



Computational Thinking Learning Environment for Teachers in Europe

# Handbook

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# 1 INTRODUCTION

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Welcome to the Colette Portal Handbook!

In the rapidly evolving educational landscape, integrating computational thinking skills has become essential to prepare students for the challenges of the future.

Colette is your all-in-one solution to teach and promote these skills in a dynamic and engaging way.

Designed with teachers in mind, Colette allows you to create interactive assignments and learning paths that encourage students to explore, experiment, and master the art of computational thinking.

This guide will walk you through the basic steps to using the Colette Portal and allow you to seamlessly guide your students to a deeper understanding of these important skills.

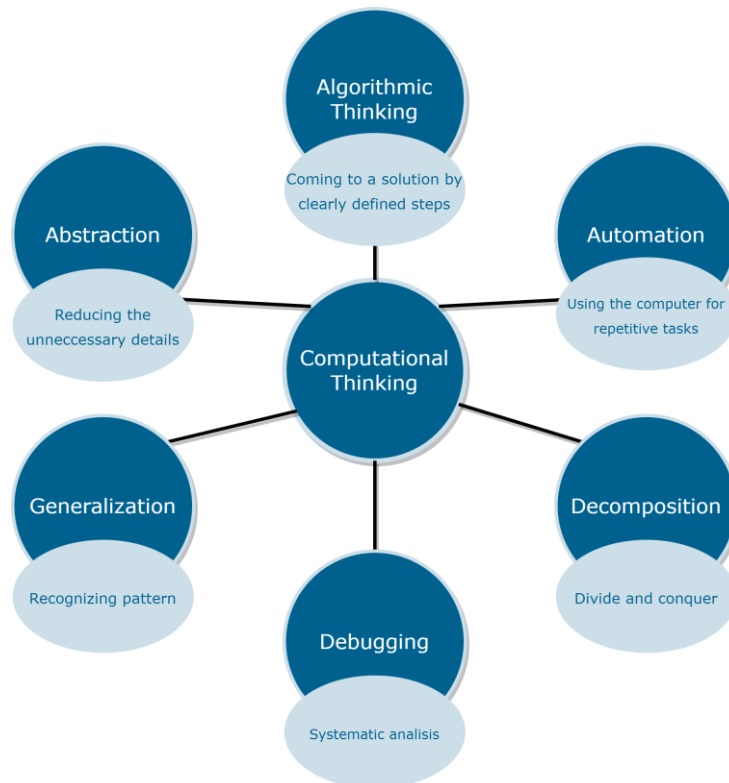
Join us on our journey of educational innovation and equip the next generation with the tools they need to succeed in an increasingly digital world - all through the intuitive and immersive experience of Colette.

## 2 WHAT IS COMPUTATIONAL THINKING?

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Computational Thinking is a collection of different problem-solving skills based on the skills needed to be a programmer. However, these skills are not only useful in programming, they are also applicable outside of computer science.

The six problem-solving skills we work with in the project, based on a compilation by Bocconi et al. (2016), are:



For a better explanation, we use an everyday example here to describe the individual capabilities.

### 2.1 ALGORITHMIC THINKING:

A recipe for making soup is, at its core, nothing more than an algorithm - a step-by-step guide to achieving a goal. Algorithmic thinking is needed when we want to create a recipe on our own.

### 2.2 DECOMPOSITION:

When creating the recipe, it is necessary to break down the big problem into smaller ones. For example, we could first ask ourselves what ingredients we want to use in the first place, and then think about the individual ways of preparing the vegetables.

### 2.3 AUTOMATION:

Cutting up vegetables and stirring soup are tasks that are repetitive and require little human input. Instead, the task can be handed over to a machine.

## **2.4 DEBUGGING:**

The ability to "debug" involves two different starting points of the process:

1. On the one hand, it is the ability that if the result is incorrect (for example, a soup that does not taste good), we can find the error and correct it.
2. On the other hand, it is also the ability that we can detect errors even before the execution of the recipe and also correct it.

## **2.5 GENERALIZATION:**

A solution that works for a certain problem can be extended in some situations so that it works for a whole class of similar problems. To stay with the soup example: Once we know how soup works, we can adopt a similar approach for other types of soup.

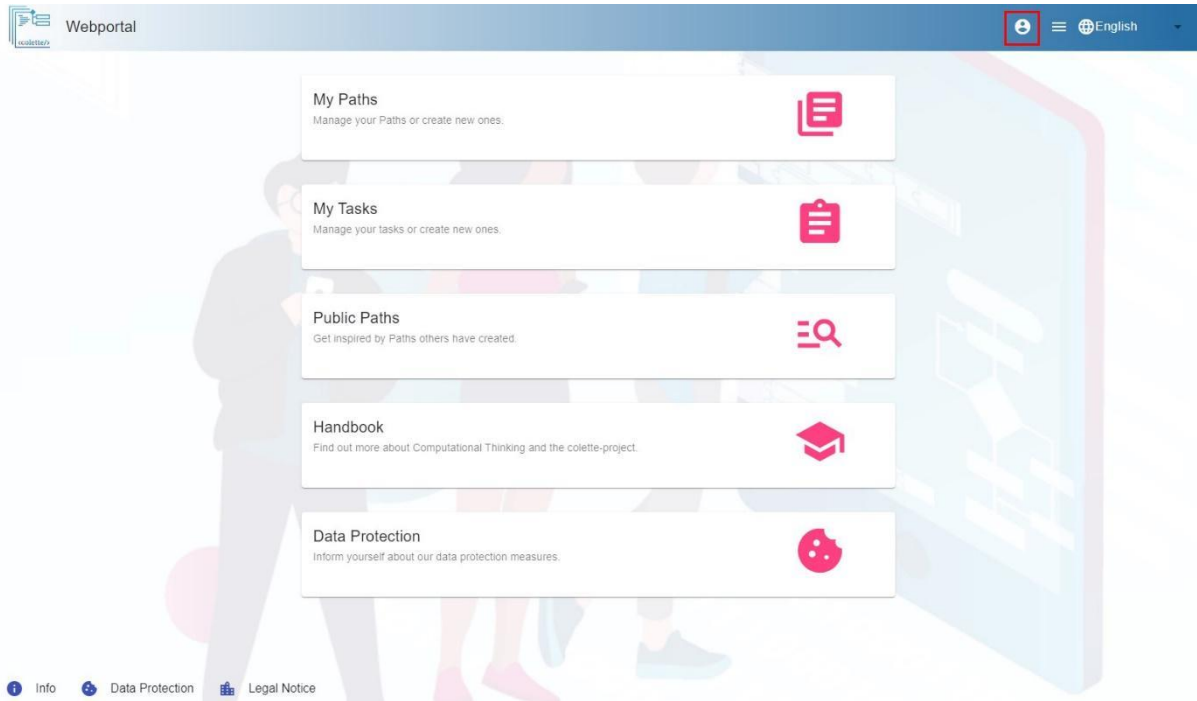
## **2.6 ABSTRACTION:**

Recognizing patterns in more complex processes and abstracting them to the essentials has always been one of the most important human skills in solving problems. This ability to focus on the core logic instead of being overwhelmed by every technical detail is crucial in programming. However, we also encounter many abstractions in the analog world. For example, a formally written recipe for cooking a soup can often be further abstracted and presented, for example, in the form of a flowchart that only depicts the core logic and omits all unnecessary details.

### 3 REGISTRATION

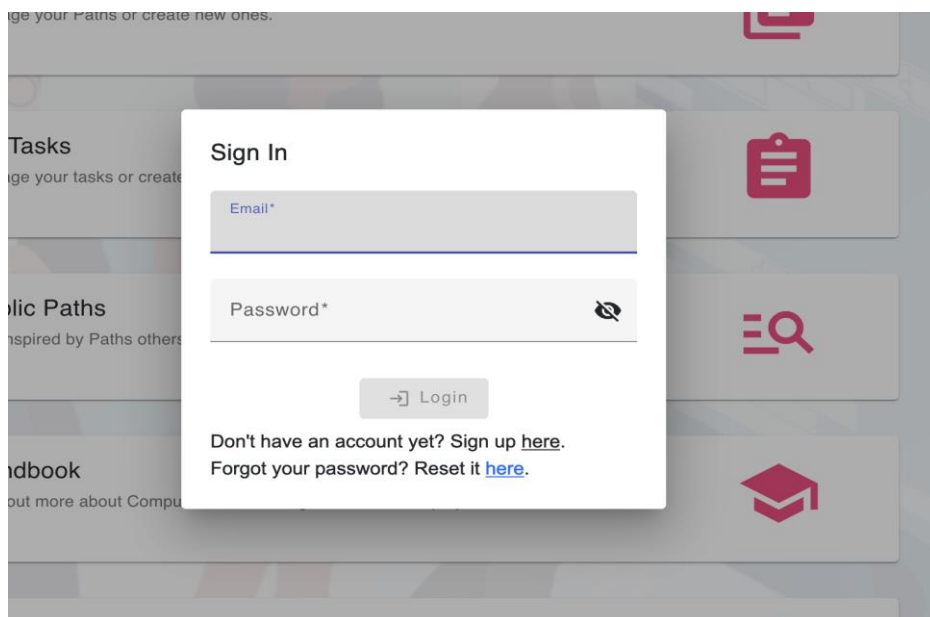
First, you need an account on the Colette portal.

To do this, go to <https://portal.colette-project.eu/#/> and click on the account icon at the top right of the bar.

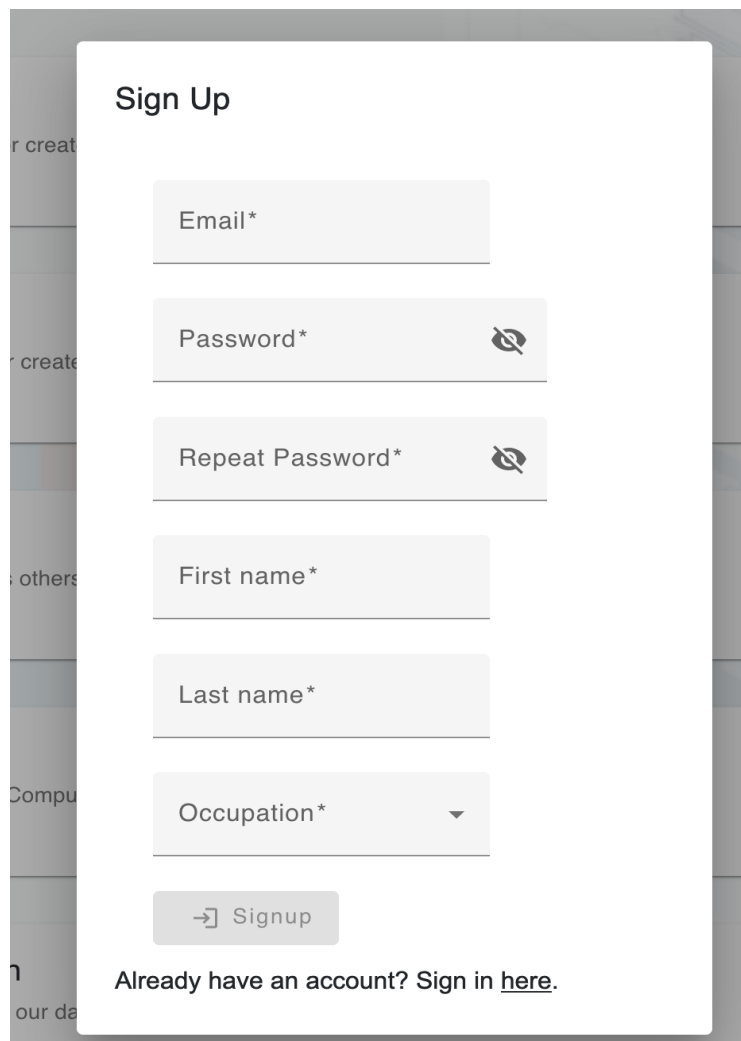


Now the login dialog appears, with the help of which you can log in later or reset your password, if you have forgotten it.

To create a new account for yourself, please click on Sign up **here**.



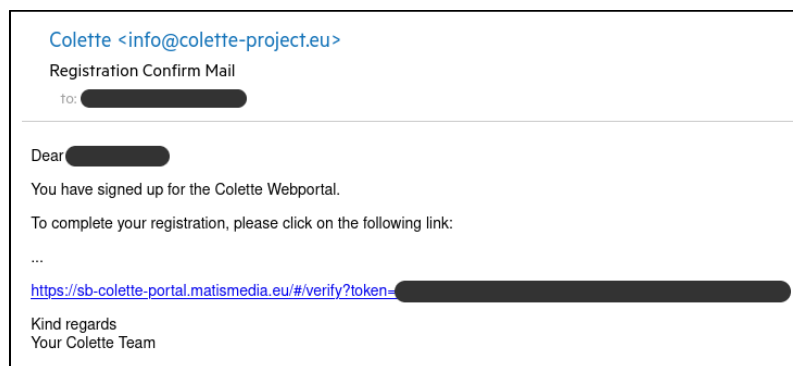
Now please enter your data, these are needed to create a new account.



The image shows a 'Sign Up' form with the following fields: Email\*, Password\* (with a toggle icon), Repeat Password\* (with a toggle icon), First name\*, Last name\*, Occupation\* (with a dropdown arrow), and a 'Signup' button with a right arrow icon. Below the button, it says 'Already have an account? Sign in [here](#).'

Once you have entered all your data, click on "Signup".

You will then receive an email to the email address you provided to confirm your account.



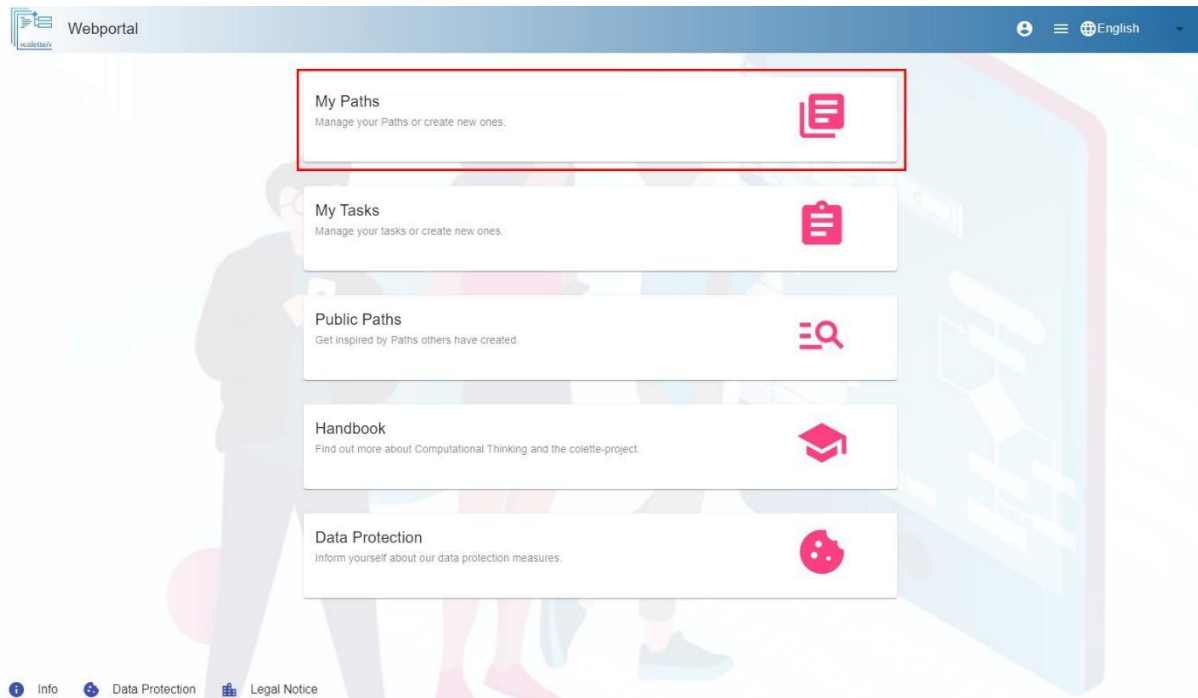
After the successful confirmation of your account, you can log in with your login data via the login dialog, with the help of which you have registered.

## 4 CREATE A PATH

A path is a collection of tasks that are to be processed one after the other.

You can freely decide which tasks you want to add and whether they should be mixed or thematically matching.

To create a new path, click „[My Paths](#)“ on the portal's main page.



On this page all your paths will be displayed later on.

Now click on the "+" to create a new path.



On the right you will see general information of your path that you need to enter.



You have to provide the following information:

- A title under which your path will be displayed later
- The approximate grade level for which your path is intended
- A description of your path. (e.g.: the topic you want to cover in this path).

You can also optionally add an image that will be displayed after the path is created. To do this, click on the magnifying glass icon under the <colette/> icon.

All tasks that you have already created will be listed in the upper left corner. You can also create new ones by selecting one of the task families at the bottom left (see below).

If you don't want to decide right away, you can of course add tasks to your path later.

Once you are satisfied with the path, click the "create the path" button to save the path.

The screenshot shows the 'Webportal' interface for creating a new path. The top navigation bar includes the 'Webportal' logo, a user profile icon, a menu icon, and the language 'English'. The main content area is divided into two panels. The left panel, titled 'Add tasks', shows 'Your tasks' (0 of 0) and 'Task families' including 'Building Cubes' (69 Scenarios), 'Drone' (30 Scenarios), and 'Free Task'. The right panel, titled 'Create a new path', contains a form with the following fields: 'Path title\*' (My first Path), 'Targeted grade level\*' (Lower Secondary), and 'Path Description\*' (This is my first path). Below the form is a section for 'Tasks in the path' with a message: 'There are currently no Tasks in your Path! Choose a task from the list on the left, modify it and then add it to your Path.' A 'Create the path' button is located at the bottom of this section.

## 5 CREATE A TASK

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There are several task families from which you can choose.

These provide the rough framework of the task.

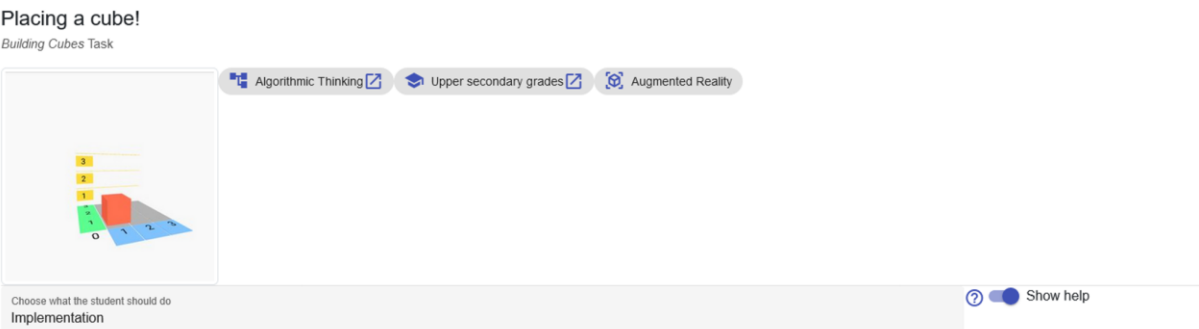
These include:

- Building Cubes
- Drone
- Patterns
- Free Task

In the following we will look at these individually.

### 5.1 BUILDING CUBES TASKS

The Building Cubes is about an algorithm creating its geometric objects or structures made out of colored cubes



First choose what you want your students to do:

- **Implementation** means that students build the structure from scratch using an algorithm
- **Fix The Error** allows them to build your own errors into the sample solution (see Below) for your students to fix
- **Parsons Puzzle** allows you to break the pattern solution into the individual blocks and randomize them so that your students then have to put them together correctly.

After that, you have to choose a scenario.

Here it means that you choose some kind of structure on how the cubes should be arranged.

My new awesome Task!

Building Cubes Task

Algorithmic Thinking Upper secondary grades Augmented Reality

Choose what the student should do  
Implementation

Show help

Task Settings Preview

Choose the scenario  
Cuboid

Cube Wireframe

L-Shape

Tower

Cube

Cuboid ✓

Gate

Once you have done this, you can still customize this structure using the settings options.

With the help of the refresh button (blue with 2 arrows) under the setting variables you can refresh the view on the right.

Task Settings Preview

Choose the scenario  
Cuboid

Width\*  
1

Depth\*  
1

Height\*  
1

X Start Value\*  
1

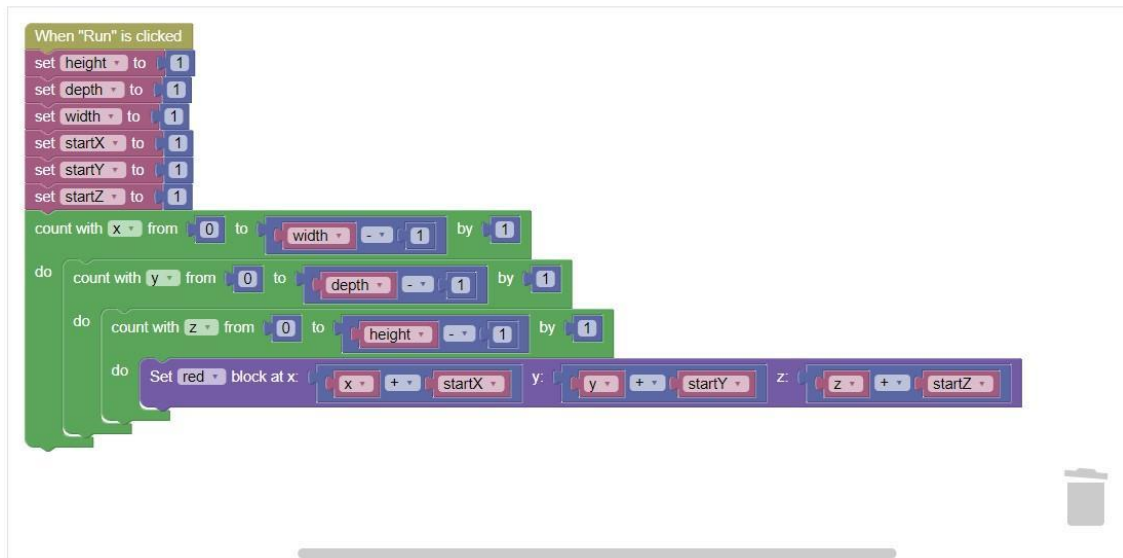
Y Start Value\*  
1

Z Start Value\*  
1

Update the preview automatically

Here you see the sample solution, which your students will not see in Implementation until they failed (too many wrong attempts). For Fix The Error, you have to add an error here. For Parsons Puzzle, here's what your students will see.

<> Sample Solution in Blockly



Here you can change the title, the image and the task. Don't forget to save your changes here (save icon).

You can add up to 3 hints. You must save them as well.

To save a task, you must either take a screenshot of the current preview image using the "Take a Screenshot" button or upload your own image.

Assignment Preview

My new awesome Task! ✎

Place a cube at x=1, Y=1 and z=1. ✎

📄

Take a Screenshot!

**Keywords**

Algorithmic Thinking ✎
Upper secondary grades ✎
Augmented Reality ✎

Add keyword

⌂
 Add to path

Hint 1

✎
🗑
 Sketch the cuboid using cubes.

Hint 2

✎
🗑
 Think about the layers of the cuboid.

Hint 3

✎
🗑
 Three nested loops over the coordinates might be useful.

Once you are satisfied, you are asked again if everything meets your expectations.

If so, the Task is created and added to the path if necessary.

Confirm

Are you sure?

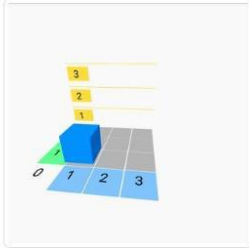
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**My new awesome Task!**  
Task Family "Building Cubes"  
Implementation Task  
Scenario "Cuboid"

Algorithmic Thinking

Upper secondary grades

Augmented Reality



**Assignment / Problem Definition**

Place a cube at  $x=1$ ,  $y=1$  and  $z=1$ .

**Hint 1**

Sketch the cuboid using cubes.

**Hint 2**

Think about the layers of the cuboid.

**Hint 3**

Three nested loops over the coordinates might be useful.

Yes  No

## 5.2 AR-TOKEN TASKS

With this task family, it is important that students have an AR marker. You can find this on our website. It is best not to print them too large (about 5x5cm is large enough).

A PDF file with 24 markers per page can be found at: <https://colette-project.eu/AR/>.



### 5.3 PATTERNS TASKS

Patterns Tasks are about analyzing the structure of a series and identifying the pattern that underlies the series.

First, choose what you want the student to do:

- **Fill the gap** means that the student will insert a missing element within a series of elements

My new Patterns task!

Patterns Task

Algorithmic Thinking Lower secondary grades Abstraction

200 300 400 500 700 800

Choose what the student should do  
Fill the gap

Show help

After that, you have to choose a scenario.

In this case, it means that you choose the type of patterns (elements) that will make up the series.

- **arithmetic** means numbers with even spacing
- **geometric** means numbers with factorized spacing
- **Tile Pattern** means that you have a set of tiles that can be rotated and mirrored

Task Settings Preview

Choose the scenario

Solution

Problem

Arithmetic Progressions

Geometric Progressions

Tile Pattern

Here you can see the result of your settings.

In order to add this task to the path, you have to take a screenshot first


Add to path

Once you have done this, you can customize the series of patterns in the settings, specifying, among other things, which elements are missing from the series to be used later by your students.

## Task Settings

Choose the scenario  
Tile Pattern

Choose a position to configure  
Position 4



Pattern length\*  
5

Missing index\*  
2

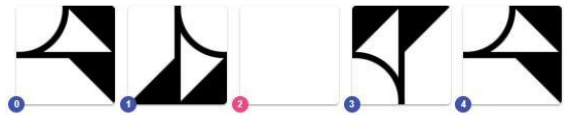
Update the preview automatically

## Preview

### Solution



### Problem

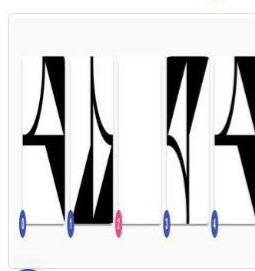


Once you are satisfied with the problem, you can give your task a suitable title and up to 3 hints, which can help your students in case they have problems to master the task without help.

As an image you can either insert a screenshot via the "Take a Screenshot" button, or upload your own image, which is suitable for your task or topic.

## Assignment Preview

My first tile-pattern task



Find the missing tile and transformations and complete the pattern.

Take a Screenshot!

Hint 1

Think about what happens from one tile to the other.

Hint 2

Are the tiles rotated, mirrored, or both?

Hint 3

If the tiles are rotated, do they rotate left or right?

## Keywords

- Algorithmic Thinking
- Lower secondary grades
- Abstraction

Once you are satisfied, you are asked again if everything fits. If yes, the task is created and added to the path if necessary.

Confirm

Are you sure?

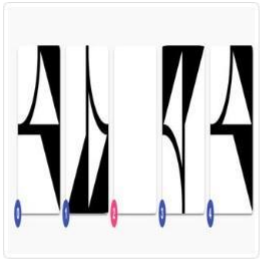
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**My first tile-pattern task**  
Task Family "Patterns"  
*Fill the gap* Task  
Scenario "Tile Pattern"

[Algorithmic Thinking](#)

[Lower secondary grades](#)

[Abstraction](#)



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**Assignment / Problem Definition**

Find the missing tile and transformations and complete the pattern.

[Hint 1](#)

Hint  
1

[Hint 2](#)

Hint  
2

[Hint 3](#)

Hint  
3

---

Yes    No



## 5.4 FREE TASKS

With Free Tasks you can create your own tasks without any specifications.

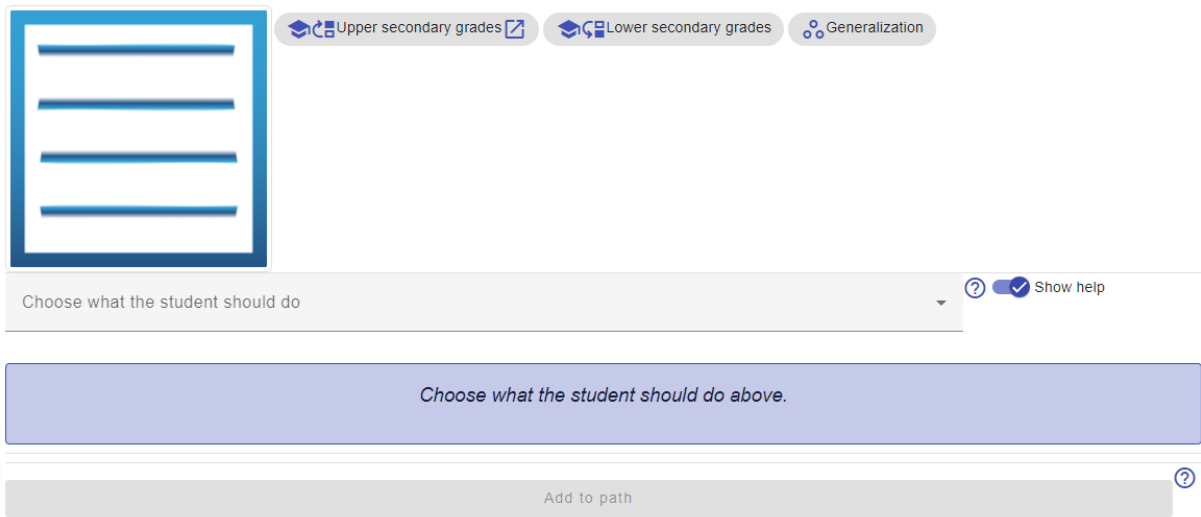
This allows you to create tasks for all kinds of problems.

First select what you want the student to do:

- **Match exact text** means that they will be asked to match an exact text
- **Free Text** means that you can ask a task as free text
- **Picture** means that you can ask a task as a picture

My new awesome Task!

Free Task Task



The screenshot shows a task creation interface. At the top, there is a title "My new awesome Task!" and a subtitle "Free Task Task". Below the subtitle, there are three buttons for selecting the task type: "Upper secondary grades", "Lower secondary grades", and "Generalization". To the left of these buttons is a placeholder image showing a blue-bordered box with four horizontal lines. Below the buttons, there is a dropdown menu with the text "Choose what the student should do" and a "Show help" button. Below the dropdown menu, there is a blue button with the text "Choose what the student should do above.". At the bottom, there is a grey button with the text "Add to path" and a help icon.

Once you are satisfied with the problem, you can give your task a suitable title and up to 3 hints, which can help your students, if they have problems to master the task without help.

As an image you can either insert a screenshot via the "Take a Screenshot" button, or upload your own image, which is suitable for your task or topic.

## Assignment Preview

My new awesome Task! 









What is the name of the project? 

 Hint 1  
 <enter your first hint here>

 Hint 2  
 <enter your first hint here>

 Hint 3  
 <enter your first hint here>

## Keywords

 Upper secondary grades   Lower secondary grades   Generalization 

Enter new keyword







Once you are satisfied, you are asked again if everything fits. If so, the task is created and added to the path if necessary.


### Confirm

Are you sure?

#### My new awesome Task!


Task Family "Free Task"  
Match exact text (case insensitive) Task  
Scenario "Match exact text (case insensitive)"


 Upper secondary grades   Lower secondary grades   Generalization 




#### Assignment / Problem Definition

What is the name of the project?

 Hint 1  
<enter your first hint here>

 Hint 2  
<enter your first hint here>

 Hint 3  
<enter your first hint here>

Yes    No

## 6 OPEN A PATH IN THE APP

The app can be seen as a counterpart to the portal.

While the portal is meant for teachers to create tasks and paths, the app is primarily meant for students to work on those tasks.

You can find the app in both the Google Play Store (for Android devices) and the App Store (for iOS devices).

Open the link to the corresponding app or scan the QR code with your smartphone and install it on your device.

[Google Play Store](#)

(for android devices)

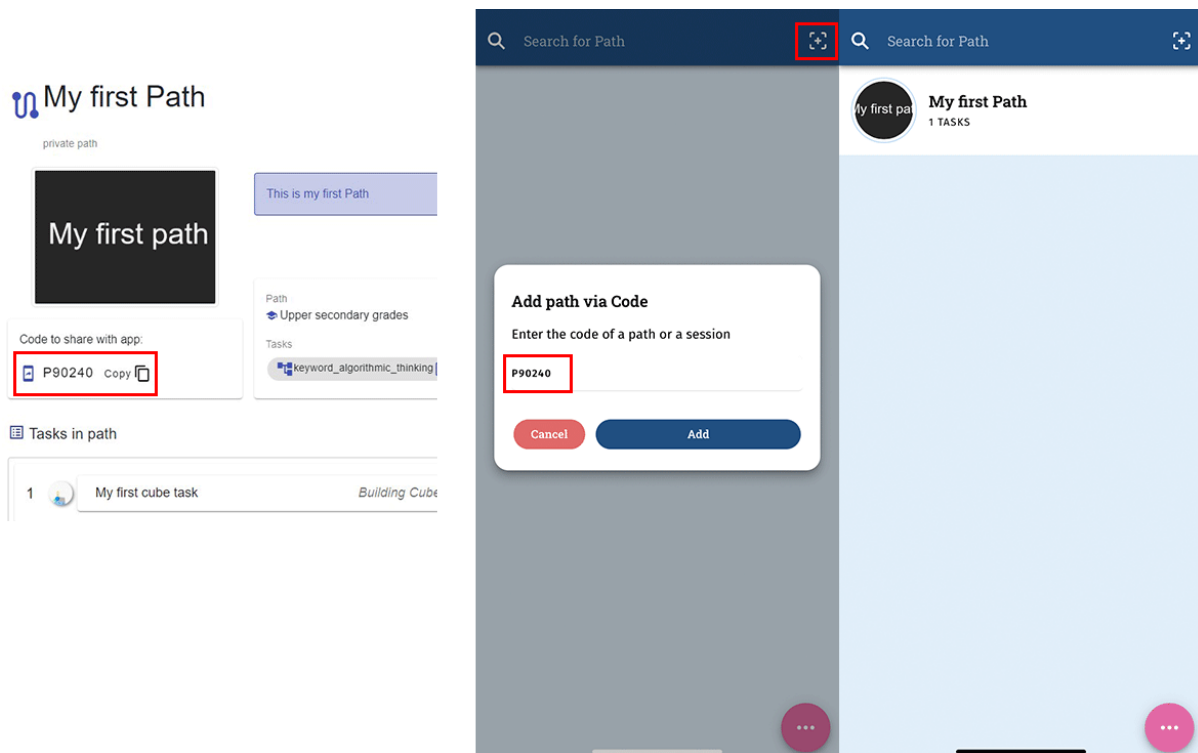


[App Store](#)

(for iOS devices)



When viewing the path via "My Paths" for your paths, or "Public Paths" for all already published paths, you will see the path information on the right as well as the tasks within the path. Using the code that sits below the image, your students can add to the path.

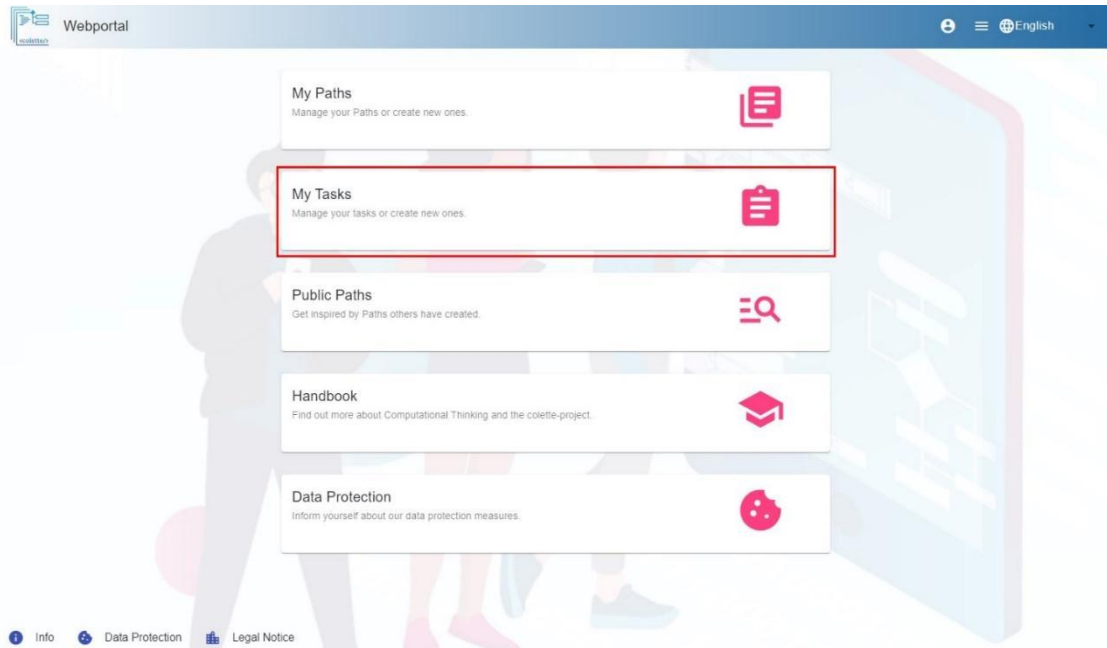


## 7 EDIT TASKS

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Of course, it is possible to edit an already existing task.

To do this, navigate to the main portal page and click on „[My Tasks](#)“.



Now select the task you want to edit in the bar on the left, click on it.

More detailed information about this task will be displayed now.

Open the task by clicking the button at the bottom right of the detailed information.

The task will now open in the right side of the window.

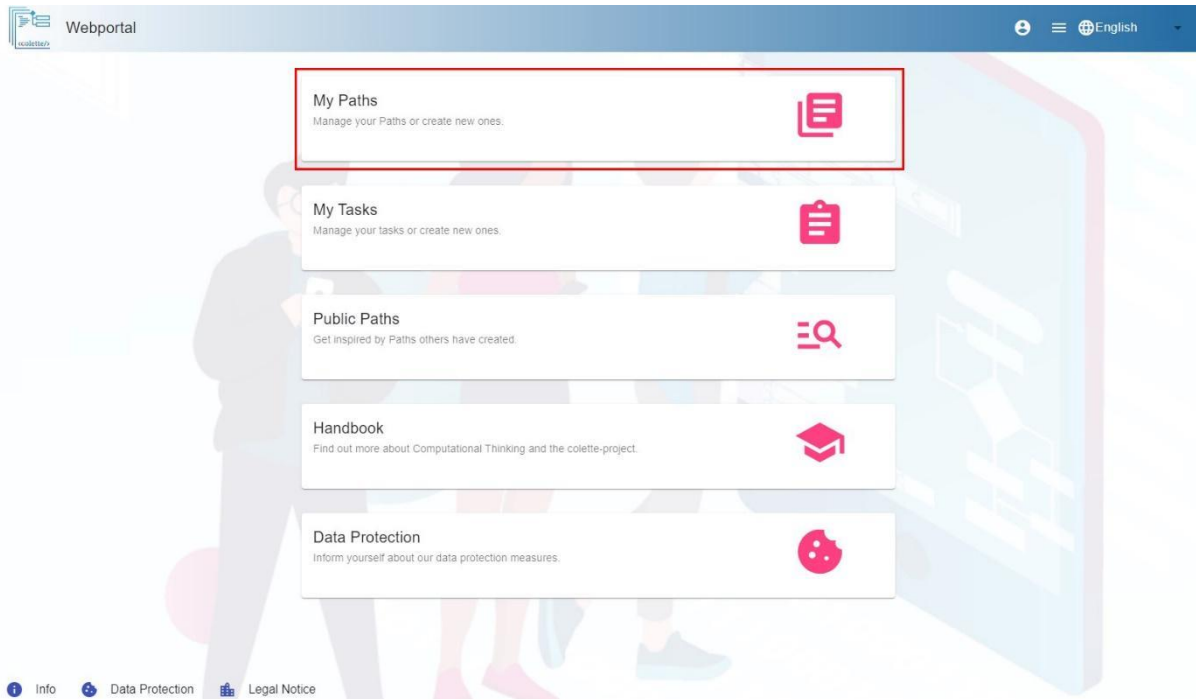
To edit it, please click on the edit button at the top right of the window.

Make the desired changes and then click on the save button.

## 8 EDIT PATHS

Of course, it is possible to edit an already existing path.

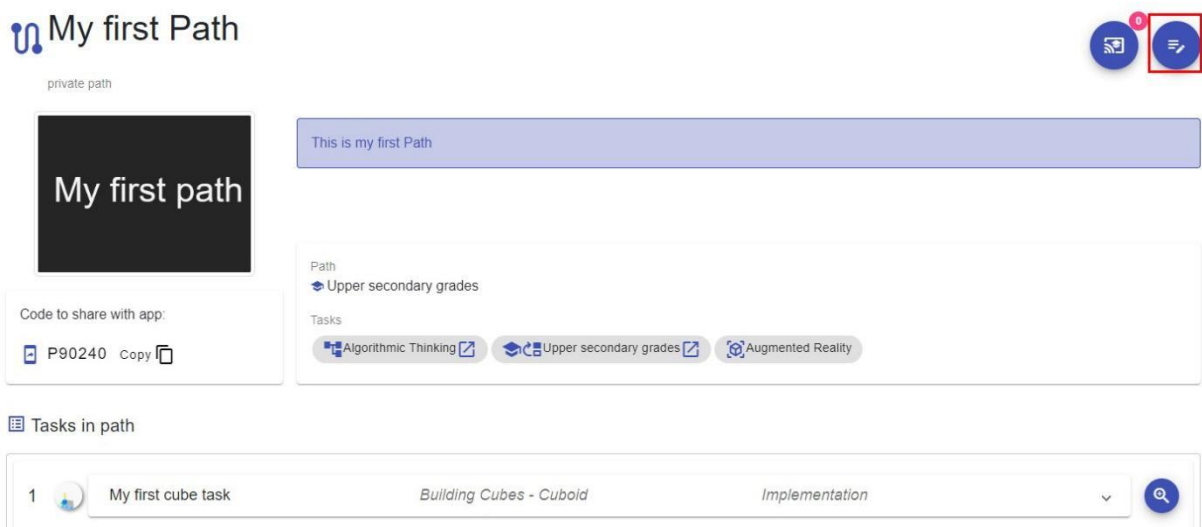
To do this, navigate to the portal main page and click on „[My Paths](#)“.



Now select the path you want to edit in the bar on the left.

This is now displayed on the right side of the window.

To edit the path, click on the edit button in the upper right corner of the window.

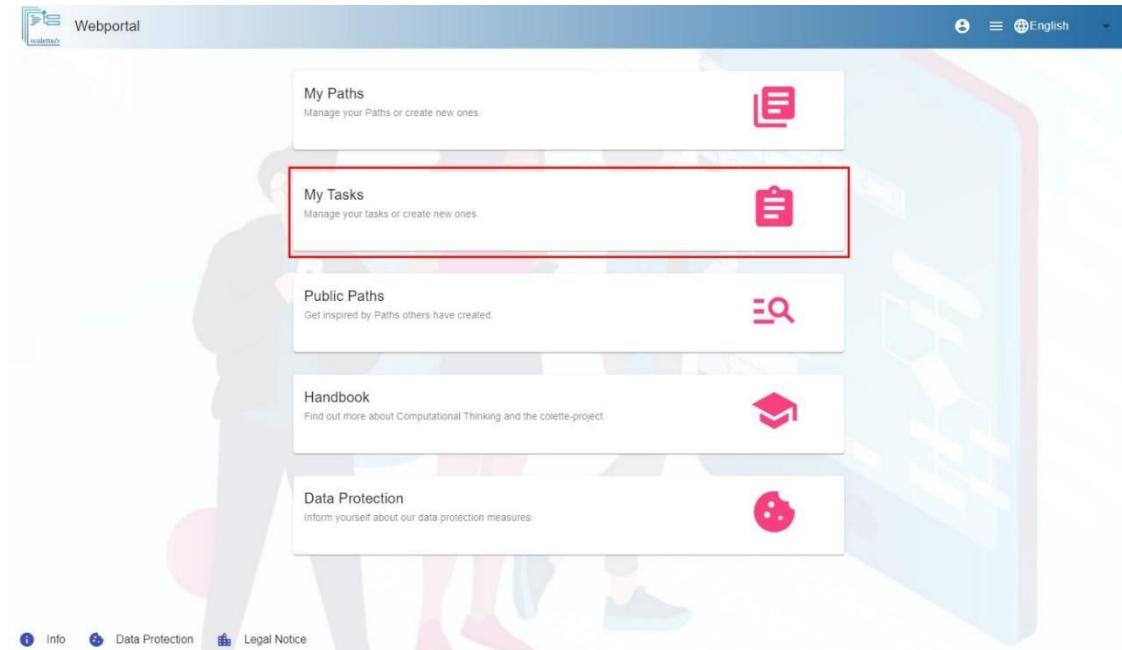


Make the changes you want or add more tasks. Then click the Save button to make your changes effective.

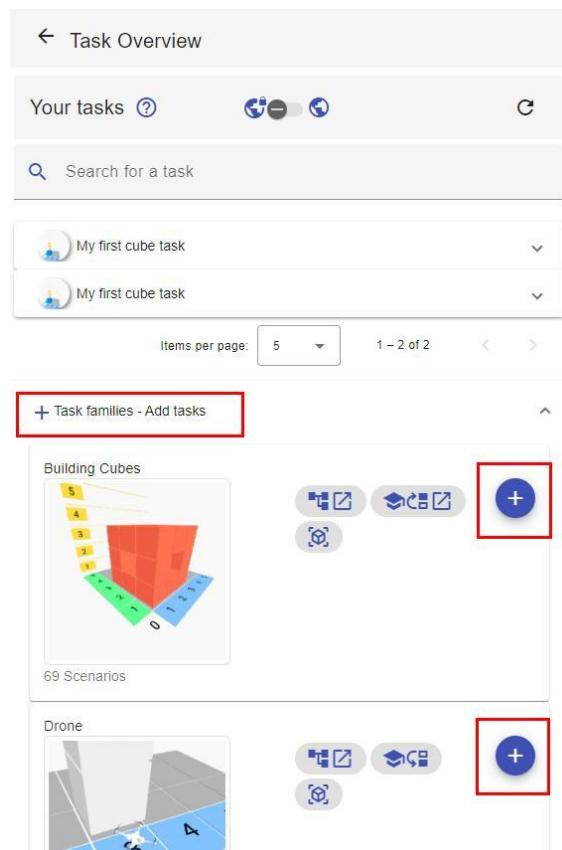
## 9 CREATE TASKS WITHOUT PATHS

You can also create tasks without adding them directly to a path.

To do this, navigate to the main portal page and click „[My Tasks](#)“.



Now click on "Add task" and then on the "+" next to the desired task type. From here on follow the steps to create a task of the corresponding task type.



# 10 DIGITAL CLASSROOM

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## 10.1 WHAT IS A DIGITAL CLASSROOM?

A Digital Classroom gives you the ability to interactively stay connected with your class and closely monitor their learning progress in real time.

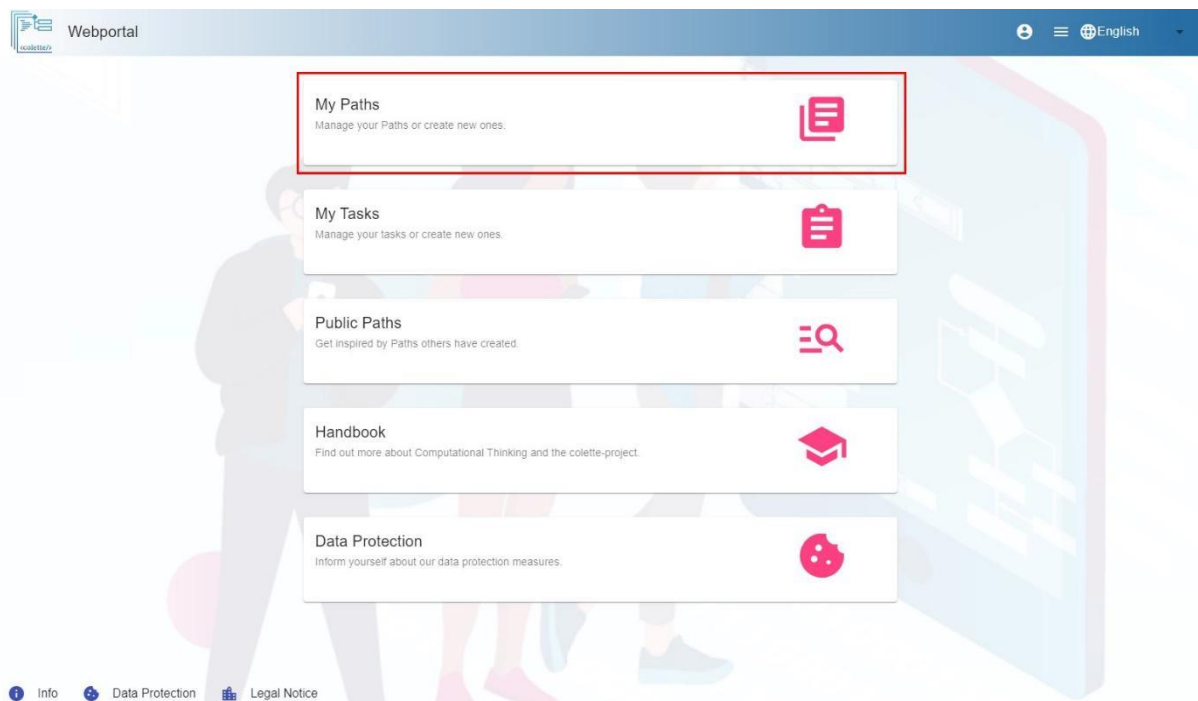
A Digital Classroom always exists for an existing Path to be worked on, but you are free to create as many Digital Classrooms for a Path as you like. Your students can now join this Digital Classroom and work on the path in the timeframe you specify.

As a teacher, you can now monitor in real time how your students are progressing, what problems they encountered while working on which task, which tasks were successfully completed and respond to them in the form of a chat.

In this way, you always have an overview and can optimally support your students in their learning progress.

## 10.2 CREATE A DIGITAL CLASSROOM

To create a Digital Classroom, please navigate to the main portal page and click on „[My Tasks](#)“.

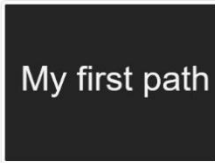


Select the path to be added to the Digital Classroom and open it.

At the top right of the window you will now see the "Digital Classroom" button, next to which you can see how many Digital Classrooms are currently active for this path.

Now click on this button to get to the overview of all existing digital classrooms for this path.





This is my first Path

Code to share with app:

P90240 Copy

Path  
Upper secondary grades

Tasks

Algorithmic Thinking Upper secondary grades Augmented Reality

Tasks in path

1 My first cube task Building Cubes - Cuboid Implementation

Now you can see an overview on the left side, of all your Digital Classrooms for this path and in which state they are.

A Digital Classroom can either be ...

- Planned
Active
Completed

... be.

With this overview you can always navigate to your Digital Classroom later on.

To create a new digital classroom, click on the "+".

On the right side you will see the create dialog.

Enter a title, a description, a welcome message for your students, as well as the time period during which the Digital Classroom should be active and therefore open for your students to work on.

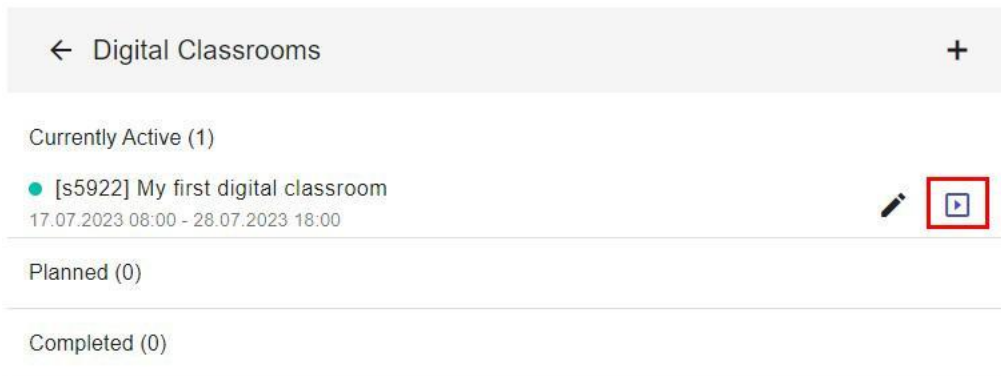
Once you are satisfied, click save.

Webportal interface showing 'Create a digital classroom' dialog with fields for title, description, welcome message, and dates. Includes 'Cancel' and 'Save' buttons.

The Digital Classroom you have created is now displayed in the overview on the left in the corresponding status category.

You can still edit your digital classroom in the future by clicking on the pencil.

Now open the Digital Classroom by clicking on the play button to get to the overview.



### 10.3 THE OVERVIEW

In this view you will see a list of all the actions of your students once they have joined the session.

Joining is done through the Colette app and is described in more detail in Chapter 6 - Opening a Path in the App.

**(Important:** Use the session code instead of the path code for this! This is the number beginning with an "s" that is displayed next to or above your Digital Classroom. So in the image above the session code would be "s5922" and in the image below "s109").



● Currently Active

## [s109] A new Digital classroom!

This is an example

3 day(s)

<b>A</b>	Anna Torphy	Progress		TASK_SUBMIT	>
<b>D</b>	Dwight Rosenbaum	Progress		No Event	>
<b>E</b>	Elvira Pacocha	Progress		No Event	>
<b>M</b>	Marie Dach	Progress		No Event	>
<b>R</b>	Randal Cole	Progress		TASK_LEAVE	>

The progress bar in the middle of each entry shows which tasks have already been started or completed. The last event is displayed next to it.

Clicking on the right arrow takes you to the detailed view (see below).



● Currently Active

# [s624] Digital Classroom Test

Digital Classroom Test

Remaining time: 15 day(s)

A	Another Test of ti.	Progr...		Session joined	>
B	Bea	Progr...		TASK enter	>
C	Christian	Progr...		Task leave	>
C	Christian	Progr...		Session joined	>
E	Eva Schmidthaler	Progr...		TASK enter	>
E	eva test	Progr...		Task leave	>

## 10.4 THE DETAIL VIEW

In the detail view all events of a person can be seen, and filtered by the student submissions. The type of events sent by the app when a student submits something is called TASK\_SUBMIT, and can be turned on as a filter by clicking the button in the filter bar to see only the submissions.

The individual submissions show various details about the particular assignment, as well as the student's submission.

For example, you get to see how many attempts the respective student took.

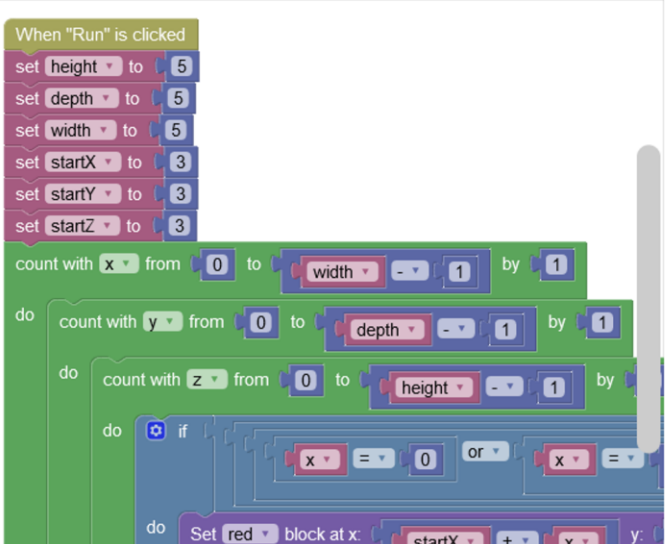
● Event Filter TASK\_SUBMIT

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**T** TASK\_SUBMIT  
22.05.2023 09:28 Give Feedback

**Task 1:** Attempt: 2 ✓  
Something with a building cubes problem

<> Show Blockly Code ^



```
When "Run" is clicked
  set height to 5
  set depth to 5
  set width to 5
  set startX to 3
  set startY to 3
  set startZ to 3
  count with x from 0 to width - 1 by 1
  do
    count with y from 0 to depth - 1 by 1
    do
      count with z from 0 to height - 1 by 1
      do
        if x = 0 or x = width - 1
          do
            Set red block at x: startX + x y: startY + y z: startZ + z
```

Message  

Clicking "Give Feedback" will reference that event in the next chat message, making it possible to point out specific things that happened in that solution to your students. In the chat, students can then go back within the app to see the delivery you are referring to by tapping on the feedback message.

However, the chat also allows you to interact with your students normally. For example, you can share images, audio, and text files with each other and offer selective support.