

SKETCH IMAGINARY SKYLINE OF A CITY
USING THE SHAPES AND LINETYPES
THAT YOU HAVE PRACTICED

HATCHING

*CROSS
HATCHING*
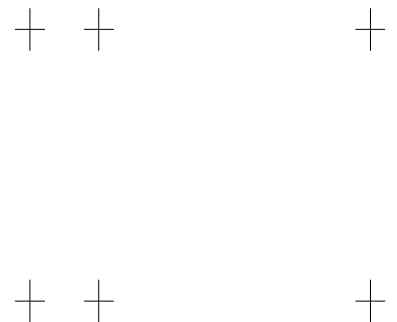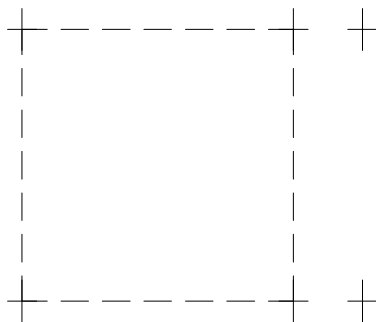
SCRIBBLING
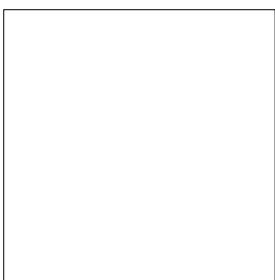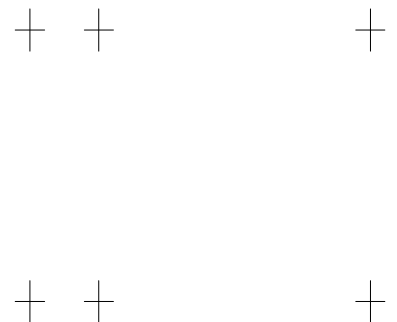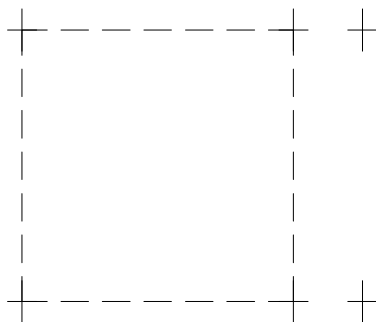
STIPPLING
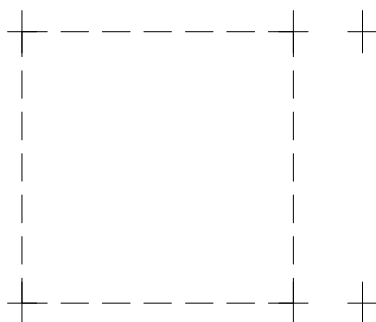
USE A 0.2 PEN AND FILL THE COLUMN
WITH TONAL VALUES FROM DARKEST TO
LIGHTEST
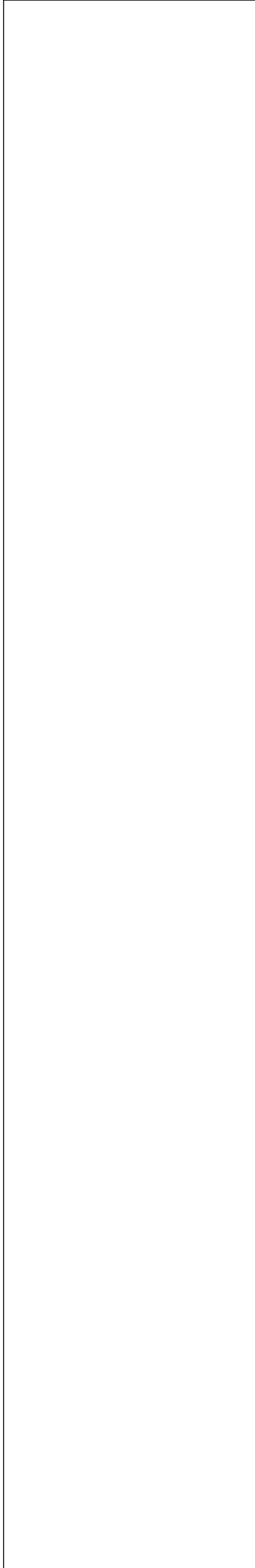
*CROSS
HATCHING*
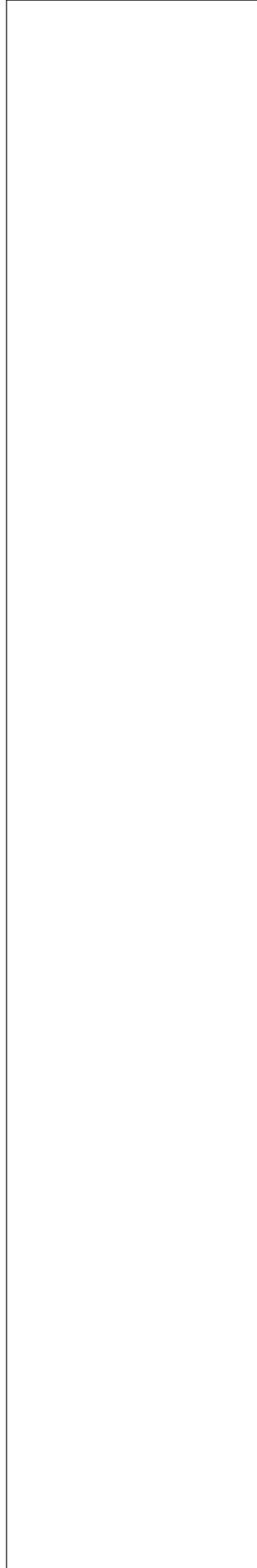
STIPPLING

USE A 2B PENCIL AND FILL THE COLUMN
WITH TONAL VALUES FROM DARKEST TO
LIGHTEST

*CROSS
HATCHING*
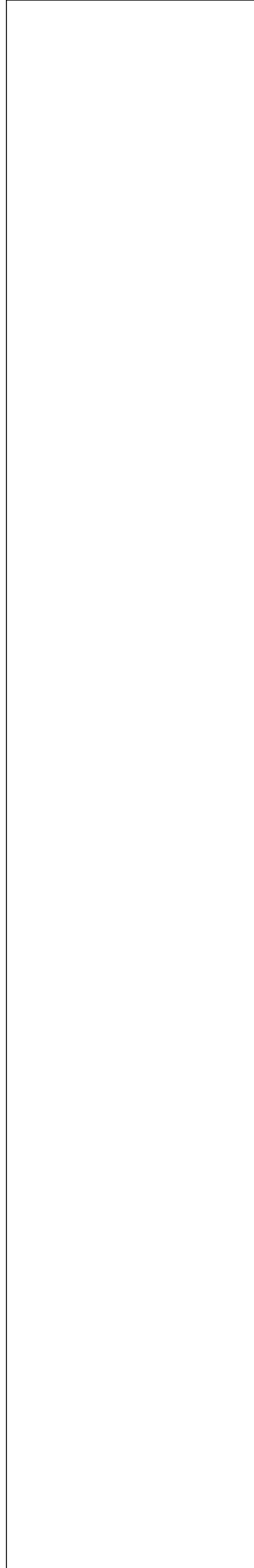
STIPPLING
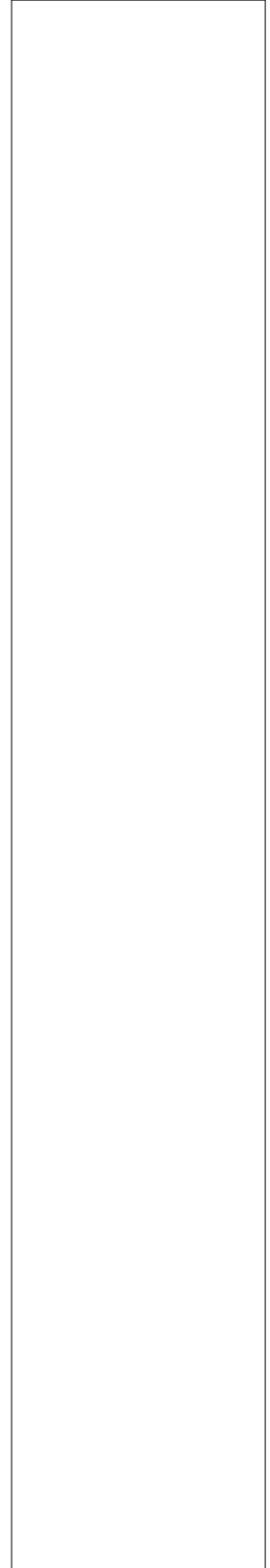
RENDER THE DRAWING
AS PER THE
PHOTOGRAPH
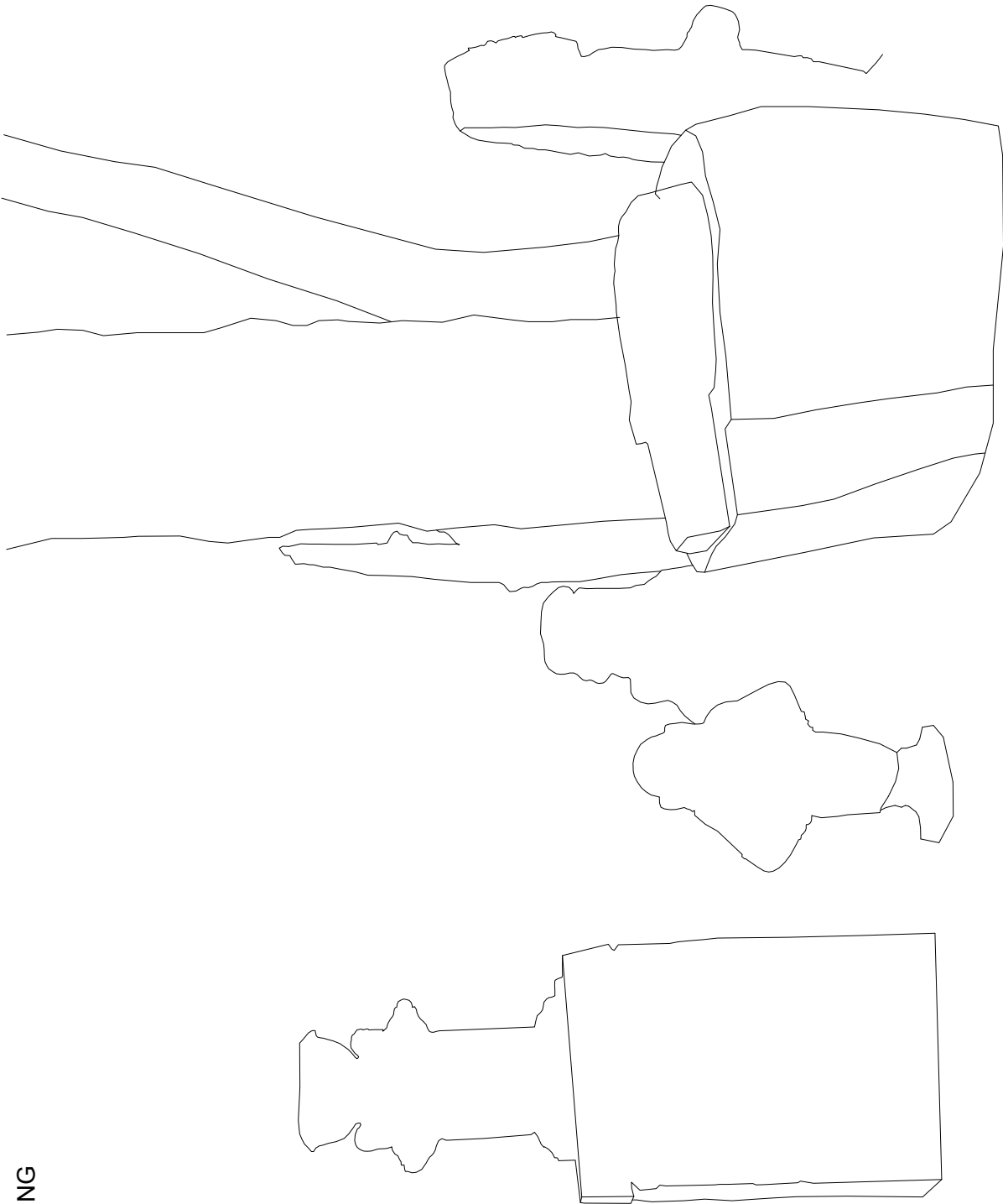
DRAW ELLIPSES IN THE RECTANGLES
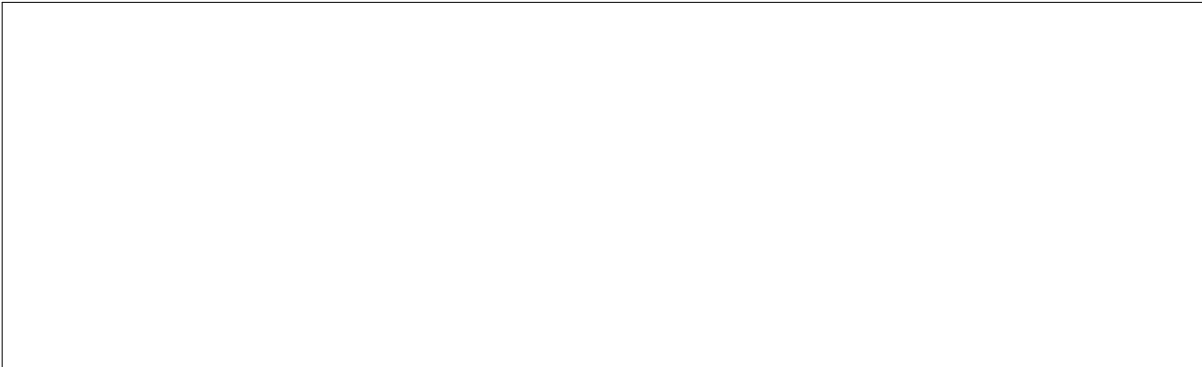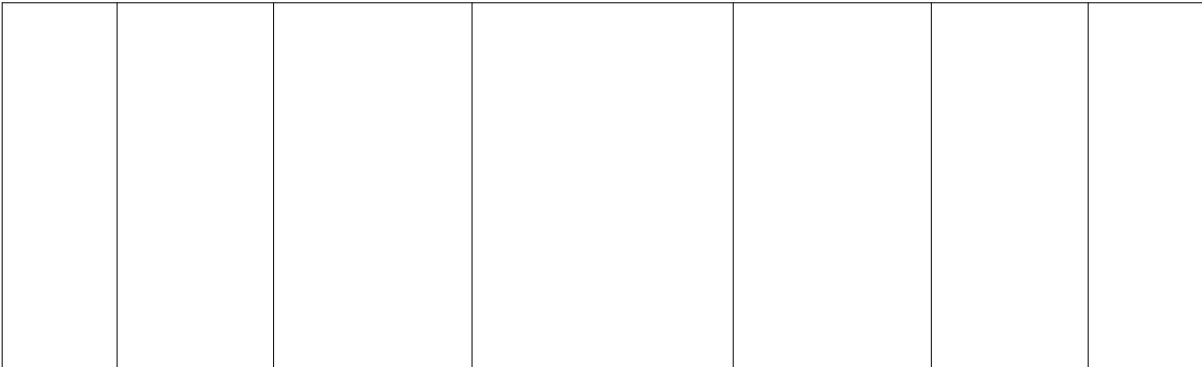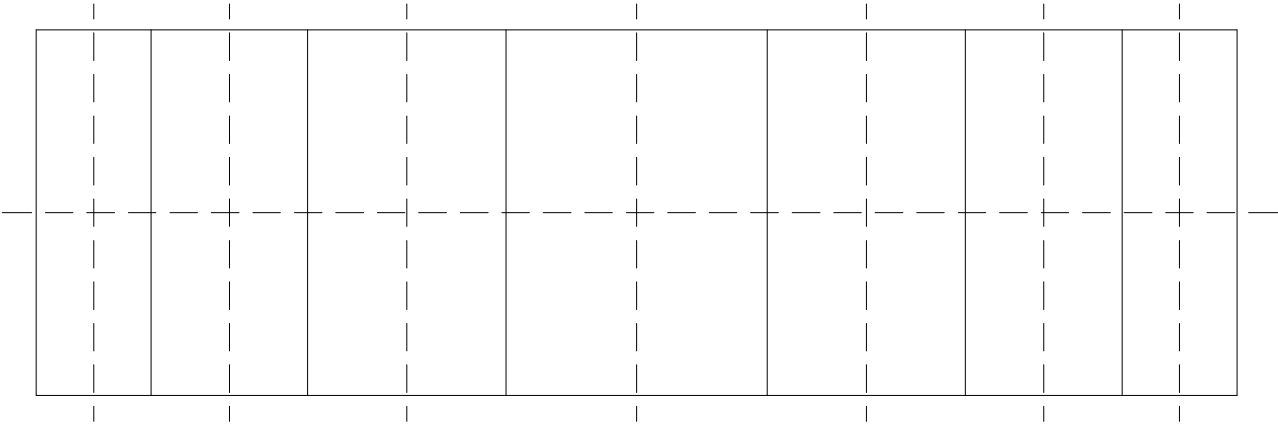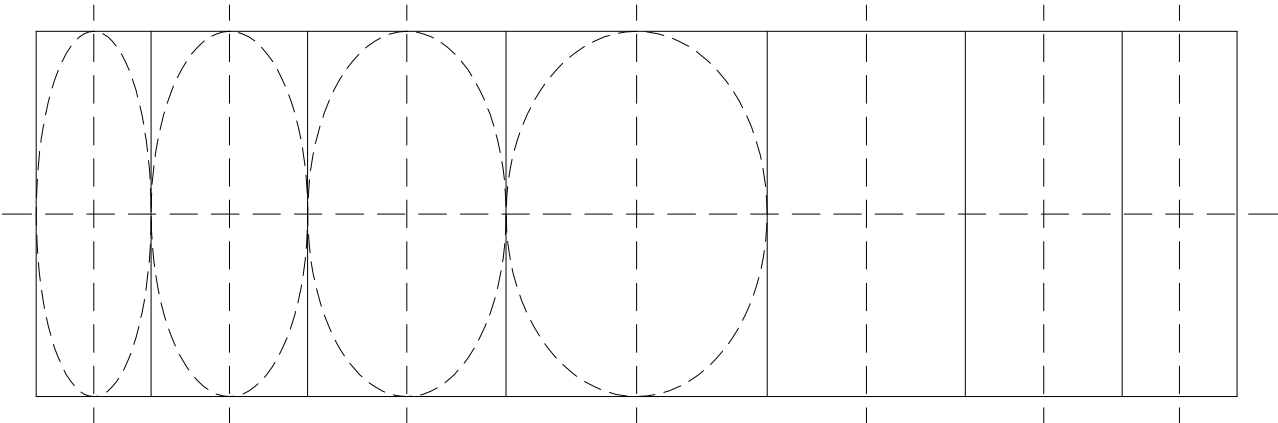
DRAW CIRCLES BETWEEN THE LINES
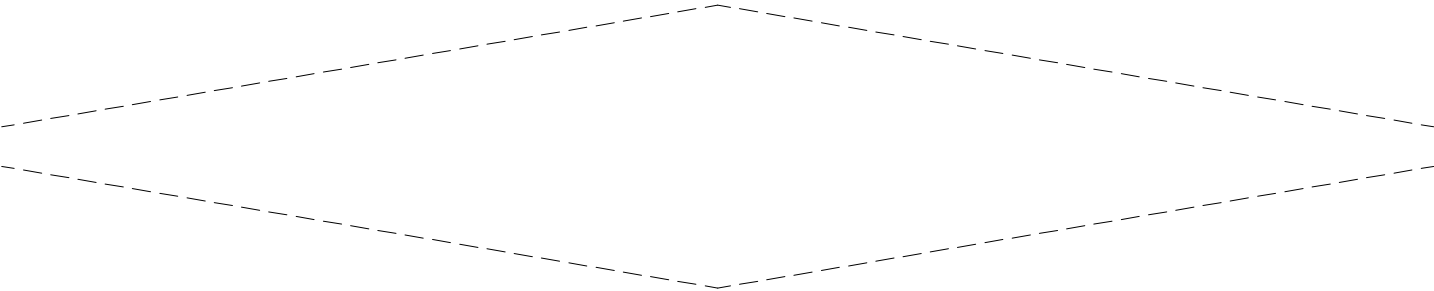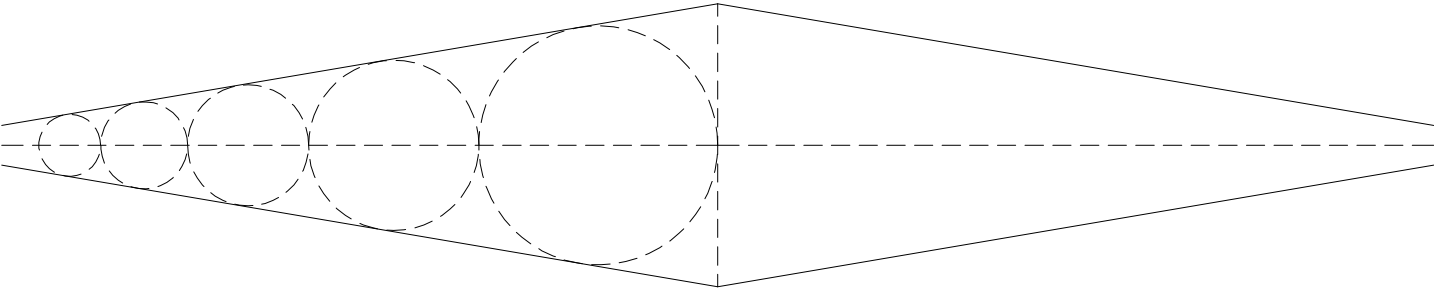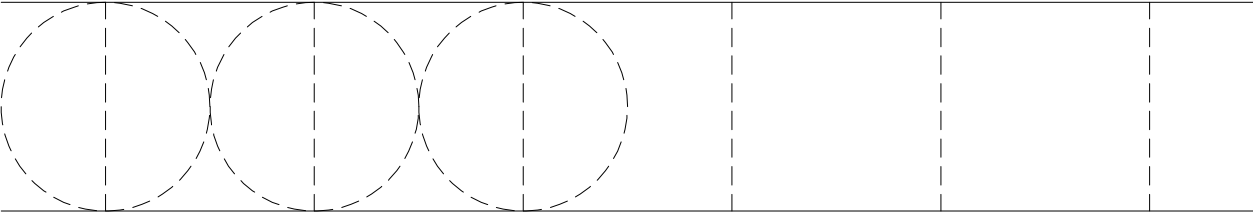
DRAW ANY OBJECT AROUND YOU. WHILE DRAWING LOOK AT THE OBJECT AND NOT AT THE PAPER. LET THE EYE TRACE THE OBJECTS LINES AND LET YOU HAND FOLLOW ON PAPER

WHAT IF NO FACE OF THE BOX IS PERPENDICULAR TO YOU?
A 2 POINT PERSPECTIVE IS NEEDED. DRAW BOXES OF VARIOUS SIZES.
CAN YOU COMPARE L, W AND H OF BOXES A AND B?
WHAT IF A BOX IS FULLY ABOVE THE HORIZON LINE?

HL

VP

A

B

MEASURING LINE
ML

HL

VP

MEASURING LINE
ML
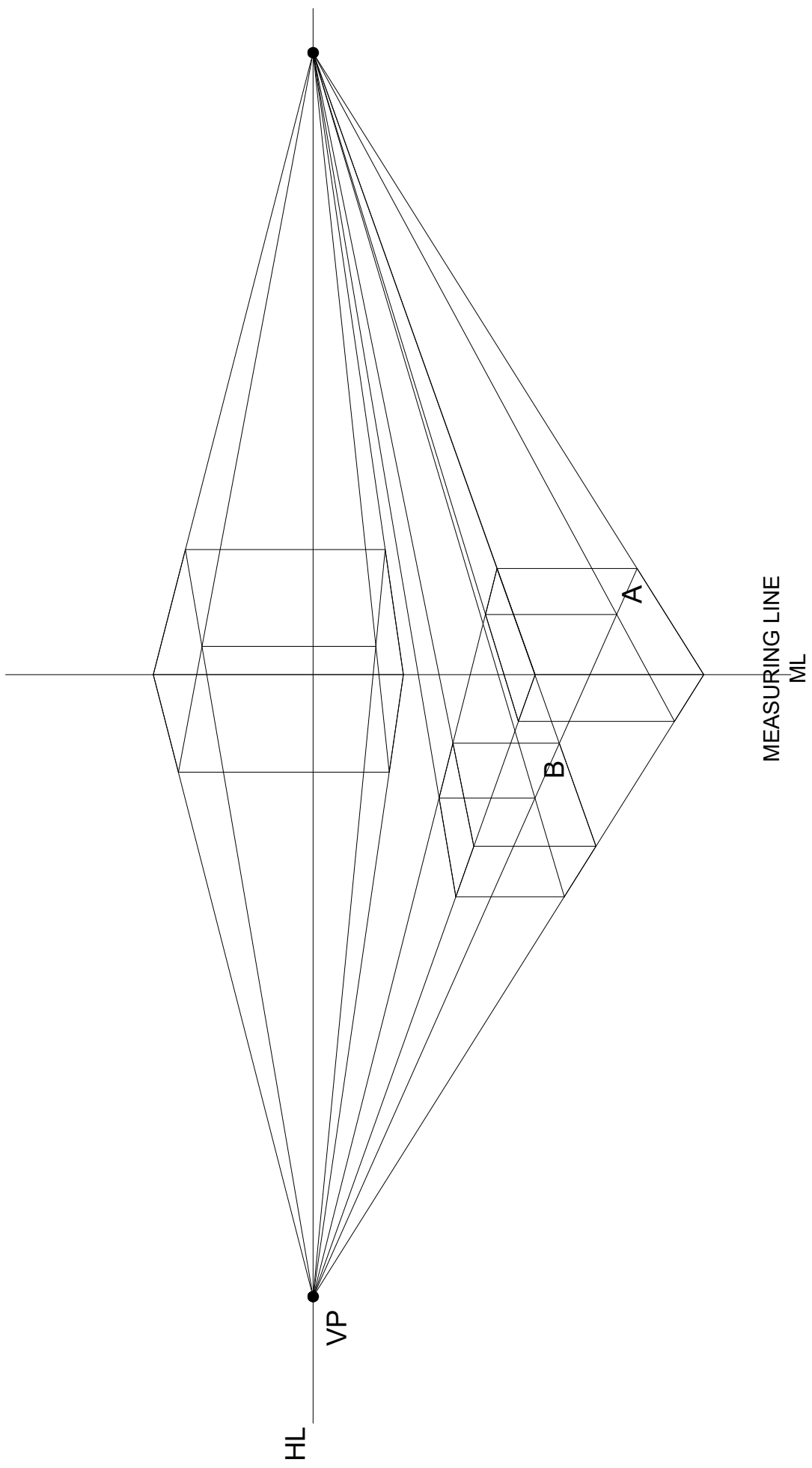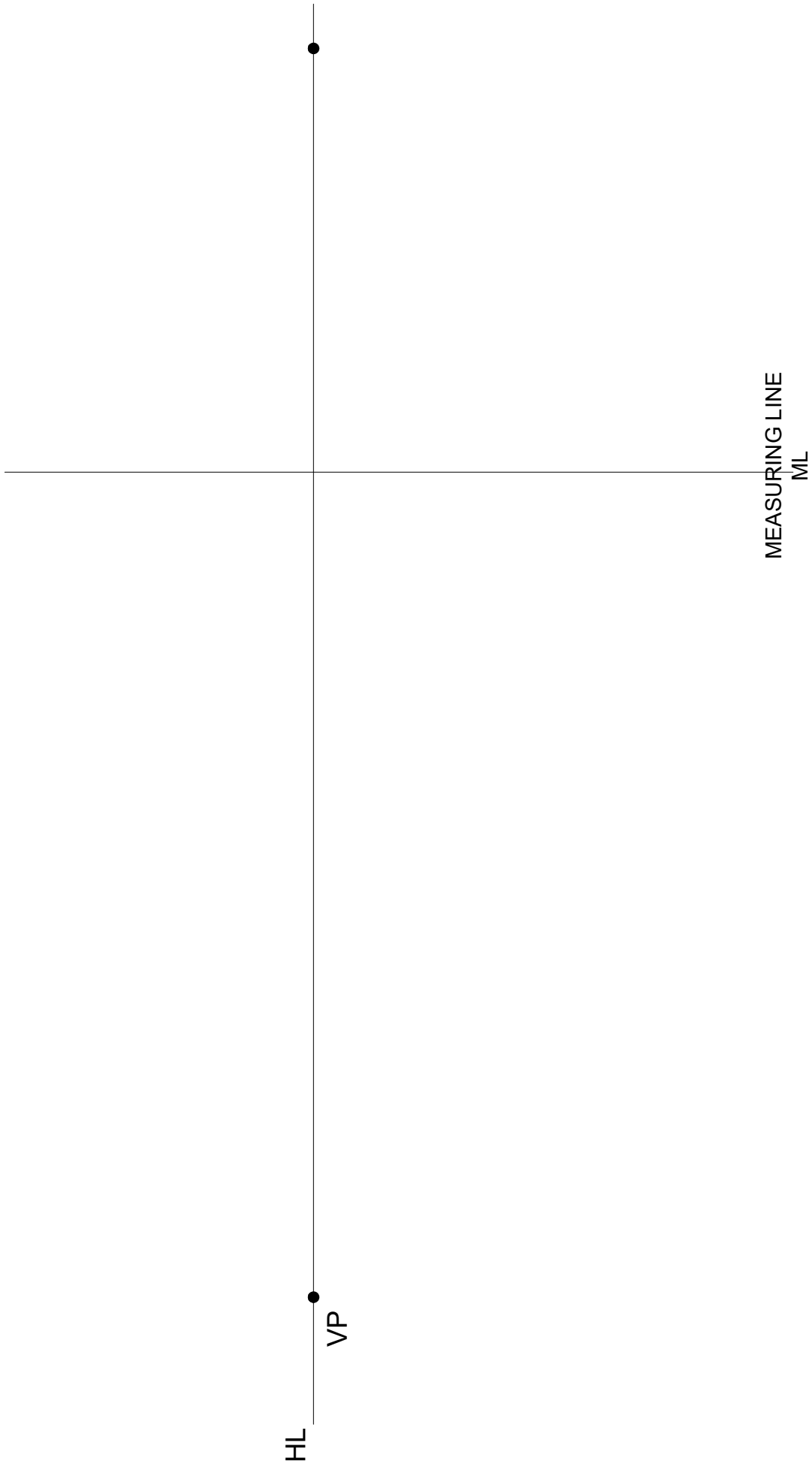
HAVE FUN DRAWING BOXES OF VARIOUS SIZES. MAKE SURE YOU DRAW THE EDGES OF
THE BOXES NOT SEEN!

WHAT IF THE BOX IS ON THE HL?
WHAT IF THE BOX IS HALF BELOW AND HALF ABOVE THE HL?
CAN YOU DRAW A CUBE? A CYLINDER? A CONE?

VP

HORIZON LINE
HL
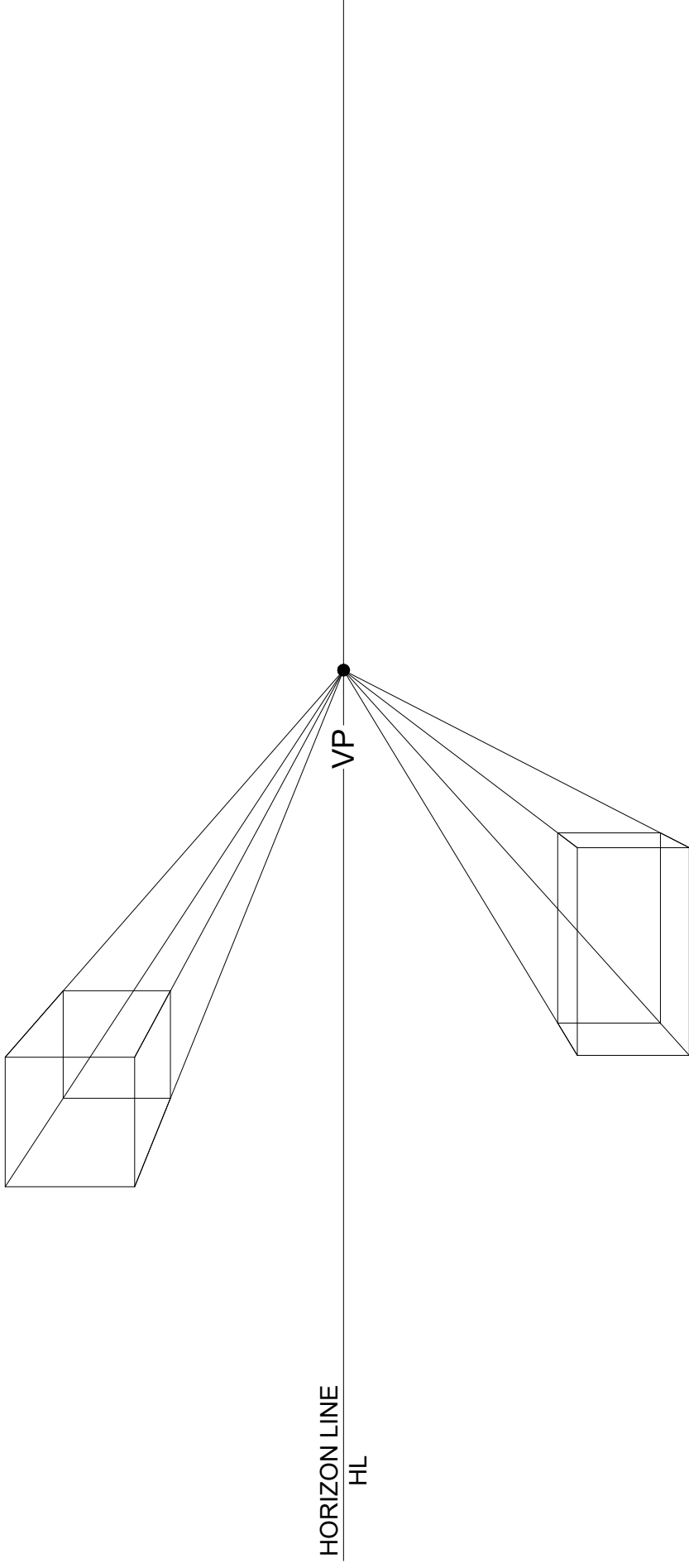
COMPLETE THE SKETCH
AS PER THE
PHOTOGRAPH
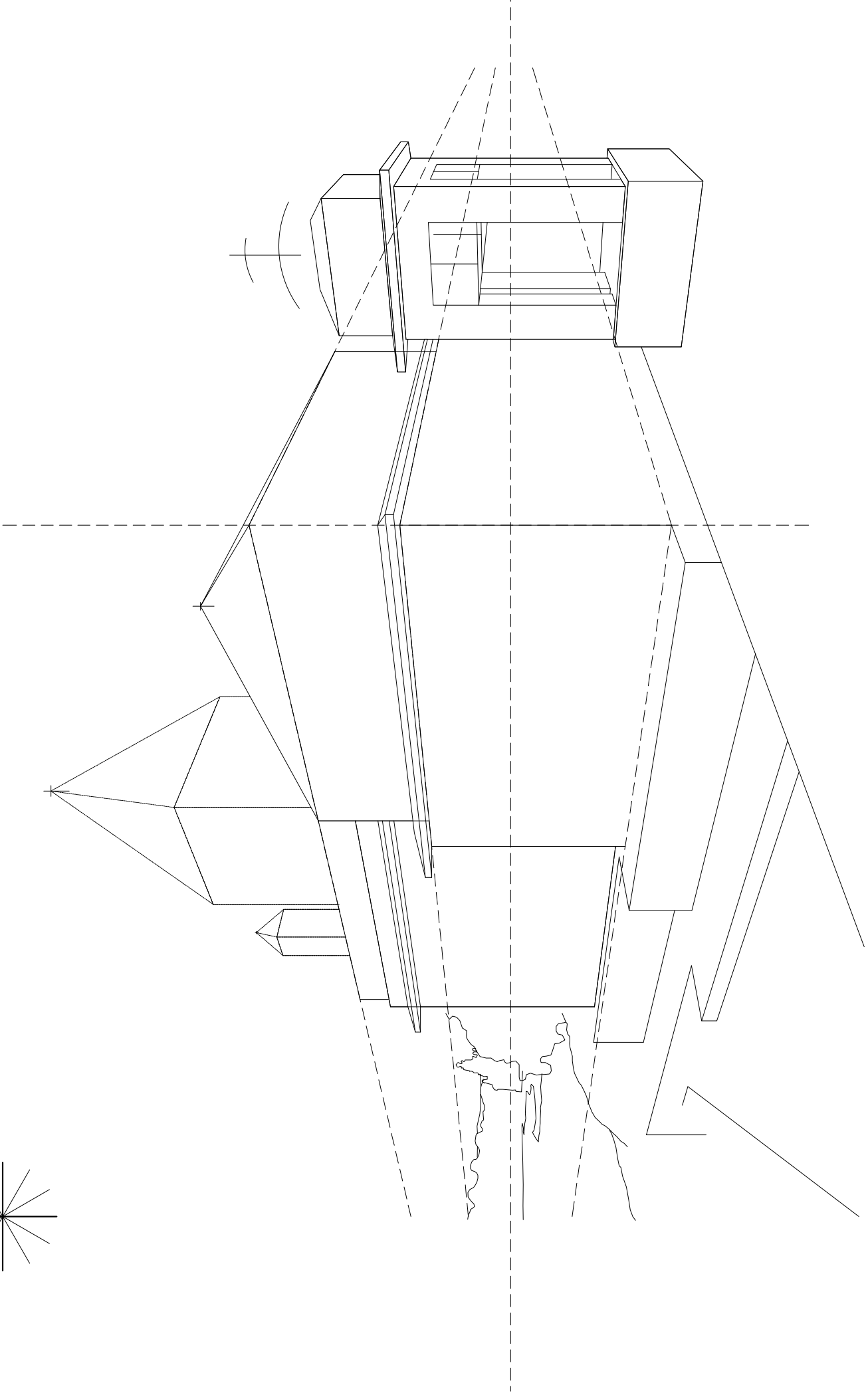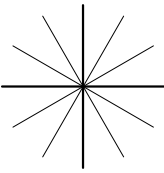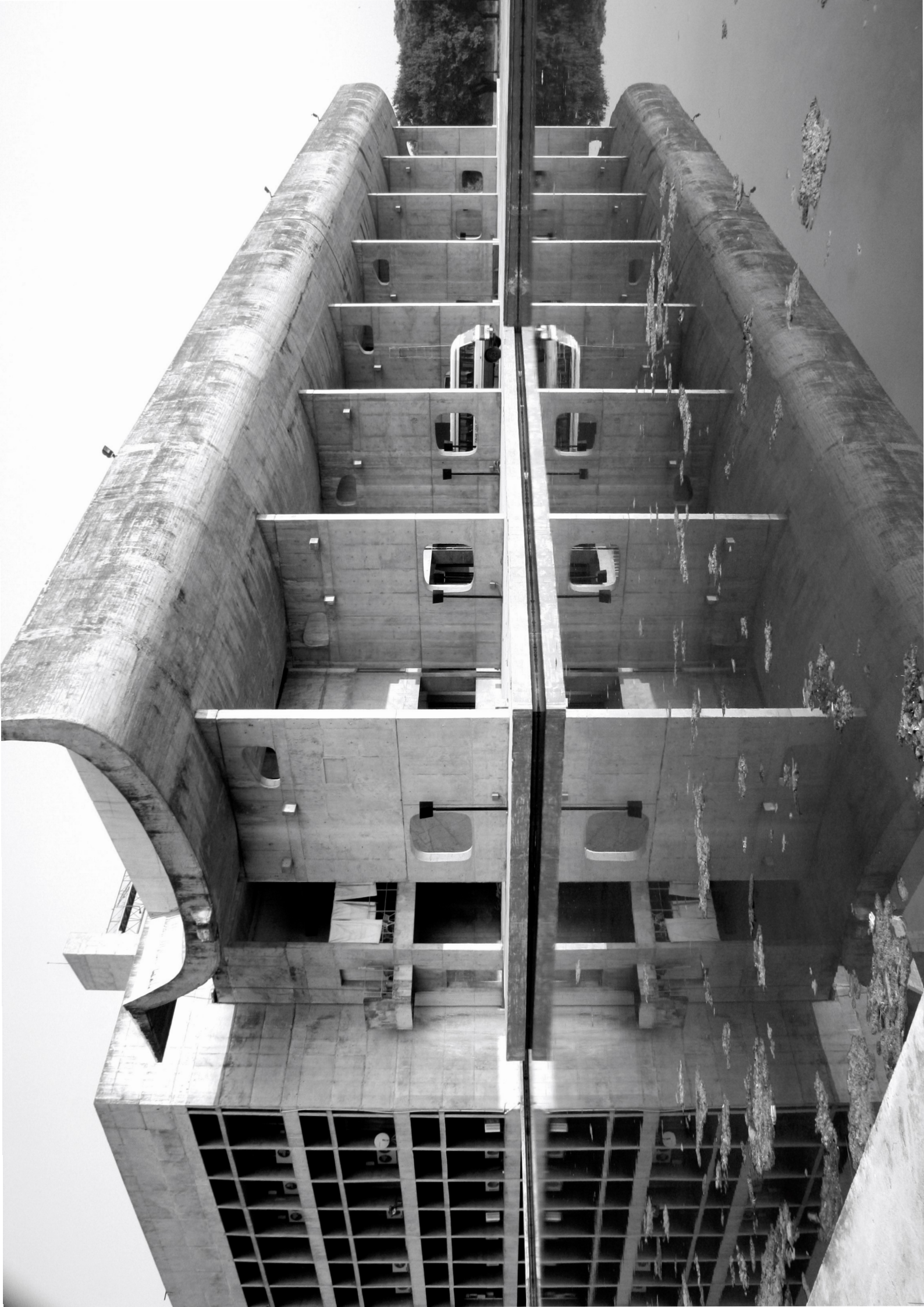
Student centric skill building to improve core skills for the AEC industry

In the Age of Information, the internet has revolutionized how students gain exposure to iconic built forms, transforming their aspirations and approaches in architectural design. This exposure enables them to engage with global architectural masterpieces, broaden their perspectives, and redefine their ambitions. The digital landscape provides students unprecedented access to resources, and inspiration for exploring parametric forms.

The charm of non-standard geometries and parametric architecture lies in their innovation, complexity, and the creative possibilities they offer. These designs often challenge conventional norms, inspiring students with their ability to combine aesthetics, functionality, and technology.

Architectural students often encounter significant challenges when attempting to translate parametric designs they admire on platforms like Pinterest or Instagram into tangible projects. These challenges stem from the complexity of the design process, a lack of technical expertise, and limited resources. This leads to misalignment between vision and feasibility, lack of contextual and structural understanding and a vast difference between aspired and realized form causing frustration amongst students.

We as an institute have responded to increasing interests of students to be inspired by parametric forms. The aim was to foster enthusiasm and creativity in students while preparing them for modern industry demands.

Strategies used by the institute to Overcome Challenges

1. **Skill Development**:

- Introduce parametric design tools into the curriculum with structured learning pathway.
- Offer workshops on 3d modelling ,coding basics and computational design.

2. **Hands-On Practice**:

- Create studio projects briefs that focus on computational process for form making, prototyping, digital fabrication, and model-making.
- Use tools like 3D printers and laser cutters to translate designs into physical forms.

3. **Realistic Expectations**:

- Teach students to analyze case studies critically, understanding the constraints and processes involved in iconic designs.
- Highlight the iterative nature of design, emphasizing problem-solving over perfection.

4. **Resource Accessibility**:

- Provide access to licensed software, tutorials, and online resources within the institution.

5. **Focus on Fundamentals**:

- Strengthen foundational knowledge in geometry, materials, and structural systems to complement computational tools.

The intent was to empower students to move beyond imitation and toward innovation, transforming parametric aspirations into viable, contextually relevant designs.

Over the period of three years starting from A Y 2022-2023 three studios allowed students to test the principles of parametric architectural design

Sr No	Academic year & Semester	Subject	Title of brief	Duration of capacity building workshop and name	No of students enrolled in program
1	AY 22_23, Sem V	AD IV	Urban Sports Hybrid	Rhinoceros 7 and Grasshopper workshop,16 weeks long	15
2	AY 22_23, Sem V	AD V	Horticulture Expo pavilion	Rhinoceros 7 and Grasshopper workshop,2days workshop	12
3	AY 23_24, Sem V	AD IV	Visitor centre in Western Ghats	Rhinoceros 8 and Grasshopper workshop,12 weeks continuous capacity building sessions	40

The first of the capacity building was in the form of an experimental studio in the year 2022. This was a choice-based studio wherein 15 students elected to use the capacity building sessions to navigate their architectural design project. This batch for AY 2022_2023 had come after a lockdown period of 1&1/2 years and were intimidated by the complexity of the medium. The students found the algorithmic computational mediums complex and time taking since this was their first offline interaction in the institute after lockdown

Based on the feedback received the second experimental skilling was again in the choice based wherein students were given a choice of participating in the skilling workshop. Students were exposed to easier mediums like Rhinoceros 7.0 incrementally about 20 students started using the 3d modelling mediums to navigate their major problem .after seeing the acceptability of the medium a workshop of two days of algorithmic skilling was conducted .12 students opted for it and were introduced the skill via a 2 day workshop on form finding and used the medium to navigate their minor design problem.

Later a team of 4 digital architects proficient in computational mediums teamed up for conducting a choice based studio of 16 weeks for Sem V as a special parametric studio.The aim was to foster enthusiasm and creativity in students while preparing them for modern industry demands.

The following steps were followed

1. **Showcasing Iconic Projects**
   The faculty showed relevant case studies of renowned architects and parametric projects to illustrate the potential of these techniques and inspire students.

2. **Development of Referent models**

   The faculty made referent models (algorithmic)that connected the geometrical aspirations with form finding. student were given these referent models that were devoid of computational complexity and allowed them to experiment.

3. **Curriculum Integration**
   The faculty Introduced courses specifically on computational design, parametric tools (Rhino and Grasshopper), and non-standard geometry concepts that were incrementally conducted in tandem with the design studio and its set milestones

4. **Integration with Emerging Technologies**
   The studio was later integrated with emerging fields like AI, and 3D printing to show its relevance to modern architectural practice and to simplify rendering of the digital design that improved workflow integration and took less post processing time

Planned Outcome for Students

- Enhanced creativity and problem-solving abilities.

- Mastery of cutting-edge tools and methodologies.

- Exposure to innovative industry trends, preparing them for competitive roles.

- A stronger connection to global architectural movements.

This allowed the institute to create an ecosystem that fosters curiosity, exploration, and practical application, theses three attempts show the way in which we as an institute want to harness the allure of parametric geometries to inspire and empower our students.

Images of workshop

The tutor conducting the workshop with Participants on Day 1

Problem solving and students attending to the tutorial instructions
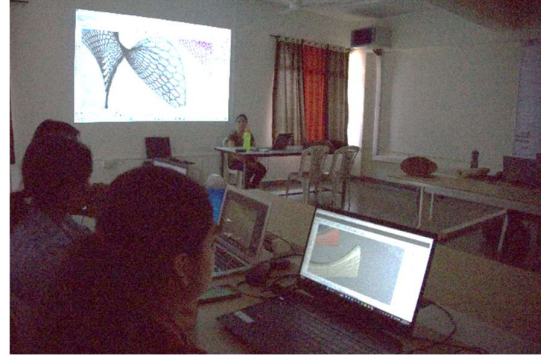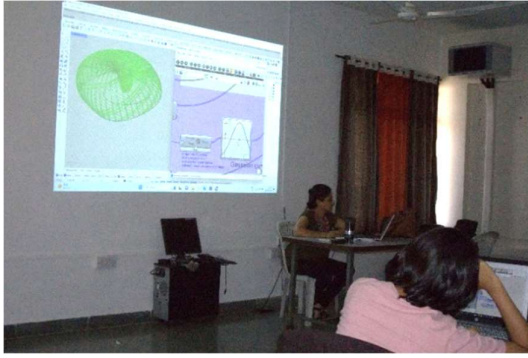
Various grasshopper scripts being introduced on Day 1
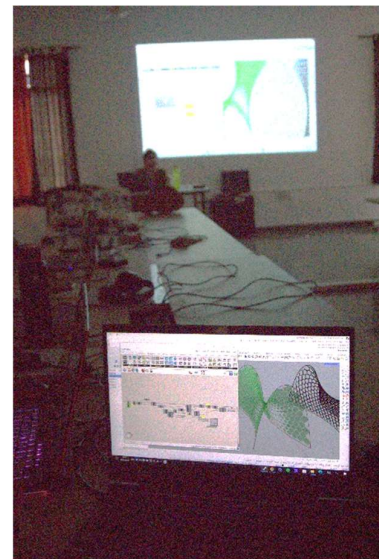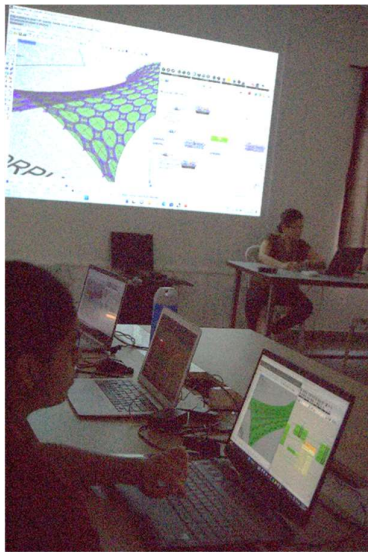
Students emulating the code as it is being taught

Day 2
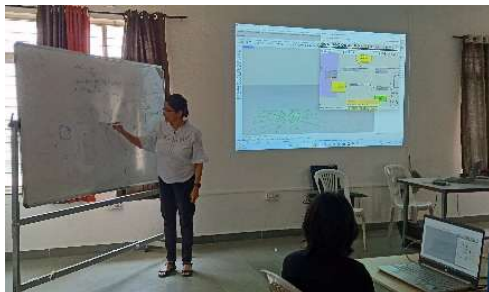
The geometrical logic of the grasshopper script being explained by the tutor, students I attendance on Day2
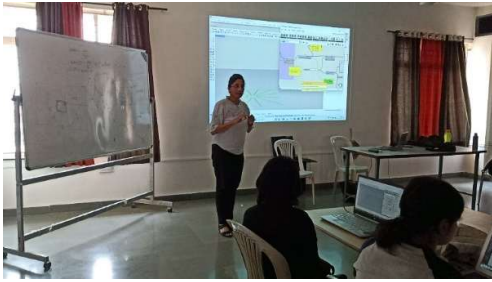
The tutor explaining a computtaional concept on board and the students emulating the coded script

The tutor trouble shooting query board and the students emulating the coded script
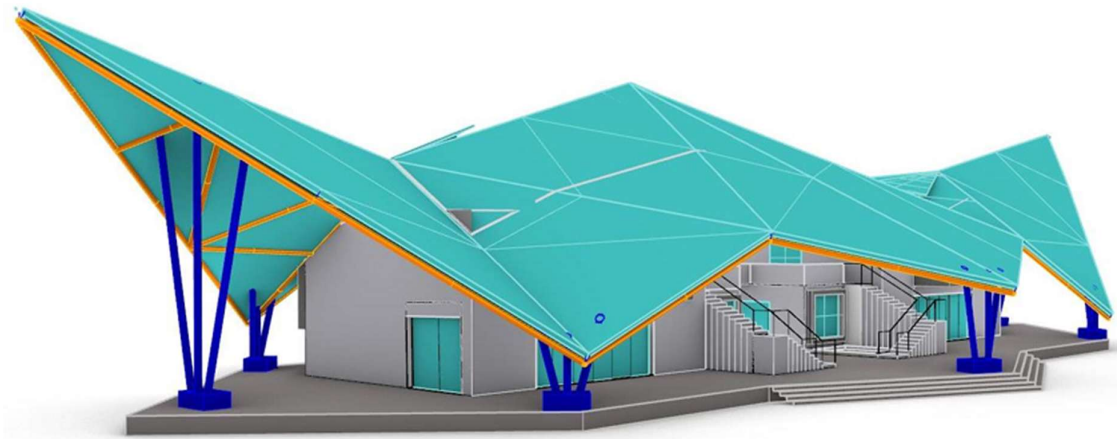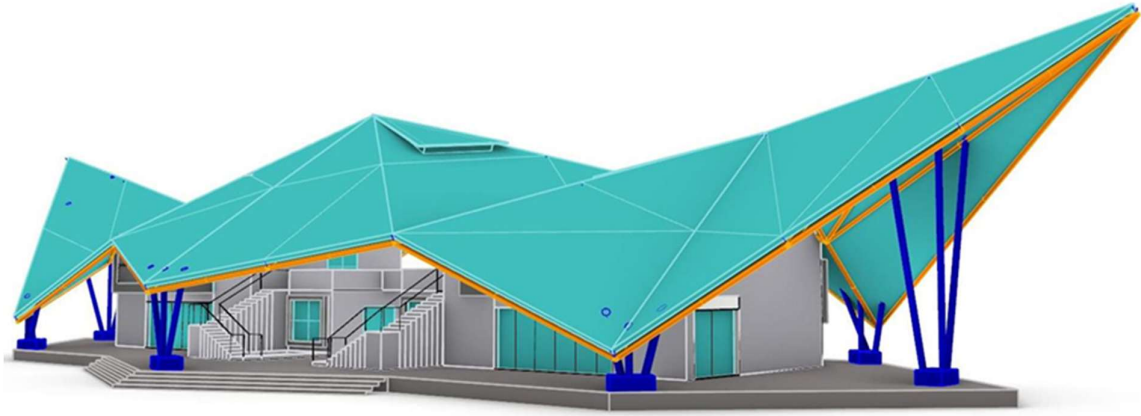
Student work Rashi Jambhale TY BNCA Studio Blue AY_2024

Student work Rashi Jambhale TY BNCA Studio Blue AY_2024
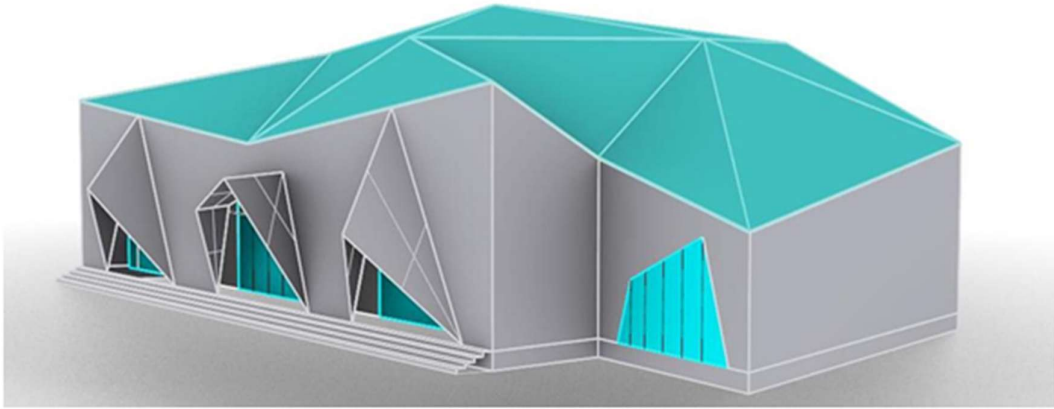
Student work Rashi Jambhale TY BNCA Studio Blue AY_2024

RENDERED VIEWS

Student work Rashi Jambhale TY BNCA Studio Blue AY_2024

Final renders of a project by student Shreya Dhumal AY 2022_23

Instructions to students

- *Take out a print of the workbook on A4 size paper and complete the questions on the workbook itself.*

- *Draw neat sketches use ink, pencil colours, water colour or other medium of your choice to make the workbook presentable*

- *Write your name and roll number on the cover page of the workbook*

- *Submit the workbook for assessment as instructed by your teacher*

- *Once you complete the workbook before submitting scan the workbook (Microsoft office lens app recommended) and submit on LMS*

MAHARSHI KARVE STREE SHIKSHAN SAMSTHA'S
DR.BHANUBEN NANAVATI
COLLEGE OF ARCHITECTURE
FOR WOMEN
BNCA Campus, Cummins College Road
Karve Nagar, Pune 411052

UNITED NATIONS
academic
impact
MEMBER
Sharing
a Culture
of Intellectual
Social
Responsibility

UNIT I
STUDY OF SOIL- SOIL MECHANICS

NAME:

CLASS/ DIV:

ROLL NO:

1. Identify the type of soil seen in the pictures

_____

_____

_____

_____

_____

_____

_____
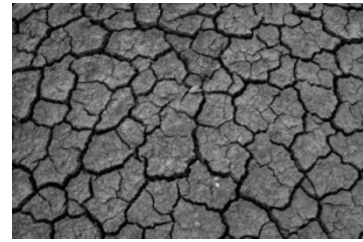
2. What does the parabolic line indicate? Write the missing information as indicated by '?'

W

W1

?

?
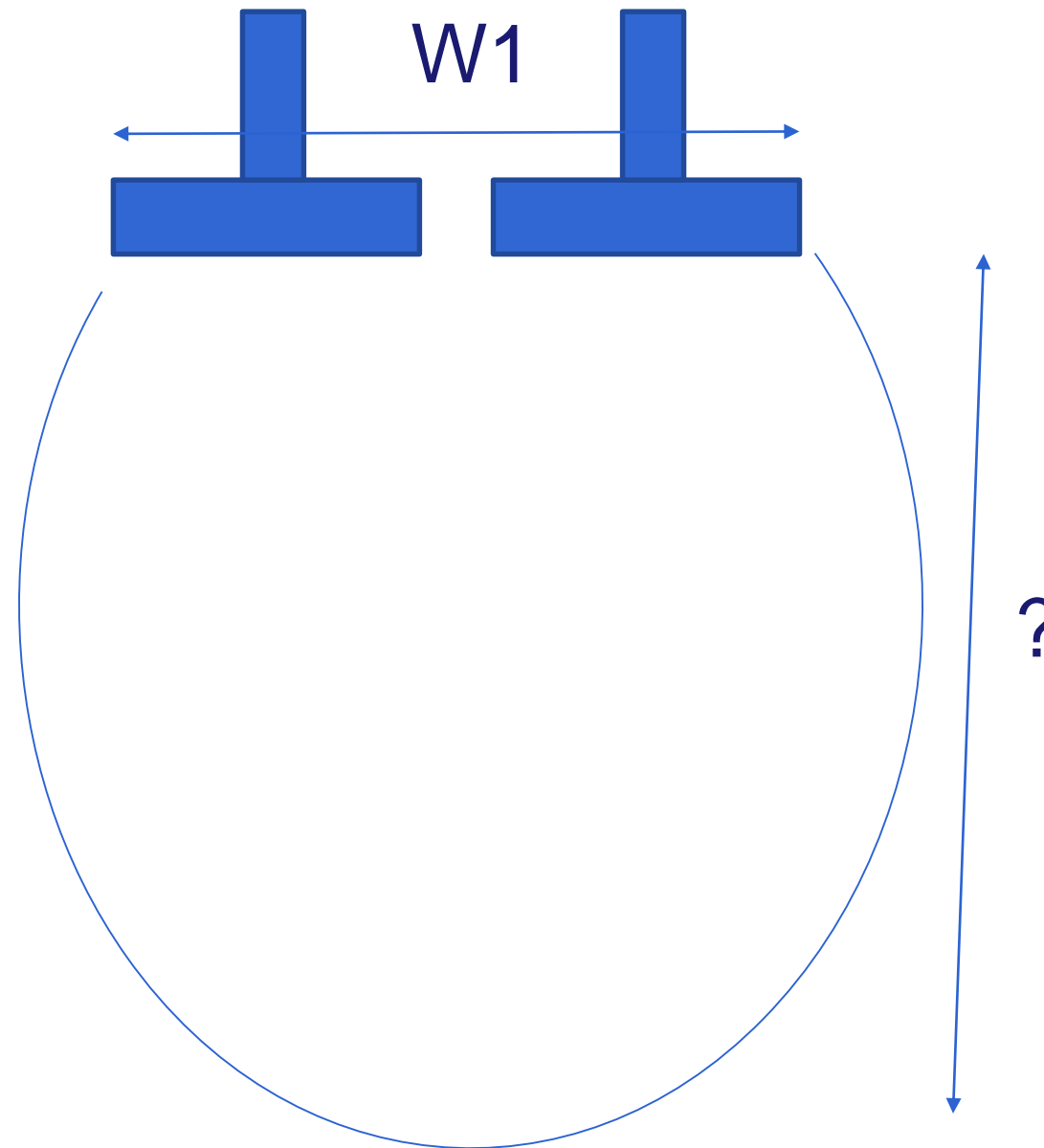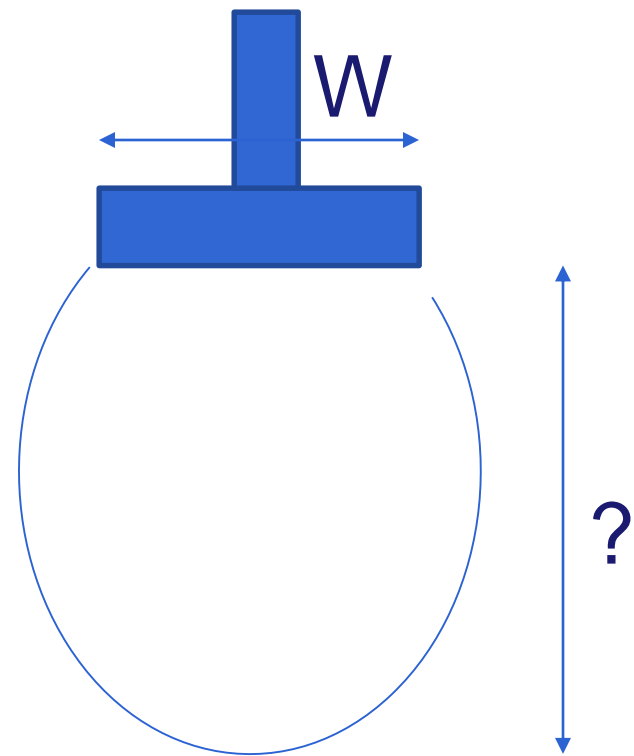
3. Explain what is wrong in this sketch and draw correct sketch

TRIAL PIT
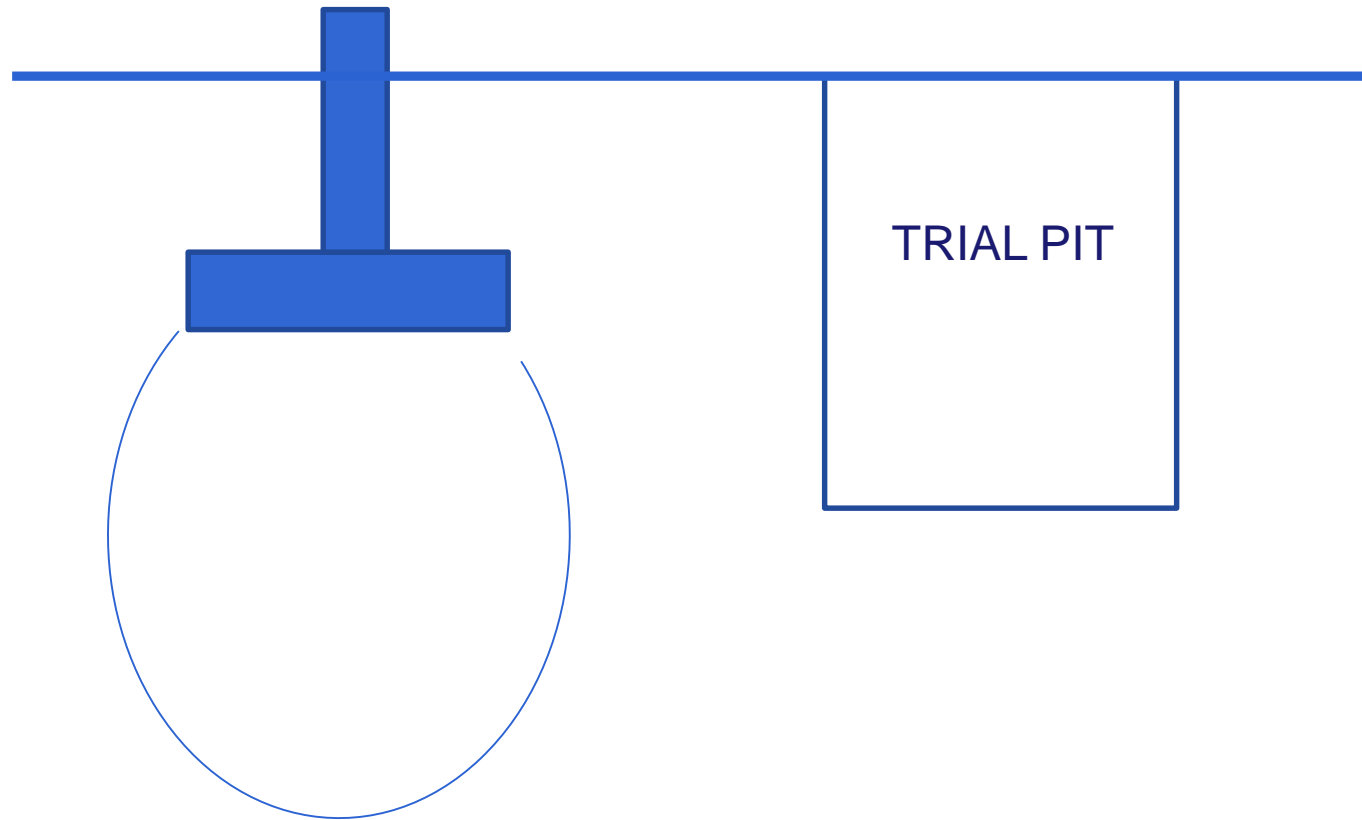
3. Give title to both sketches and explain in your own words what is happening here?

4. The ultimate bearing capacity of the soil is 40 tons /sq.m.. The foundations are carrying 40 tons/sq.m. load. What does this statement tell you? Explain in your own words what should be done in this case.

5. A building has been constructed on black cotton soil. After a few years cracks have developed in the walls, the flooring in some rooms has sunk. The steps leading to the plinth have separated from the main structure. You have been called as an Architect to find out the reasons for these phenomena. Write in your own words what could be the reasons for this.

6. What is meant by 'Permeable' and 'Non-permeable' soil? Explain these terms and write about how they are important for foundation design/soil mechanics

Innovative Techniques in Teaching Methodology

Faculty Name: - Ar. Mandar Athavale

Assistant Professor, BNCA

Innovative Techniques in Teaching Methodology.

Subject: - Quantity Surveying and Specification Writing I and II

QS SPW -I and II is a 4th Year subject from Bachelor of Architecture. To enhance attendance and attention among students while providing better preparation for exams, **surprise tutorials** were introduced for QS SPW I and II. These sessions were designed as interactive, impromptu learning experiences, focusing on core concepts and practical applications. The element of surprise helped in breaking monotony, keeping students engaged, and encouraging regular attendance. Additionally, these tutorials addressed common exam challenges, providing targeted guidance and equipping students with effective writing strategies for their answers. The initiative proved valuable in fostering better understanding, active participation, and overall academic improvement.

Test 01_QS SPW-I conducted on 24/07/2024			
Name of Student:	ID No.	Division	Marks Obtained
Tejal Khaire	A21084	Fourth Year B	10
Dhariya Renu	A21034	Fourth Year B	9
Khushi Mantri	A21126	Fourth Year B	9
Rageshri Rajendra More	A21127	Fourth Year B	10
Patne Niddhi	A21014	Fourth Year B	8
Gadekar Sharayu	a21001	Fourth Year B	9
Kale Anushka	A21175	Fourth Year B	10
Gandhi Snehal	A21096	Fourth Year B	9
Joshi Rutuja	A21047	Fourth Year B	10
Urunkar Praniti	a21043	Fourth Year B	10
Mule Mrunal	A20150	Fourth Year B	9
Sarda Sejal	A21042	Fourth Year B	9
Askhedkar Aarushi	A21053	Fourth Year B	9
Joshi Ananya	A21091	Fourth Year B	8
Revti Nagarkar	A21019	Fourth Year B	9
Vaishnavi Sondge	A21103	Fourth Year B	10
Chaudhari Isha	A21150	Fourth Year B	7
Narawade Avantika	A21156	Fourth Year B	5
Firodiya Samiksha	A21143	Fourth Year B	9
Parakh Khushi	A21137	Fourth Year B	10

Jaju Sakshi	A21015	Fourth Year B	8
Thorave Nikita	A21172	Fourth Year B	8
Pore Sakshi	A21120	Fourth Year B	7
Kela Dhanashri	A21080	Fourth Year B	8
Janhavi Karnavar	A21039	Fourth Year B	9
Chondhe Shrutika	A21076	Fourth Year B	7
Pawar Prerana	A21106	Fourth Year B	5
Thombal Aditi	A21041	Fourth Year B	8
Abhonkar Isha	A21022	Fourth Year B	9
Lihade Tejaswini	a21161	Fourth Year B	8
Chopdha Vidisha	A21021	Fourth Year B	8
Shinde Rutuja	A20155	Fourth Year B	6
Bardia Garima	A1138	Fourth Year B	10
Nahar Riddhi	A21117	Fourth Year B	7

Subject: - Electives: Affordable Housing

Electives course on Affordable Housing was conducted for 3rd year, 4th Year and 5th Year Bachelor of Architecture students. **Gamification** was used as a tool to enhance learning and engagement. By incorporating game-based elements, complex topics more accessible and fostered a collaborative environment where participants could creatively solve real-world housing challenges. By incorporating elements such as competition, rewards, challenges, and interactive design, gamification aims to make tasks more enjoyable, interactive, and compelling.

STARRY NIGHT – VINCENT VAN GOGH

Design Studio
2020-21

IN BETWEEN

Shubhashish Subandh   Chetan Sahasrabudhe   Sudhanva Kolhatkar   Mohit Jadhav

Where does 'Inside' end? Where does 'Outside' begin?
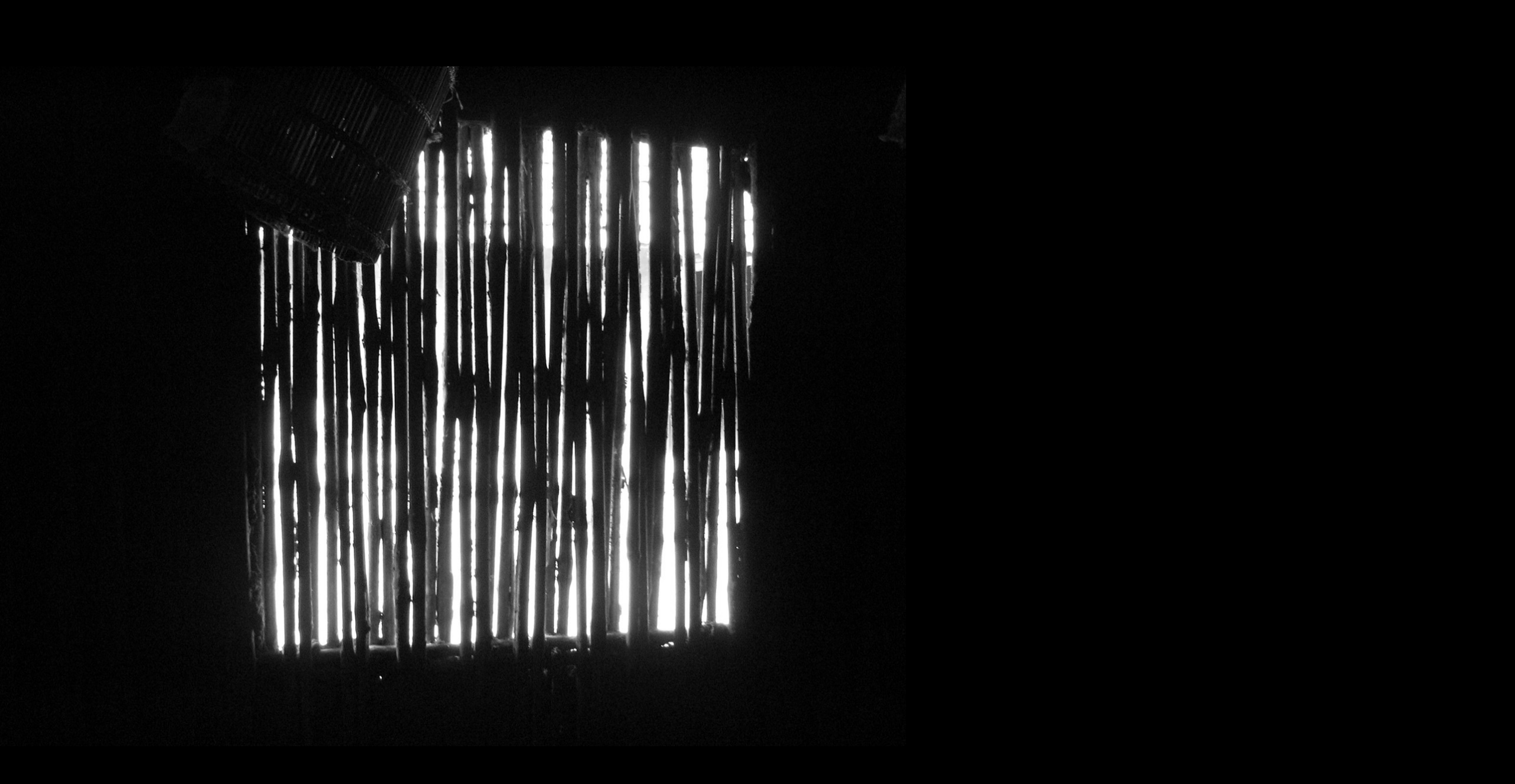
Where does the 'Wall' end? Where does the 'Window' begin?

Is the Inside more inviting or the Outside?

Where is the 'In Between'?

What spaces does it occupy?

How do you negotiate it?

How do you recognize it?

How do you read it?

IN BETWEEN

The in-between has been a central concern of architecture for ever.

From scale of a city to that of a humble door; the 'in-between' manifests in a range of fascinating forms.

We will explore the idea of the **IN-BETWEEN** through the projects of this semester

A campus on some site somewhere in India ....

A small building somewhere on the MKSSS campus ....

Program Analysis

Site analysis

Articulating Architectural response to concerns of Climate

Resolving Structure

Acquiring Design Knowledge
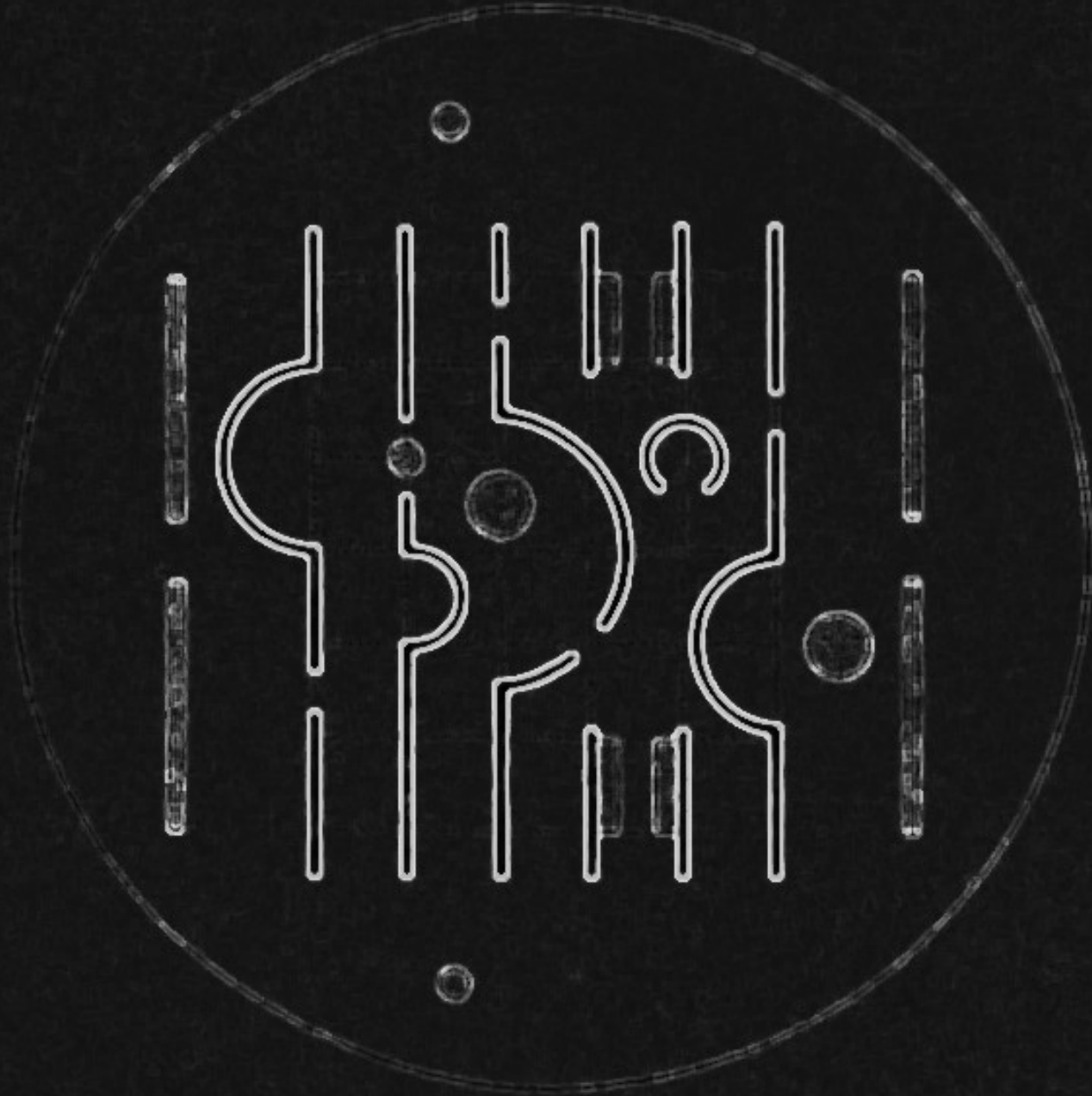
**A Place where different things
can meet and unite**

**The common ground where
conflicting polarities can again
become twin phenomenon**

ALDO VAN EYCK

Is the IN BETWEEN

Liability? Opportunity? Problem?

Indeterminate? Approximate?

Ignorable? Exciting?

Shubhashish Subandh

Chetan Sahasrabudhe

Sudhanva Kolhatkar

Mohit Jadhav

DK1 - Build Design Knowledge

DK4 - Reflection ON Action
Become your own critic

TC1 - Orientation Strategies
TC2 - Fenestration Design
Audit Your Design

TC3 - Wall and Roof Assemblies
How's the weather today!
TC4 - Define Climate Response Strategies
Dont forget the Climate

GC1 - Graphical Conventions
Change of hat - Become a designer again

DD1 - Minimums of Human Movement
DD3 - Analyse an Activity
How do i get the area programme?
DD4 - Universal Accessibility
Remember the users
PD1 - Built Space Program
Lets work out the design brief

DK2 - Form Design Schemata
PA1 - Draw Bubble Diagram
PA3 - Identify Knowledge Gaps
Study Precedents

PA4 - Understand Vertical Adjacencies
Heads down! Give us a design in 2 Days! (No we are not joking)

SA2 - Site Features
SA1 - Slope Analysis
Contours? whats that?
SA3 - Draw Site Sections

SD1 - Negotiate Site Levels
SD2 - Represent Graded Contours
Managing Contours
SD3 - Grading of Site

DK3 - Reflection IN Action
Review

Tell us about your design

S1- Choose and Apply a Structural System and Material Palette
S2 - Resolve Skin Sections
Architectural Character and what goes into it
S3 - Understand Structure as a Systems

DK6 - Relate Abstract and Concrete
Meet - Interact - Learn – Reflect

Cut the c***, Tell us what we are building..thats it!

SA4 -Respond to larger Context
Shift Gears, lets talk form!
DK5 - Use Ideation Methods

GC3 - Use models as a thinking tool
What have you got for us today?

Heads down! Give us a design in 2 Days! (you are kidding, right?)

SE4 - Outdoor – Indoor Integration
Heads down!
SE5 - Social Interaction
Submission time
SE6 - Architectural Identity
Putting it all together

DD2 - Minimums of vehicular Movement
PD2 - Open Space program
PA2 - Zoning Diagram
Site Planning a Birds Eye View
TC5 - Use Landscape Elements

SE1 - Network and Hierarchy
SD4 - Design Networks
SD5 - Design Spaces for Outdoor Activities
Open spaces - hierarchies, activities......Oh I forgot the contours
SE2 - Pause, Surprise, Termination, Variety, Focus
SE3 - Sequential Experience, View, Vista, Enclosure

DK4 - Reflection ON Action
How was it?

GC2 - Construct a Narrative
Putting it all together

DK7 - Commit to some Architectural Ethic or values

Assignment 2 – Campus Design

Assignment 2 - Campus Design

	Session	Date		Week
1	Lets work out the design brief	28th Aug	Fri	**4**
2	How do i get the area programme?	1st Sept	Tue	**5**
3	Study precedents	4th Sept	Fri	
4	Contours? whats that?	8th Sept	Tue	**6**
5	Lets Ideate, but don't forget the Climate	11th Sept	Fri	
6	**Heads down! Give us a design in 2 Days! (you are kidding, right?)**	**15th Sept**	**Tue**	**7**
7	Shift Gears, lets talk form!	18th Sept	Fri	
8	What have you got for us today?	22nd Sept	Tue	**8**
9	Architectural Character and what goes into it	25th Sept	Fri	
10	**Tell us about your design**	**29th Sept**	**Tue**	**9**
11	Site Planning - A birds eye view	2nd Oct	Fri	
12	Managing Contours	6th Oct	Tue	**10**
13	Open spaces - hierarchies, activities......Oh I forgot the contours	9th Oct	Fri	
14	**Heads down!**	**13th Oct**	**Tue**	**11**
15	Putting it all together	16th Oct	Fri	
16	How was it?	20th Oct.	Tue	**12**

Test of prior knowledge

Dear Student, welcome to the third-year design studio. As you might be aware, the third-year design studios require a sufficient command over skills in various subjects that you have learnt in first and second year of Architecture School. While the pass or fail of the semester end exams is one indicator of your domain knowledge; it has its limitations as a tool for assessing the required skills.

We urge you to take the following test. It will enable us together to identify your strengths and weaknesses. It will help us to recommend additional instruction for you aimed at improving your skills and abilities.

The results of the test will be shared with you individually and we may have class or focused group discussions as the need may be. Please read and follow the instructions diligently to help us assess your submissions faster.

We as your design studio faculty feel that such an insight will help us build a robust community of inquiry as a class.

Read the Instructions for completion carefully before beginning the test
1.   Print out the test paper on A4 size paper.
2.   Write your name and mobile number in the indicated space.
3.   Put in the appropriate responses in the space provided.
4.   Scan all the pages as pdf. Combine them in a single file using any online /offline pdf tool
5.   Make sure the combined file size in less than 5MB and upload the file as a single *.pdf file onto the LMS.
6.   File naming – firstname . first letter of surname in capital_PKT.pdf
        For example for 'Chetan Sahasrabudhe' the file will be named as –
        Chetan.S_PKT.pdf
7.   Give yourself 45 minutes to complete the test.

1 Identify by marking on the drawing the graphical mistakes in the drawings given below. Number them and write small notes for each to explain the mistake

IN

OUT
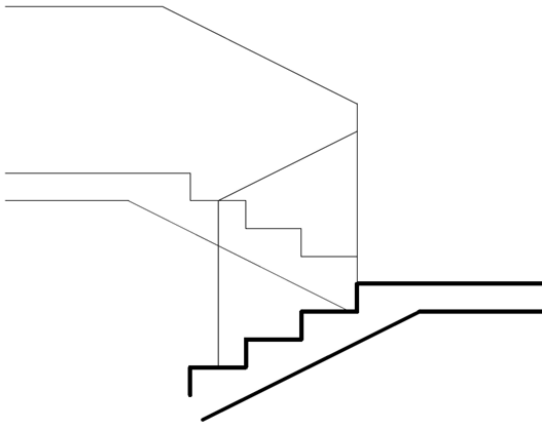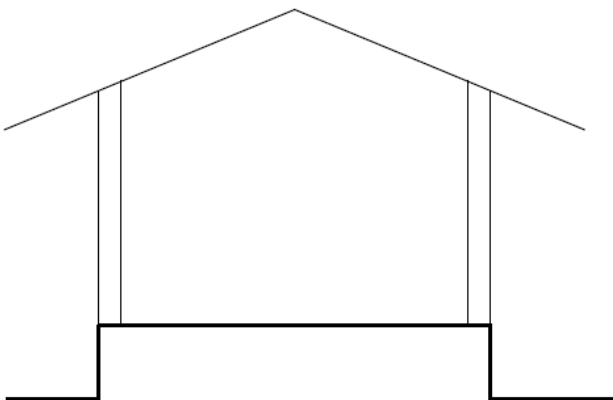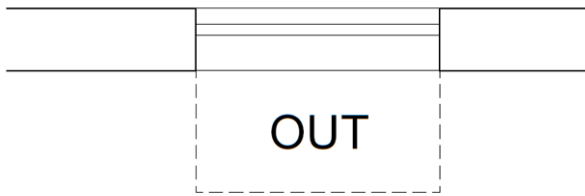
2   Indicate on the drawings below the required annotation, (dimensions, symbols and text)that need to be added to it.
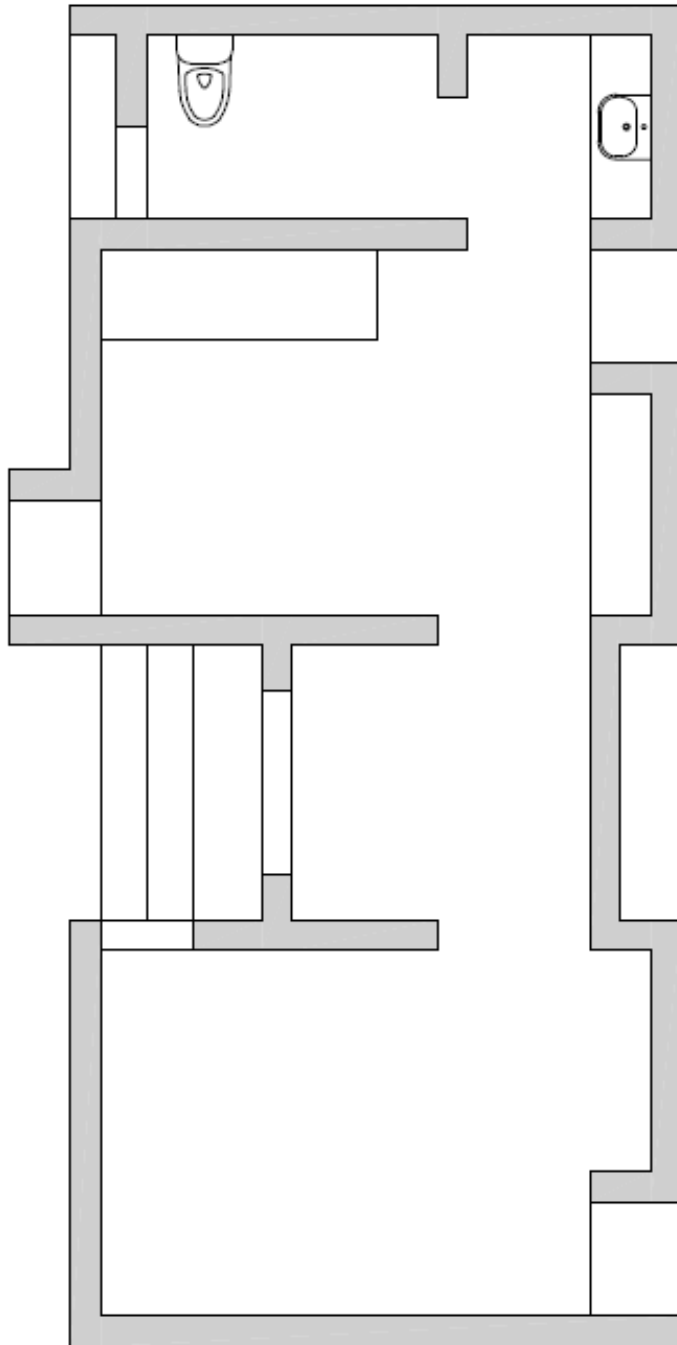
3 A. Below are two roof plans, What type of roofs do they indicate?
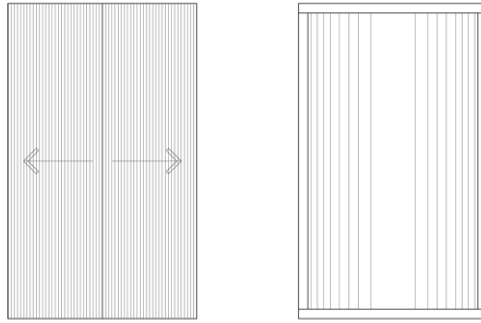
B. In the following pair of sketches identify the mistakes with reasons. If you feel both are wrong or right mention that in the explanation.
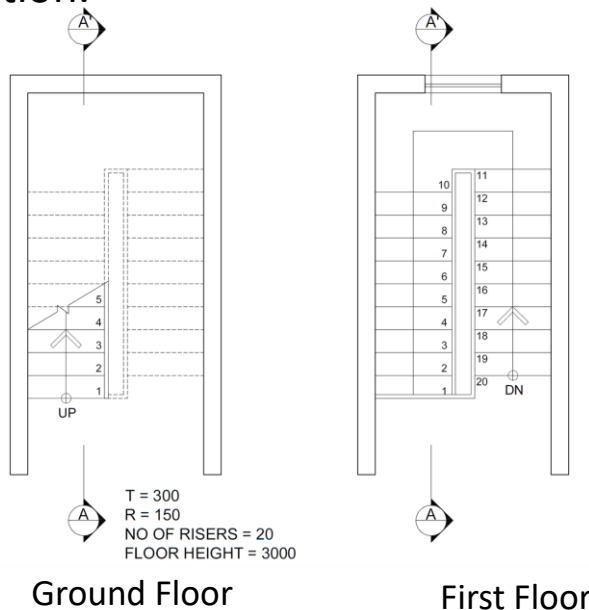
T = 300
R = 150
NO OF RISERS = 20
FLOOR HEIGHT = 3000

Ground Floor

First Floor

4   You are designing a small residence and have to plan for an optimally sized toilet for the Master bedroom which has a Shower space, Wash Hand Basin and a Water Closet (WC).

    a.   Design the toilet and communicate by drawing a dotted spatial envelope line representing the toilet boundary and indicate the toilet fixtures and their layout.
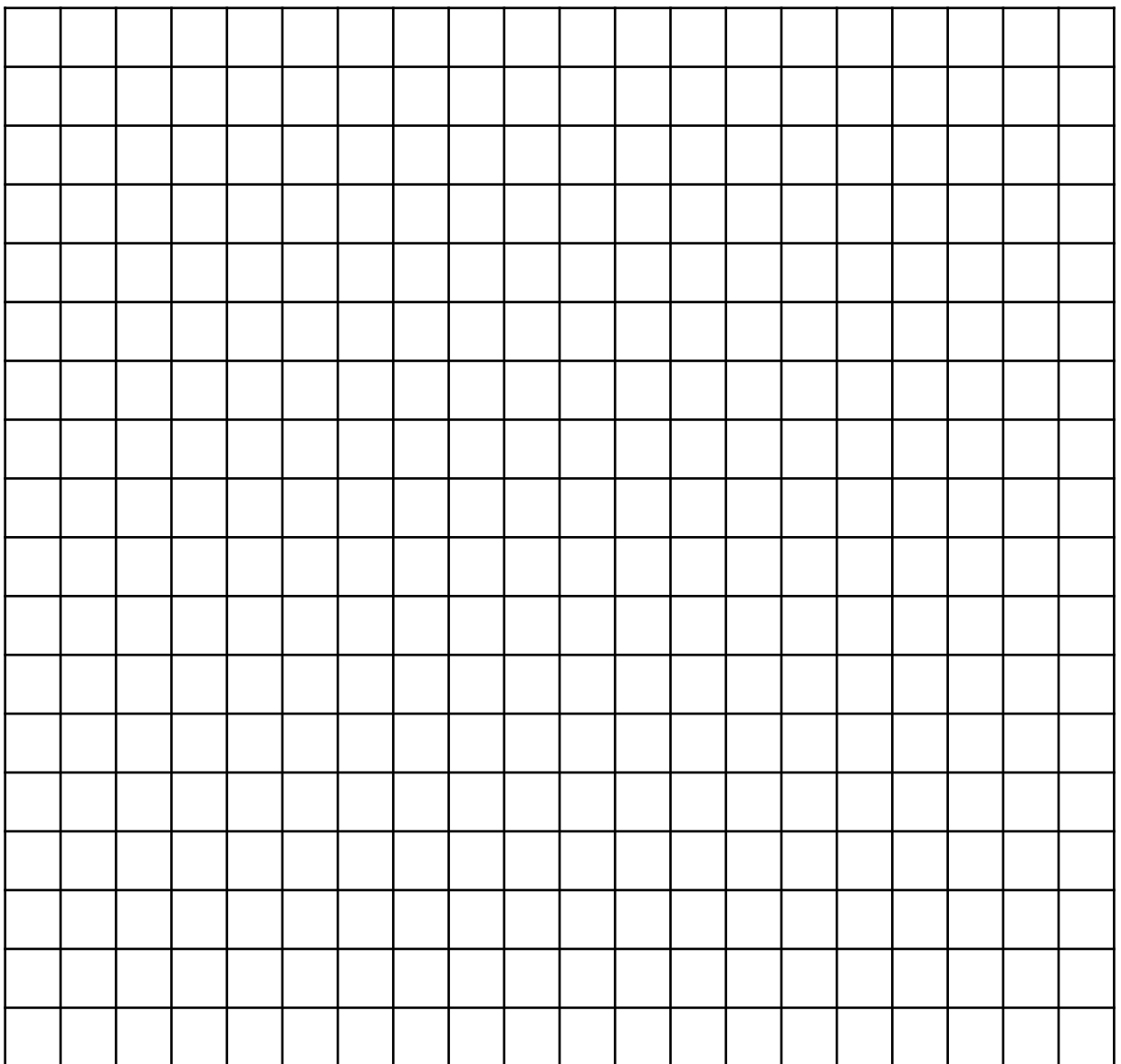
4   You are designing a small residence and have to plan for an optimally sized toilet for the Master bedroom which has a Shower space, Wash Hand Basin and a Water Closet (WC).

b.   Add adequate dimensions to your sketch and also indicate aa appropriate location for a door.
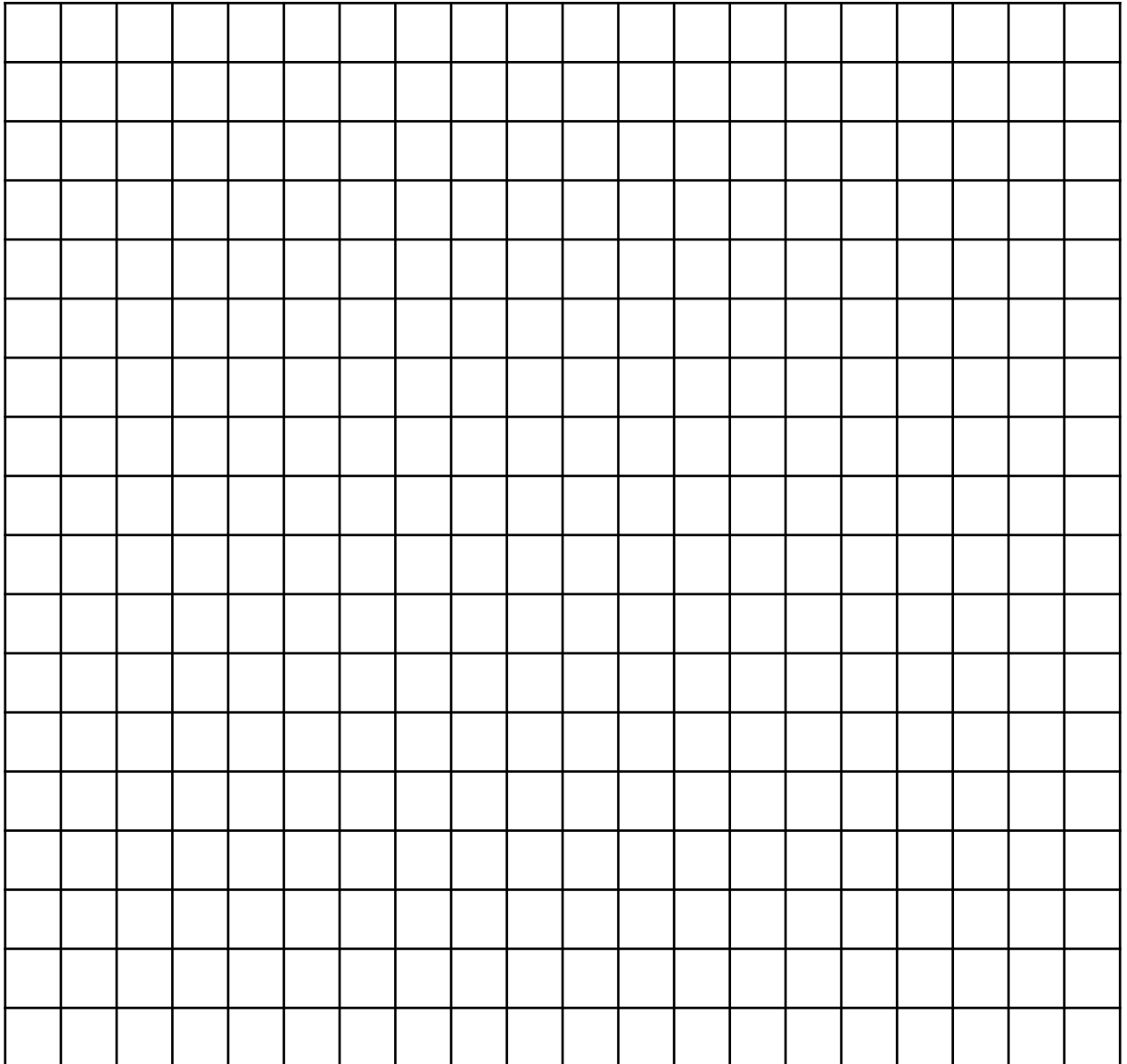
5 An institute wishes to build a dining hall for its students (100 Students) staying in the hostel.

   a.   List the various spaces that as per you will be required for such as dining hall

5 An institute wishes to build a dining hall for its students (100 Students) staying in the hostel.

    b.   Draw a bubble diagram to graphically indicate the relationship (weak, strong or tentative) between these spaces and their relative space requirement.

6   Study the given images and list the i. Roofing, ii. Spanning, iii. Supporting, iv. Opening systems used in that building. In case a system is not clearly visible; you may have to make an educated guess about the system used. List your responses in the same order.

i.   Roofing System

ii.   Spanning System

iii.   Supporting System

iv.   Opening Systems

i.   Roofing System

ii.   Spanning System

iii.   Supporting System

iv.   Opening Systems

6   Study the given images and list the i. Roofing, ii. Spanning, iii. Supporting, iv. Opening systems used in that building. In case a system is not clearly visible; you may have to make an educated guess about the system used. List your responses in the same order.

i.   Roofing System

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iii.   Supporting System

iv.   Opening Systems

i.   Roofing System

ii.   Spanning System

iii.   Supporting System

iv.   Opening Systems

7   Write a note on the following three structures highlighting the similarities and differences in their forms.

8   Identify the locations of the places based on the sun path diagrams.
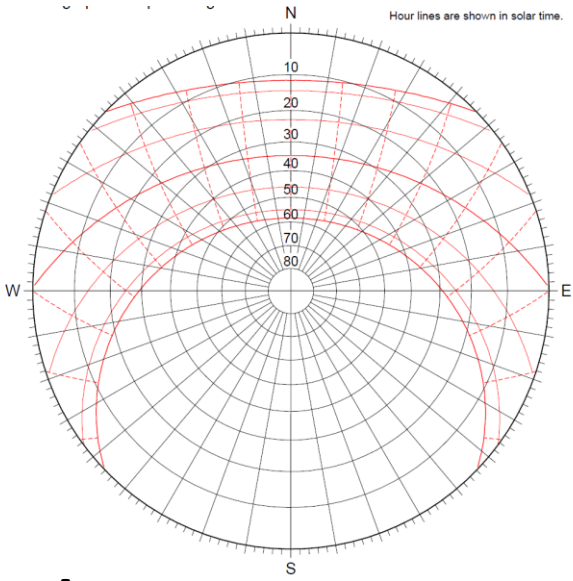
A
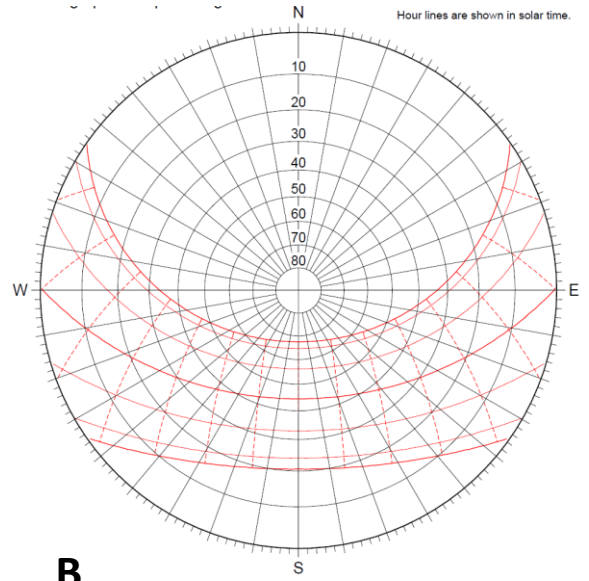
B
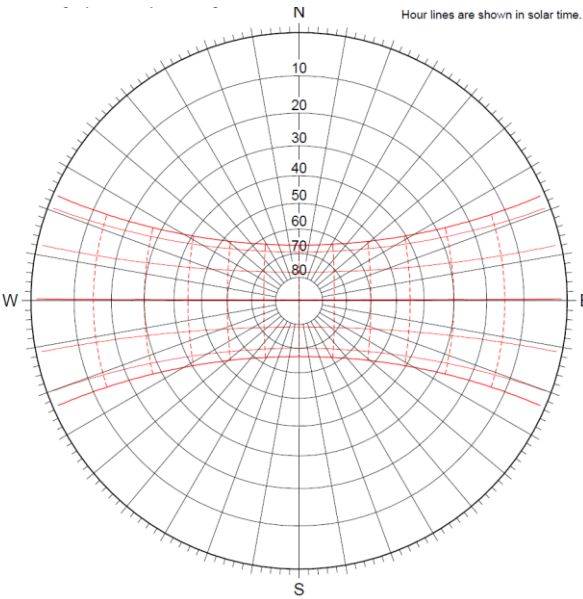
C
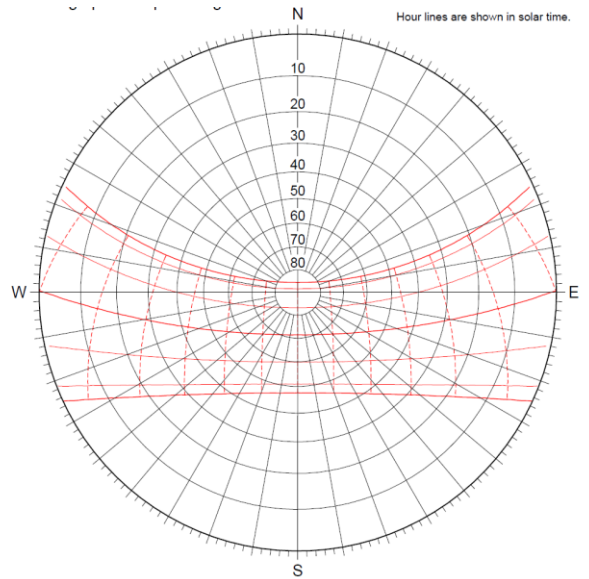
D

9 A family in Ratnagiri (Konkan) plans to by a desert cooler to beat the heat of the summers. Advise them on this decision and also give your recommendations to the family for achieving thermal comfort.

10   Write a note on the plan given below.

11 BNCA wishes to build scale models of some buildings which will be used as an educational tool. The institute does not need 'realistic' models but wishes to bring out the architectural ethos of the designer through these models. Suggest modelling materials for making these models. (if you are not aware of these buildings; look them up on the internet)

i. Heydar Aliyev Centre - Zaha Hadid

ii. Salk Laboratories - Louis Kahn

iii. Centre for development Studies – Laurie Baker

12 You have been asked to do a layout of a poster announcing the presentation by an architect at BNCA auditorium. The contents include the following
   1. Architects Photograph
   2. Two Images of his works
   3. Details of venue and timing
   4. Name of the Host institute
   5. A small writeup about the architect

   Prepare a blocking diagram for this poster. Indicating the base grid used and the rectangular blocks representing the content arranged in the rectangle below

Model Centric Learning Architecture

JP

MCA

This is the new way of teaching & learning. It provides the student an opportunity to watch an expert solve problems in real life environment. The expert shows students the systematic approach to solve the problem with a given situation, strategically, e.g;

PLAN – IMPLEMENT – VERIFY cycle

By following this model students will be able to solve problems in real life scenarios with an appropriate level of guidance from the expert. This will gain expertise in solving similar kinds of problems which students are likely to encounter in their fields. This model shall prepare them to successfully meet the challenges of real life environment.

The course will consist of-

- Several problems in increasing order of complexity
- Progress through these problems as per the level of guidance
- The level of this guidance will gradually fade out
- Guidance will be given for first few problems or until they get more comfortable with their knowledge.
- Someone closely monitors the students and grade them for their performance.
- There will be complete un-guided practise at the end.
- Students shall solve problems on their own.

The 5 Pillars of the model

- Business and Industry scenarios
- Expert model
- Guided practise
- Guided exploration
- Unguided practise
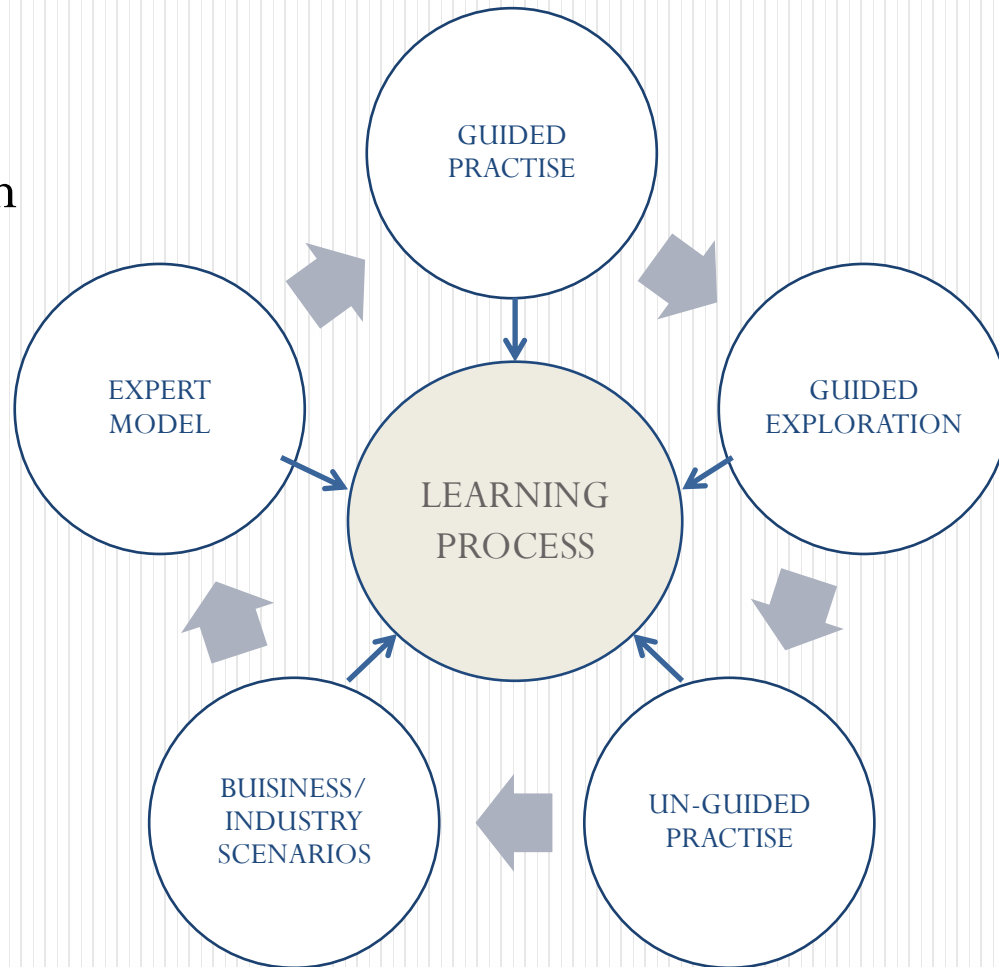
Business and Industry scenarios

- The problems set by an expert shall have Industrial requirements of real life scenarios as per Architectural scopes

- It must have the typical organizational set-up or functions by which the problems can be solved

- Students must be confident enough, not just in technical skills but they must have ability to apply their knowledge in different situations as per the real life scenarios

- These scenarios serve as the backdrop for problem discussions and practises during any point in the curriculum.

Expert model

- The faculty involved shall impart technical knowledge, demonstrate techniques for problem solving and exemplify the use of best practises

- In this stage, students observe the expert performing various tasks in systematic manner of How to approach the given problem

- The demonstration shall be designed to make the knowledge of the expert visible to the novice learner

- This will be termed as guided practise.

Guided practise

- Once the faculty demonstrate the approach to the problem, then students shall solve similar or higher complex problem based on the knowledge they have acquired under the guidance of the faculty
- This enables them to immediately apply the concepts they have learned
- The guided practise will be recorded for analysing their periodical performances and will remain with them as a guide of reference in future
- This will still be termed as guided practise.

Guided exploration and case studies

- In this process of learning and applications, students are allowed to consult various information sources like, technical reference, library, internet and help of other experts or consultants

- This helps students to develop their skills in technical exploration and will ingrain it as a habit

- This habit becomes their lifelong ally in the race to stay on the top of the situation in the constantly changing Architectural field

- The ability to explore and get familiar with the outside world is vital to keep them updated, confident, busy and self reliant.

Unguided Practise

- At this stage students are confident and ready to implement and verify solutions on their own

- Solving the Unguided practise problems builds tremendous sense of confidence and they are able to demonstrate independent problem-solving capabilities for themselves and anyone else who matters

- The complexity and intricacies of these problems increases as they go ahead with different set of problems

- Faculties will have their own time for other academic assignments as they are least involved in students at this stage

- Final assessment will be done by the experts to analyse students performance

Implementing MCA

In order to conduct the course in this system, faculties has to make themselves prepared for inputs to be delivered to students. Specific methodology has to be established to make the experts and students comfortable to work in. It has to generate interest amongst them and must develop an energetic environment. The curriculum needs to be designed in a structured manner which must be coordinated by all the team members involved. Hence every individual member must incur their valuable time and effort to structure the syllabus to suit this new way of teaching & learning.

The course can be structured in two parts –
1. Technical reference (Notes, Information, Books, Case studies, Site visits, Market study, Demonstration & Consultancy)
2. Skill base (Problems, Exercises, Assignments, Quizzes & Exams)

Technical reference

- The technical reference will provide exhaustive information on the concepts, techniques related to the subject/ topic

- It must provide variety of information, examples, illustrations aimed at effective learning experience.

- It must be like a teaching manual developed by the expert of the subject which will remain as a handy reference guide during the course or at work place.

- The manual may also have pointers to help students search information on Net, library or any organizations involved.

- To make this guide efficient, faculties must have desire to incur their knowledge, skill and field experience.

Skill base manual

- The skill base will first have a questionnaire which students will attempt. This questionnaire will test their prerequisites before they start with their practise. (*Testing of existing / previous knowledge*)

- The skill base is divided into number of topics. Each topic shall contain number of problems and exercises

- The problems will be of three types as mentioned earlier like – **Demonstration, Guided practise and Unguided practise**

- The topics will be divided into number of sections. Each different section shall begin with "Getting started". This section will have basic requirements for understanding the problems that follow

- The problem solving process shall be divided into **PLAN–IMPLEMENT–VERIFY** section.

- The solutions for demonstration problem will be in form of tasks to be done in planning, implementing and verifying.

- The knowledge necessary to perform these tasks is given in technical reference and taught to the students as and when required.

- The same procedure will be followed by students to attempt the guided as well as unguided practise.

- All the problems/ exercises has to be generated well in advance (*start of semester*) with slight modifications at later stage

- This Skill base manual itself becomes the term/ year schedule and students are aware of how much efforts they have to put in, right at the beginning of the semester.

Structure for Skill Base

- Problem Statement: Expert has to formulate the problem statement giving all the required data and expected result. The problem may be designed based on the Design Project/AD studio

- Information sources:
  - Problem statement- the problem itself is the first hand information
  - Expert / Guide- name of the person who will guide for the solution
  - Reference book- Technical reference or Name of the book referred
  - Internet- e.g: Website referred, Google, YouTube, etc…
  - Others – if any other sources are involved (specify)

- **Plan the solution**: identify the tasks to be done in the problem given
  - Task 1
  - Task 2
  - Task 3

- **Implement the solution**: implement the solution for the above tasks
  - Task 1 solution
  - Task 2 solution
  - Task 3 solution

- **Verify or Check the solution**: as per the result expected in the problem statement verify whether the expected answer is correct or wrong. Get it verified from design faculties.

SY. B. Arch SEM III (Core centric approach)

- Technical communication

- AutoCad

BTM III

BS I

DESIGN III

- History

TOS III

ADG

- Surveying & Levelling
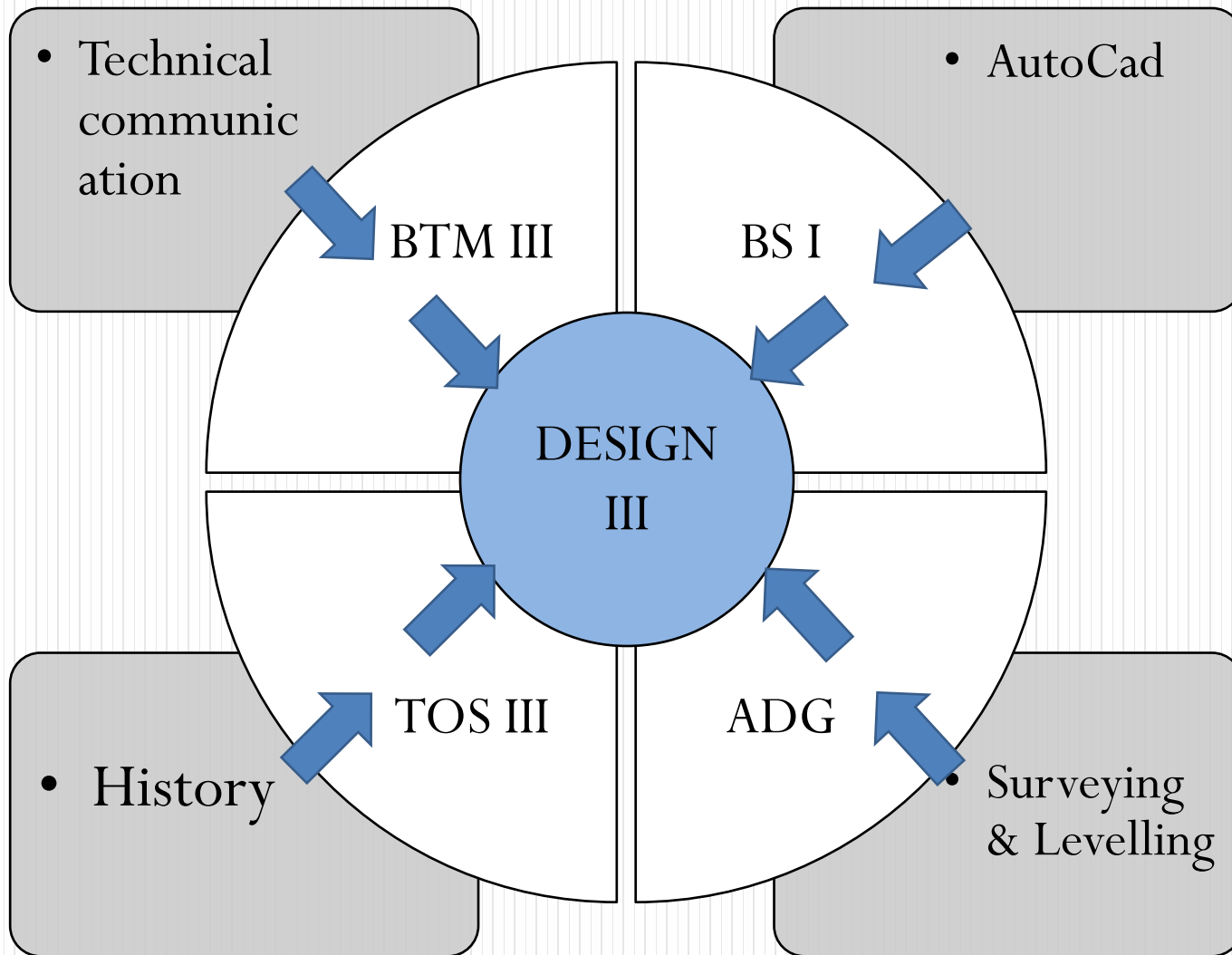
Let's implement

- We will consider here SY. B.Arch. course for the Subject 'BUILDING SERVICES I' as an example to demonstrate an approach to this system

- In Architectural curriculum 'DESIGN' is the core subject, while all other subjects support to make the Design problem a success.

- The students needs to be well versed with what they learn in all the supporting subjects and then apply their knowledge and creative skills to make a good design. Hence solving a design problem indirectly means having an Guided/ Unguided practise in the overall scenario.

- So an expert needs to formulate a Design Problem for both cases, guided as well as unguided practise. One can be a demo problem done in the initial stages of semester and others can be more complex problems done at a later stage once all their skill sets are developed with the help of other subjects

- Faculty must coordinate and make students aware of how to integrate knowledge gained from other subjects and then to apply in their design. This will be the implementation stage in '**Plan-Implement-Verify**' sections.

Building services I

UNIT I Water supply - I

1.1 Principles and techniques of supplying water
- Treatment of water
- Concept of Pressure head
- Flow through pipes

1.2 Tapping of water mains on street by means of Ferrule

1.3 Requirement, Storage and distribution of water in building premises
- Sizing of Water tanks
- Static water storage requirements (Fire Tank)
- Collection and Storage systems
- Types of Pumps and applications

Problem can be formulated on the topics highlighted above.

Problem Statement DP1:

An apartment consisting of four floors, each floor has four numbers of tenements. Two of the flats are of 3BRHK and two are 2BRHK. Every flat has a visiting maid servant who utilizes water for washing dishes and cleaning the house. Calculate the daily water demand and total water storage capacity for the entire building and design the UGWT.

Information sources:

Problem statement – Data given in problem

no of floors = 4   no of 3 BHK flats = 2 X 4 = 8   no of 2 BHK flats = 2 X 4 = 8

Expert – Prof. XYZ

Reference – Technical reference, NBC guide, Plumbing code

Plan the solution:

Task 1 - Identify daily demand as per their use

Assuming 2 persons/ bed + 1 maid per flat   (*ref: NBC guide)

(8 X 2 X 3) + (8 X 2 X 2) + (4 X 4) = **96 persons are using water**

Task 2 – Calculate the water requirement based on the data given.

Assuming 135 Lts per person as daily water consumption

135 X 96 = **12960 Lts**

Daily water demand is to be divided as –   (*ref: Plumbing code)

One day requirement on roof top tank (OHWT) = 12960 Lts ~ 13000 Lts ~ **13 m³**

Two days to be stored at ground level (UGWT) = 2 X 12960 = 25920 Lts ~ 26000 Lts ~ **26 m³**

Task 3 – Calculate the size of UGWT. Calculate the size of OHWT.

Assuming 2m as height of water table in the tank = 26/2 = 13 m²

assuming one of the dimensions of the tank so as to fit in available space is 3m then,

Internal size of the tank will be (4.33L X 3W X 2H) up to FB of water table. Add 300mm as FB to Ht component,

UGWT Internal Tank Size = **4.3L X 3W X 2.3H , OHWT** internal tank size = **3.3L X 3W X 1.6H**

Adding wall thickness (230mm) and (100mm) Thickness of top slab for **RCC water tank**.

UGWT External Tank size = **(4.76m X 3.46m X 2.4m), OHWT** External size = **(3.6m X 3.3m X 1.7m)**

Implement the solution:

Task 1 – Total **96 persons** are using water daily

Task 2 – daily water consumption of the building is 12960 Lts ~ **13000 Lts**

      Size of RCC UGWT = **4.76m X 3.46m X 2.4m (Cap – 26000 Lts)**

      Size of RCC OHWT = **3.6m X 3.3m X 1.7m (Cap – 13000 Lts)**

Task 3 – Draw the details of UGWT & OHWT showing all the components to the scale

Check the solution:

Problem Statement GP1:

A single family dwelling for a working couple having two children needs water storage facility comfortable for their living standards and also to suffice their large landscape area. Calculate the water tank capacity to store water fulfilling their daily demand. Identify the strategic location of the tank in the plot area, so that it is easily accessible for maintenance.

Information sources:

Problem statement – Data to be obtained from Design project

Expert – Prof. XYZ

Reference – Technical reference, NBC guide, market survey

Plan the solution:

Task 1 - Identify number of people residing, total landscape area and type of plantations. Identify daily demand as per their use

Task 2 – Calculate the water requirement based on the data given. Calculate the size of UGWT. Calculate the size of OHWT. Identify the material to be used for building the tanks.

Task 3 – Identify the location of UGWT and OHWT as per design and the method of installation and construction of same.

Implement the solution:

Task 1 – summarise the results with available data

Task 2 – draw UGWT & OHWT as per the material selected and sizes decided

Task 3 – show on site plan the exact location of tanks (Key plans). Indicate the levels, mounting height of OHWT, foundations required feasible with the structure of the building

Check the solution:

GREEN HABITAT: TOWARDS ECO-FRIENDLY HOUSING

Fourth Year Housing Studio B AD VI Semester VII AY 2024-25

Preamble

The Green Housing studio conducted as part of the fourth-year Architecture course, focused on three key parameters – **Site Considerations**, **Unit and Cluster Design**, and the **Health and Well-Being of Residents** – to create sustainable, livable, and environmentally responsible housing solutions. Through hands-on projects like volumetric explorations, and visit to live projects, this program aimed to cultivate a deeper understanding of green building practices and foster innovation in creating sustainable living environments for the future.

Studio Methodology

The innovative aspect of green studio focussed on using green design parameters as tool to create eco-friendly housing. The inherent motive of this studio was to encourage students to 'think green' in their design approaches.

Analysing green parameters through documented case studies and visiting green housing projects in the city, students were acquainted with these parameters and their influence on design. The objective was to make them realize that green design is not primarily about technology and materials, but it can be used as a design tool too. Time bound studios were scheduled to focus on developing design guidelines based on these parameters. This methodology also made them understand their priorities in design and the compromises they may have to make for their choices.

Studio Evaluation

Towards the end of the studio, students were asked to rate green parameters based on their importance and level of difficulty they encountered. These responses were cross examined through their architectural drawings. Students rating site considerations as significant design tool were examined for their sustainable landscape measures, soft and hard landscape areas identified, and responses to the slopes. Students with higher priority to unit and cluster design were evaluated for their Wall-Window ratio and Window-Floor ratio, use of shading devices, and optimum habitable and circulation areas. Health and Well being aspect was evaluated for design of safe and secure public spaces, interactive spaces to encourage people interaction, and incorporating universally accessible features.

Key takeaways from the Studio

The foremost takeaway of the studio was in-depth knowledge about green design guidelines and parameters. The discourses from experts in the field educated them about awareness of green housing, challenges and opportunities faced by the professionals, and introduced them to various projects on the theme.

IMPROVING LIVABILITY OF SMALL HOUSES

Fourth Year Housing Studio B AD VI Semester VII AY 2022-23

Preamble

The concept of livability in housing design is central to creating environments that not only meet the basic needs of shelter but also foster the well-being, comfort, and quality of life of the inhabitants. In a fourth-year architecture course, students explore how architectural design can enhance livability by addressing various factors such as functionality, aesthetics, health, social interaction, sustainability, and overall user experience.

Studio Methodology

Studio methodology involved diverse tools like research papers, live project studies, and documented project studies to gain knowledge about livability of small houses. An innovative idea of deriving livability parameters through group discussions and debates formed the base of their design program. Various livability factors were identified through the above-mentioned areas which were further scrutinized to arrive at reasonable factors of livability. These were further rationalized based on their strength to be used as design tools.

This method ensured inter-disciplinary knowledge gain, enhancing students' understanding about livability. The livability parameters identified for the study were physical aspects, social aspects, economic aspects, human capital, and environmental aspects. These factors were evaluated through their design output.

Key takeaways from the Studio

The studio methodology helped students on various aspects. Students developed ability to comprehend concepts like small house designs that are not experienced by themselves. Second, they develop ability to process information gathered through diverse sources and use them in their domains. Third, they learned to appreciate difference of opinions through group discussions, and then draft design guidelines for themselves. This ensured a holistic process of design.

MKSSS's Dr. Bhanuben Nanavati College of Architecture for Women, Pune

BNCA | Events and Activity Reports

Event / Activity title: **Experimental Learning of Forces and force system, Lami's theorem, Various Types of Supports**

Date & Time: 22nd November, 2024

Venue: Respective Classrooms

Faculty In-charge: Prof. (Dr.) Sujata Mehta,

Faculty Co-ordinator: , Dr. Sujata Mehta, Prof. Swapnil Shinde, Prof. Preeti Namjoshi

Students' In-charge: Shreya Kapile

NAAC Criteria (if any): Innovation in teaching

Guest Speakers: -

Chief Guest (if any): -

Objective of this Event: To understand coplanar concurrent force system, its resultant and equilibrant, Lami's theorem, Various types of supports for beams

Summary of the event (150-200 words):

Calculation of resultant and equilibrant by analytical method, Lami's theorem and various types of supports for beams are taught in class in First Year Sem I. The hands-on experiments were designed using simple day-today material and equilibrant force was found.

Objective – Find the equilibrant force in a concurrent force system

Material –

Each group will have a kit with following ingredients

- 4 strings of 1 ft each
- 4 plastic bags
- Marbles – 40
- 4 rubber bands
- 1 used sheet (blank back side)

Cellotape

- Two-way tape

- 4 Plastic pulleys

- Pencil, pen, eraser, cutter, protractor

- Two bangles

Procedure –

Step 1. Place a used sheet on the top of the table and draw angles as shown.
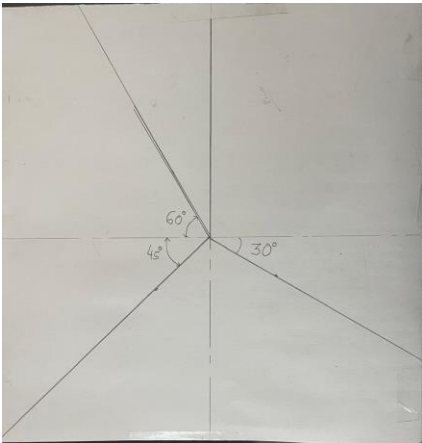
Step 2. Stick four pulleyes using two way tape, at the edge of the table/ sheet as shown.
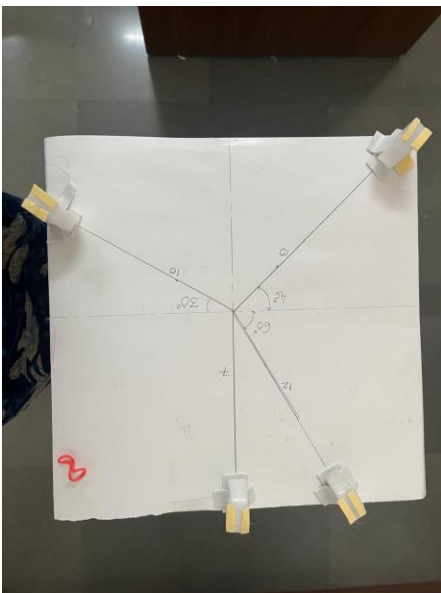
Step 3.

Add marbles as given by the instructor to the plastic ziplock bags at the end of each string as suggested by the instructor. Bring the system in to equilibrium. Verify your answers with analytical method.

Lami's theorem :

Objective – Understanding Lami's theorem

Material –

Each group will have a kit with following ingredients

- 3 strings of 1 ft each
- 3 plastic bags
- Marbles – 40
- 3 rubber bands
- 4 pushpins
- Pen, pencil, protractor

Procedure –

1. Place a used sheet on the soft board and draw angles given by instructor.
2. Fix push pins as shown
3. Tie strings to the bangles and add required number of marbles to the plastic back at the end of each ziplock bag to ensure the system is in equilibrium.
4. Verify the answer with calculations.

Various Types of Supports Using the game of Mechanix

Students created rollers, hinges and fixed support using slotted straight, angle and C members and bolts

Attachments:

Collaboration details (if any):

Event Supported / sponsored by:

Event Category: Academic / Co-curricular / Extra-curricular: Co-curricular

Copy of the attendance is attached as separate document.

MKSSS's Dr. Bhanuben Nanavati College of Architecture for Women, Pune

B-DIVISION.

MKSSS's Bhanuben Nanavati College of Architecture for Wo...

Course	TOS				
Date	14/10/24	14/10/24	21/10/24	11/11/24	22/11/24
Faculty					
Student					
AARYA BAGUL	P	P	P	P	P
ACHAL BHUTE	P	P	P	A	P
ANUSHKA GADE	P	P	A	A	A
ARYA NIGADE	P	P	P	P	P
BHAKTI SALUNKE	P	P	P	P	P
BHUMIJA PATIL	P	P	P	P	P
DEVYANI DEULKAR	P	P	P	P	P
DHANASHREE GADHE	P	P	P	P	P
DIYA JADHAV	L	P	A	A	A
DURVAA BARMECHA	P	P	P	P	P
GARGI GHALSASHI	P	P	A	A.	P
GIRIJA SHIRALKAR	P A	A	A	P	A
IESHANVI BHUTADA	L	P	P	P	P
KIRAN PATIL	P	P	P	P	P
KRITIKA AGARWAL	L	P	P	P	A
LAXMI KULKARNI	P	P	P	P	P A
PARI SETHI	P	P	A	P	P
PAYAL NETAWATE	P	P	P	P	A
PRAPTI DHAVALE	P	P	P	P	P
SAI KAMBLE	P	P	P	P	P
SAMRUDDHI KESKAR	P	P	P	A	P
SEJAL KHARAT	P	AL	P	L	A
SHALMALEE BAGATE	P	P	P	P	A
SHARVARI GADRE	P	P	P	P	P
SHARWARI HAJARE	P	P	P	P	P
SHIVANI VARMA	P	P	P	P	A
SHRIYA JANNU	P	P	A	P	P
SIDDHI BANGAD	L	P	P A	P	P
SNEHA MEHTA	L	P	P	P	P
SRUSHTI GURAV	P	P	P		P
TANISHKA DEVNANI	P	P	P	P	A
TANIYA HIRE	P	P	P.		A
TANUSHRI VAIDYA	P	P	P	A	P
URVI PATEL	P	P	P	T	P
VAISHNAVI GHIWARE	P	P	P	P	P
VEDASHREE SANDHAN	P	P	P	P	P
VEDIKA CHANDAK	A	P	P	P	P
VEDIKA KARAD	P	P	P	P	P
Vidhi Kothari	P	P	A	P	P
VISHAKHA SHITOLE	P	P	P	P	P
SAEE GJAGTAP	P	P	P	P	P
Raajashree Patil		P	P	A	A

MKSSS's Dr. Bhanuben Nanavati College of Architecture for Women, Pune

Copy of the poster :

NO POSTER WAS PREPARED

Signatures

Events Co-ordinator   HOD   IQAC Co-ordinator

Dr. Chetan Sahasrabudhe
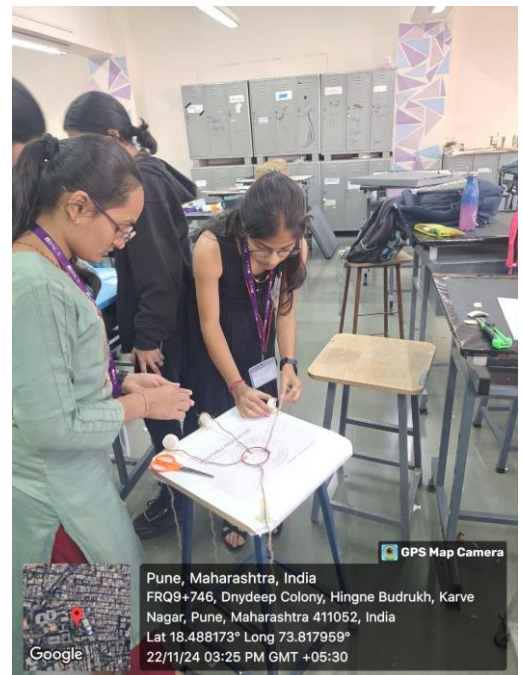

Fig.1. Coplanar Concurrent system angle marking

Fig.2. Applying forces using marbles

Fig.3. Adjusting forces to achieve equilibrium

Fig. 4. Lami's theorem

Fig. 5. Creating various types of supports, hinges, rollers and fixed support

BNCA | Mental Model Teaching

Mental model teaching is a student-centered instructional strategy that uses mental models to help students understand content and develop design step-by-step.

Second year 1st sem design is an important start point for students to learn planning of a house. For the students of this semester, a house is complex as the numbers of spaces are many, they have to manage designing with climate considerations, design with knowledge of load bearing structural system, use a combination and of open and built spaces for good lighting and ventilation. All the above parameters are overwhelming and may hinder students design process.

Concerning this, we have broken down the design process into a step-by-step progression, yet allowing creative digression. The process is below

1. **Understanding the planning typology.**

Students are given a list of bunglow designed by various architects. Students study the plans of the allotted project and prepare simple line diagrams of the plans. The simplistic plans are devoid of any details and claen space demarcations. Once this step is over, faculty presents about the planning typology describing linear, radial and courtile or central plans. While explaining with brief examples, students are suggested to analyse and categorize the case study plans. This step helps students understand and be able to categorize and plan the layouts with knowledge of planning typolog
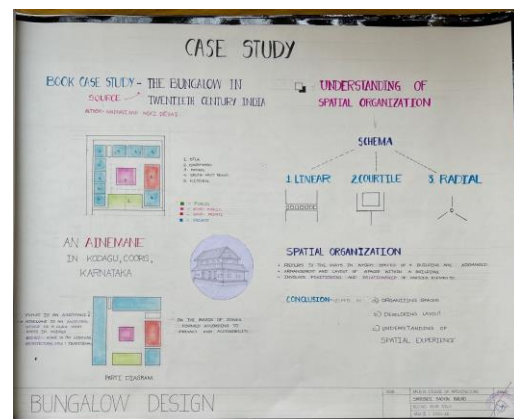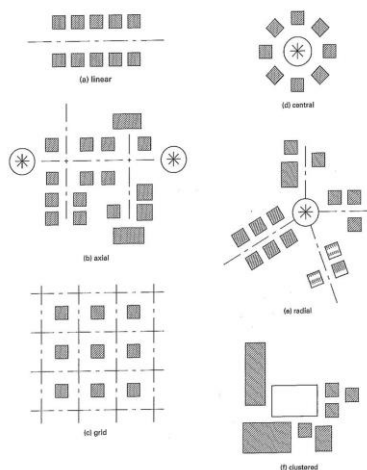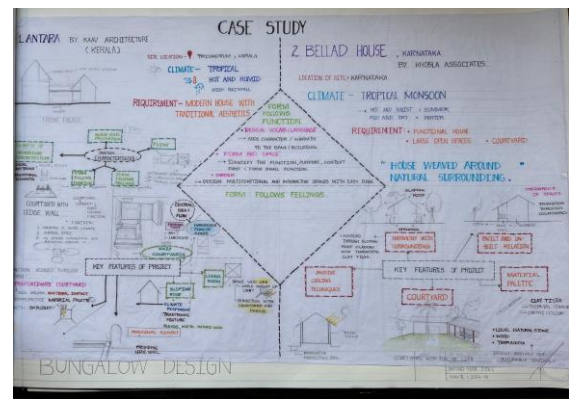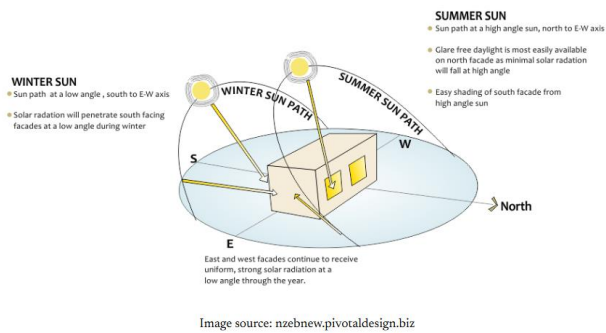

| a. | Slide explaining different types of planning strategy. | b. | b. Case study sheet of student showing courtile planning analysis. |

2. **Understanding and Applying climatic design strategies**

A brief presentation is given to the students to make them understand importance of climate knowledge for planning. These strategies can be used to minimize heating and optimize wind circulation in the house. The second stage for applying climatic strategies for openings and façade treatments. The presentation also focuses on how the size of openings on the external wall can help achieve thermal comfort inside the houses.

The students use the first part of presentation for strategizing the orientation of the building block. Through series of discussions, the zoning of the building block can be formatted along with planning type. The detailing of the plans then progresses with consecutive discussions.

a. Slide explaining importance of climate strategies for zoning

b. Case study sheet of student showing different strategies including climate for design.

3. **Step-by-Step design development**

Throguh different variations of planning and climate strategies, students progess in their design whilst discussing with their mentors. Students are encouraged to discuss with different mentors to get larger perspectives for design.

Schemas, Parti diagrams, block models, etc are some tools used to explore possibilities of plans for their designs. These design tools can be used by students at any juncture of their academic and professional practice, thus giving a more robust ground of designing philosophy and principles.

MKSSS Dr.Bhanuben Nanavati College of Architecture for Women

SETTLEMENT STUDY FIRST YEAR 2023-24

B/D DIVISION

LOCATION: **Pench, Maharashtra – Madhya Pradesh Border**

AIM OF THE SETTLEMENT STUDY

Objective - To gain an understanding of human settlement of Khamba, and Amazhiri villages

The aim of the visit to these settlements is to study architectural aspects of tribal houses with reference to climate responsive design.

Location - Near Pench National Park along the border of Maharashtra and Madhya Pradesh

Expected learning outcomes

CO 1 – Illustrate and Document tribal house form through measured drawings and models (Based on writings of Amos Rappoport)

CO 2 – Present strategies used to achieve thermal comfort by observing, clothing, Architectural form, openings and materials

CO 3 – Describe the setting and siting of the settlement through plan, sections and Model (Regional Scale).

CO 4 – Document cultural associations between people and places through semi structured interviews.

Student Tasks

Pre visit work

- Preparing plan of the settlement from Google image and drawing section through the landscape
- Preparing a list of local flora using herbarium formats
- Collecting information on Material Culture
- Collecting Climate related information – Sun Path Diagram, EPW file
- Measure draw a small structure as practice

On Site work

- Drawing profile sections through the streets in groups of three (2 for measuring, 1 for drawing on the grid pad)
- Measured drawing of selected houses (groups of 10)

- Semi-Structured interviews in groups of three (2 for interacting, 1 for recording and noting observations) – Questions about trees, festivals, food, rituals
- Measurement of RH, Surface temperature, Ambient temperature
- Collecting tree, shrub, climber samples, preliminary identification using google lens

Teacher Tasks (Common and Group based instruction)

Common Instructions

- Introduction to measuring buildings
- Technique for drawing section of existing building
- Introduction to idea of thermal comfort
- Contour and contour sections

Group based Tasks

- Group 1 - Contours and contour sections, Preparing Herbarium
- Group 2 - Thermal comfort (Hygrometer, Ambient temperature, Surface Temperature, Strategies – Roof, wall, window)
- Group 3 – Conducting interviews, preparing questionnaires, Collecting and presenting information on Material Culture
- Group 4 – Readings about tribal architecture

Tour Schedule

Total plan- 6 nights/7 days

Day 1: Travel to Pench, Site visit by Teachers to confirm study locations

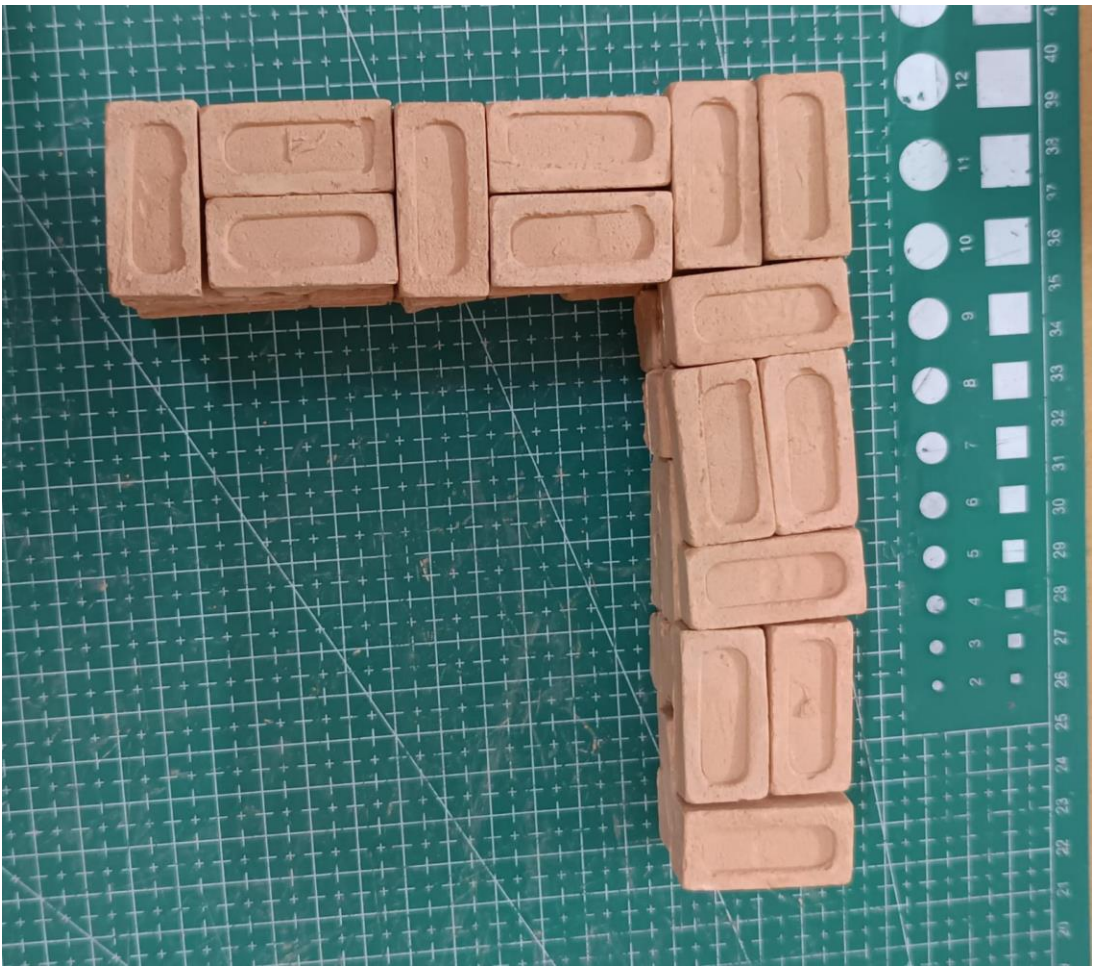**Day 2, 3, 4:** Working on site - 4 Locations to be identified
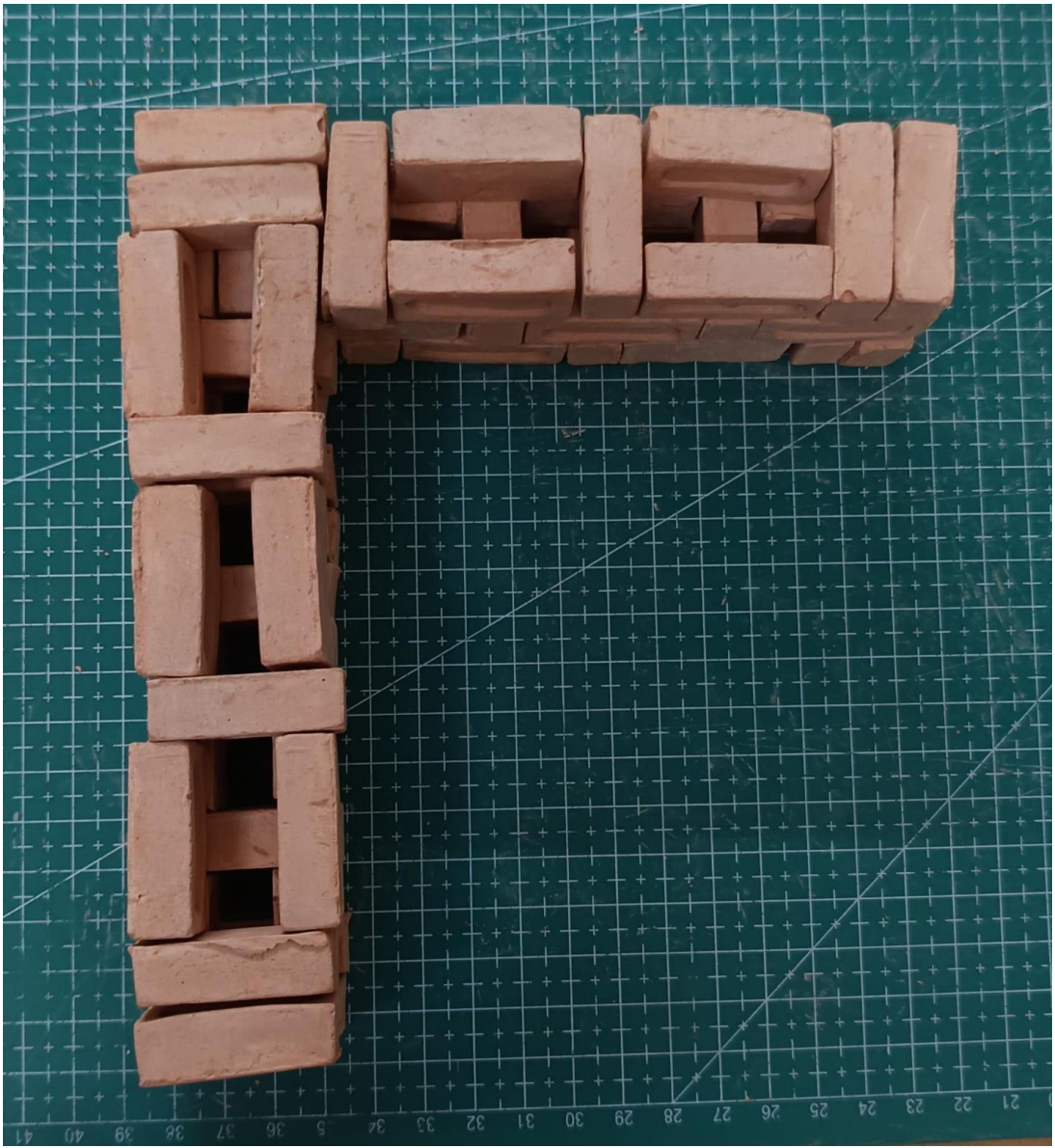
Day 5: Visit to Ramtek.

Day 6: Heritage walk in Nagpur
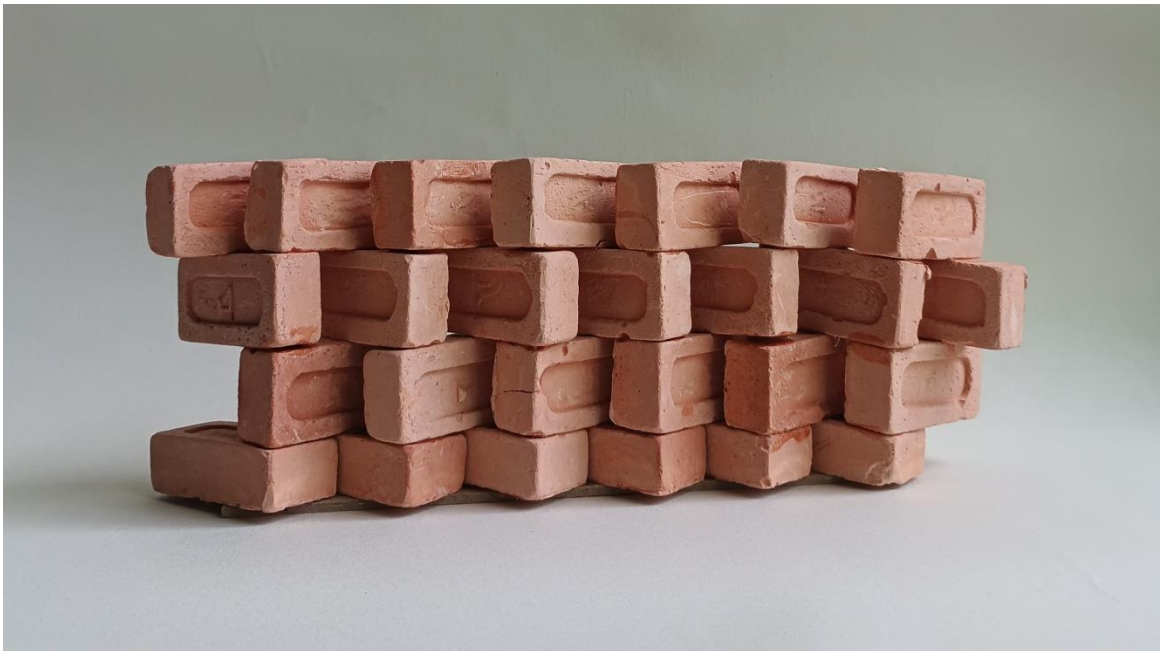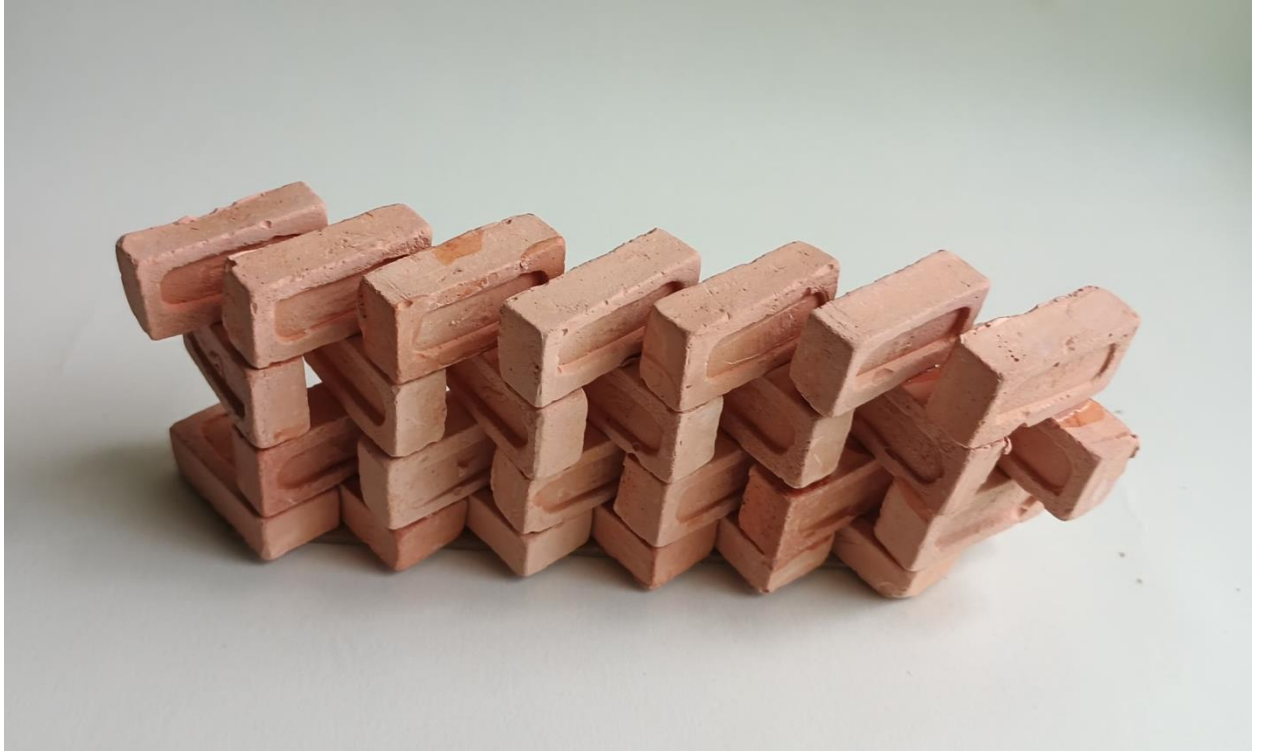
Day 7: Return to Pune

Building in Miniature
Scaled bricks developed for
BNCA students

Innovation in Teaching Continues……

Building with Bricks

Workshop conducted for First Year Students 2023-24
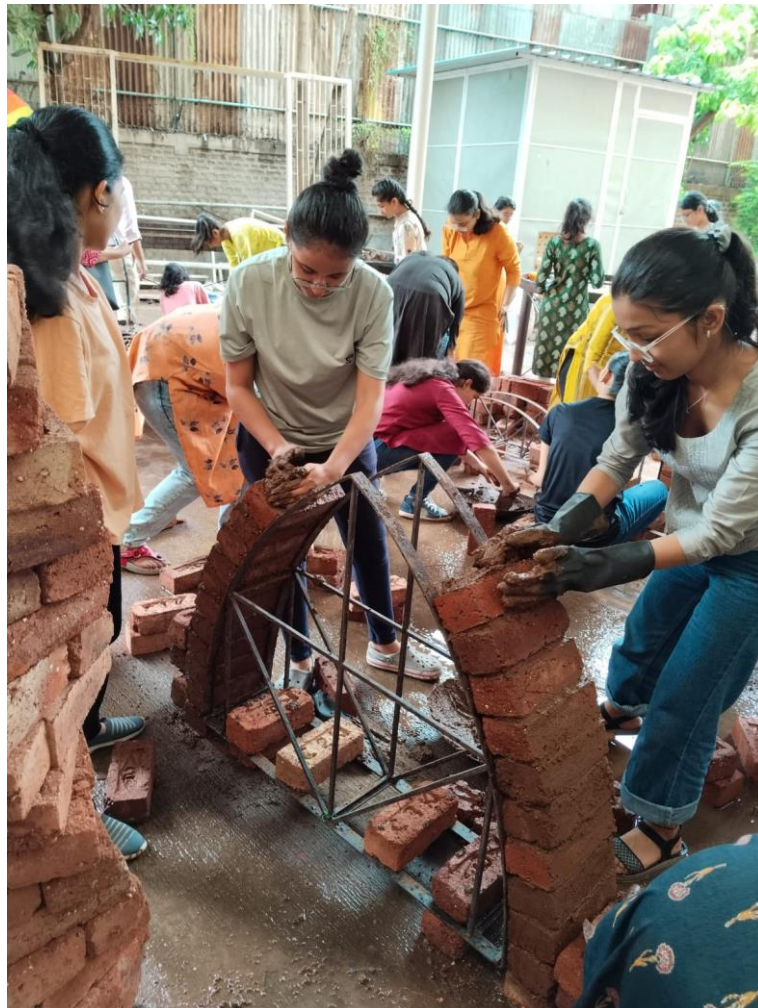
@bncaofficial

EXPERIENTIAL LEARNING THROUGH DESIGN AND BUILD

M.Arch DIGITAL ARCHITECTURE PROGRAM

The realm of Digital architecture focuses on innovative and nonstandard design pursued via various subjects in the curriculum of Master's in Digital architecture program. Parametric design thrives on experimentation, often push engineering boundaries towards design of unconventional forms/Nonstandard design

Unconventional forms /Non-standard design need specialized expertise to construct forms that deviate from standard practices. In the realm of non-standard parametric design, the institute promotes the culture of design and build of large-scale prototypes to augment experiential learning .This student centric approach of encouraging the design and build process is supported by funds from the department allocated in the annual budget of the institute.

Herein students use the fabrication lab and use the funds to realize a large scale prototype of their design ideas.This ecosystem of design and build is facilitated to realize the complexity, customization, and innovation that non-standard design demand. It ensures that the creative potential of parametric models translates into feasible, efficient structural solutions.

The institute has an established ecosystem in the form of the Digital Fabrication Lab that houses digital tools like 3d printers, Laser cutters, CNC millers, and a KUKA KR 30-3 Robotic arm. Students often make tabletop study model before they take up the design and build exercise

This part of experiential learning via the design and build initiative guarantees that the envisioned design can be fabricated and constructed without losing its integrity as sought in the computational medium and help students learn the technological deviation needed from standard fabrication practices.

Large-scale prototypes in parametric design education transform abstract digital concepts into concrete experiences, equipping students with practical skills, critical thinking abilities, and a deeper understanding of the interplay between design, materiality, and fabrication. They foster creativity, innovation, and readiness for real-world challenges

The institute is committed to continue this activity where the institute immersive mediums digital fabrication facility and other resources are used to its fullest. Though resource-intensive, this activity fosters deeper hands-on learning about construction challenges. Involves hands-on experience with actual construction techniques, tools, and equipment. Provides practical knowledge of tolerances, alignment issues, and challenges like weather, human error, or site constraints

Since most of the design that are built in these exercises are designed through computational mediums the students also understand the impact of small errors in digital models on real-world fabrication and assembly while building them. The use of digital fabrication processes requires attention to micro-level details, such as precise connections, material finishes, and joint mechanics, which otherwise cannot be taught via theoretical lessons.

In the case of robotic fabrication, it is employed for its ability to augment human craft and dexterity and offers precision and efficiency, its use requires overcoming significant technical, material, and operational challenges.

Students learn the following while using the robotic fabrication for the design and build exercises

- Translating Digital Design to Robotic Workflow: - File-to-Machine Compatibility, Software Integration
- Precision and Tolerances of every tool and end-effector limitations: - Robotic arms have to be precisely calibrated for position, orientation, and tool alignment. Even minor misalignments can result in errors in fabrication.
- Cumulative Tolerances: In multi-step processes, small errors in one step can compound in subsequent steps, especially for large or intricate designs.
- Tool-Material Interaction
- Real-Time Feedback and Adaptation:-Robots often lack the ability to autonomously detect and correct errors during fabrication, requiring additional sensors or human supervision.
- Error Detection and Dynamic Adaptation: Adjusting to real-time variables, such as material deformation or tool wear and tear.

Addressing these issues involves a combination of technological advancements, skilled personnel, and iterative problem-solving to ensure that the promise of robotic fabrication aligns with the complexities of non-standard, parametric design

As an activity engaged every year the department has seen students engaging in team work and that encourages skills in communication, negotiation, and resolving conflicts in a practical context. Contributing to experience that mimic real-world construction processes.

Case 1:- Ay2022_2023

This year the students explored the robotic Jenga via pick and place After explorations of the initial ideas, the students learned how a modular wooden assembly stabilizes with overlap in a non stand form of a curvilinear wall. This exercise involved the building of a computational models via grasshopper script that responded to feedback from table top analogue models of wooden assemblies to understand tolerances and overlap for module stability.

the design was then taken to the design and build premise that involved two stages ie preliminary assembly through pick and place and Global assembly and stacking via MR HoloLens

First stage assembly:_

The blocks were stacked using the Kuka Robotic Arm. This layers were nailed to create individual segments. There are 3 segments in 1 row and 14 such rows achieving a height of 2.1m.
The gripper for the pick and place action was created in house. Grasshopper definitions were generated. Simulations were run to determine the source and placement in accordance with the reach of the Robotic Arm.

Students interacting with the KUKA pick and place and physically nailing the layers

Students interacting with the KUKA pick and place and physically nailing the layers

Second stage assembly:-

Once the 42 segments were fabricated, they were assembled together. A model was generated in mixed reality on site at 1:1 scale. This was created using the Fologram app and visualised through the Microsoft Hololens Headset.

This arrangement marked the exact positions of the 42 segments in 3d helping to align the position and the angles of the segments.

Students physically stacking the assembly with the help of Microsoft hololens

Students physically stacking the assembly with the help of Microsoft hololens

AY 2023_2024 :- L system non seriality

The students designed a dynamic branching structure using L-system algorithms, merging computational design with cutting-edge fabrication techniques. The project showcases the potential of robotic fabrication in architecture, pushing the boundaries of what's possible in both form and function.

They employed a KUKA robot for drilling holes at custom angles, achieving precise, accurate cuts for each wooden component. The wooden pieces were manually cut, with profiles derived by unrolling the member surfaces in Rhino to create the exact cut shapes needed for assembly.

To ensure flawless assembly, they used Microsoft HoloLens to overlay the digital model onto the physical structure, allowing them to make real-time adjustments and align the pieces with precision. This seamless integration of robotics and augmented reality highlighted the immense possibilities of combining technology with craftsmanship to create innovative architectural designs.

*Students engaging in the **L system non seriality***

2024_2025 :-Mobius geometry

For this design and build the students designed a Möbius strip that needed precision metal bending and welding techniques to be employed to realize it. This unique design, with its continuous loop and single twist, was to serve as both a functional structure and a work of art.

What sets this project apart is the innovative use of Microsoft HoloLens for assembly. By projecting the virtual model directly into the physical space, the studentscwere able to align the real-world components with the digital design in real time, ensuring flawless precision. This blend of traditional metalworking and cutting-edge augmented reality technology allowed us to create a seamless, accurate assembly process.
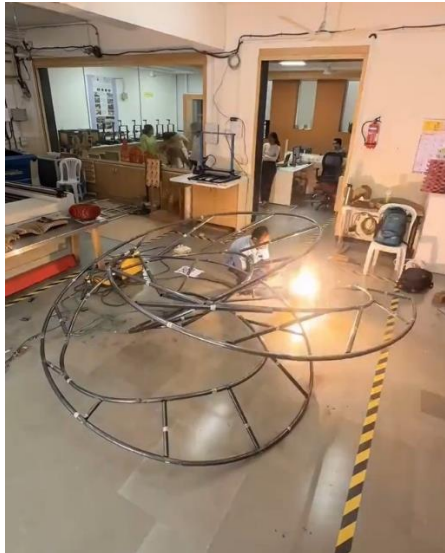
The result is a stunning Möbius strip that not only demonstrates the skill of metal fabrication but also highlights the potential of immersive technology to enhance the design and construction process.

This project demanded the use of a metal bending mchine and eternal agency students worked at the external workshop to shape their metal pipes

Using the MR for checking the precision and welding the complex assembly

The complex assembly