

Ministry of Education and Science of Ukraine
National University of Water and Environmental Engineering
Department of Architectural Design Bases, Construction and Graphics

03-07-94M

METHODICAL GUIDELINES
and tasks to a practical training and independent work
IN THE DISCIPLINE
«DESCRIPTIVE GEOMETRY»
PART 4. PROSPECT
for higher education students of the first (bachelor) level
in the field of study 191 «Architecture and Urban planning»
of full-time education form

МЕТОДИЧНІ ВКАЗІВКИ
та завдання до практичних занять і самостійної роботи
З НАВЧАЛЬНОЇ ДИСЦИПЛІНИ
«НАРИСНА ГЕОМЕТРІЯ»
ЧАСТИНА 4. ПЕРСПЕКТИВА
для здобувачів вищої освіти першого (бакалаврського) рівня
за спеціальністю 191 «Архітектура та містобудування»
денної форми навчання

Recommended
by the scientific and methodical
quality council of ERICEA
Protocol № 8 18.04.2023

Rivne – 2023

Methodical guidelines and tasks to a practical training and independent work in the discipline «Descriptive Geometry» for higher education students of the first (bachelor) level in the field of study 191 «Architecture and Urban planning» of full-time education form. Part 4. Prospect [Electronic publishing] / Pugachov E. V., Litnitskyi S. I., Kundrat T. M. – Rivne: NUWEE, 2023. – 34 p.

Developers:

Pugachov E. V., Doctor of Technical Sciences, Professor,
Litnitskyi S. I., Ph.D., Associate Professor,
Kundrat T. M., Ph.D., Associate Professor
of the Department of Architectural Design Bases, Construction and Graphics.

Head of the Department: Romashko V. M., Doctor of Technical Sciences, Professor

Head of the support group
in the field of study 191
«Architecture and Urban planning»

Doctor of Architecture,
Professor, Myhailyshyn O. L.

CONTENTS

INTRODUCTION	3
1. QUESTIONS FOR INDEPENDENT TRAINING.....	3
2. PROSPECT CONSTRUCTION OF PARALLELEPIPEDS COMPOSITION	4
3. PROSPECT CONSTRUCTION OF BUILDING.....	33
4. LITERATURE	34

© E. V. Pugachov, S. I. Litnitskyi,
T. M. Kundrat, 2023
© NUWEE, 2023

INTRODUCTION

Methodical guidelines and tasks to a practical training and independent work are developed according to the syllabus of the course for higher education students of the first (bachelor) level in the field of study 191 “Architecture and Urban planning” of full-time education form.

The purpose of a practical training is fixing of theoretical knowledge, acquisition of skills of creation of prospect in a vertical picture and also development of spatial imagination by correlation of orthogonal projections of geometrical objects and their perspective images.

Methodical guidelines contain questions for independent preparation, two exercises (on 27 tasks), short methodical recommendations about their performance and the list of references. The first exercise is creation of prospect and shadows of composition from parallelepipeds. This exercise has propaedeutic character. The second exercise is the confidant to real architectural objects.

Tasks are performed by a pencil in A3 format. The constructed prospects are distinguished with the reinforced line a soft pencil. Auxiliary constructions are shown with a thin line with a firm pencil. Shadows are represented by dot graphics. The results of the completed tasks are used to monitor current progress and admission to examinations.

1. QUESTIONS FOR INDEPENDENT TRAINING

1. For what purpose build prospects of architectural objects?
2. Name the elements of the perspective apparatus.
3. Explain the term "descent point" or "focal point". What straight lines have no focal points?
4. Where focal points of the straight lines perpendicular to a picture, the horizontal, horizontal and located at an angle 45° to a picture, secondary projections of straight lines of any situation are?
5. What lines in perspective are depicted in natural size?
6. Explain the terms "radial straight line" and "radial plane".
7. How the prospect of a point is set?
8. What are the restrictions on the choice of point of view?
9. How the main beam and the picture plane are set?

10. Explain terms "frontal" and "angular prospect".

11. What methods of creation of prospect do you know? Call the fields of their application.

12. How to divide into proportional parts the perspective of segments: parallel to the picture, horizontal, general position?

13. Explain cases when prospect of a circle is the ellipse, a parabola and a hyperbole.

14. How to divide the perspective of a circle into proportional parts?

Literature: 1 (pp. 154-170), 2 (pp. 164-209), 3 (pp. 205-262), 4 (pp. 120-156), 5 (pp. 217-300), 6 (pp. 245-270, 278-294), 7 (pp. 188-246).

2. PROSPECT CONSTRUCTION OF PARALLELEPIPEDS COMPOSITION

Task: on orthogonal projections to construct angular prospect and shadows of composition of parallelepipeds (Fig. 1). Tasks are given on the pages 5-31. The task is chosen by number of a surname of the student in the list of the academic group.

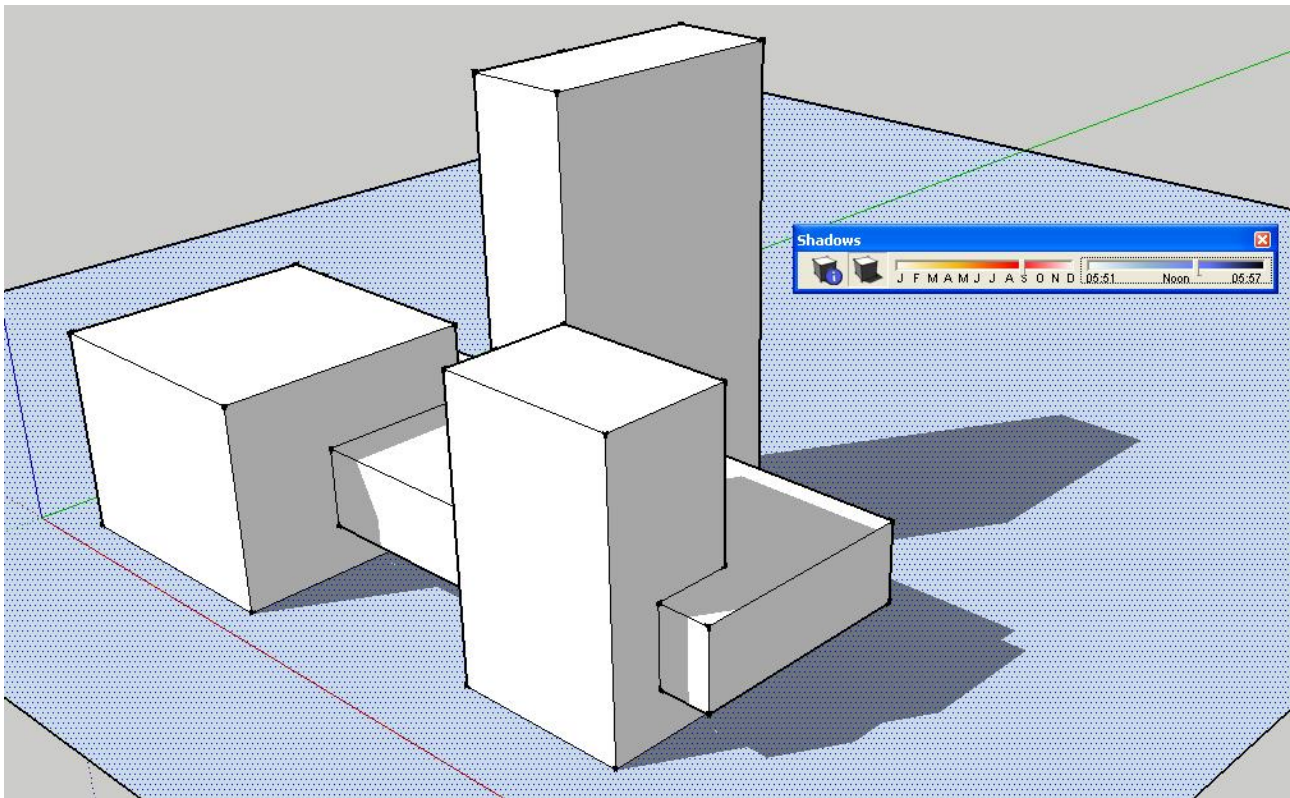
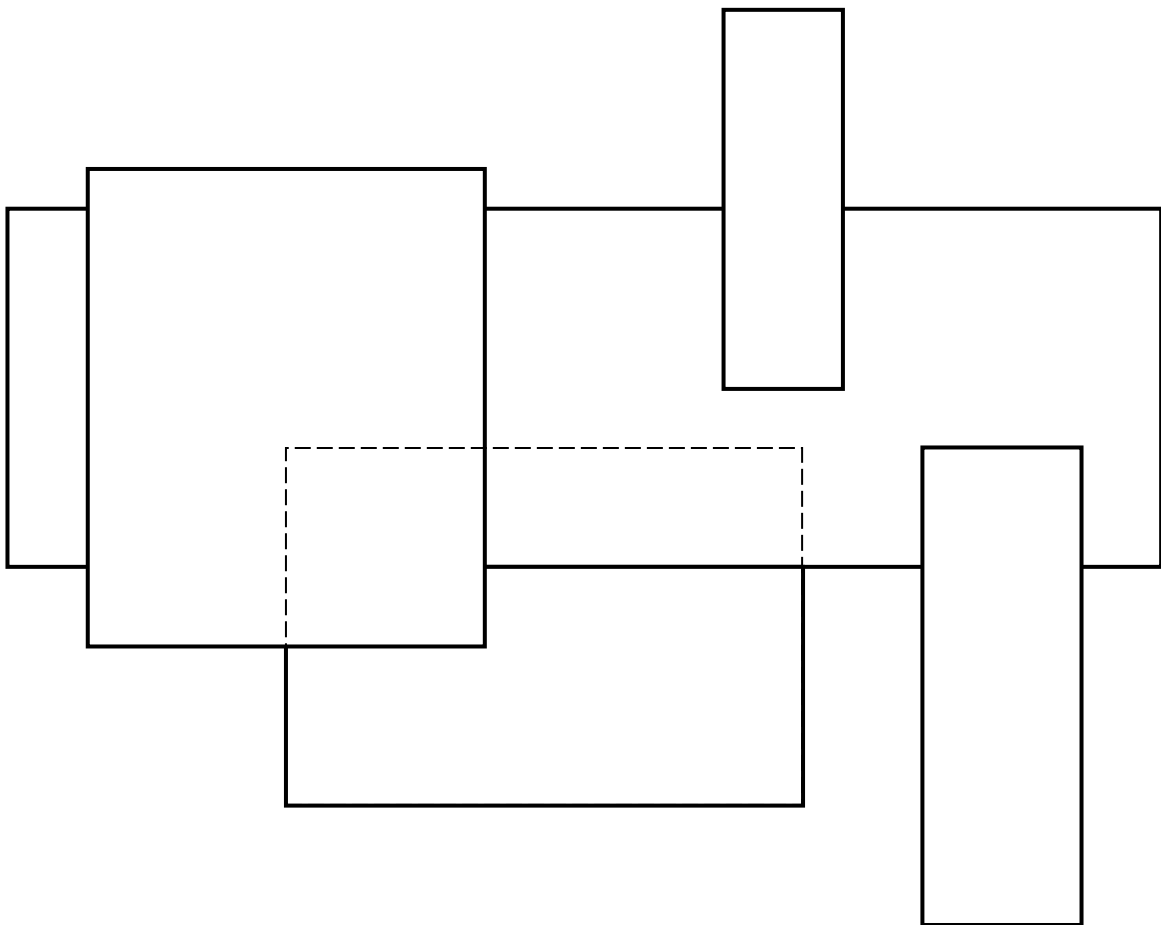
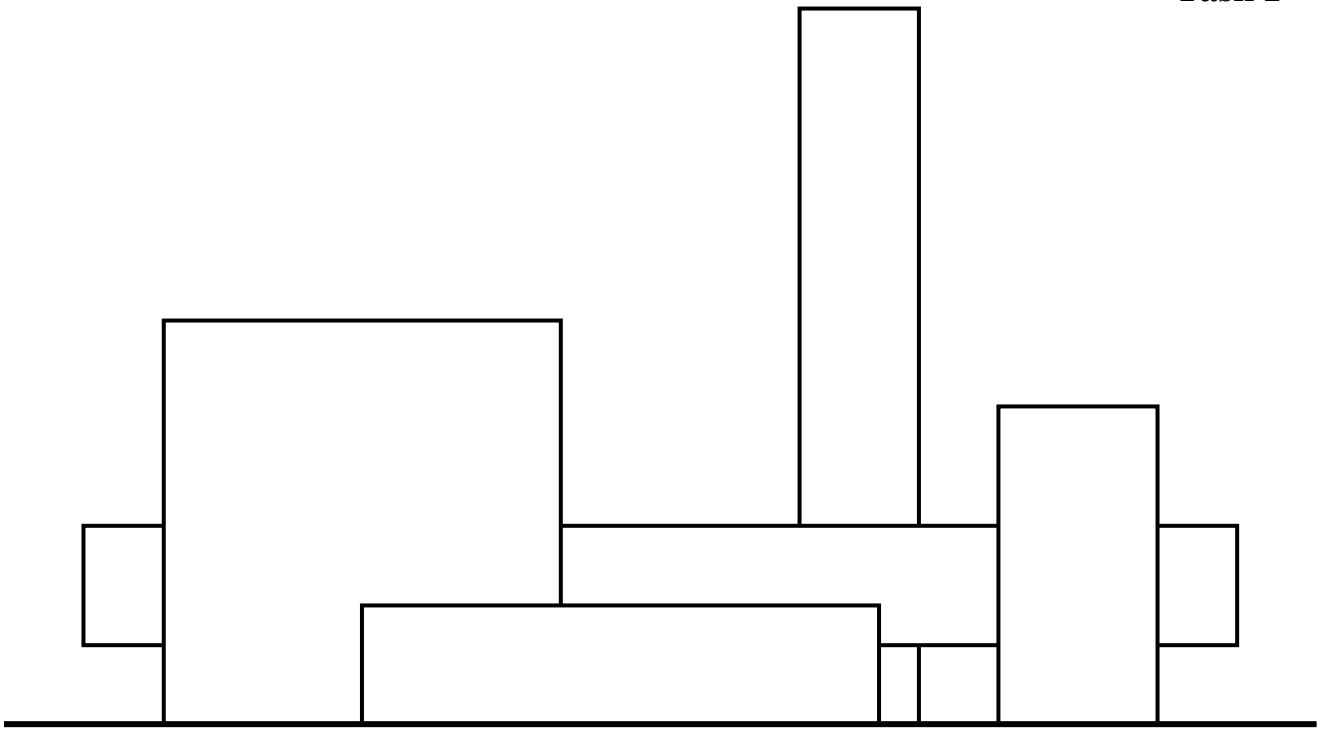
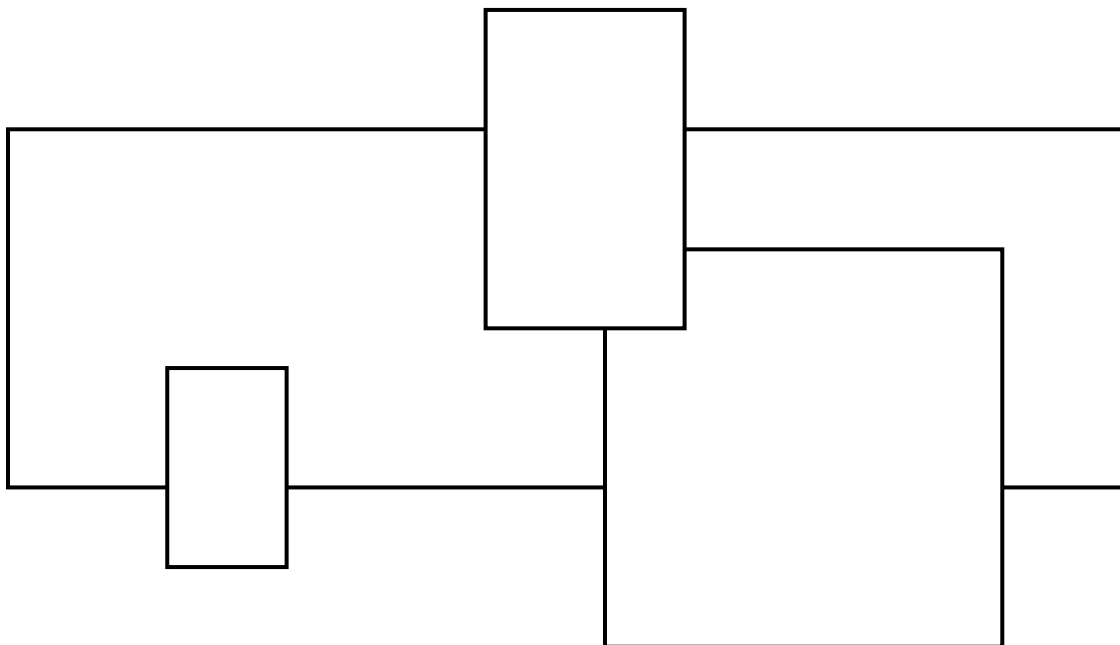
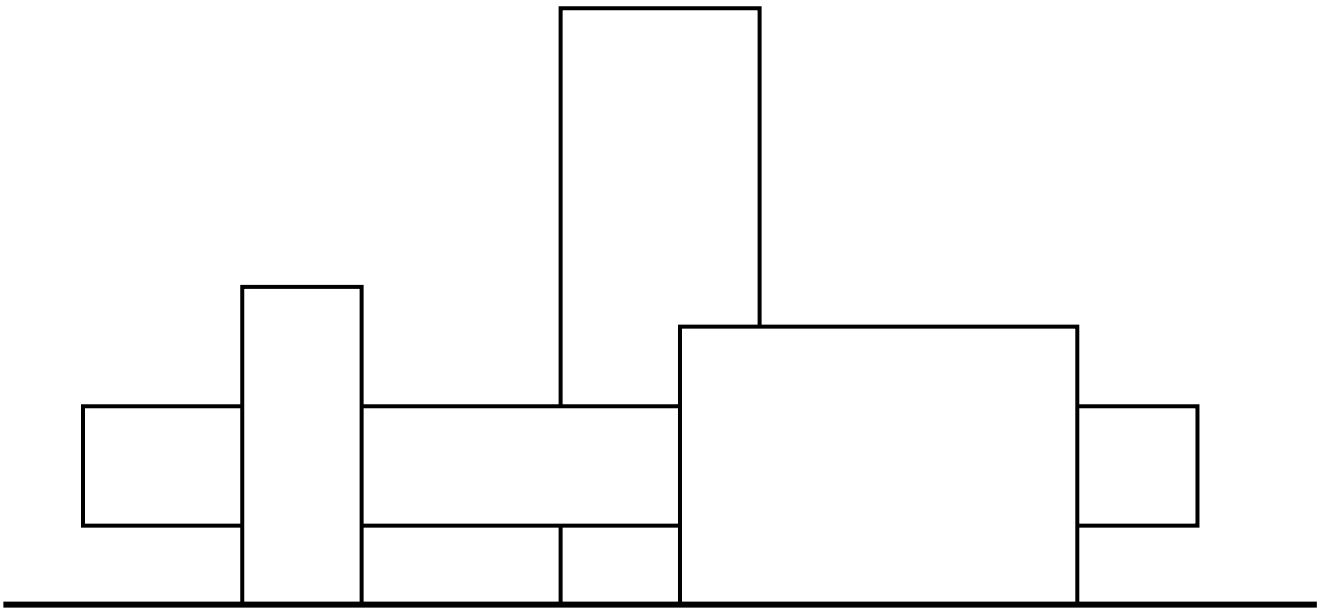


Fig. 1. Prospect of parallelepipeds composition and shadow construction

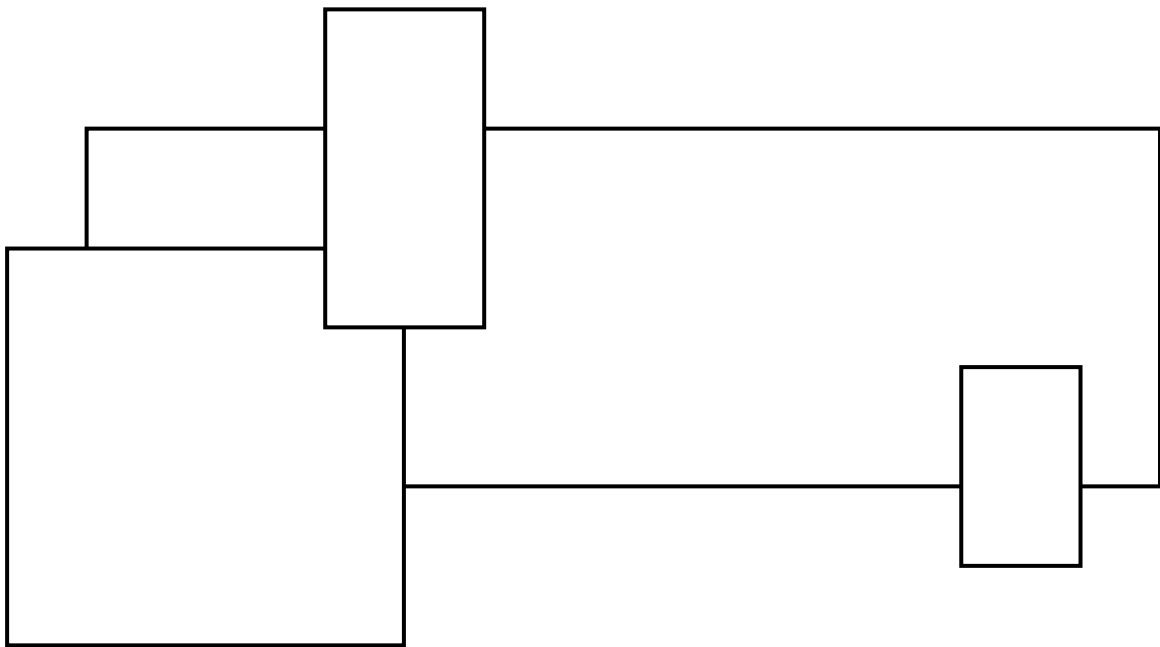
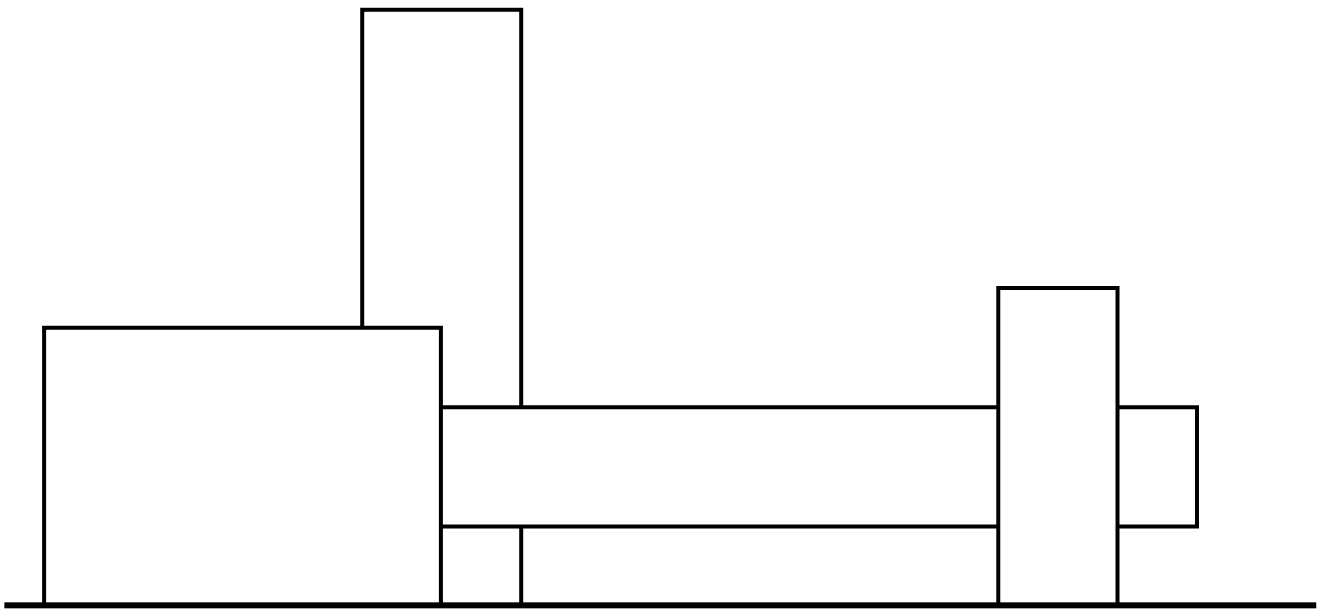
Task 1



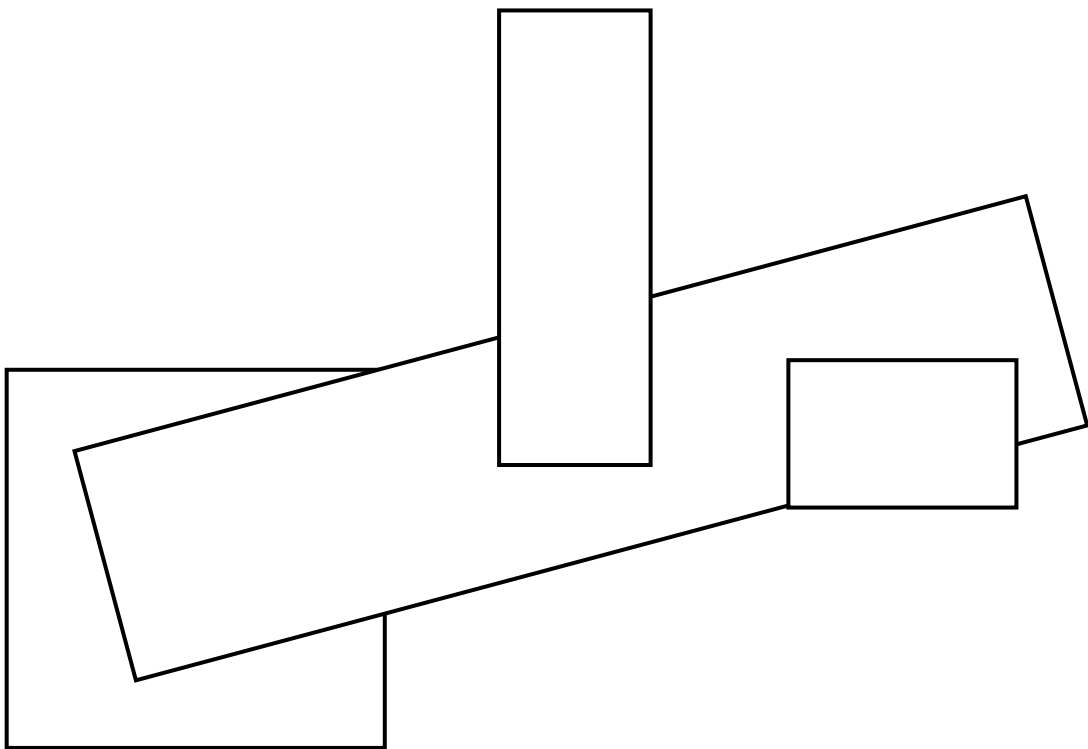
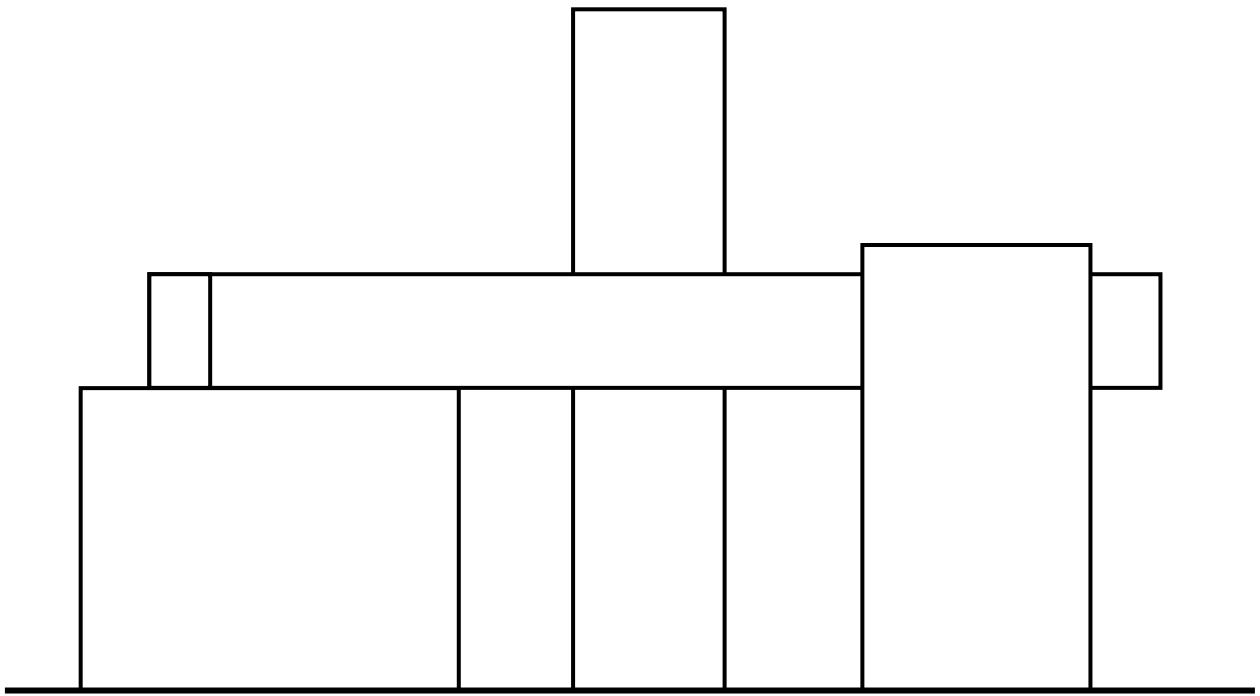
Task 2



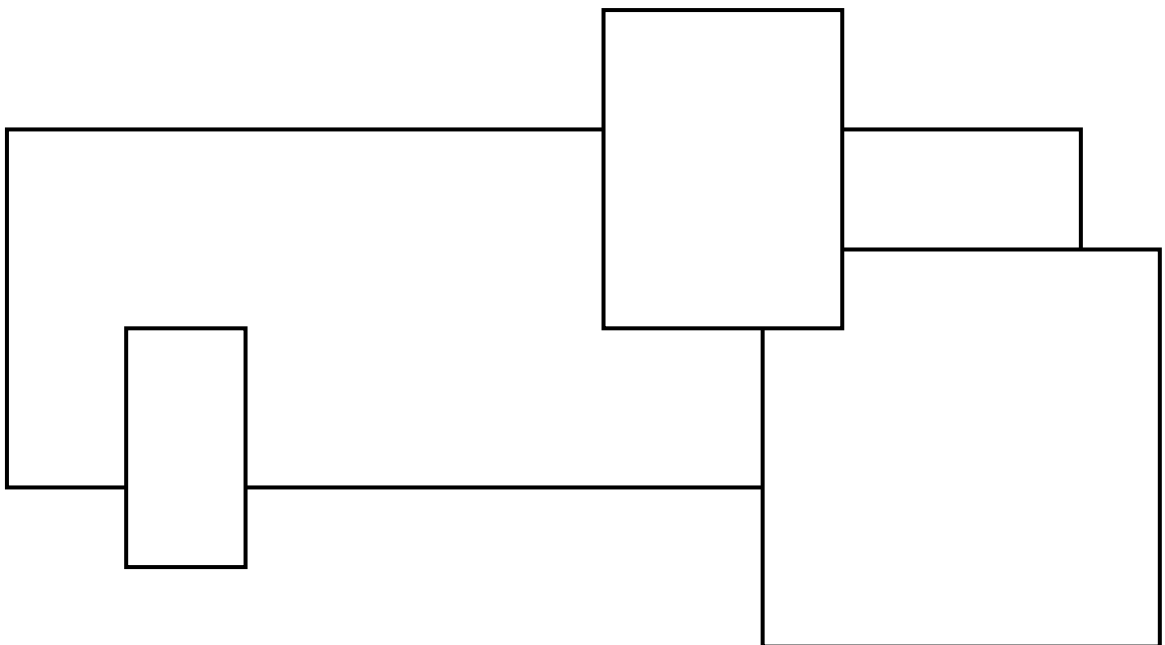
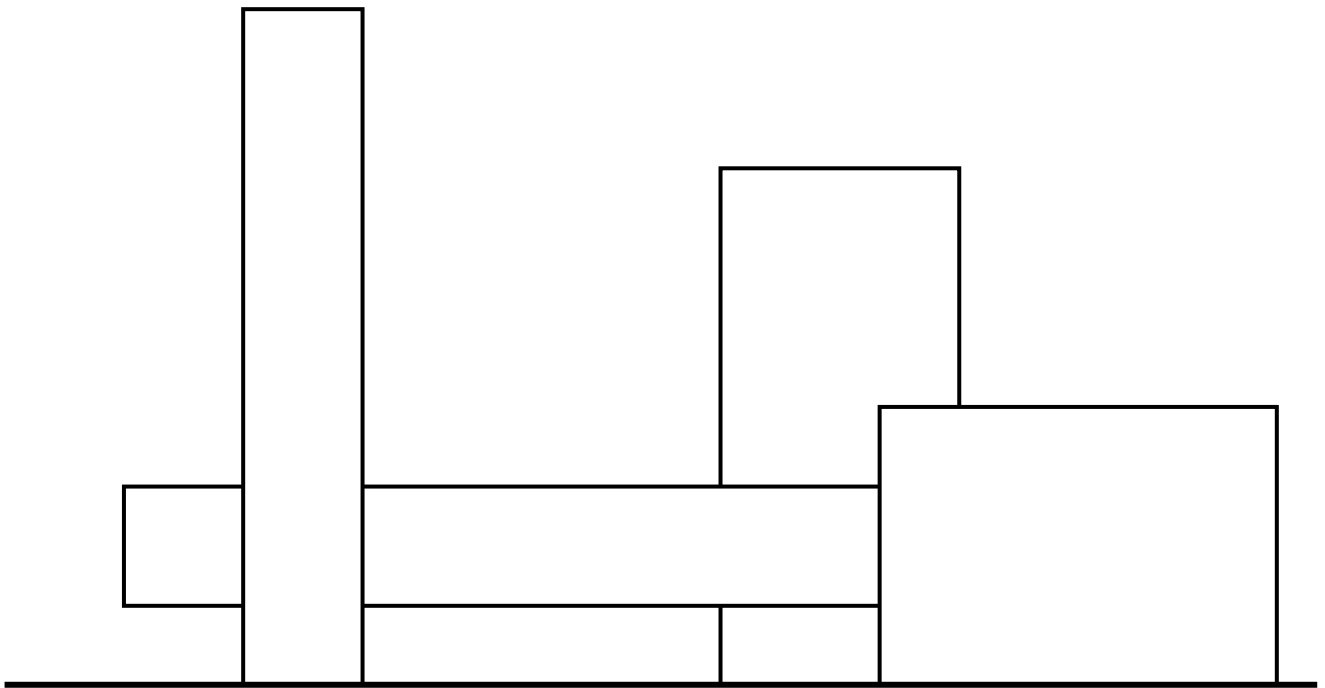
Task 3



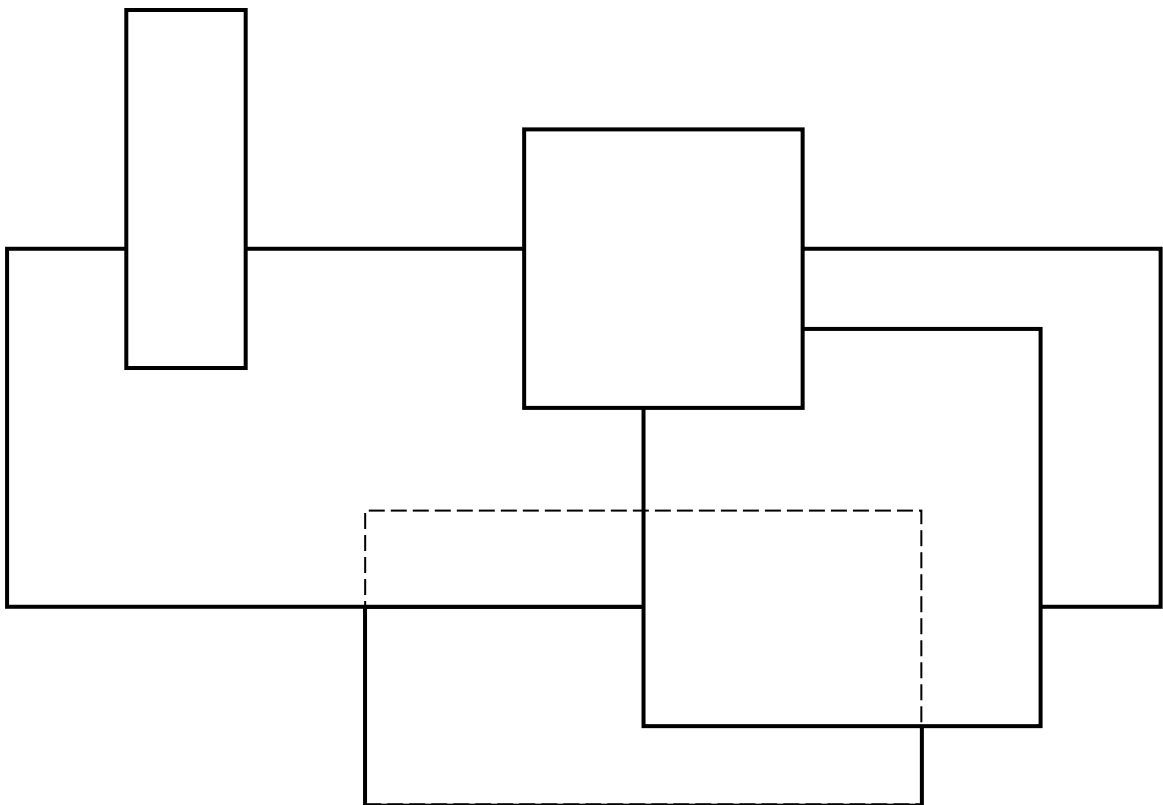
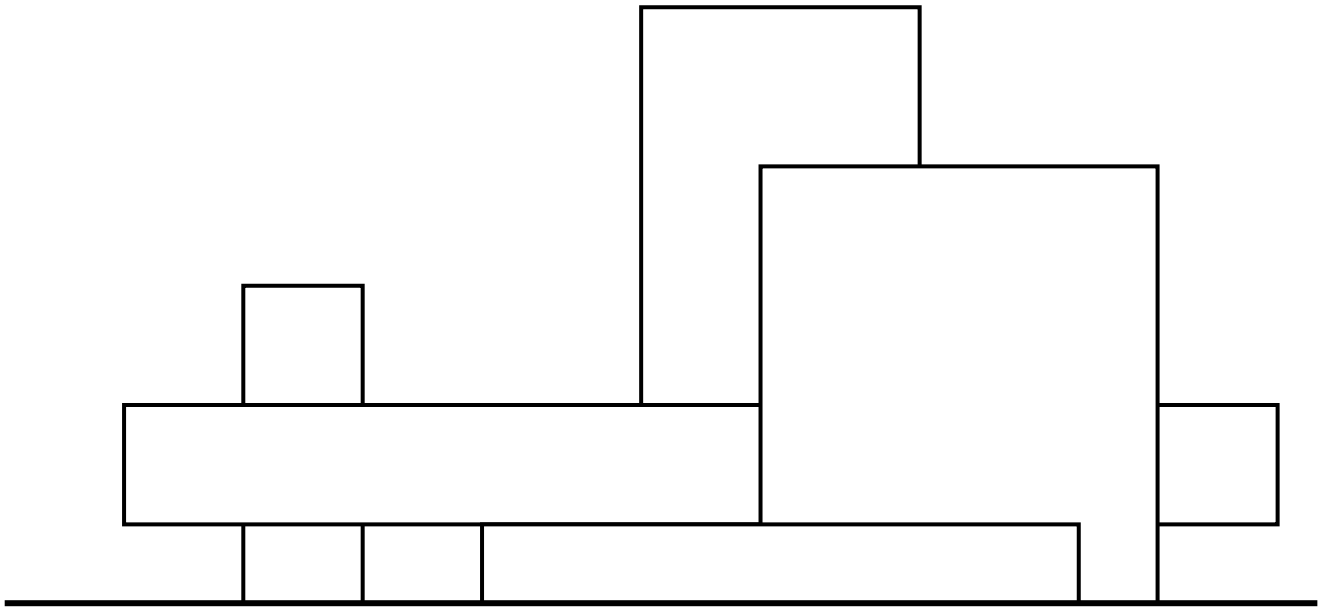
Task 4



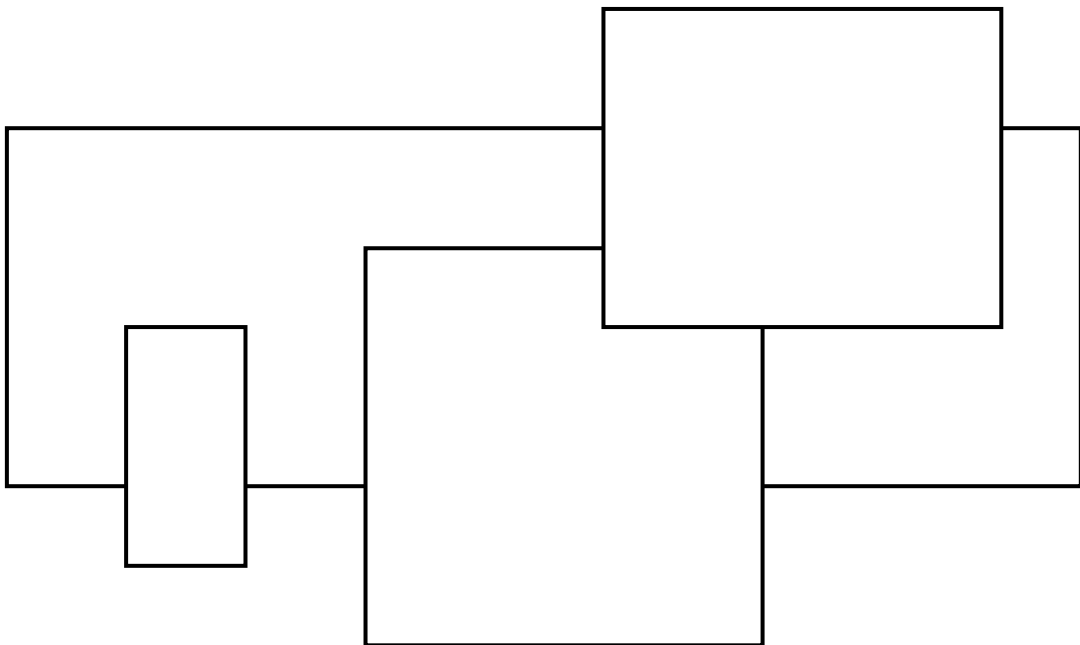
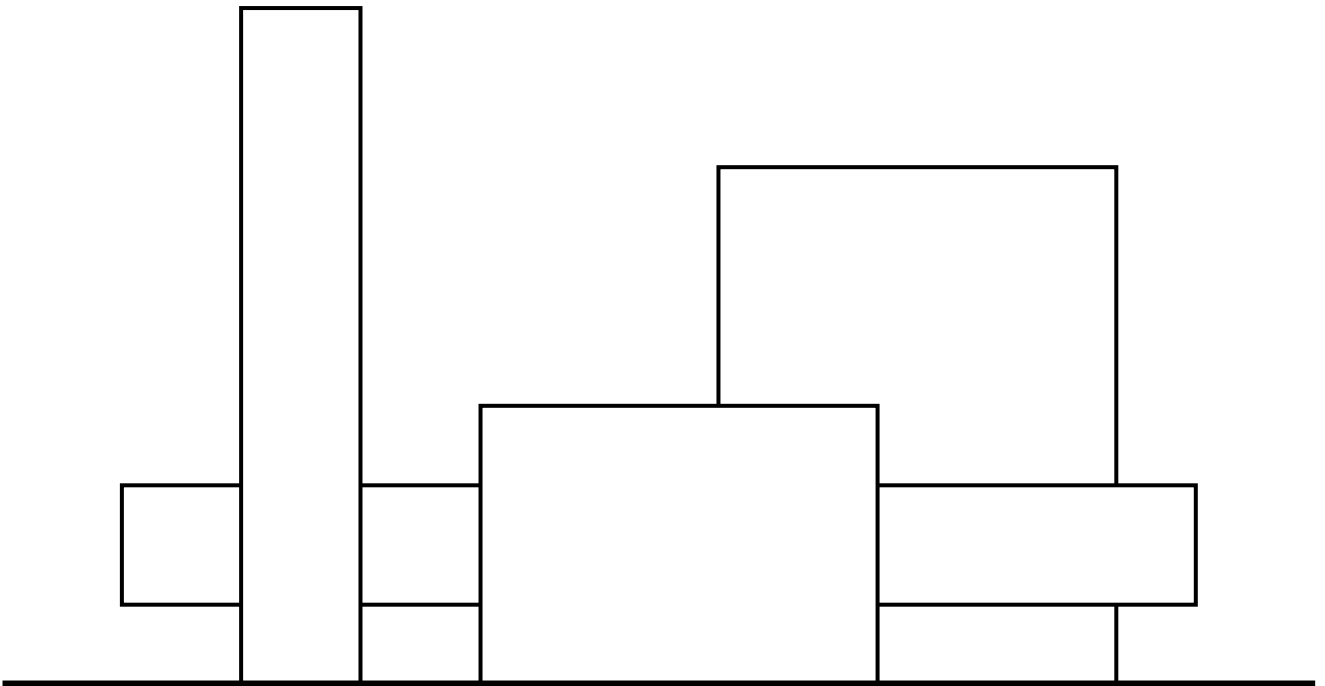
Task 5



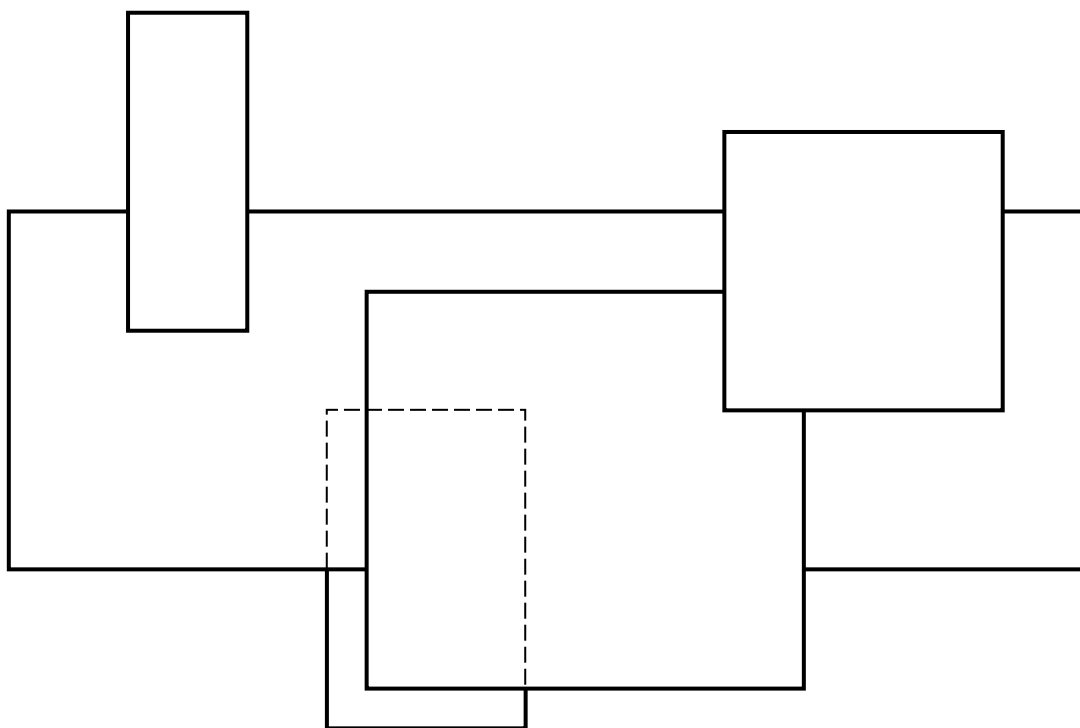
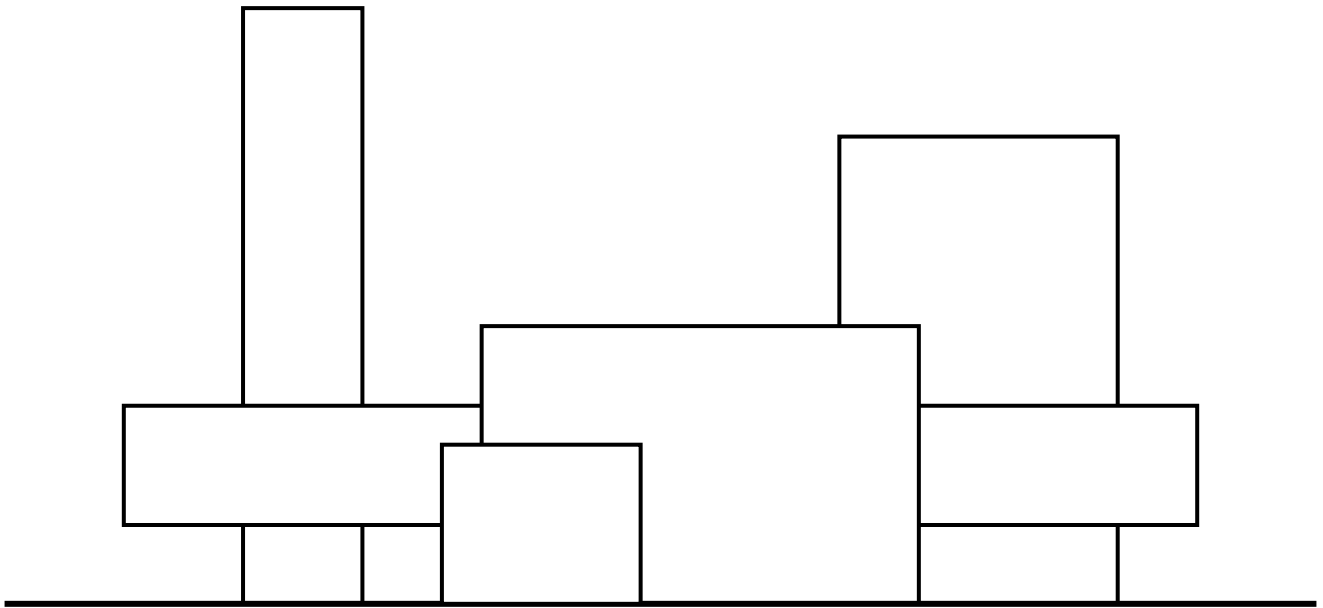
Task 6



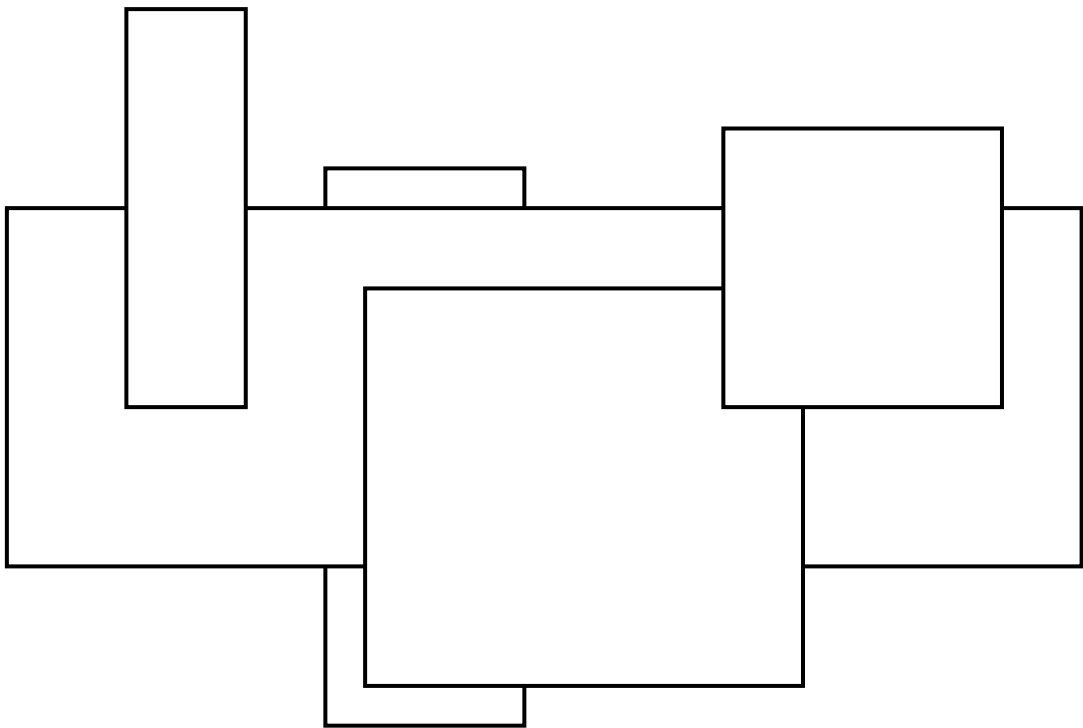
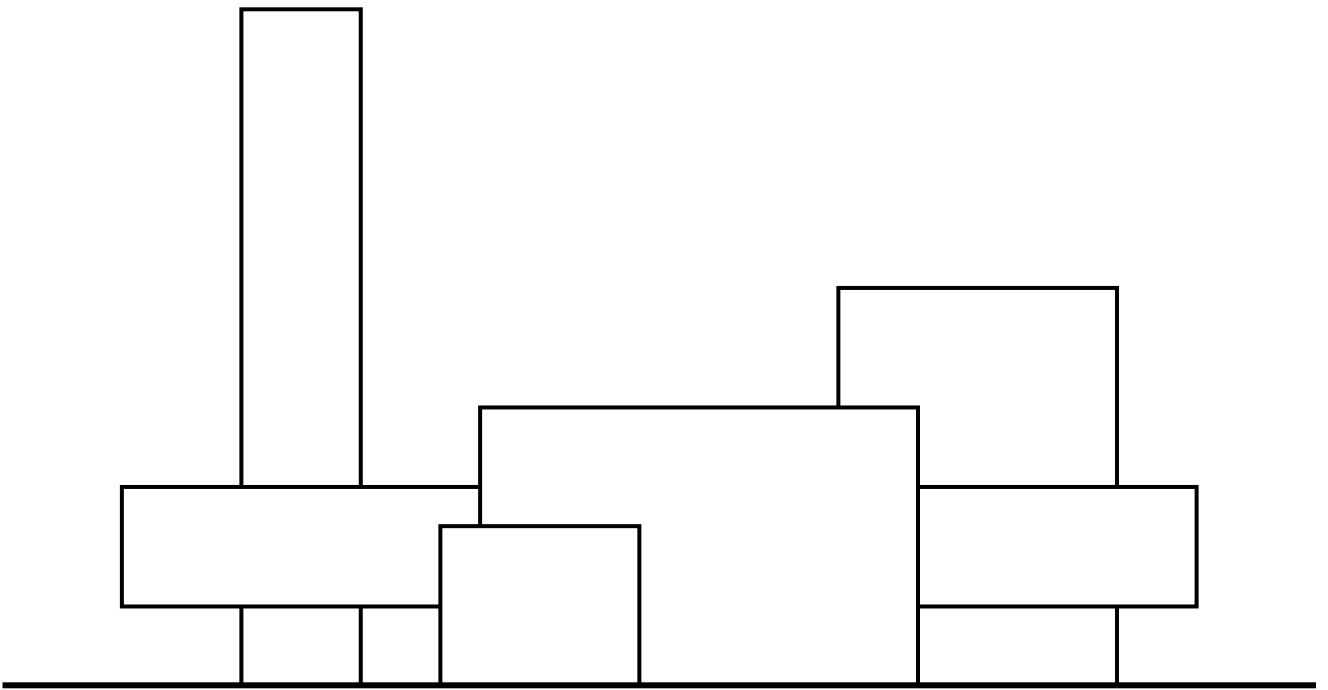
Task 7



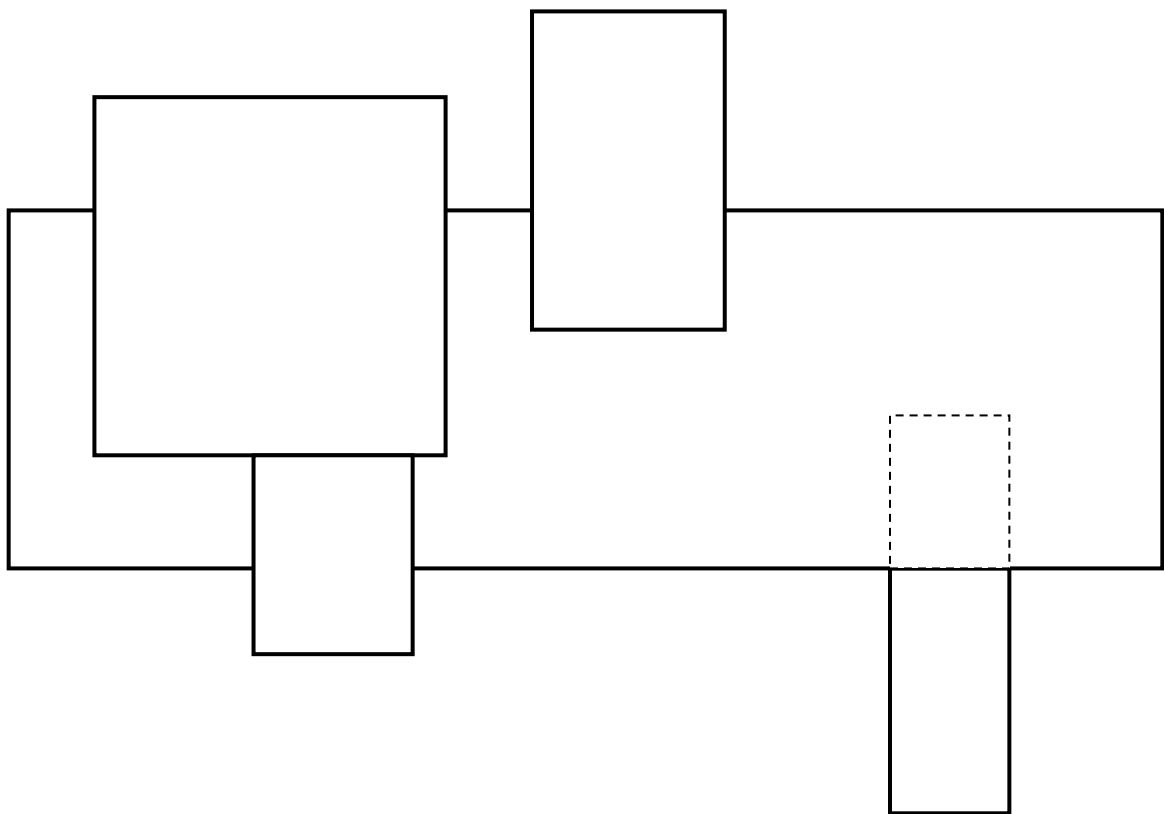
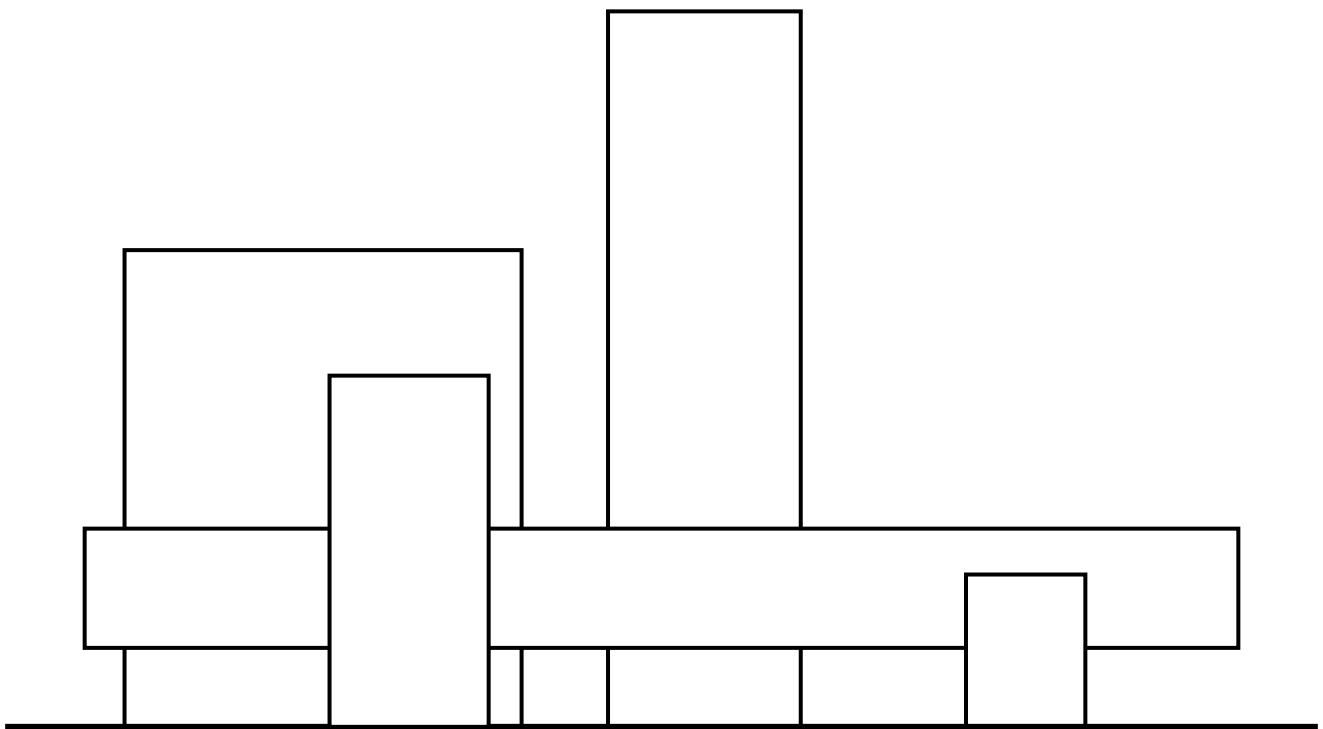
Task 8



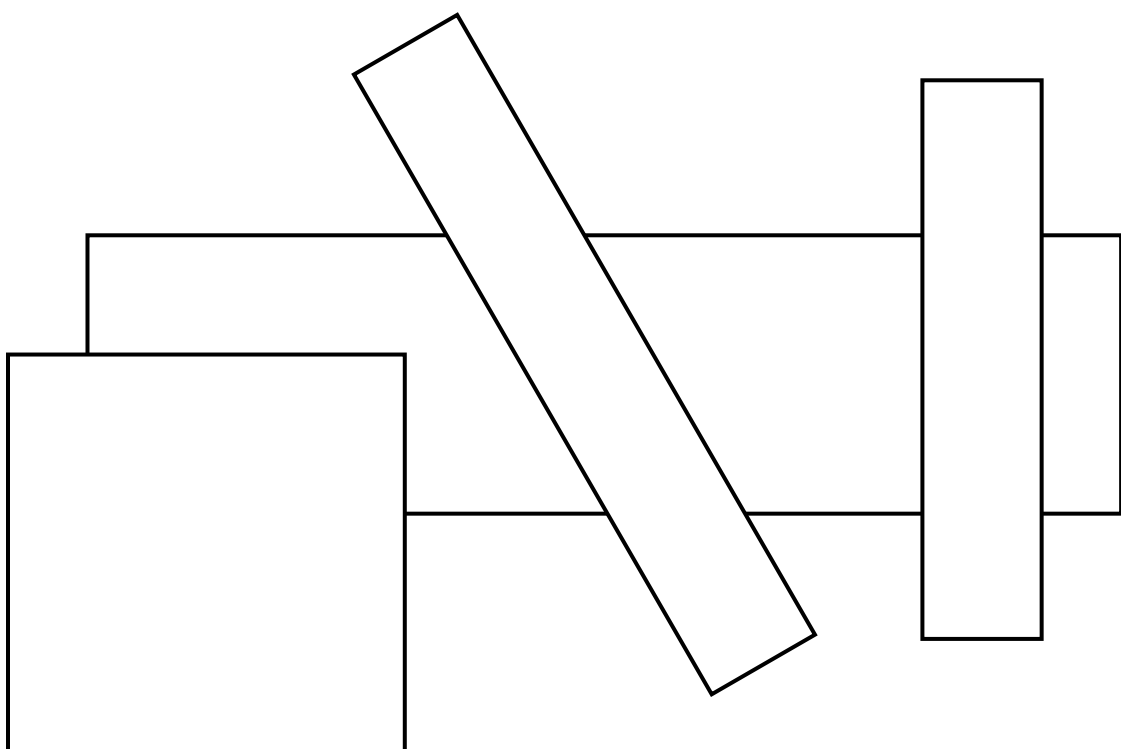
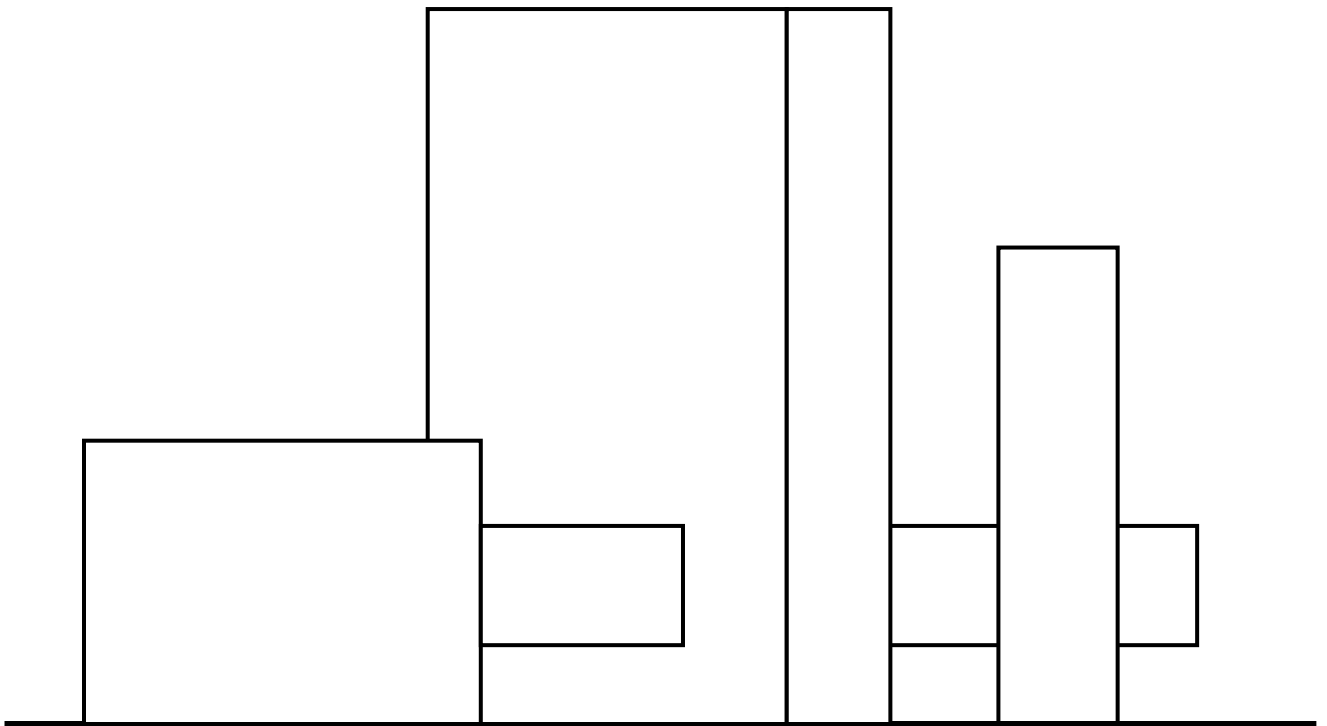
Task 9



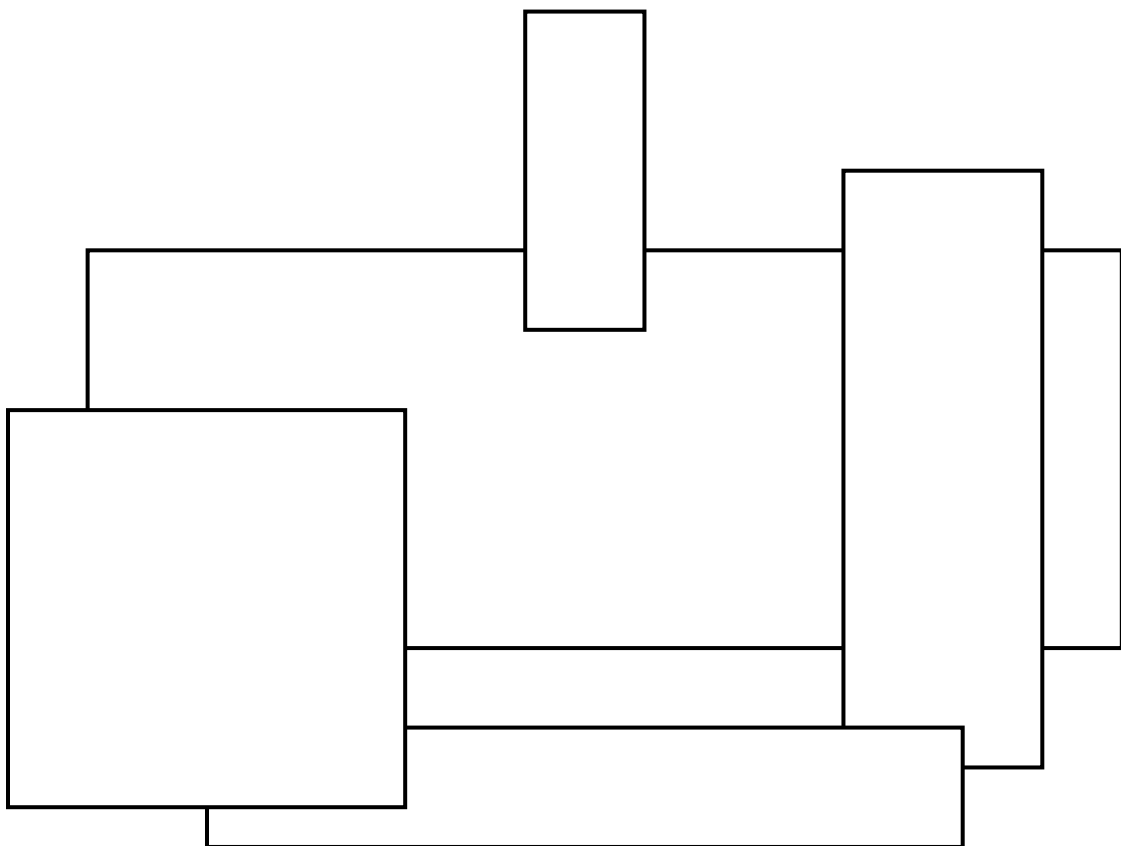
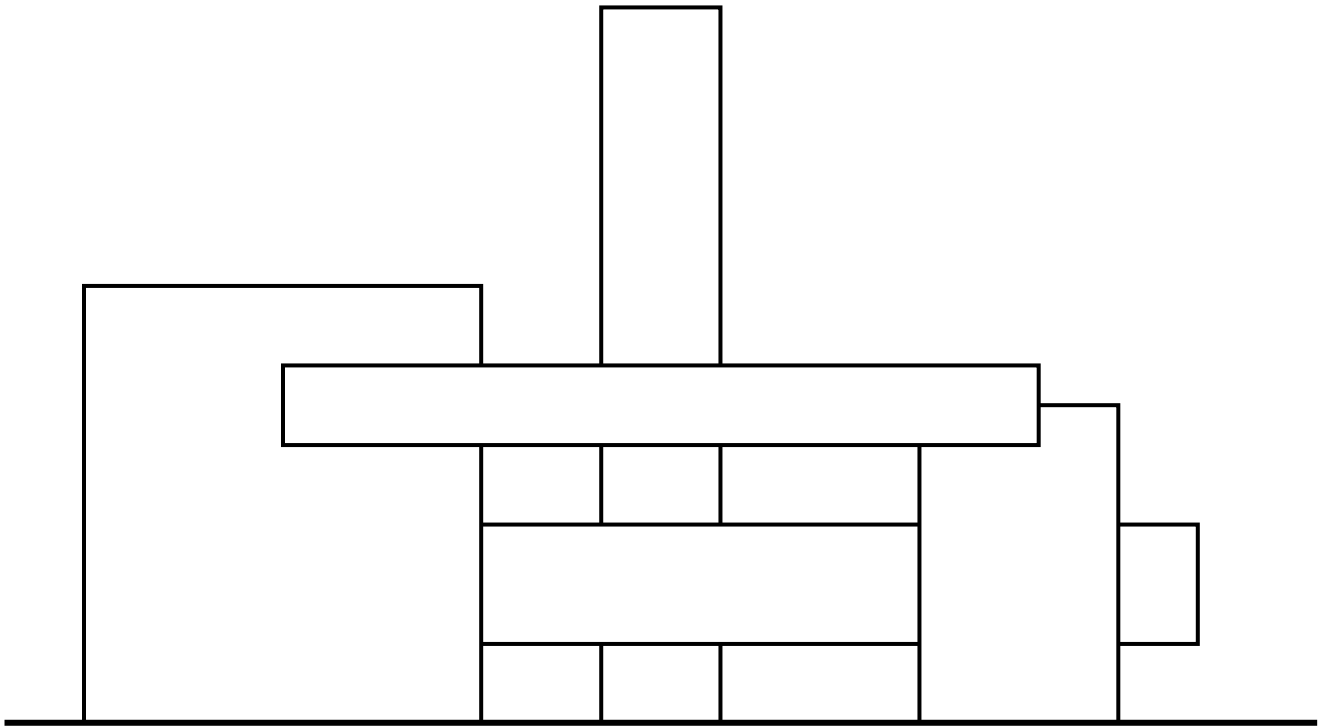
Task 10



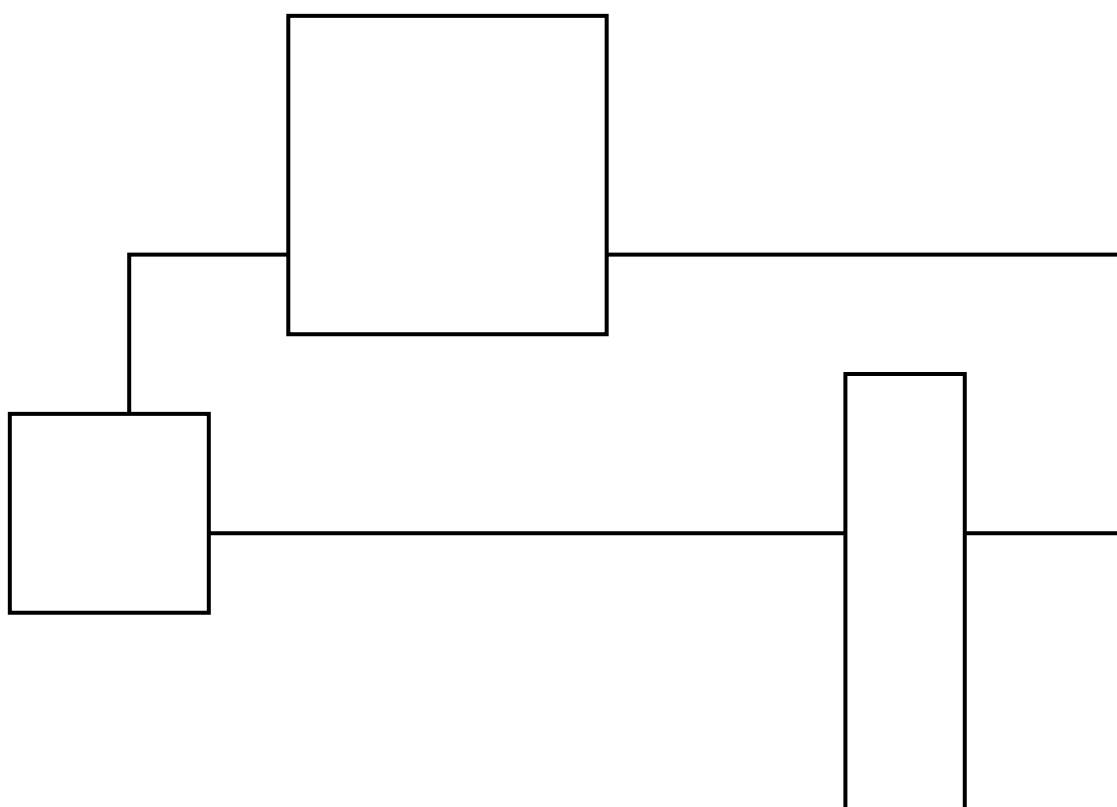
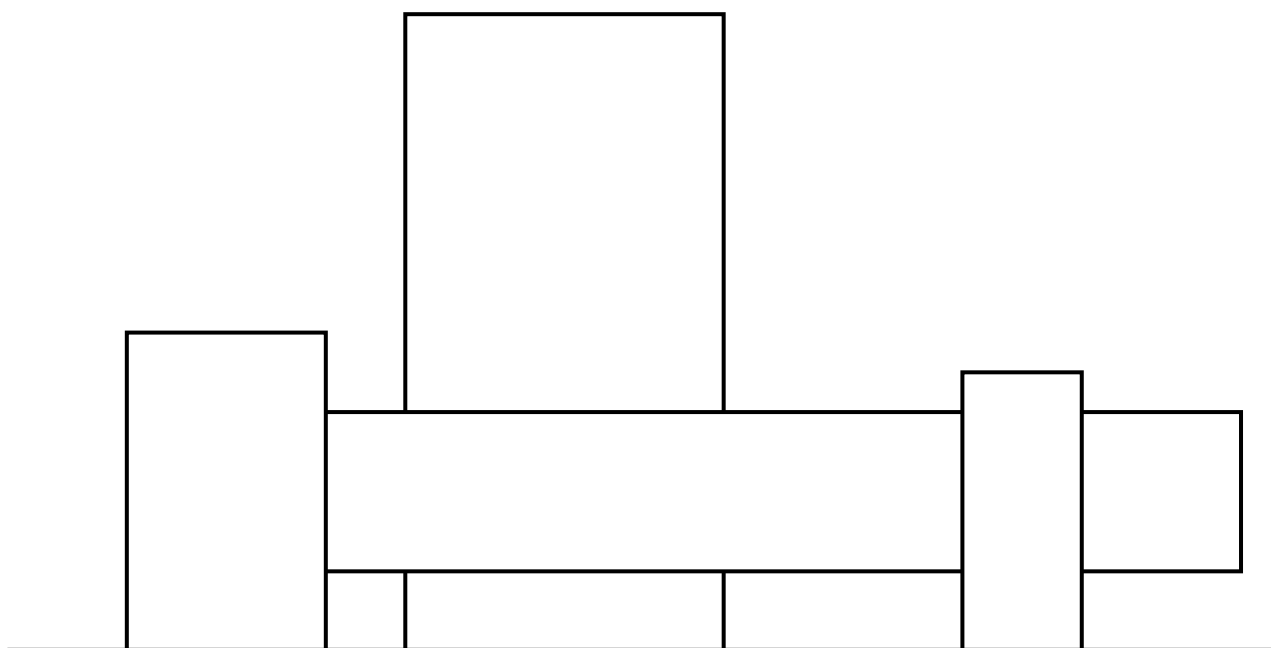
Task 11



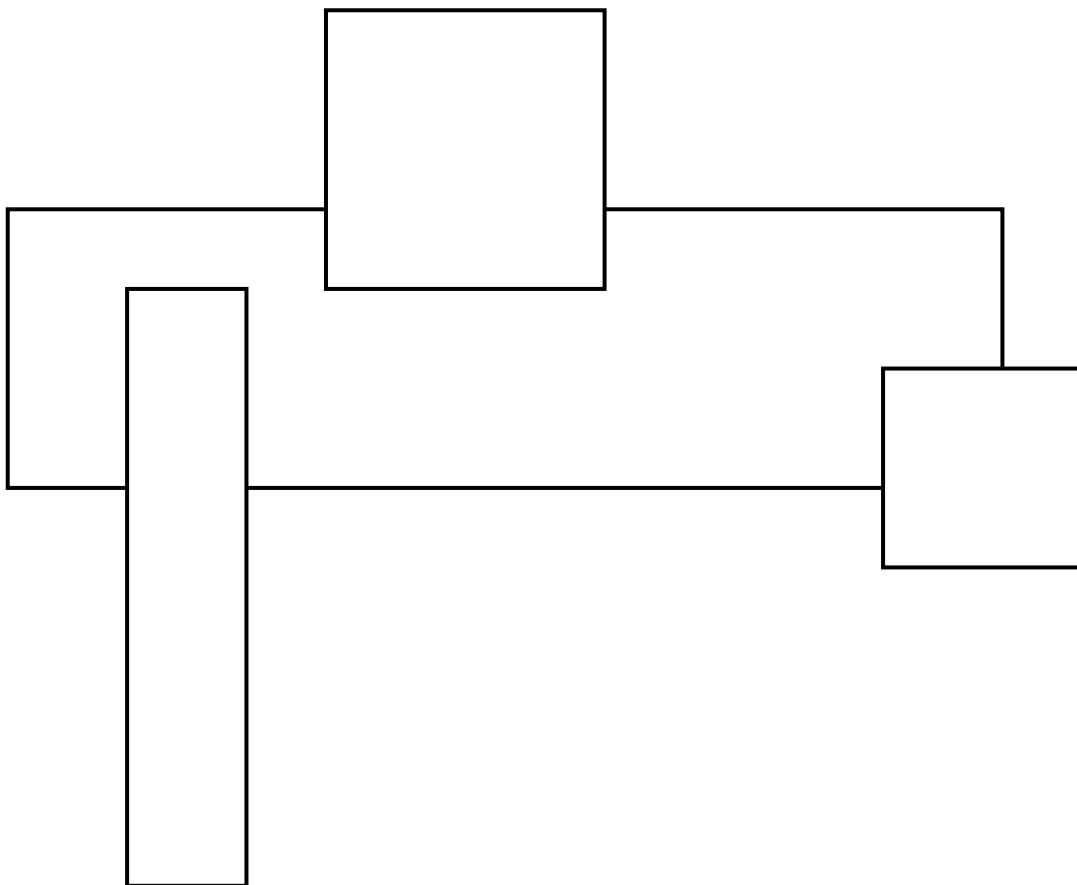
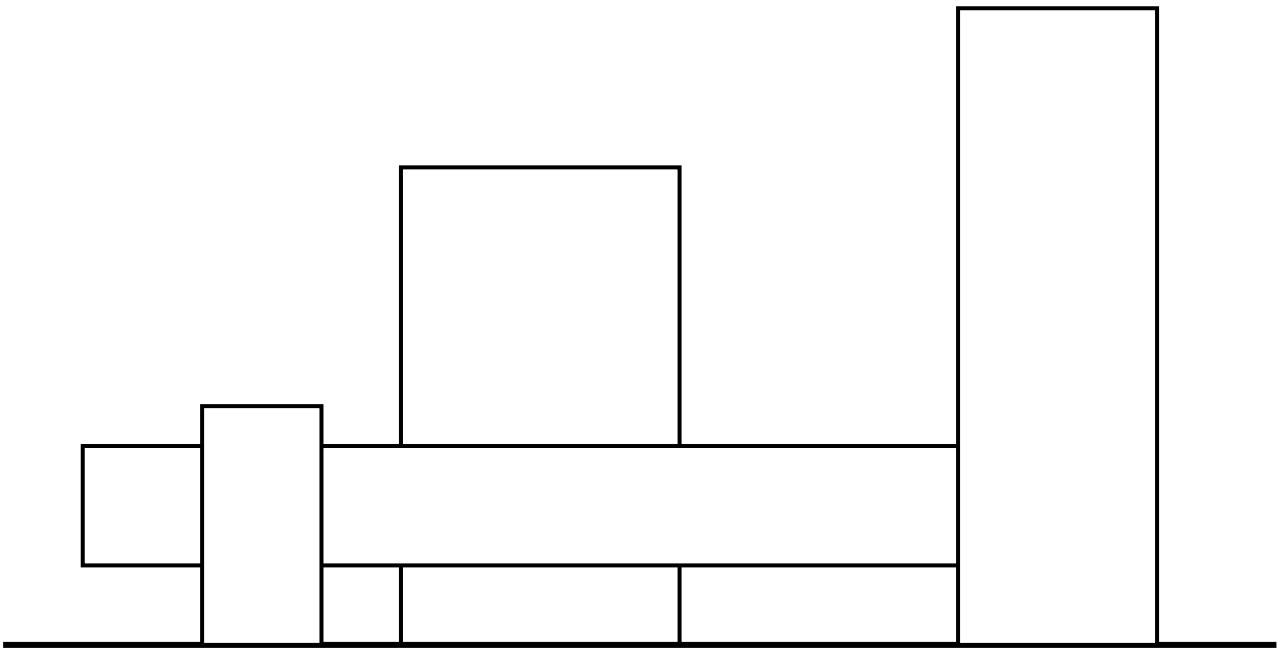
Task 12



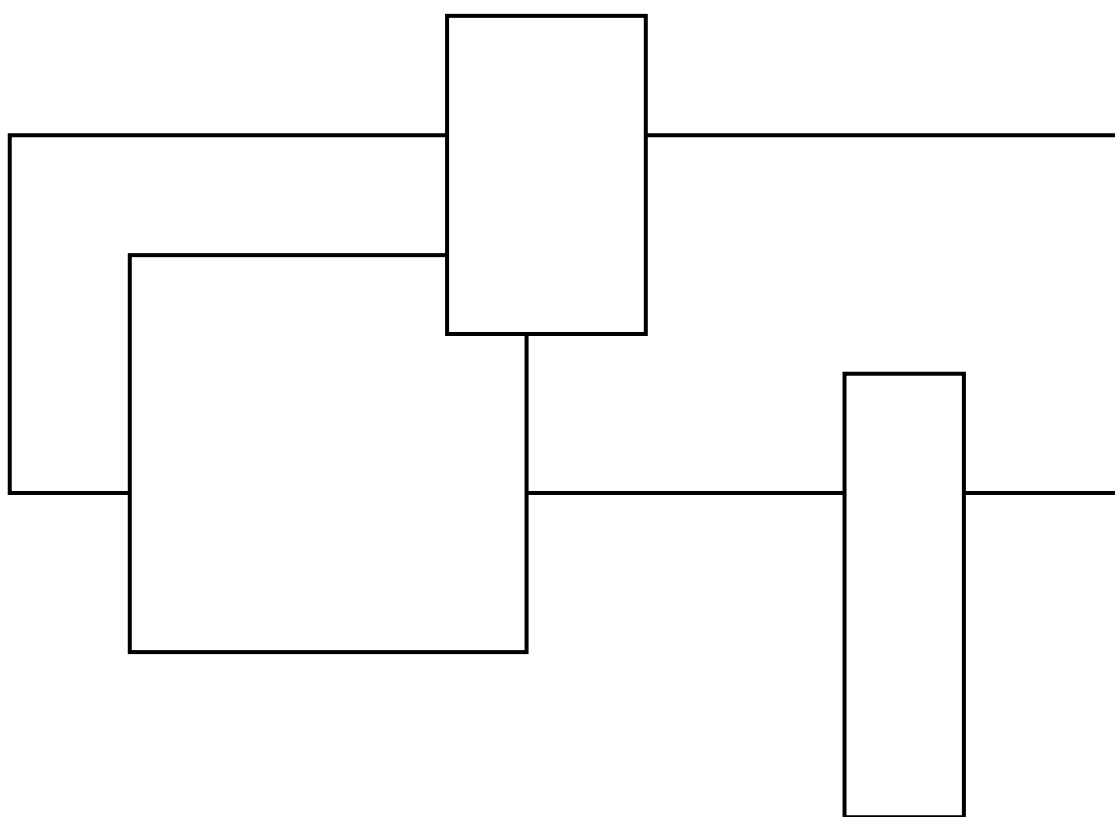
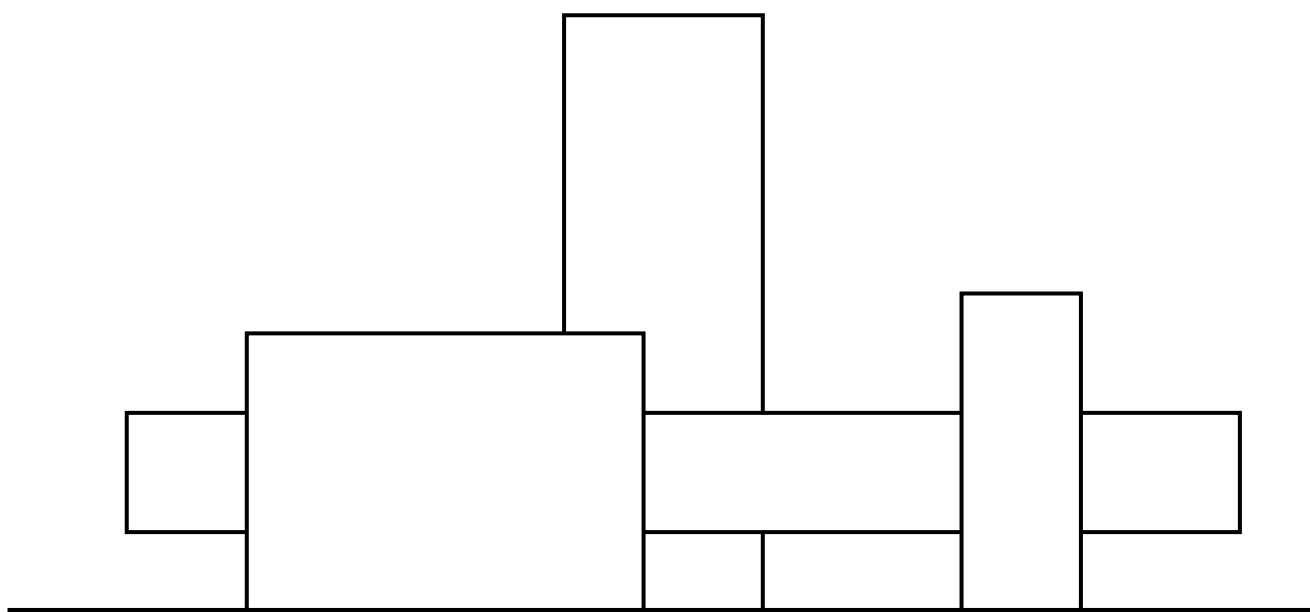
Task 13



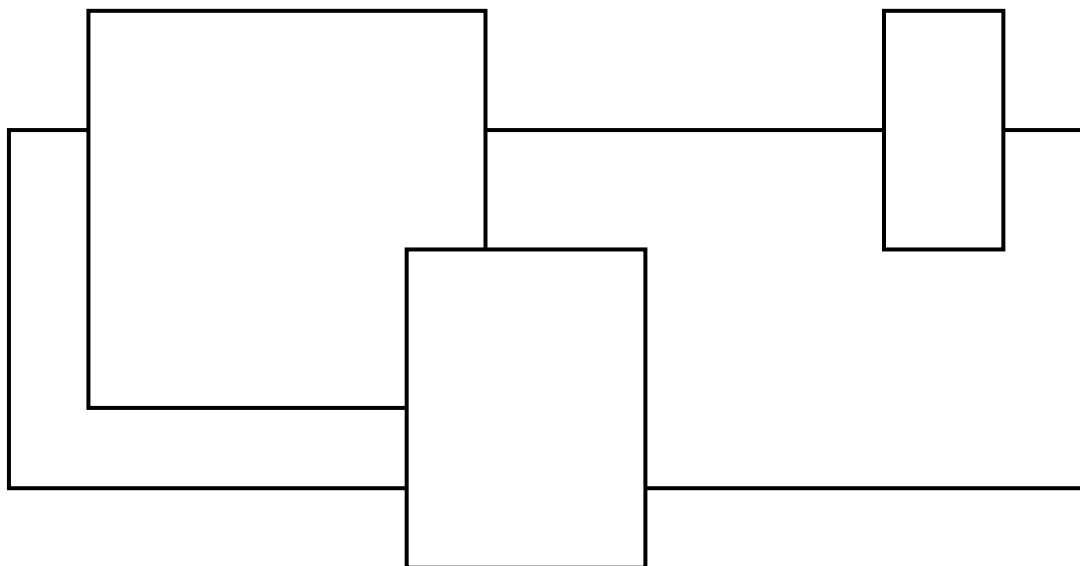
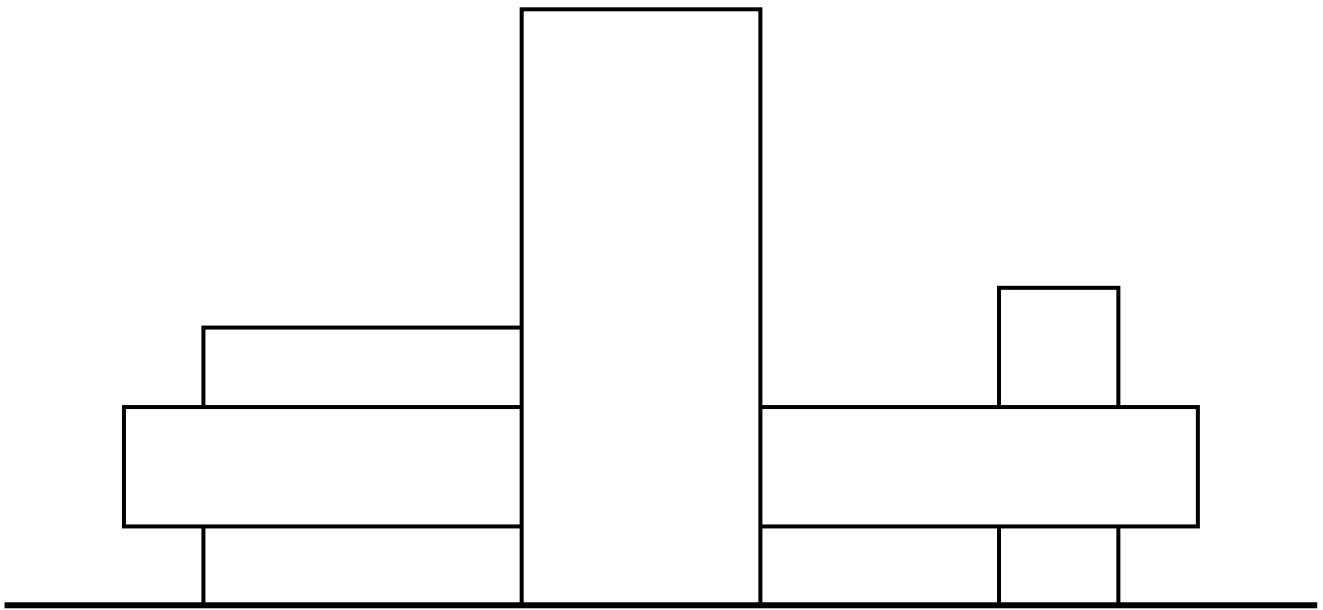
Task 14



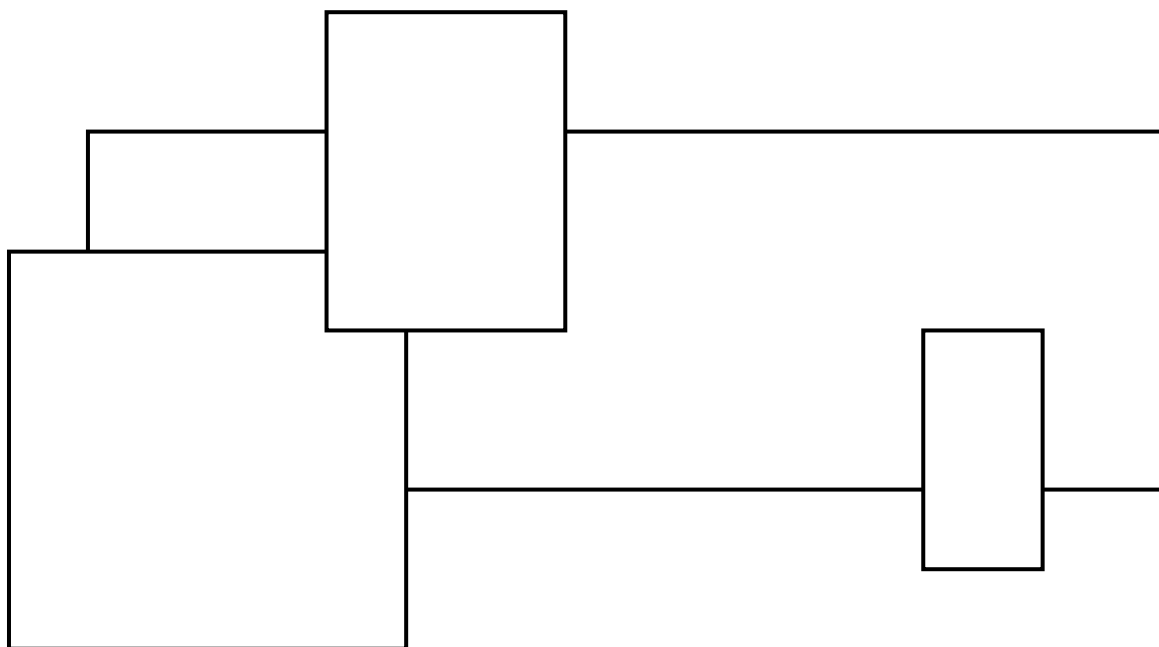
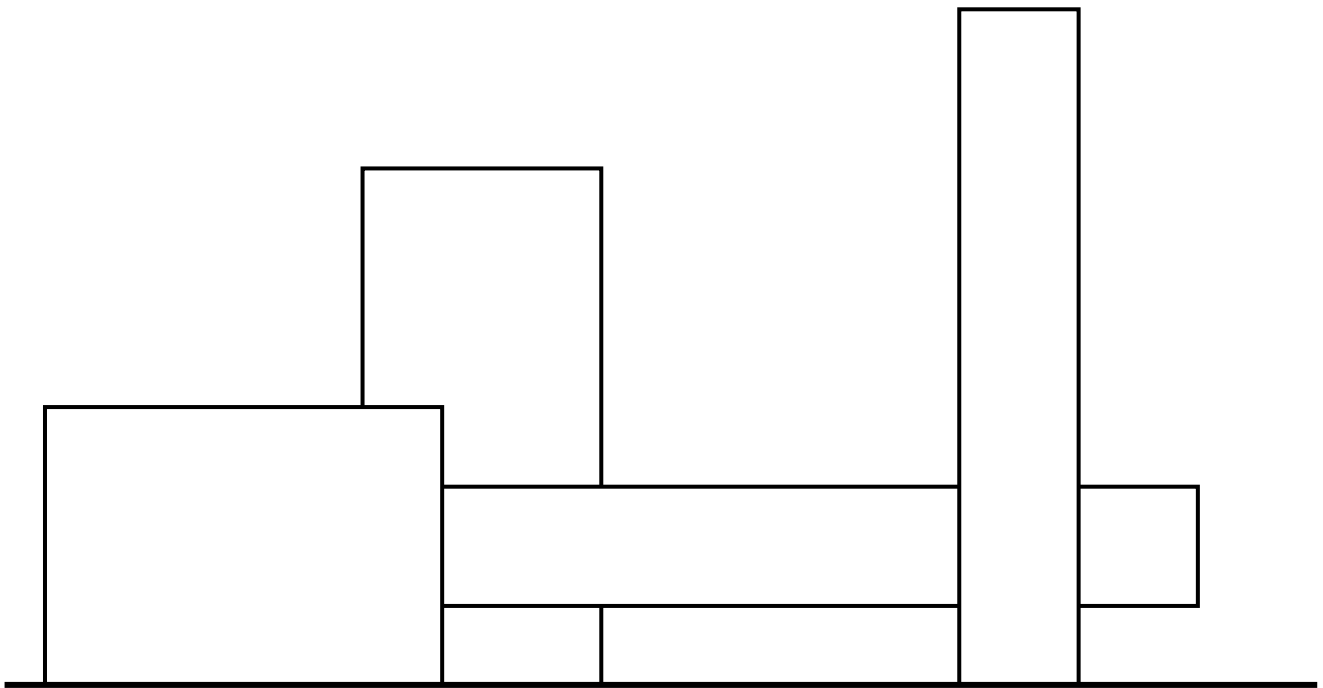
Task 15



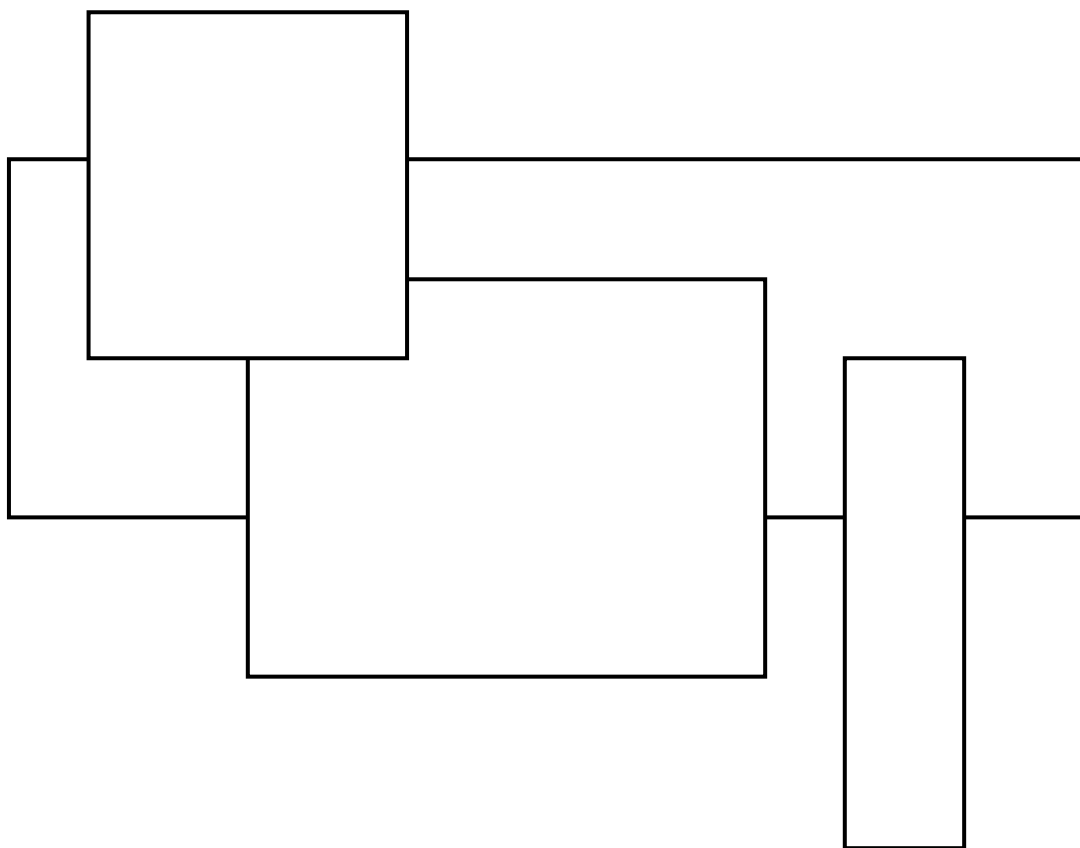
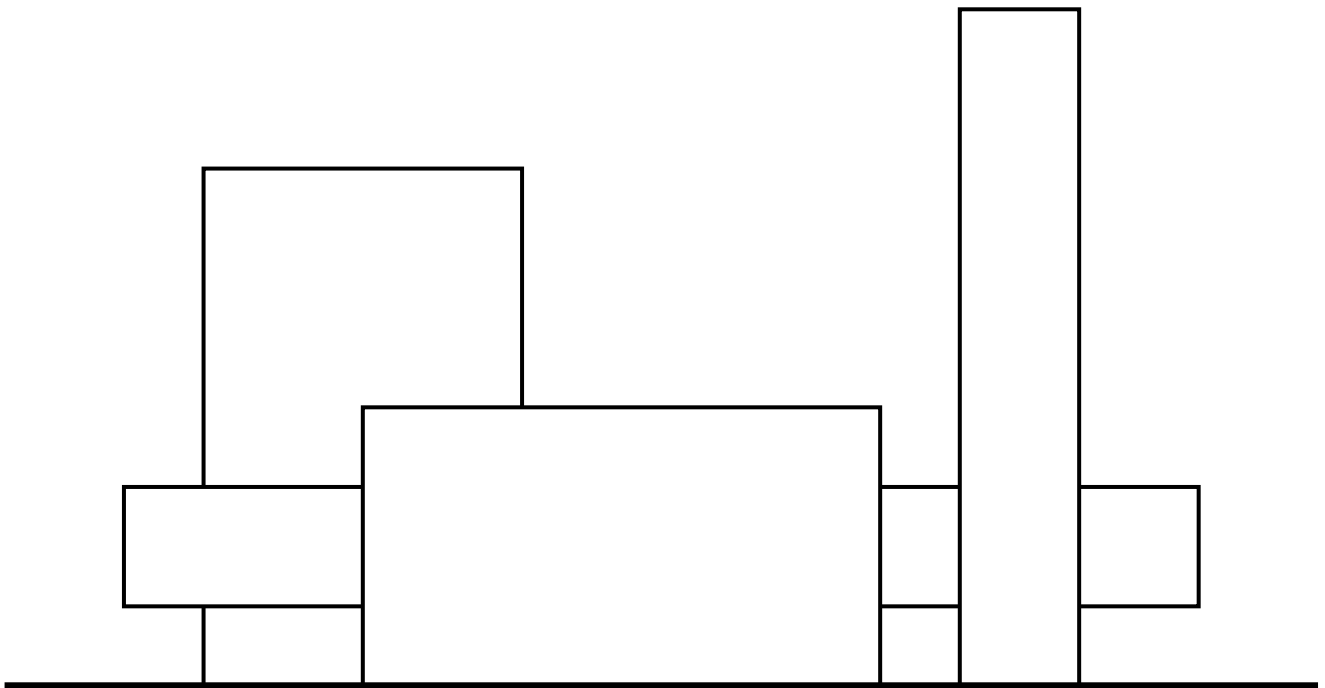
Task 16



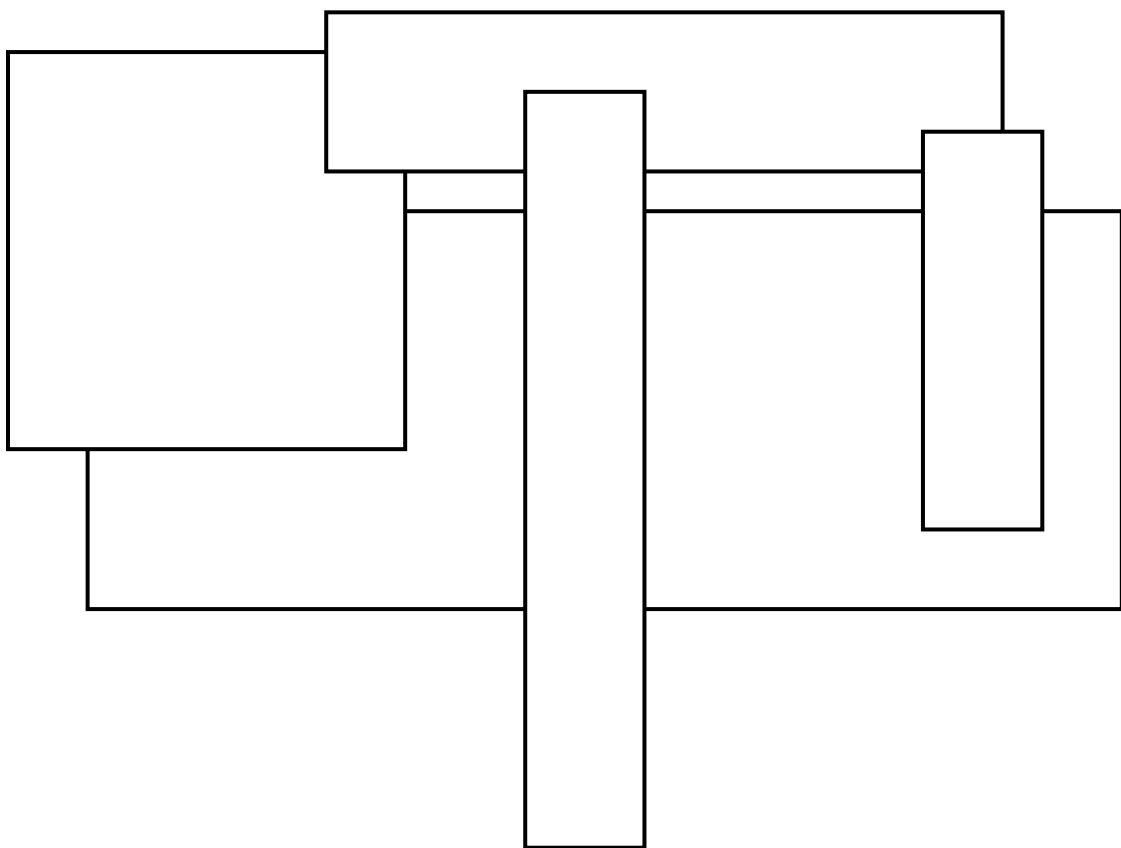
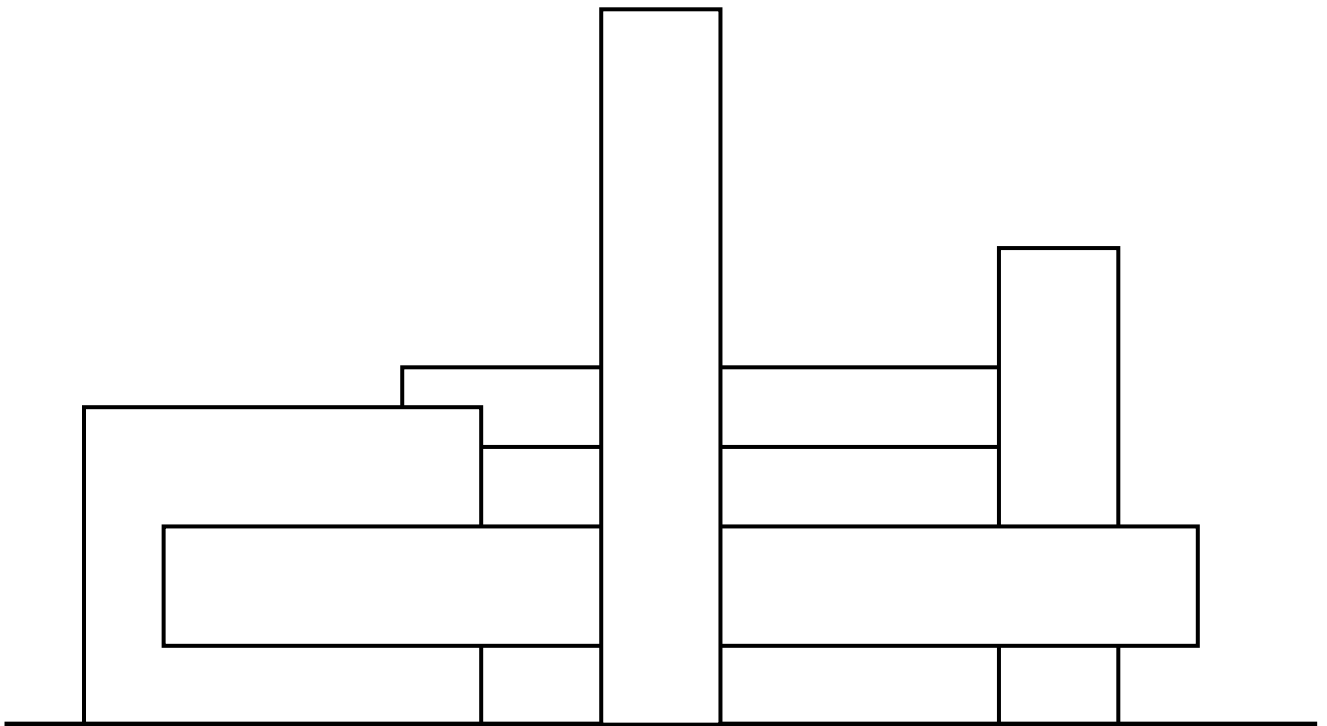
Task 17



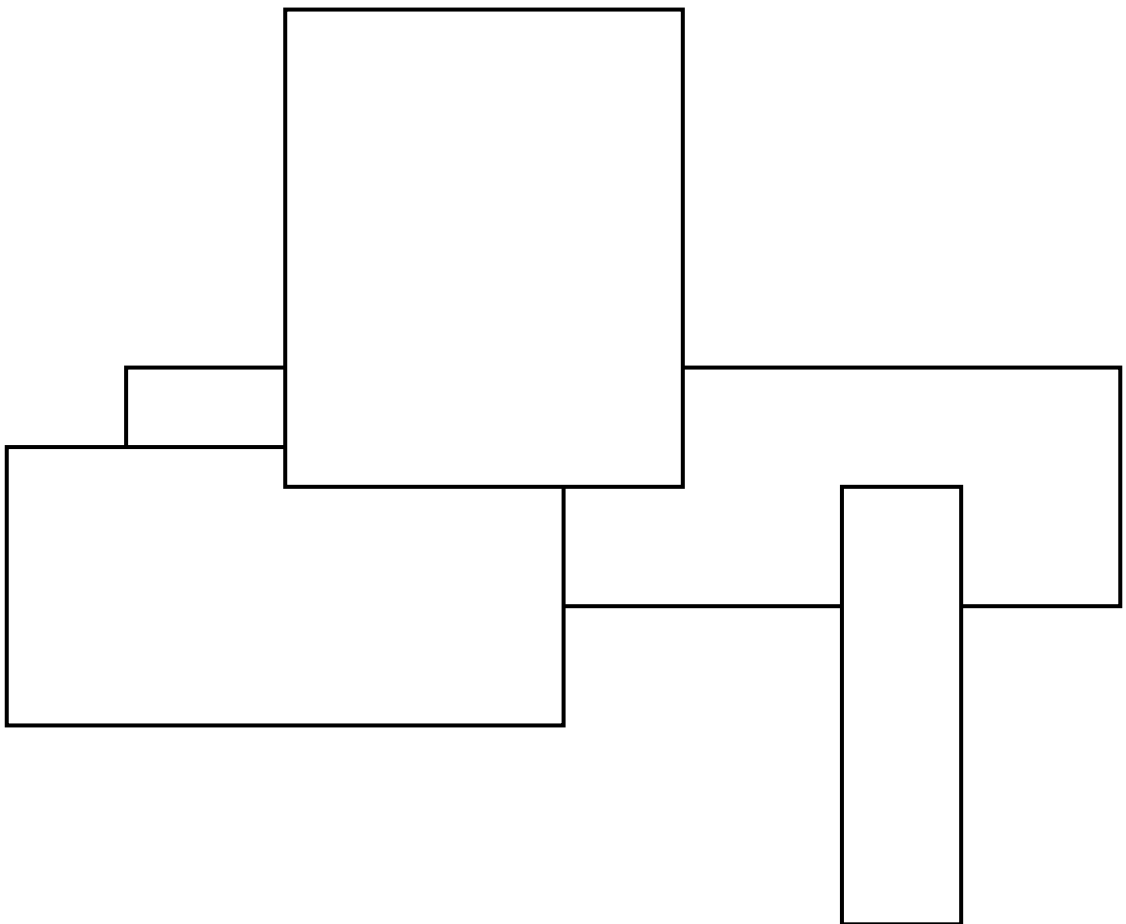
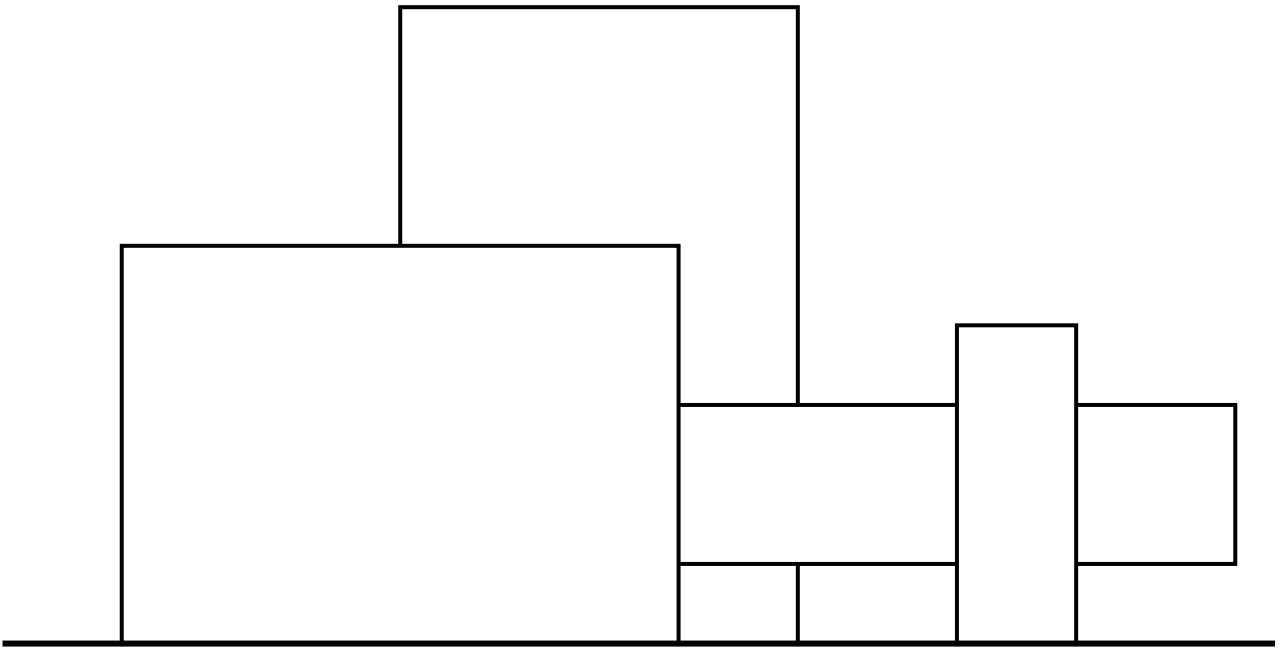
Task 18



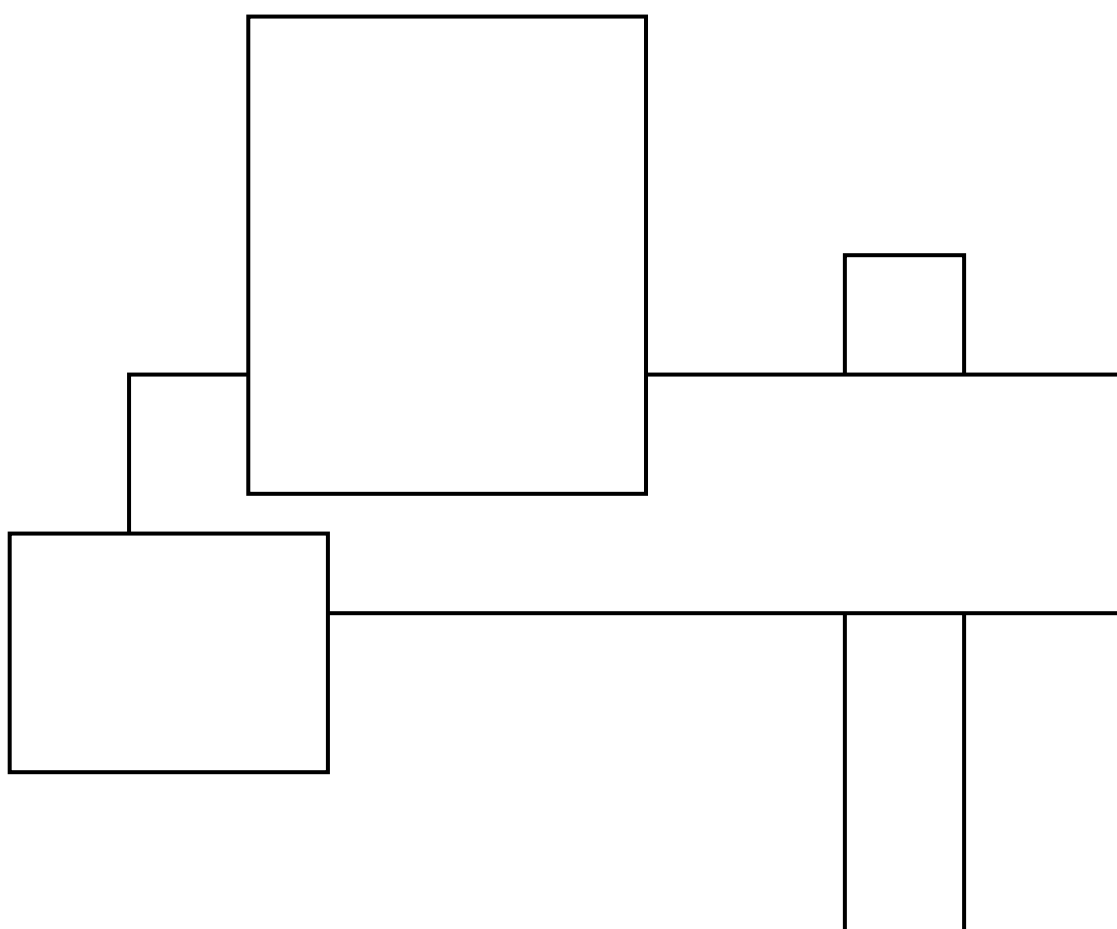
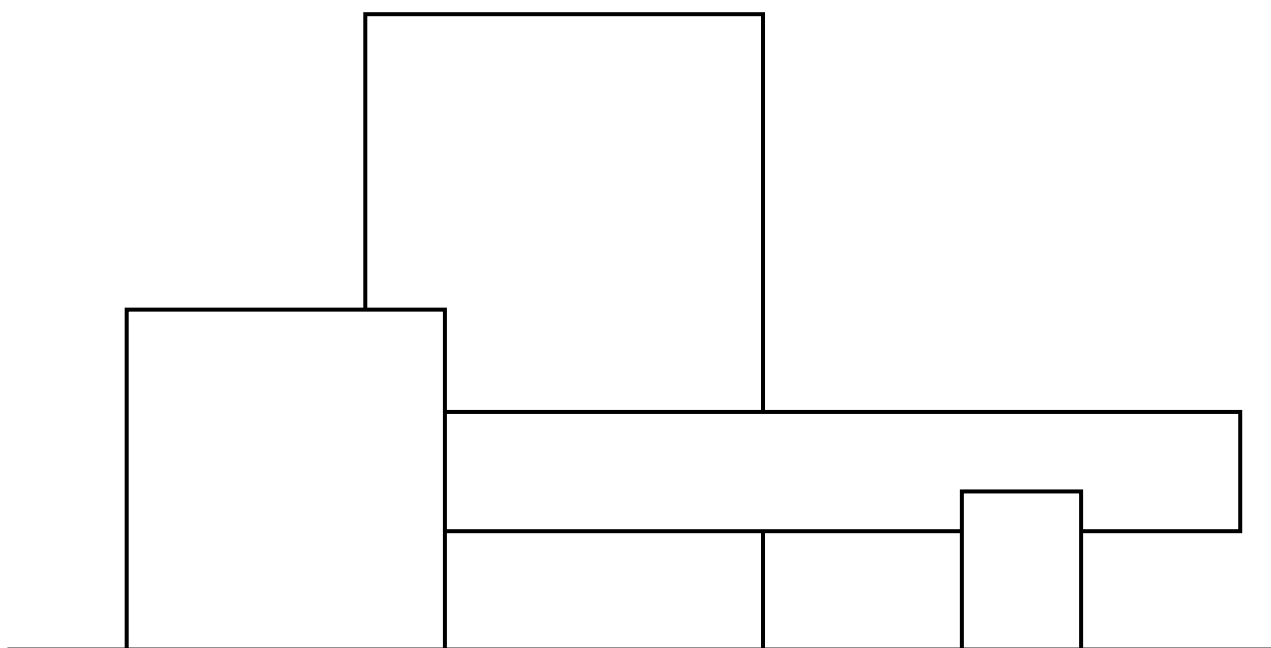
Task 19



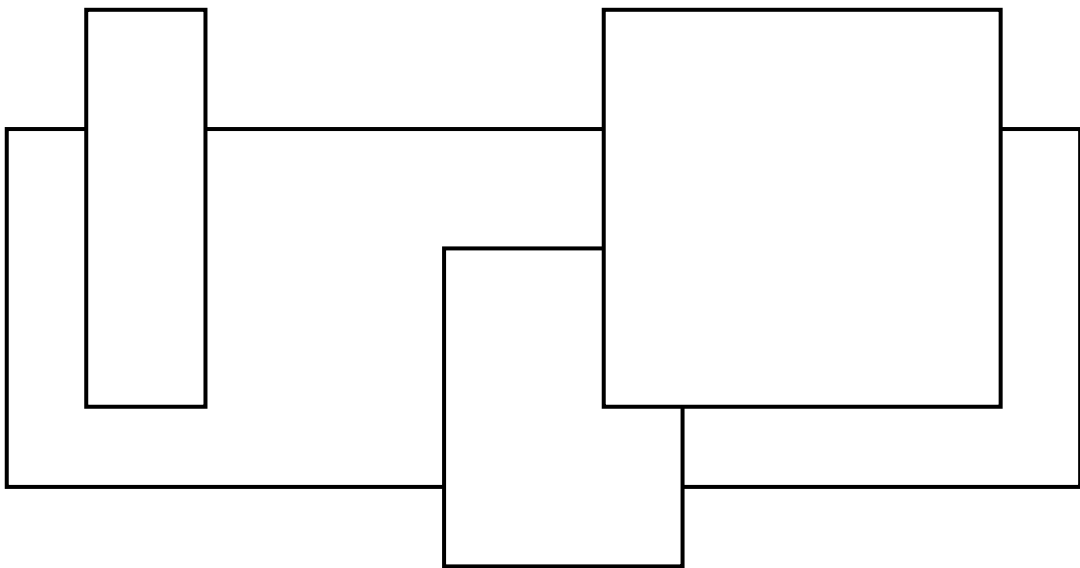
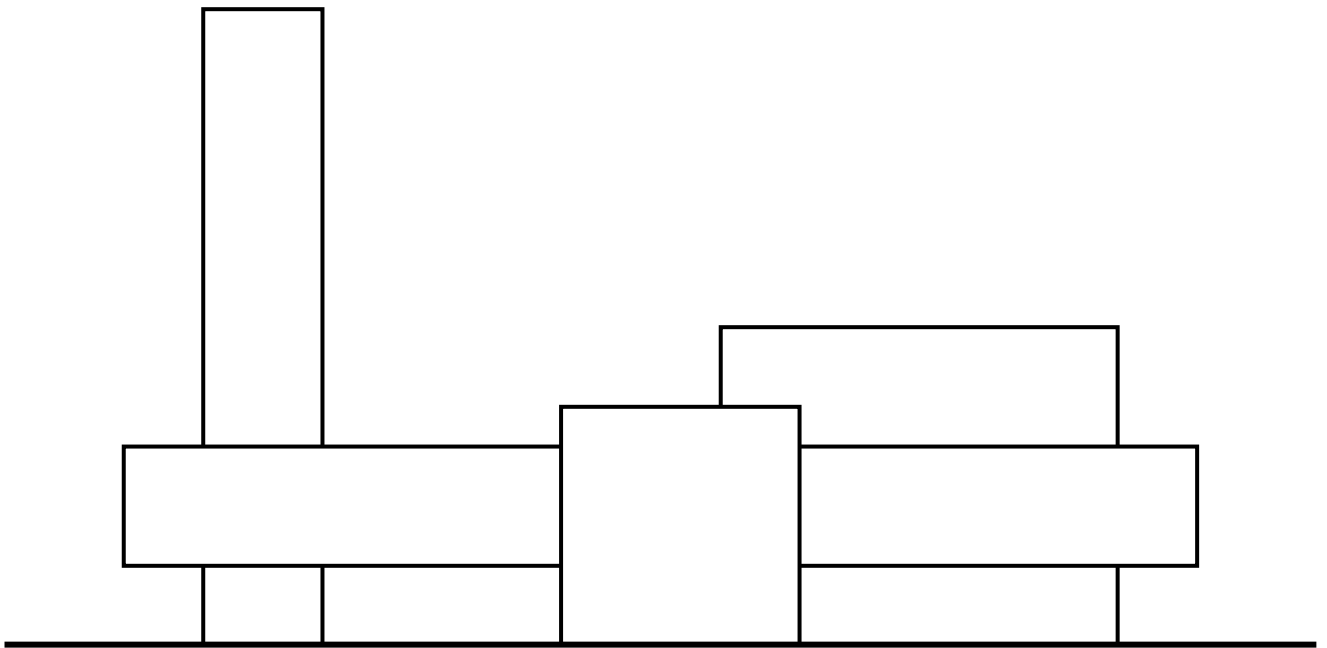
Task 20



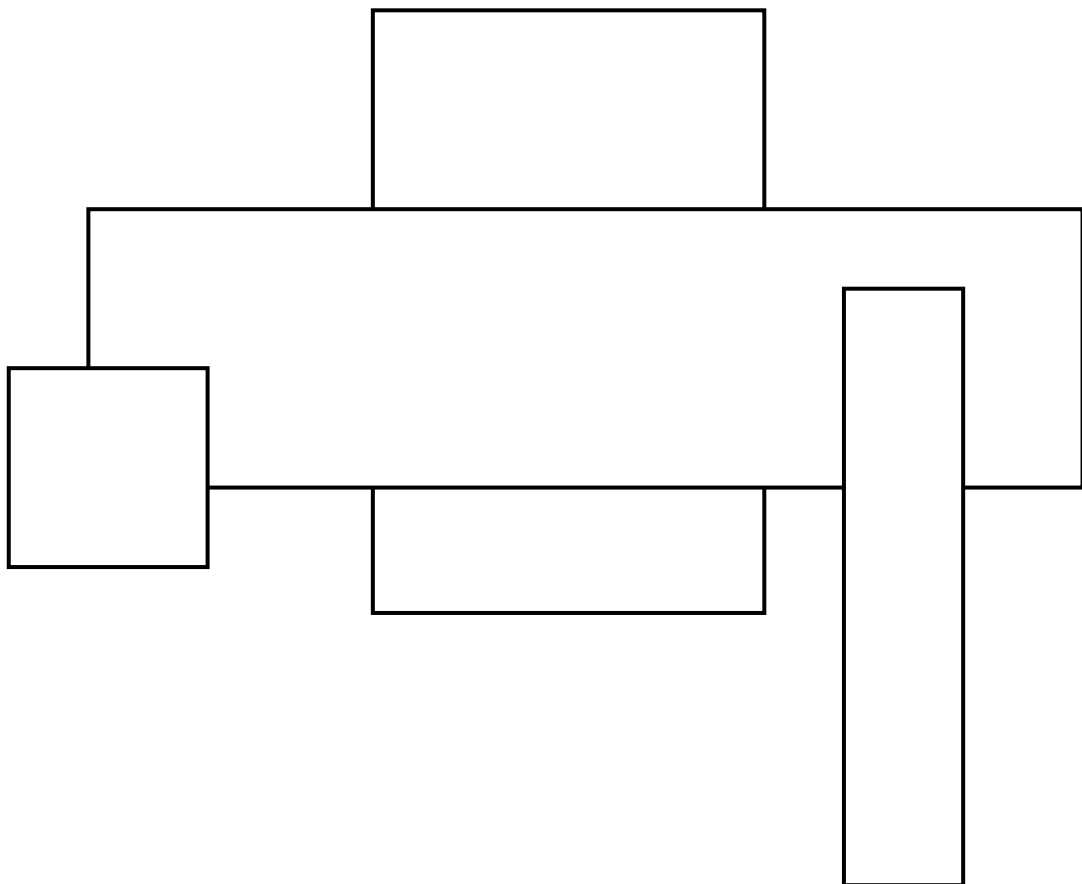
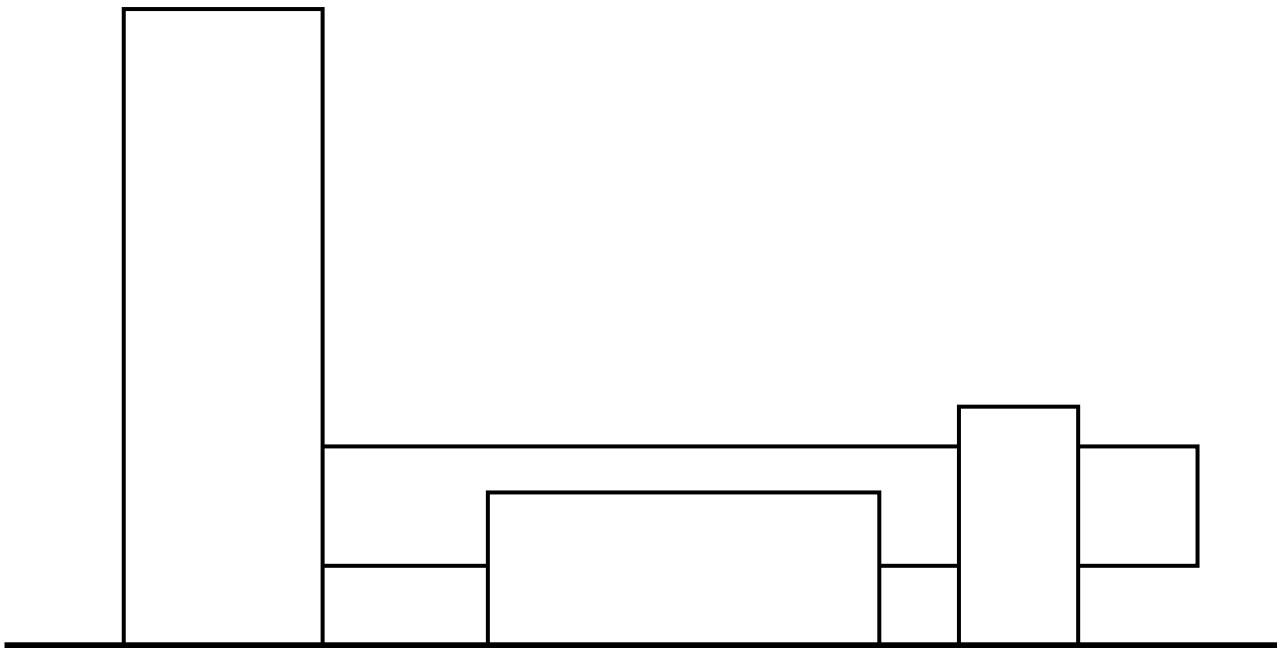
Task 21



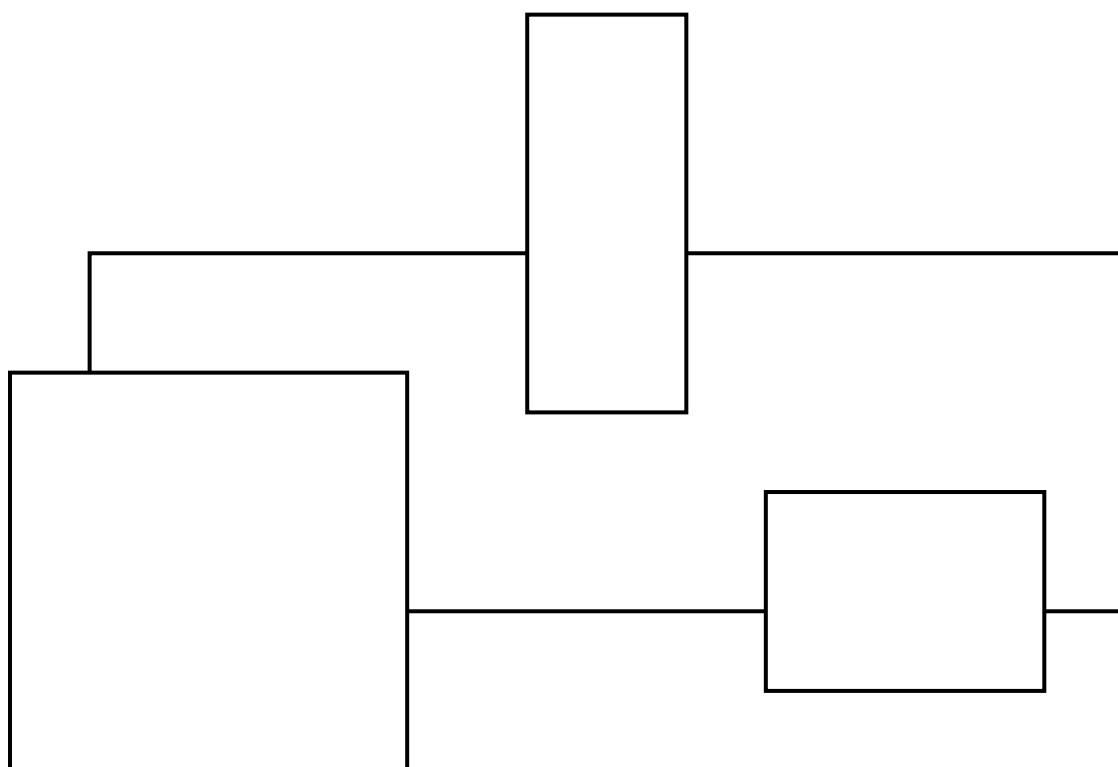
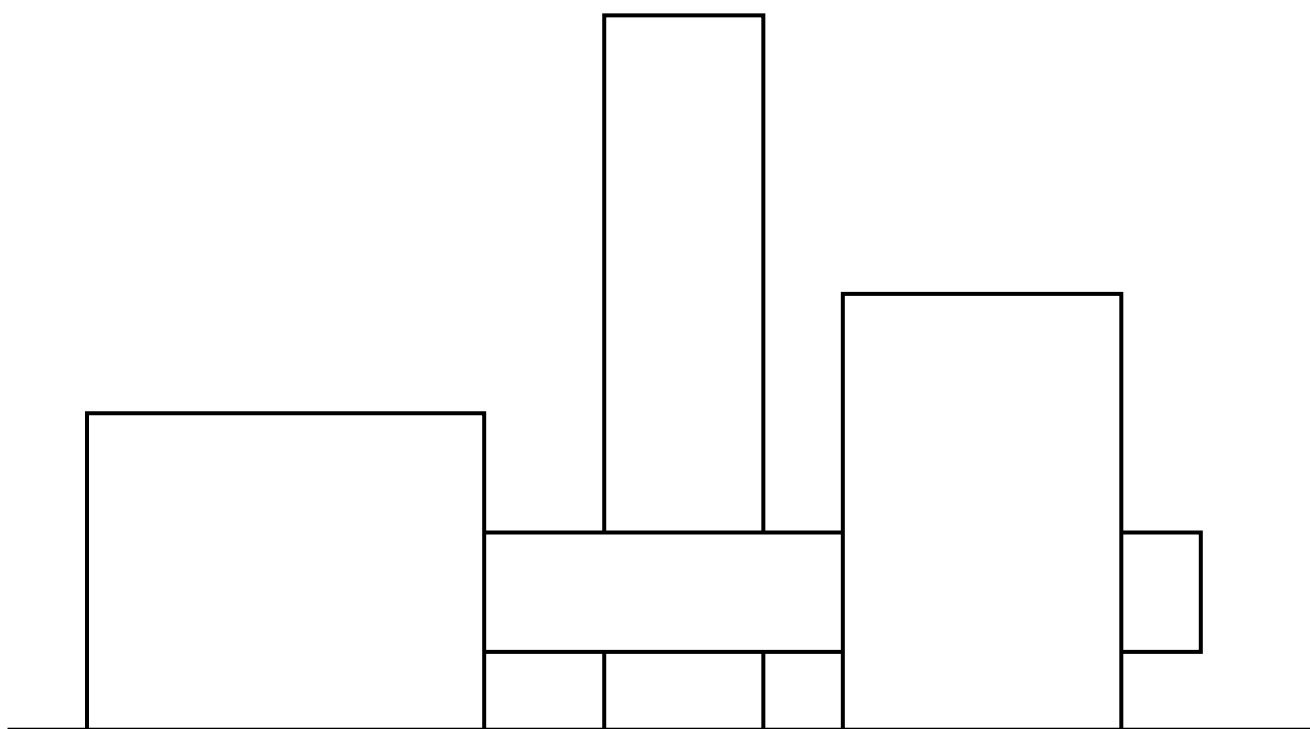
Task 22



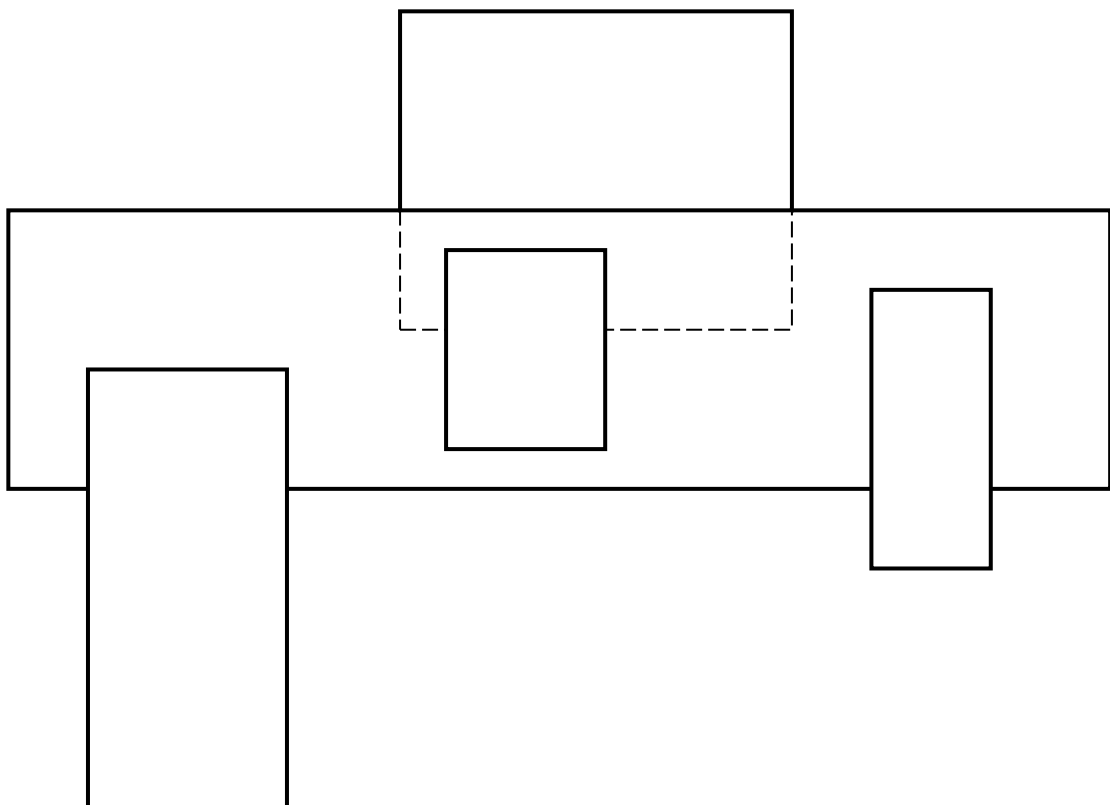
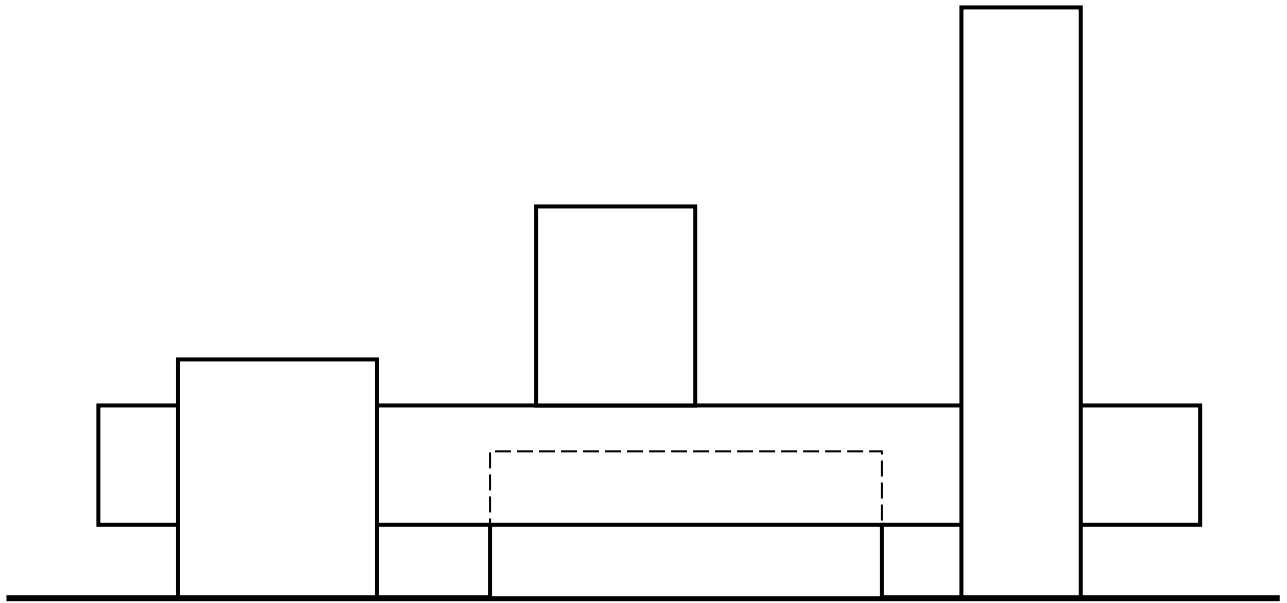
Task 23



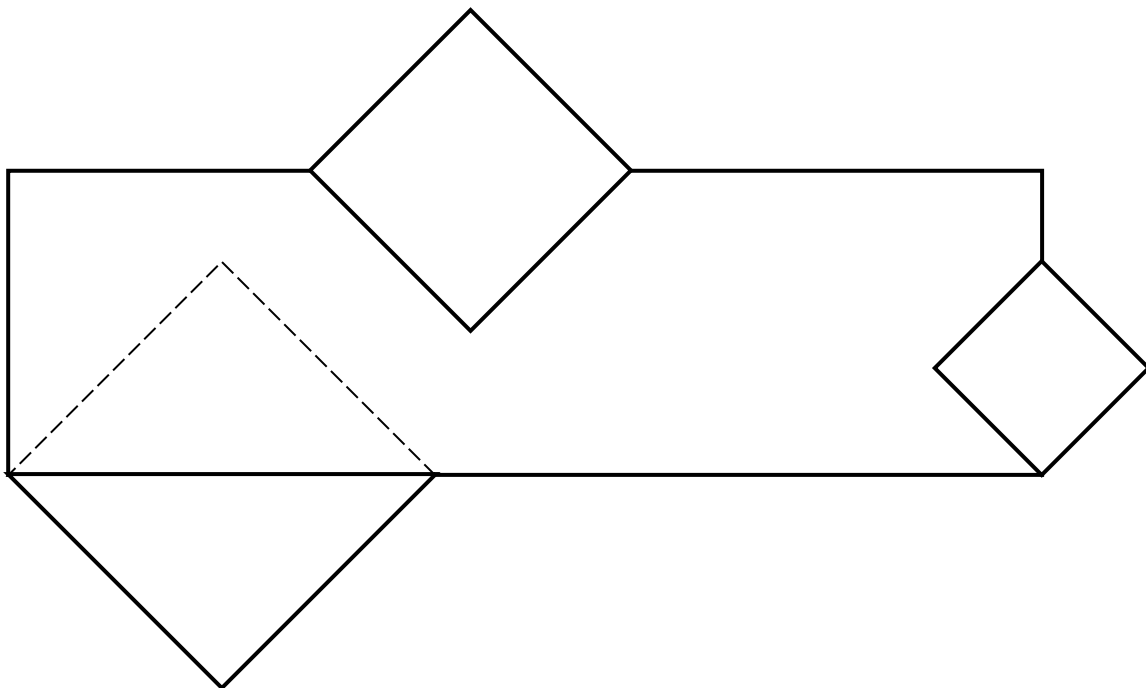
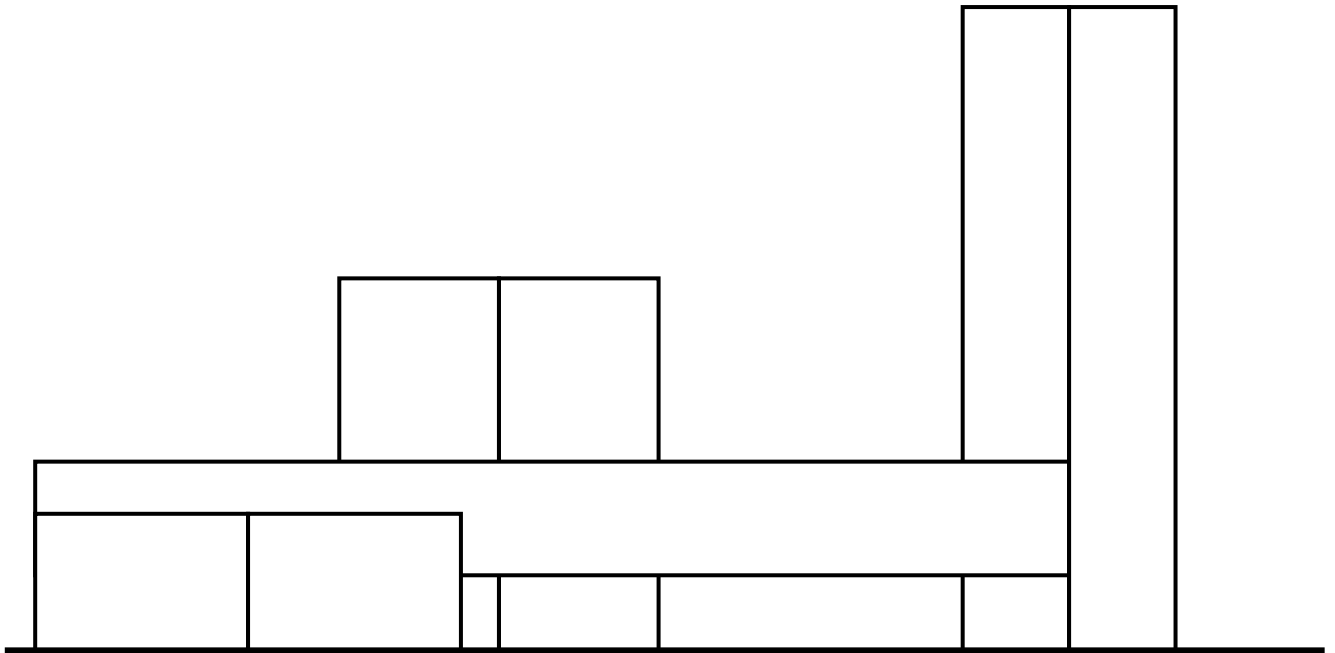
Task 24

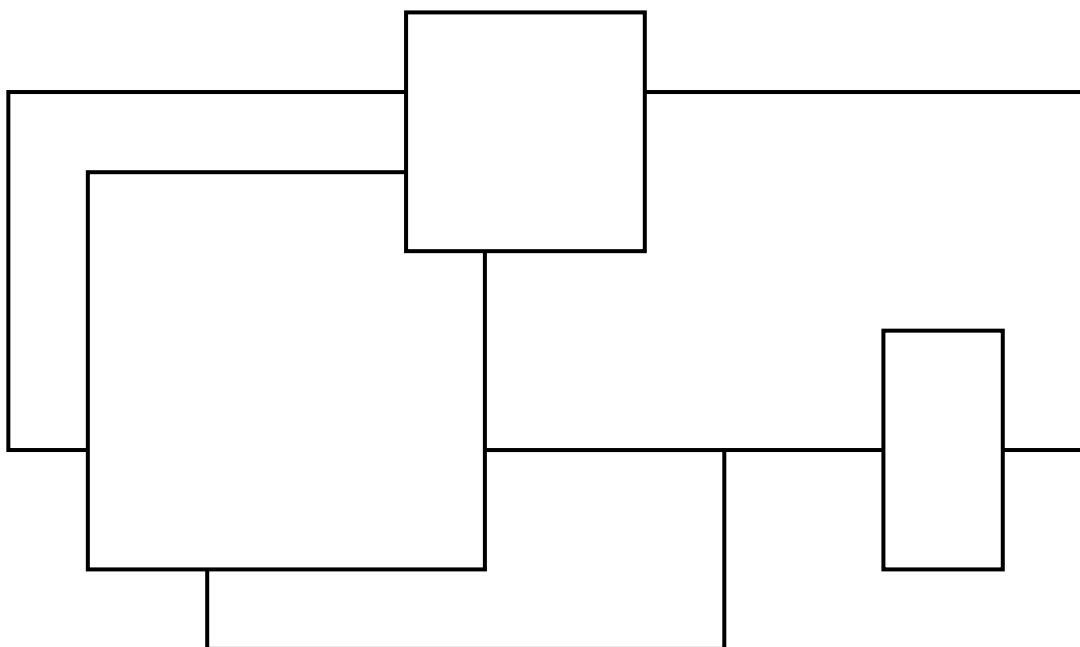
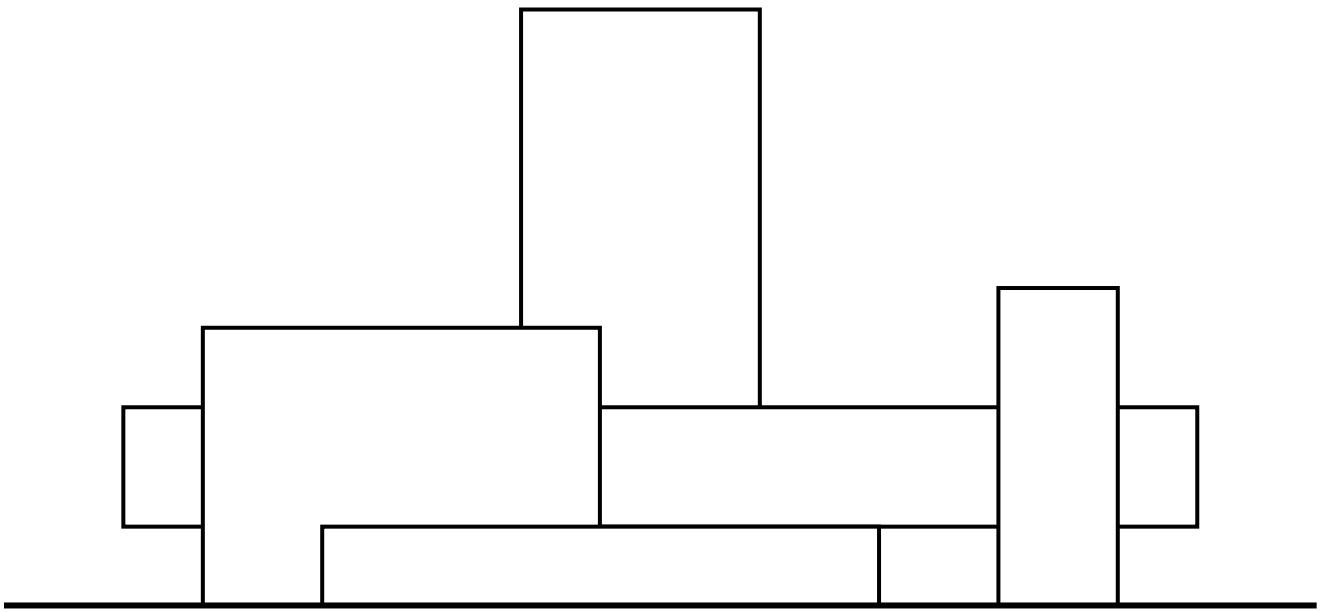


Task 25



Task 26





Methodical guidelines: *a)* the task is redrawn on the sheet of paper of A3 format A3; *b)* on a facade a line of the horizon is drawn so that it was higher at least than one parallelepiped, but below the highest of them; *c)* on the plan the point of view is chosen, the horizontal corner of coverage is checked and (at satisfactory results of check) perpendicular to its bisector the horizontal trace of a picture is carried out (it is desirable that one of vertical edges of parallelepipeds got to it); *d)* focal points (two or three) parallel families of straight lines are defined; *e)* the radial planes to vertical edges of an object are carried out and the corresponding points on a trace of the picture plane are marked; *f)* the received exposition is transferred to other sheet A3 with increase by 1.5-2 times so that focal points remained within the leaf and on it there was a space for creation of the shadows falling to the ground; *g)* perspective is built by the method of architects; *h)* position of the sun choose so that shadows revealed a geometrical form of an object (Fig. 1; 2), and the falling shadow remained within the leaf (in particular, sunshine do not need to be set parallel to pictures).

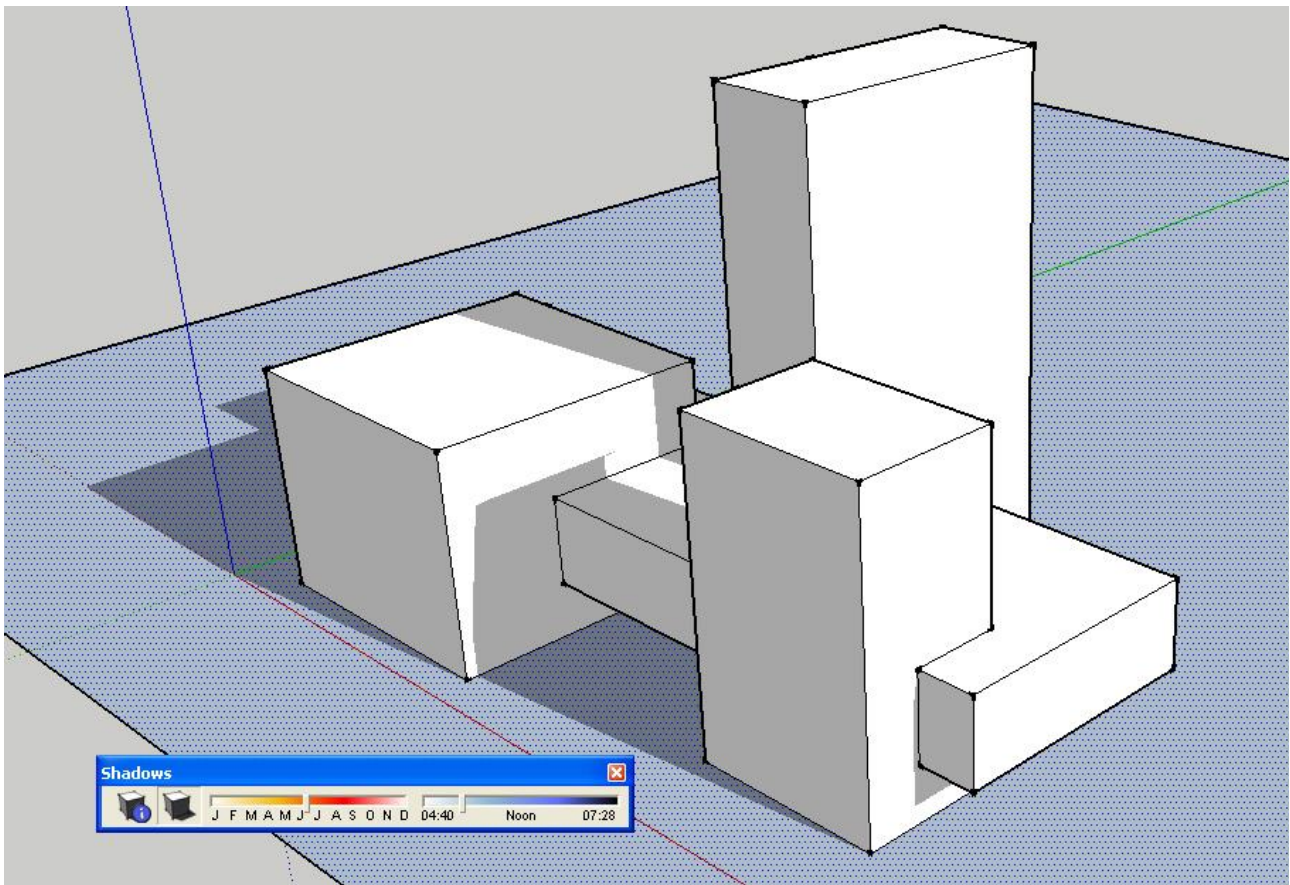


Fig. 2. Prospect of parallelepipeds composition with falling shadows

3. PROSPECT CONSTRUCTION OF BUILDING

Task: on orthogonal projections of the house to construct its angular prospect and shadows. The initial data are the variants of the houses used to construct the axonometry (methodical guidelines **03-07-93M**, pp. 5-30).

Methodical guidelines: *a)* the sequence of actions is the same as in the first task; *b)* for simplification of creation of prospect and shadows it is better to construct at first prospect of the plan of the house (including a tower and its roof, the main roof); *c)* the construction of the perspective of the roof of the tower should be started from its top, which must be marked with a radial plane and a horizontal line (perpendicular to the picture or parallel to those families of parallel lines whose focal points are constructed); *d)* at creation of the shadows falling on a roof it is expedient to use already constructed shadows falling to the ground from a tower and its roof and the main roof, returning points of intersection of the corresponding shadows on a roof in the direction of the return beam; *e)* when constructing shadows, it is sometimes convenient to conventionally extend the planes on which the shadow falls beyond the boundaries of the compartments forming the faces of the walls or roof.



Fig. 3. Building with constructed shadows

4. LITERATURE

1. Dol's'kyu YE. YE., Yevstyfeyev M. F. Zbirnyk zadach z narysnoyi heometriyi. Kyiv : Derzhbudvydav URSR, 1961. 196 s. [in Ukrainian].
Дольський Є. Є., Євстифеев М. Ф. Збірник задач з нарисної геометрії. Київ : Держбудвидав УРСР, 1961. 196 с.
2. Klimukhin A. G. Sbornik zadach po nachertatel'noy geometrii. Moskva : Stroyizdat, 1982. 216 s. [in Russian].
Климухин А. Г. Сборник задач по начертательной геометрии. Москва : Стройиздат, 1982. 216 с.
3. Koroyev YU. I. Nachertatel'naya geometriya. Moskva: Stroyizdat, 1987. 319 s. [in Russian].
Короев Ю. И. Начертательная геометрия. Москва: Стройиздат, 1987. 319 с.
4. Koroyev YU. I., Kotov YU. V., Orsa YU. N. Sbornik zadach i zadaniy po nachertatel'noy geometrii. Moskva : Stroyizdat, 1989. 176 s. [in Russian].
Короев Ю. И., Котов Ю. В., Орса Ю. Н. Сборник задач и заданий по начертательной геометрии. Москва : Стройиздат, 1989. 176 с.
5. Narysna heometriya / Mykhaylenko V. Є., Yevstifeyev M. F., Koval'ov S. M., Kashchenko O. V. Kyiv : Vyshcha shkola, 2004. 303 s. [in Ukrainian].
Нарисна геометрія / Михайленко В. Є., Євстифеев М. Ф., Ковальов С. М., Кащенко О. В. Київ : Вища школа, 2004. 303 с.
6. Russkevych N. L. Nachertatel'naya heometriya. Kyiv : Vyshcha shkola, 1978. 312 s. [in Russian].
Рускевич Н. Л. Начертательная геометрия. Київ : Вища школа, 1978. 312 с.
7. Timrot Ye. S. Nachertatel'naya geometriya. Moskva : Gosstroyizdat, 1962. 280 s. [in Russian].
Тимрот Е. С. Начертательная геометрия. Москва : Госстройиздат, 1962. 280 с.
8. Methodical guidelines and tasks to a practical training and independent work in the discipline «Descriptive Geometry» for higher education students of the first (bachelor) level in the field of study 191 «Architecture and Urban planning» of full-time education form. Part 3. Axonometry. 03-07-93M / Pugachov E. V., Litnitskyi S. I., Kundrat T. M. – Rivne : NUWEE, 2023. – 31 p.

Information resources

1. National Library named after V. I. Vernadskyi. URL: <http://www.nbu.gov.ua/>
2. Rivne Regional Universal Scientific Library (Rivne, Maidan Korolenko, 6). URL: <http://www.lib.rv.ua/>
3. Scientific library of NUWEE (Rivne, st. Oleksy Novaka, 75). URL: <http://nuwm.edu.ua/naukova-biblioteka>
4. Digital repository of NUWEE. URL: <http://ep3.nuwm.edu.ua/view/types/metods/>