

Segesta in code

Mission: build the façade of a Greek temple with code blocks.

75-MINUTE LAB

TEAMWORK

PARTNER SCHOOLS

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Calatafimi Segesta · Sicily, Italy



The temple of Segesta, Sicily: almost 2,500 years old!

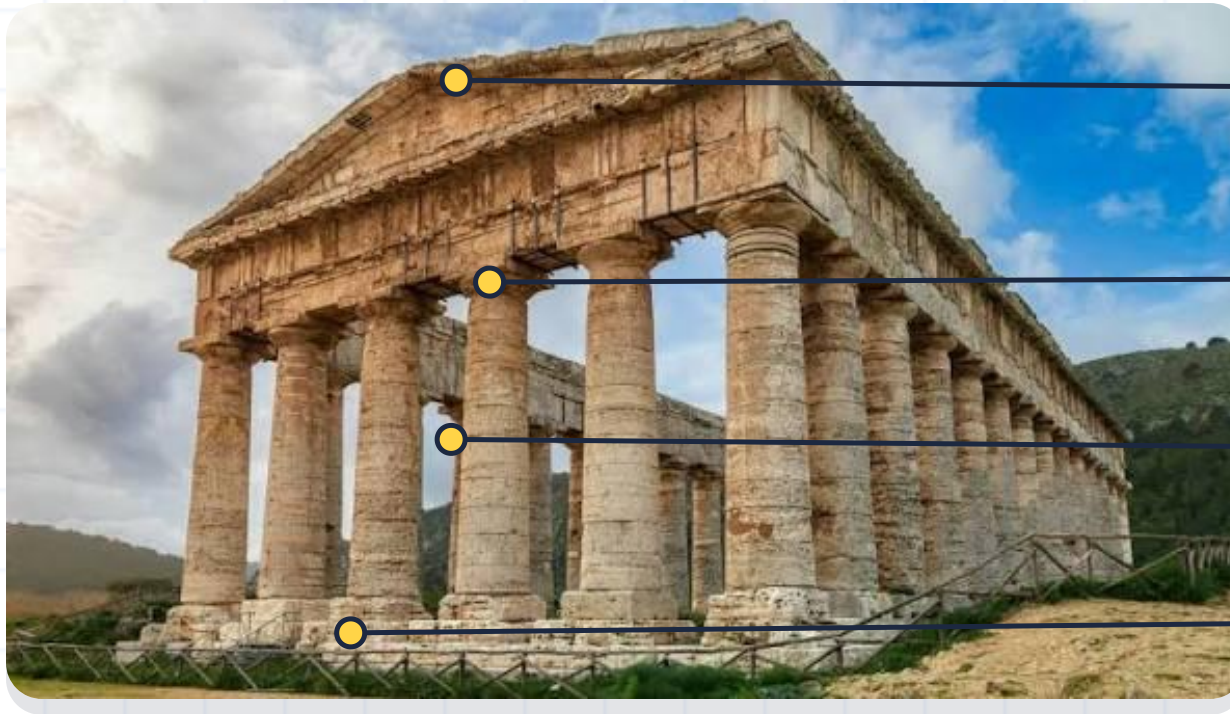
repeat 6 times

Add    < R 4 H 30

Move X X Y 0 Z 25

Shape hunt

Every monument is made of simple shapes. Can you find them in the temple?



Pediment

Capitals

Columns

Crepidoma

SHAPES · YOUR BLOCKS



Box

steps, abacus, entablature



Cylinder

columns and echinus



Roof

pediment

Drag the block into the program area,
then choose its sizes.

QUESTION



Which geometric shapes can you spot? Look for rectangles, circles and triangles.

Our temple

A stylised façade to build in 3D: three steps, six columns, the entablature and the pediment.

MODEL CARD



112 mm
width



40 mm
depth



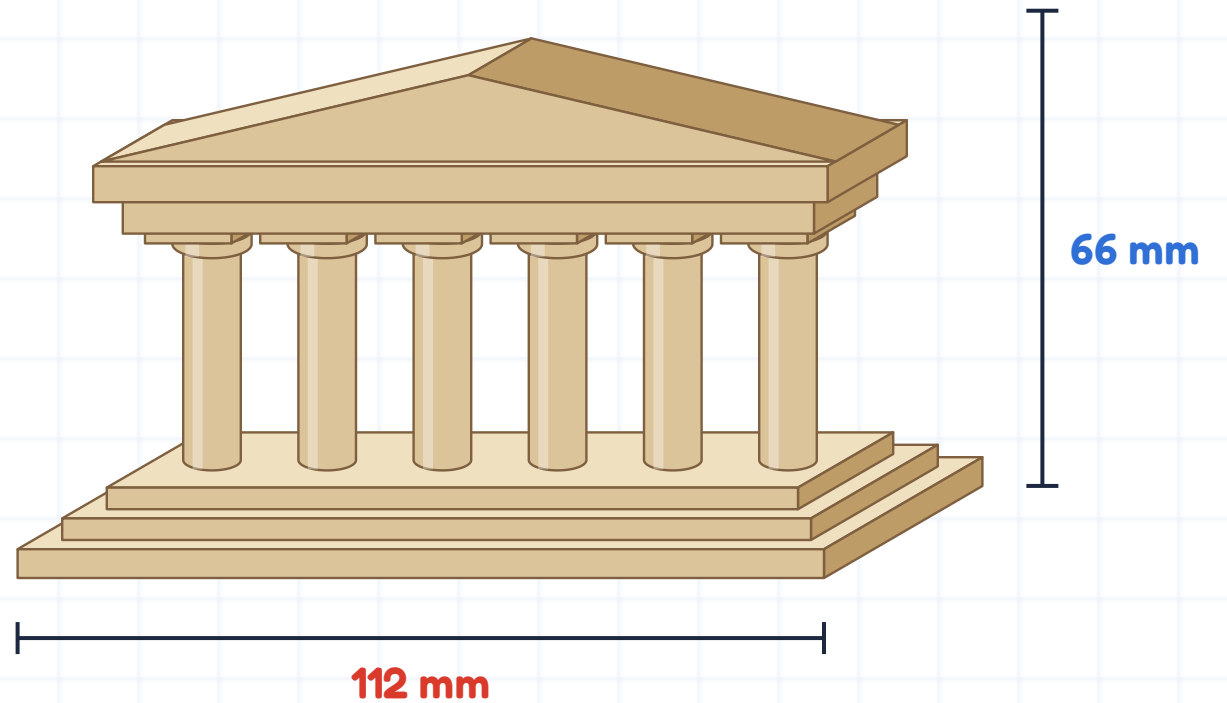
66 mm
height

Entablature = the stone “beam” resting on top of the columns.



DID YOU KNOW?

The real temple has 36 columns. We build the 6 on the façade.



The building plan

An **algorithm** is an ordered sequence of instructions. We will build the temple in 4 levels, like in a video game.

1 LEVEL 1

Crepidoma

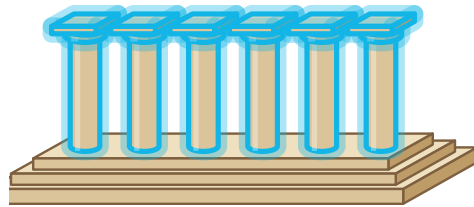
the three base steps



2 LEVEL 2

Columns

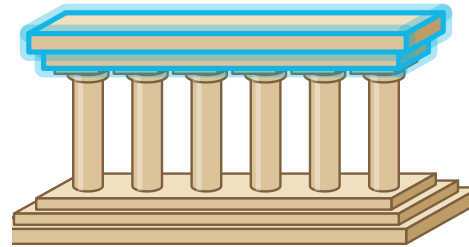
six columns with a loop



3 LEVEL 3

Entablature

the beam above the columns



4 LEVEL 4

Pediment

the triangular roof



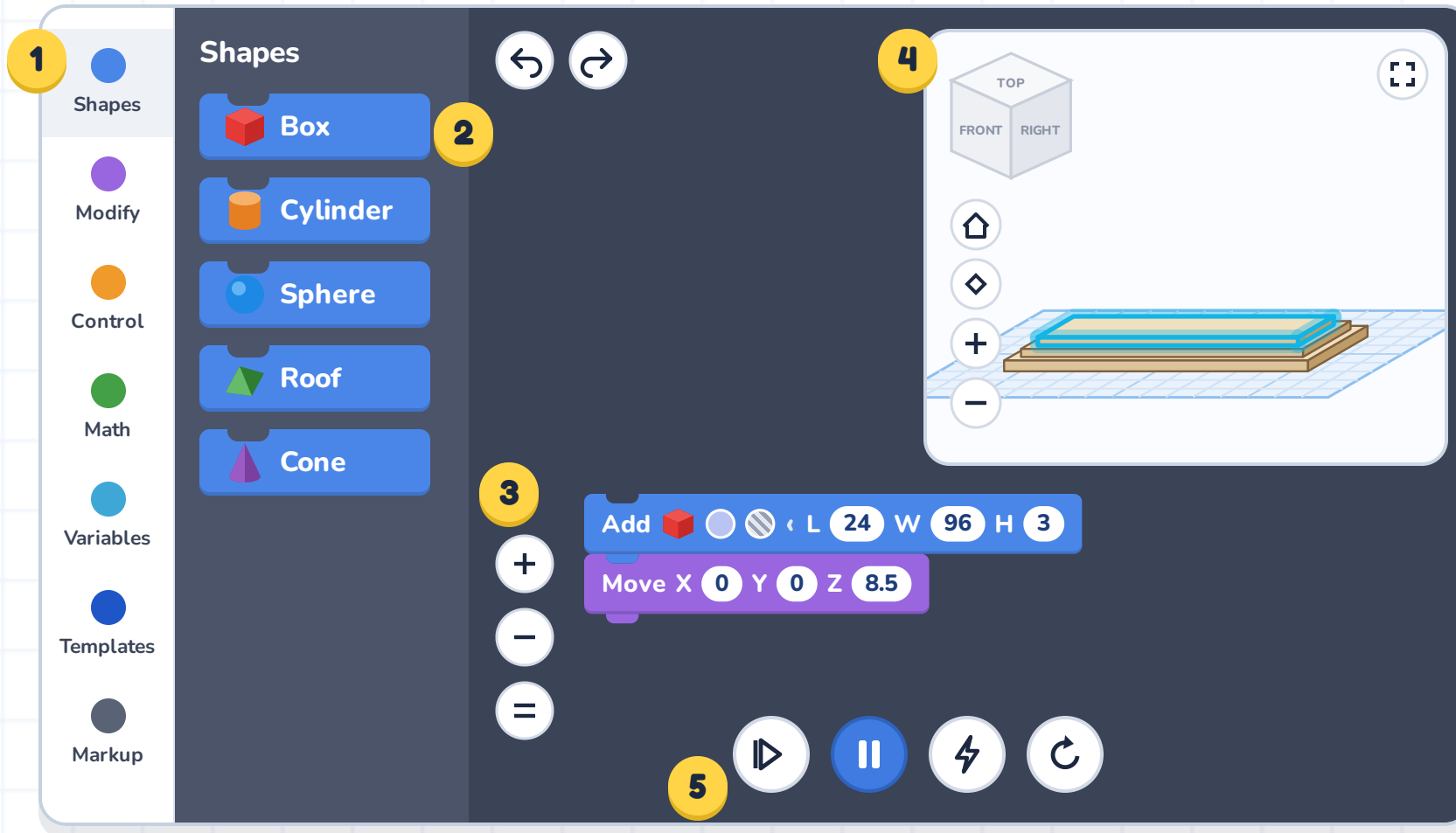
QUESTION



Why is it useful to decide the order before building? Try to imagine placing the pediment first...

The Codeblocks dashboard

Before you start, learn where the controls are.



- 1 Categories.** Each colour is a family of blocks: Shapes, Modify, Control...
- 2 Blocks.** Drag them into the program area.
- 3 Program.** Blocks snap together and run from top to bottom.
- 4 3D preview.** This is where the temple grows. Use the cube to change the view.
- 5 Controls.** One block at a time, Play/Pause, fast, restart.

Where does each shape go? X, Y, Z

Coordinates tell you where to place a shape. The workplane is at height $Z = 0$.

**Width**

from left to right

**Depth**

forwards and backwards

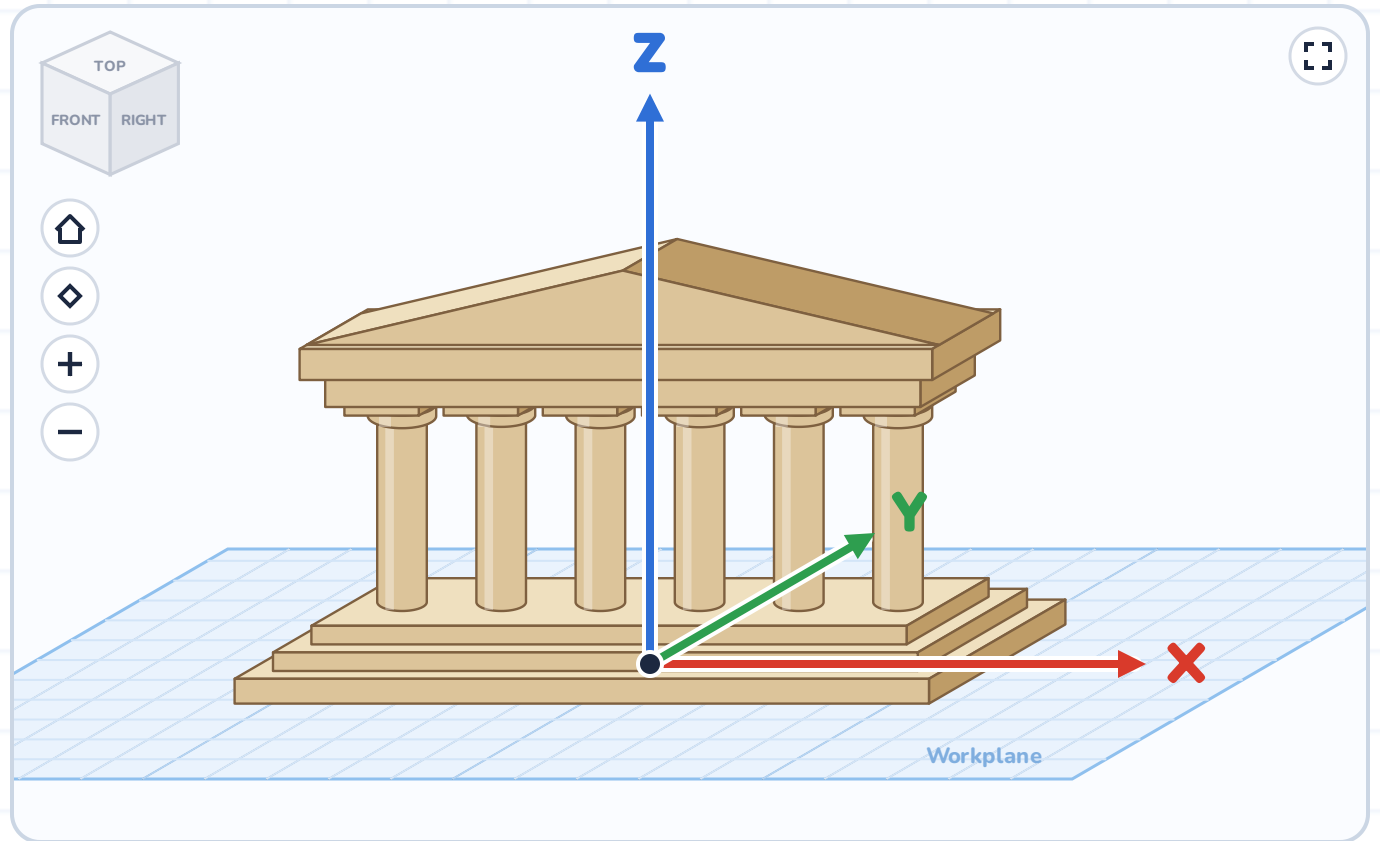
**Height**

down and up

QUESTION



A column moves up: which coordinate changes?



Variables: the temple's remote controls

A variable is a box with a name that stores a value. Change the value and the temple changes!

VARIABLES

set **N** to **6** --- number of columns
set **P** to **16** --- pitch: centre to centre (mm)
set **R** to **4** --- radius of the shaft (mm)
set **H** to **30** --- height of the shaft (mm)



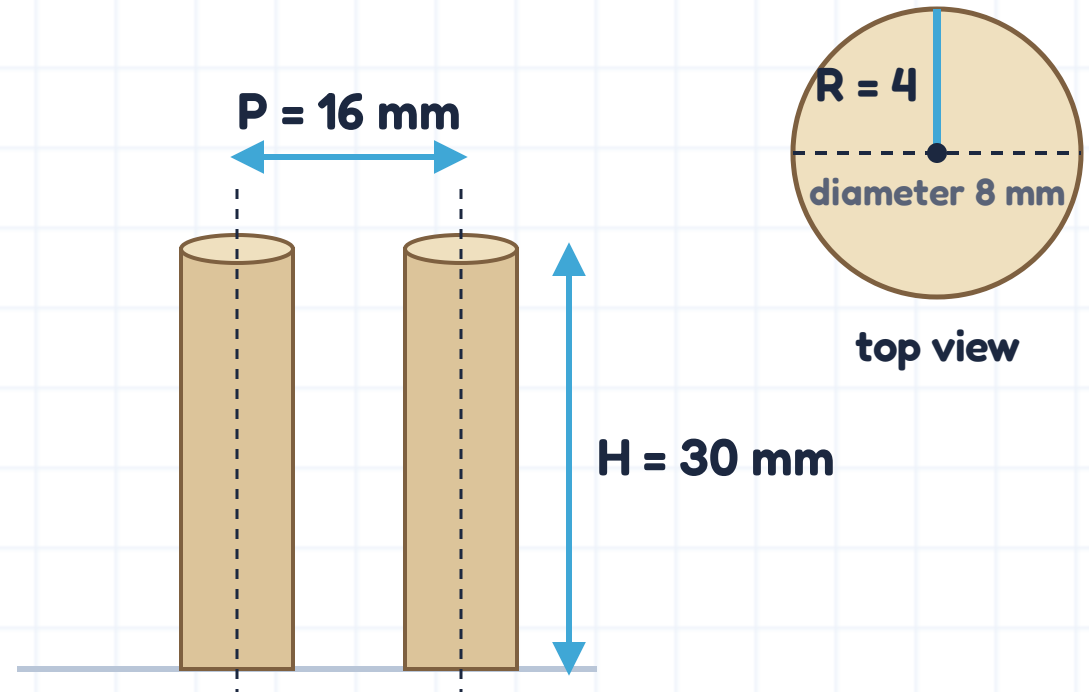
TIP

The diameter is twice the radius: $2 \times 4 = 8$ mm.

CHALLENGE



With $N = 6$ and $P = 16$, how many millimetres are there between the centre of the first column and the centre of the last one?





Level 1 · The three steps

Every shape is born with its centre at the point (0, 0, 0). Add the step, then move it to the right height.

PROGRAM · CREPIDOMA

Add    L 40 W 112 H 4

Move X 0 Y 0 Z 2

Add    L 32 W 104 H 3

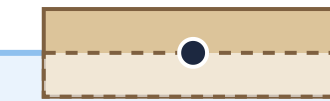
Move X 0 Y 0 Z 5.5

Add    L 24 W 96 H 3

Move X 0 Y 0 Z 8.5

1 · JUST ADDED

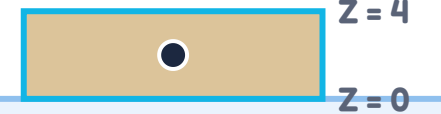
centre at (0, 0, 0)



half is below the plane!

2 · AFTER "MOVE Z 2"

centre at Z = 2



QUESTION



The step is 4 mm tall: why does its centre go to Z = 2?

WATCH OUT



In the Box block: L = length (front to back), W = width, H = height.



A complete column

The capital is made of the echinus and the abacus. Each part is added, then moved on top of the shaft.

PROGRAM · ONE COLUMN

Add    R 4 H 30 --- shaft

Move X 0 Y 0 Z 25

Add    R ? H ? --- echinus

Move X 0 Y 0 Z ?

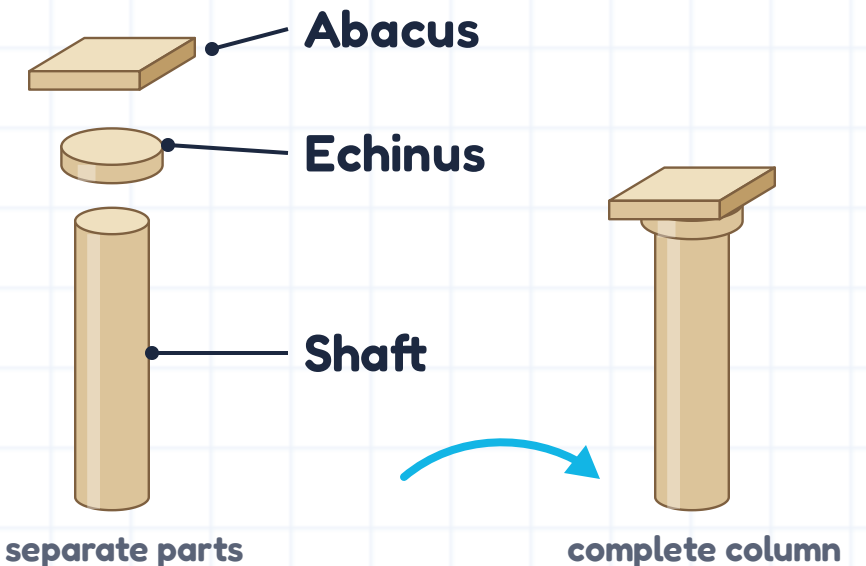
Add    L ? W ? H ? --- abacus

Move X 0 Y 0 Z ?

TIP



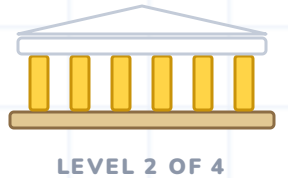
“Move” always acts on the shape you have just added.



CHALLENGE



The shaft ends at $Z = 40$. If the echinus is 2 mm tall, where does its centre go?

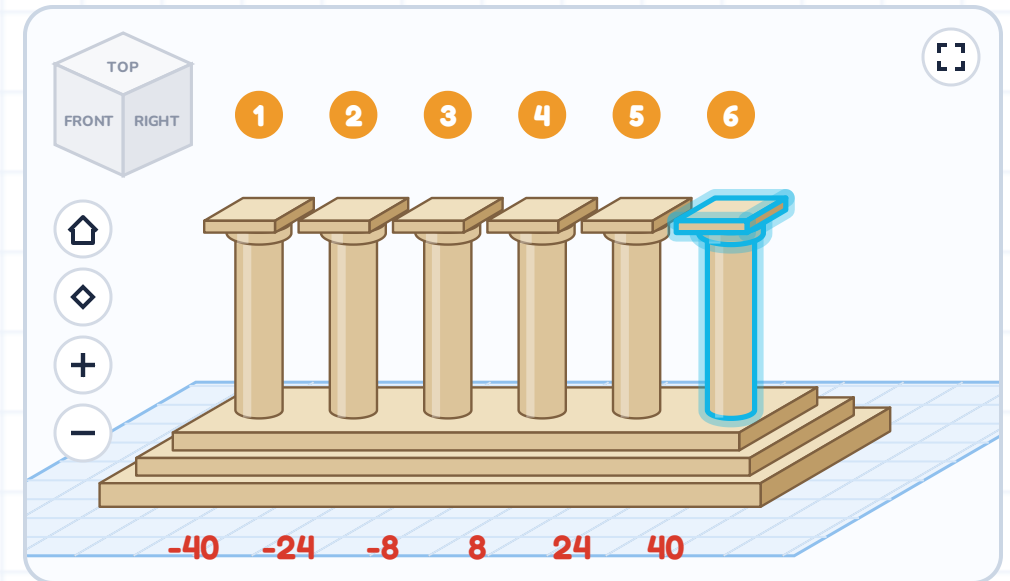


Level 2 • The loop of six columns

A loop repeats the blocks inside it: each time round, it builds a column and moves X by one pitch.

PROGRAM • COLONNADE

```
set X to -40
repeat N times
  Add [column block] R R H H
  Move X X Y 0 Z 10 + H ÷ 2
  + echinus and abacus: add and move
  change X by P
```



Without a loop

36 blocks



With "repeat"

9 blocks



TIP

Put "change X by P" last, INSIDE repeat.



Entablature and pediment

The entablature joins the columns. The pediment is a triangular prism: the Roof block.

LEVEL 3 · ENTABLATURE

Add    L ? W ? H ?

Move X 0 Y 0 Z ?

LEVEL 4 · PEDIMENT

Add    length 12

Scale X 5 Y 1 Z 1.2

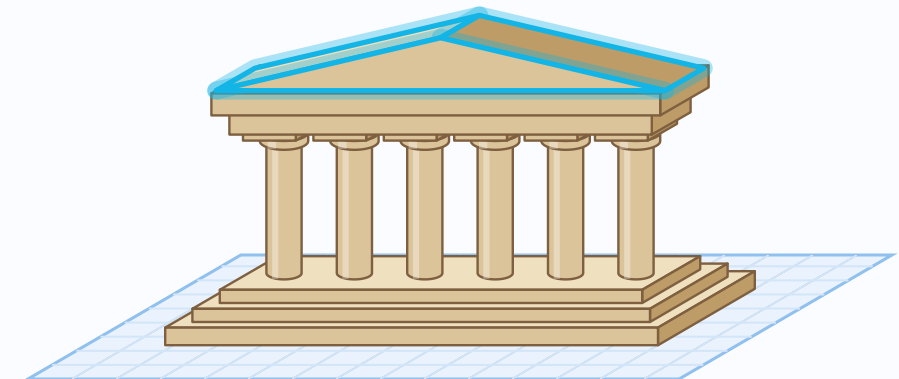
Move X 0 Y 0 Z 60

1 = the size stays the same
5 = it becomes 5 times bigger



RULE

Scale first, then Move.



CHALLENGE



How wide must the entablature be to cover all the columns? Hint: the centres go from -40 to 40 and the radius is 4 mm.



Bug hunt

First predict, then press Play. If the result is different, look for the first wrong block.



One block at a time



Play / Pause



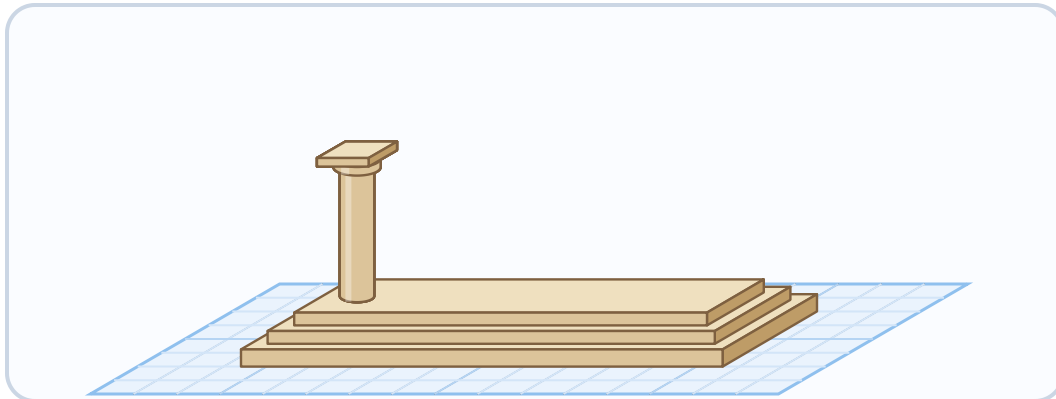
Fast



Restart



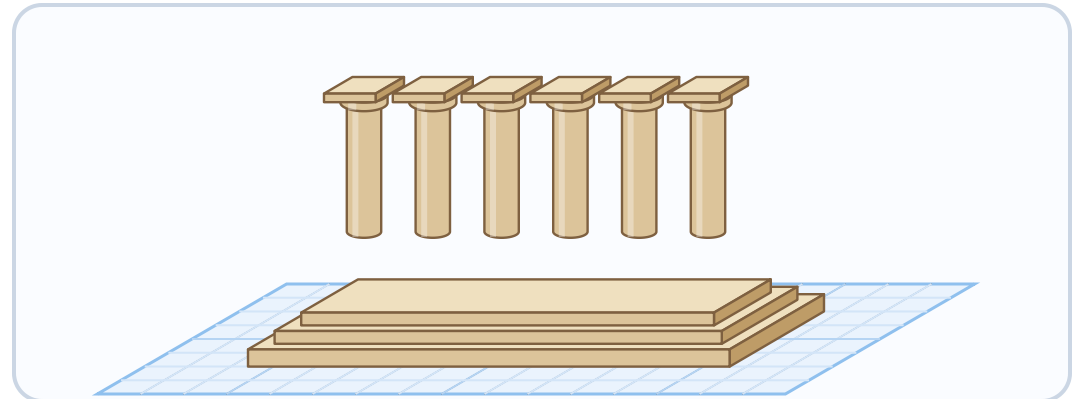
All the columns in the same spot



Check: change X by P inside repeat?



Shafts floating in the air



Check: Z must be $10 + H \div 2$



The power of a variable

Change only H: the shaft gets longer and every part above it moves up by itself.

set H ▾ to 30



set H ▾ to 40

PREDICT

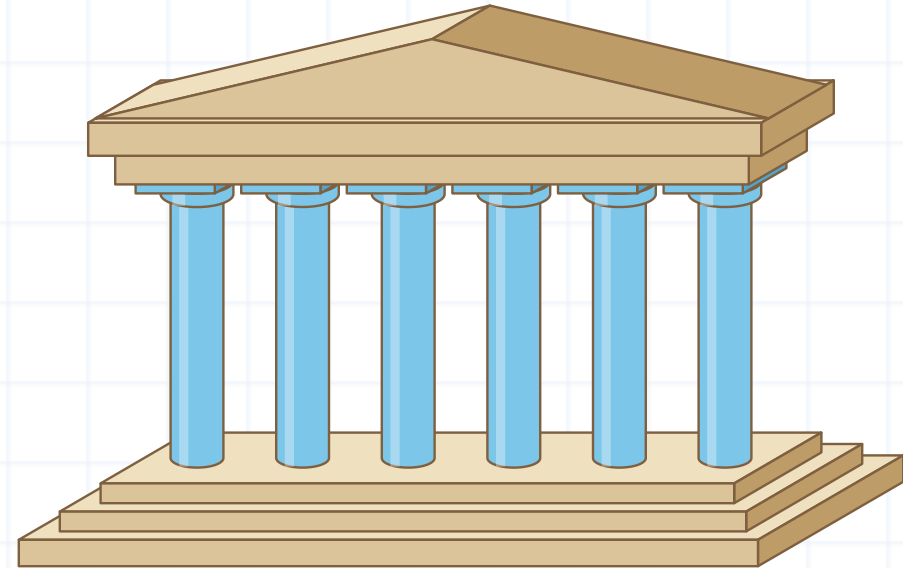


With $H = 50$, how tall will the temple be?



$H = 30 \text{ mm}$

66 mm



$H = 40 \text{ mm}$

76 mm



Team challenge

Change one variable. Predict the result, run the program and compare.



Pilot

Places the blocks and presses Play.



Checker

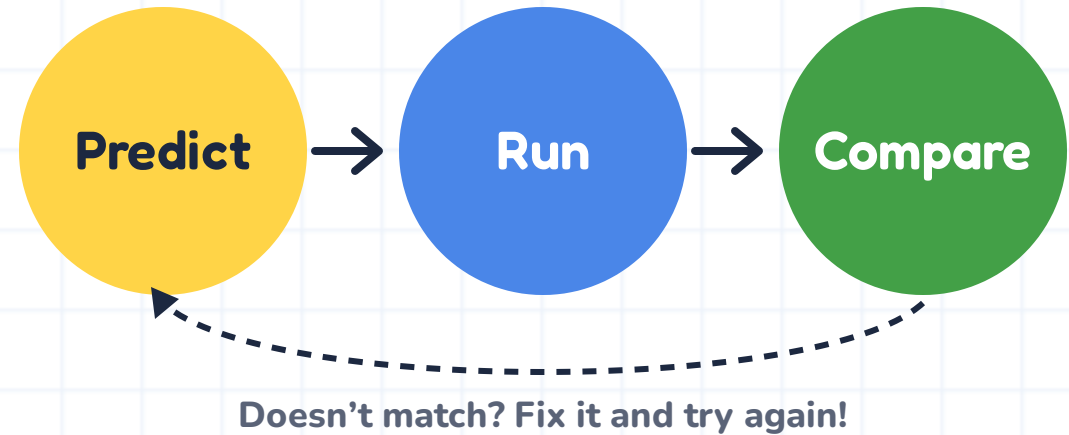
Compares blocks, values and model.



Reporter

Saves a picture and explains the change to the partner class.

Swap roles every 15 minutes!



BONUS MISSIONS

- ★ ★ ★ H = 40: predict the new height of the temple.
- ★ ★ ★ N = 8: do the columns still fit on the step? Which X should you start from?
- ★ ★ ★ P = 6: what happens to the columns? Why?

Your exit ticket

Answer the way you like best: writing, speaking, drawing or showing your project. Use an example from your work and share it with your partner class.

1

QUESTION 1

What is “repeat” for?

2

QUESTION 2

Which bug did you fix?

3

QUESTION 3

What changed when you modified a variable?
