Coding4Girls Course Platform Manual v1.5f

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This project has been funded with support from the European Commission. This software reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

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CODING4GIRLS TEACHER'S PLATFORM USER MANUAL

TABLE OF CONTENTS

INTRODUCTION

Coding4Girls addresses the gap between male and female participation in computer science education and careers by introducing early methodological learning interventions that make computer science attractive to all. It showcases interventions that target the factors that lead girls to not choose computer science, namely a) misperception of the roles and professional careers; and b) wrong assumption of insufficient skills. The main goal is to attract girls by raising their awareness on the rich possibilities for professional and personal growth that computer science offers and by preparing them for future engagement in computer science careers.

The Coding4Girls platform is designed to challenges the learners to see the big picture before designing a detailed solution, encourages them to consider wider community interests, and also challenges them to think entrepreneurially on how digital technologies can be used to address real-world problems.

The main idea of the project is to provide to the learners an innovative fun and interesting environment for their coding courses using the Snap! programming language, a Berkeley-based derivative of the famous visual programming Scratch, which elaborates on its ancestor by adding some high level programming possibilities. More instructions on how to use Snap! and its capabilities can be found on: https://snap.berkeley.edu/

This coding environment has been tailored to raise the interest of girls into coding by making them play games they particularly like, but boys also appreciate the type of games offered by the platform. All the games offered to the students are related to and exemplify the actual programming concepts that are at the heart of their courses. The courses, using elements of the design thinking methodology, present to the students an

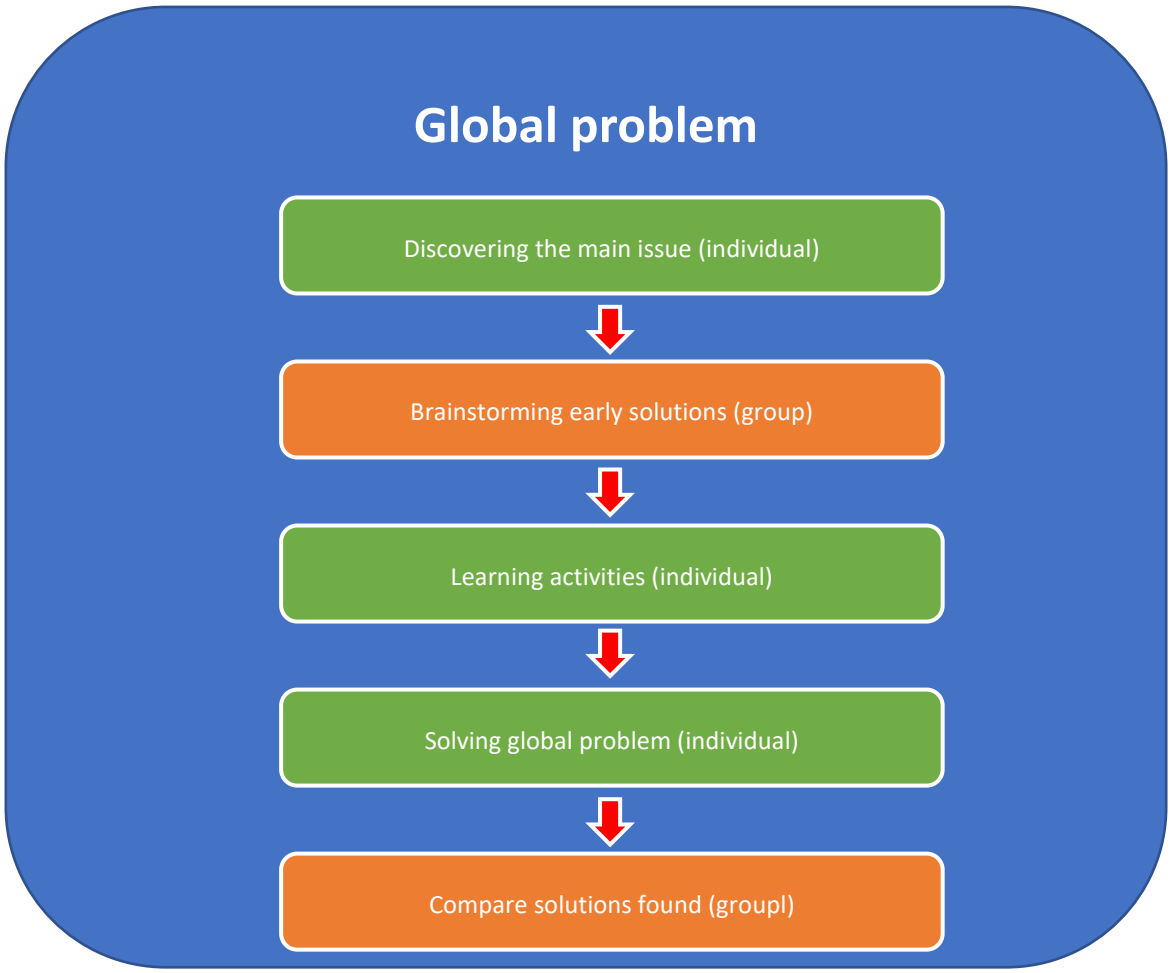


Figure 1: C4G project methodology

overarching issue to solve and present the tools to solve it in a step-by-step approach.

The Coding4Girls project is actually divided into two distinct entities:

- A web-based platform where teachers will prepare their coding course using Snap!, follow the advancement of their students and access a public repository of courses created by other teachers
- A Unity 3D videogame that the students will use to discover and complete the courses prepared by their teachers in a fun, engaging and gamified fashion.

The current manual aims to explain how to use the teacher's platform efficiently rather than describe how it was designed and goes into details about implemented mechanisms rather than specifications and design process. The exact specification can be found in the Coding4Girls game design document.

The manual of the game is found in a different document.

From now one the abbreviation C4G is going to be used to represent the project's full name, Coding4Girls.

WORD OF CAUTION

The platform is a work in constant progress. This means that the online version of the tool is updated frequently in order to add new features and correct bugs, up to several times a day. So until the software reaches it's very final version, this manual is also a work in progress.

You might find for example that there are some discrepancies between some screenshots and the actual images included in the manual, or maybe some features in the software are not detailed in the manual. Don't worry, it just means that a new version of the manual is about to be published.

If you have any question, please feel free to send an email to the lead developer at this email address, he will answer you promptly: olivier.heidmann@gmail.com.

A FEW WORDS ON THE GENERAL STRUCTURE OF C4G

Please note that from now the following terms will be used interchangeably, meaning the same thing throughout this manual:

- teacher's platform and platform
- users and teachers
- players and students
- copy and clone

The Coding4Girls platform has been designed with efficiency and a minimalist credo in mind. In order for students to access to their coding activities (grouped in what the platform calls **courses**), they have to receive from their teacher a certain code corresponding to the relevant course and register themselves to the course by using this very code.

Courses are created by teachers and are functionning as a grouping space for thematically related activities, all connected to an overarching issue. This problem is presented at the very beginning of the course to the students who can brainstorm all together to collaboratively elaborate tentative solutions. They can place post-its (akin to what is done in the real-life process) on a board to pin ideas down. These post-its can be made of text (enriched or not), images or video, offering an inovative flexibility.After the brainstorming phase, the students will be given in a step-by-step fashion, specific activites (presented in a consecutive order) designed to present the tools necessary to solve the overarching problem.

Those activities are called **challenges,** with each challenge tackled by each student in the specific order set by the teacher. For example if a teacher wants to create a course about basic programming knowledge, the first activity could concern the concept of booleans, the second conditional structures and the last one loops. In order to access to all the challenges of the course, a student has to unlock them by playing the preceding challenge. In our last example, a student newly enrolled wouldn't be able to access the loop challenge before having followed the one concerning condiotional structures.

Each challenge is structured in the following fashion:

1. one introductory minigame illustrating the programming concept at hand. The teacher will decide which minigame (if any) to play by selecting them from a list of existing minigames. For the moment 11 different minigames exist, ranging from a Match3 game to a multiple choice question quiz. The presence of a minigame is optional and the teacher creating the course can decide that a specific challenge doesn't require a minigame at all.
2. one HTML page (possibly enriched by images or videos) with instructions presenting the context and specific nature of the task to be fulfilled in Snap!
3. a Snap! canvas, based on a template provided by the teacher, containing the programming activity
4. a Snap! canvas displaying one solution to the activity. This solution canvas is fully optionnal and its presence depends on how the course was written by the teacher.
5. As many repetition of points 2) to 4) that are needed by the course. This allows the teachers to divide thir challenges in simple elementary steps where the answer to the preceding activity becomes the template in which the next activity is to be executed, allowing for an incremental scaffolded way of teaching coding.

Once the players has need completed all the challenges of the course, they are lead back to the initial coding problem and will be asked to solve it thanks to the new knowledge they just acquired. At the very end of the course, the players will be able to see all the solutions to the problem that have been divised by the other students. Figure 2 below illustrates the structure of a C4G course .

At any given time, teachers can have access to the Snap! solutions their students submitted.

Teachers also have the ability to either create **public courses** or transform their current courses into public ones. Public courses are presented in a separate menu and allow any teacher that uses the platform to discover existing courses. Any public course can be cloned and then used as a course by a user with their students. The main difference in functionnality between a public and a private course is that the answers from the players will not be registered with a public course. Users have to be careful about this point as it has two direct consequences:

- Transforming a private course into a public one mens losing the entire base of answers from the students. If teachers want to offer one of their course as a public one, they should first clone it and make the clone public
- Using a public course in the context of a classroom will mean that no user solution will ever be recorded. This means using a public course is a good solution for a quick test or demonstration but a bad idea in the framework of the integration of the C4G platform in coding courses.

Private courses subscribed to by a teacher can also be cloned by the said teacher.

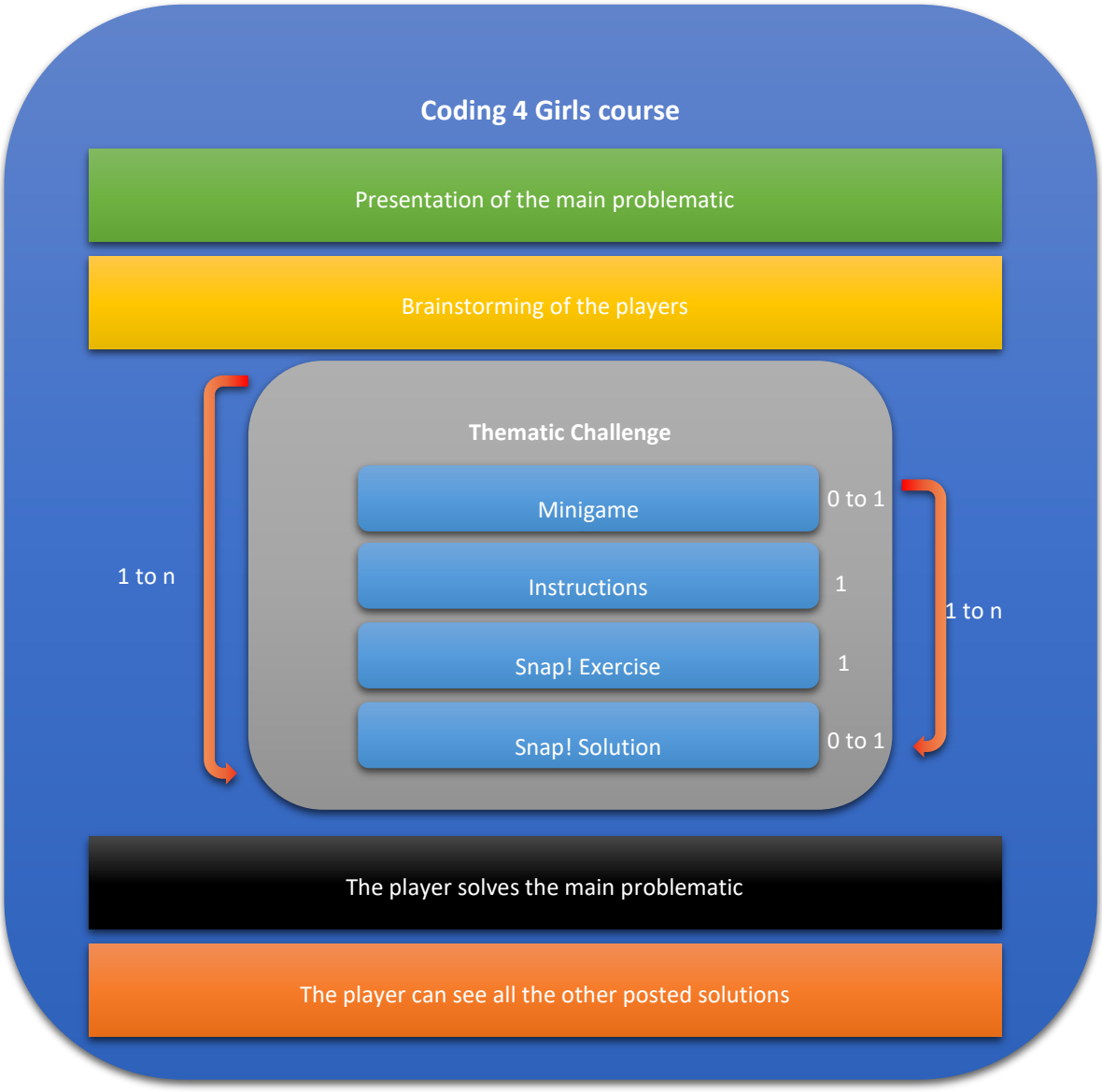


Figure 2: Structure of a C4G course

1. LOGGING IN

The teacher's platform is available at this URL: https://coding4girls.e-ce.uth.gr

The platform has been designed to work on desktop but can also be accessed from mobile devices. Google Chrome is the recommended browser to get the best experience out of the platform.

Once you type in the URL, you are greeted with a minimalistic introduction page. The entire platform has been design to be as functional and easy to use as possible with very little fluff of extra things.

The black ribbon at the top is the main menu, from which you can access all the available functionalities. As we just arrived on the platform, we are offered the choice (right hand side of the screen) to login or to register if you don't have an account already. The English flag on the top right of the screen shows the game interface is displayed in English. Clicking on the flag cycles between the available languages for this platform: English, Greek, Turkish, Bulgarian, Croatian, Italian, Slovenian and Portuguese.

Figure 3: The home page

The login page only contains two fields, one where the user can enter their username (or the email address they used when registering) and the other where they enter their password.

One both fields are filled, press the green Login button to proceed. If the remember me tick is selected the next time the user will access the platform they will be automatically logged in.

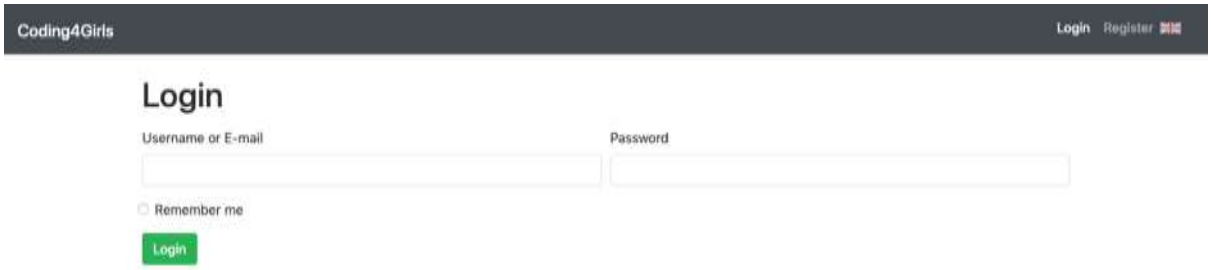


Figure 4: The login page

Because this is a platform designed only for the teachers, learners' accounts are not allowed to login.

The Register page asks the user for a username, a valid email address, a password, their first name, their last name and a code.

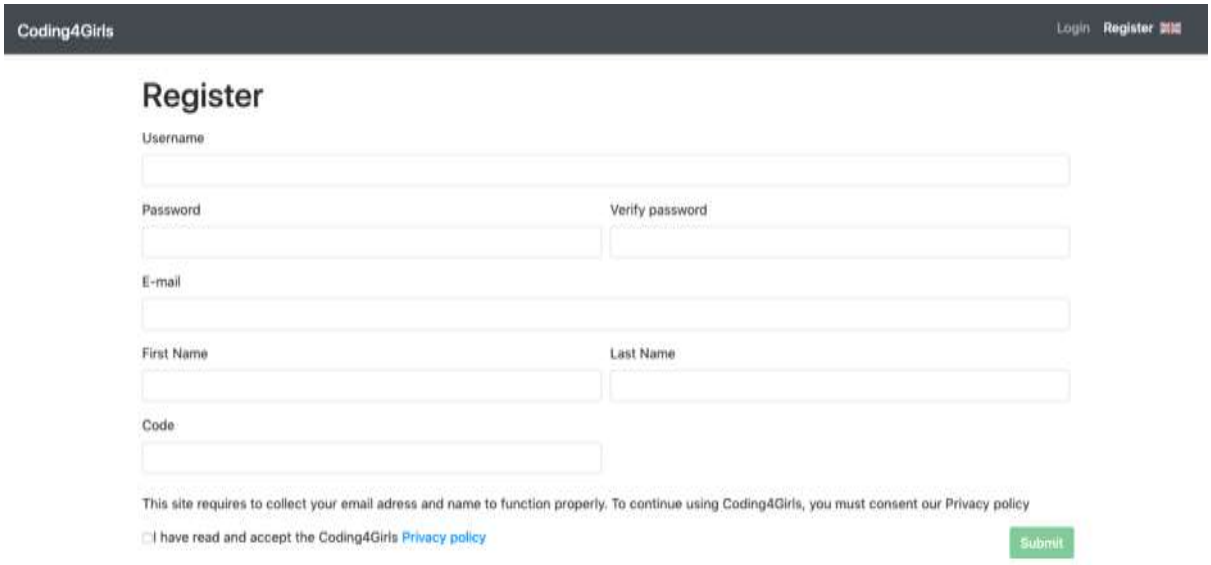


Figure 5: The register page

The Code field is here to prevent learners registering as teachers. If the right code is entered in this field, the account created is automatically given teachers rights. Otherwise the account won't be created at all.

In order to know the special teacher code, please contact us.

In both Login and Register page, when an error occurs (for example, the user has entered a wrong password) an error message will appear at the bottom and the corresponding field will have its border turned to red to indicate visually what went wrong.

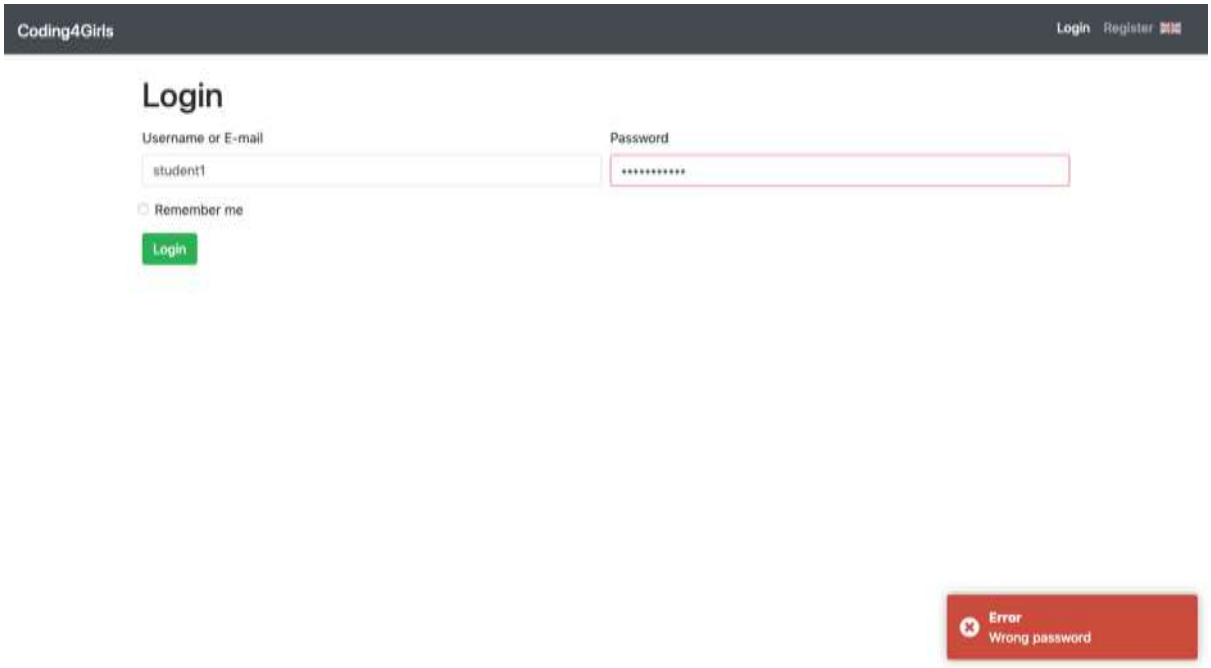


Figure 6: Example where user entered the wrong password

Abiding by the GDPR directive, the user also has to accept the privacy policy of the platform in order to be able to register.

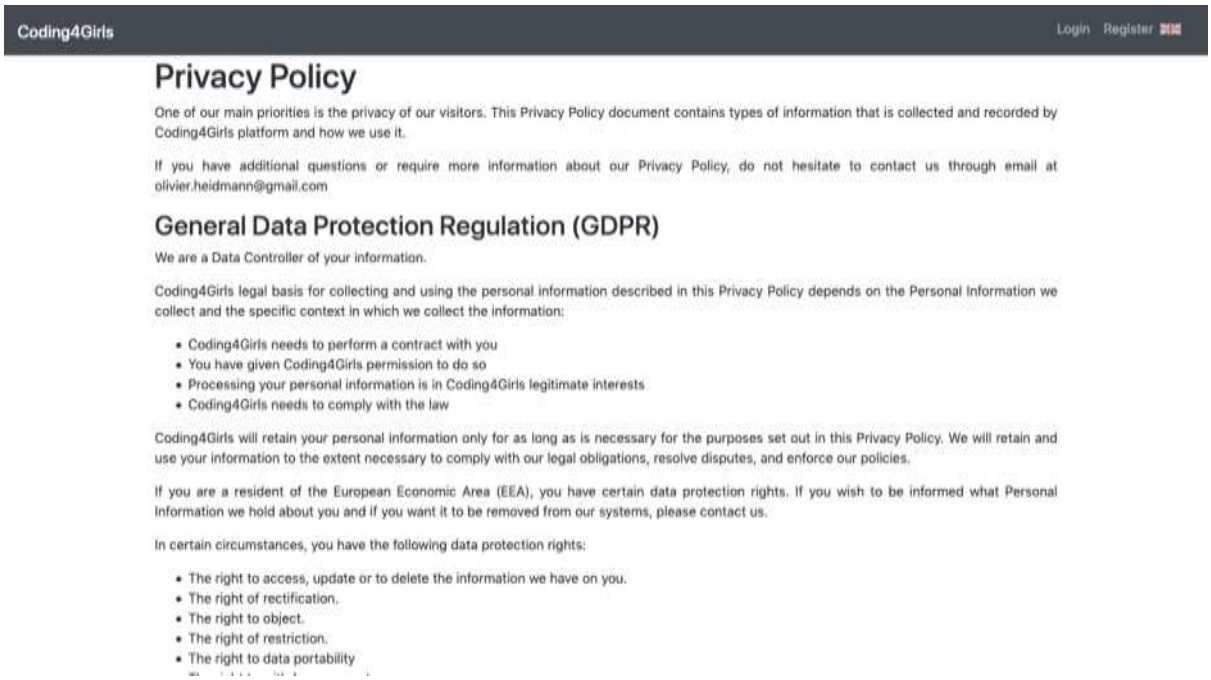


Figure 7: Coding4Girls teacher's platform privacy policy

Once all the information fields have been filled, clicking on the green SUBMIT button proceeds to the main screen. For the following examples, we are going to be logged in as “teacher1” a fictional teacher used as an example throughout this manual.

Once logged in, the user can see on the bottom a success message that temporarily displayed (it disappears when the green bar at the bottom reaches the left hand side).

Figure 8: Login success message

This type of success message (and the error message shown in figure 6) is routinely displayed throughout the software as a feedback for the users when they take some actions such as editing parameters.

2. COURSES

CREATED COURSES

The Courses menu displays both the courses the teacher created and the courses the teachers has copied or subscribed to. If you have created a public course, it will not appear here but in the Public courses menu. Before making a course public, a good practice is to clone it first and then make its clone public rather than the original course.

Courses from other teachers are subscribed to by using the code of that specific course. The courses screen presents a box 

where you can enter course codes.

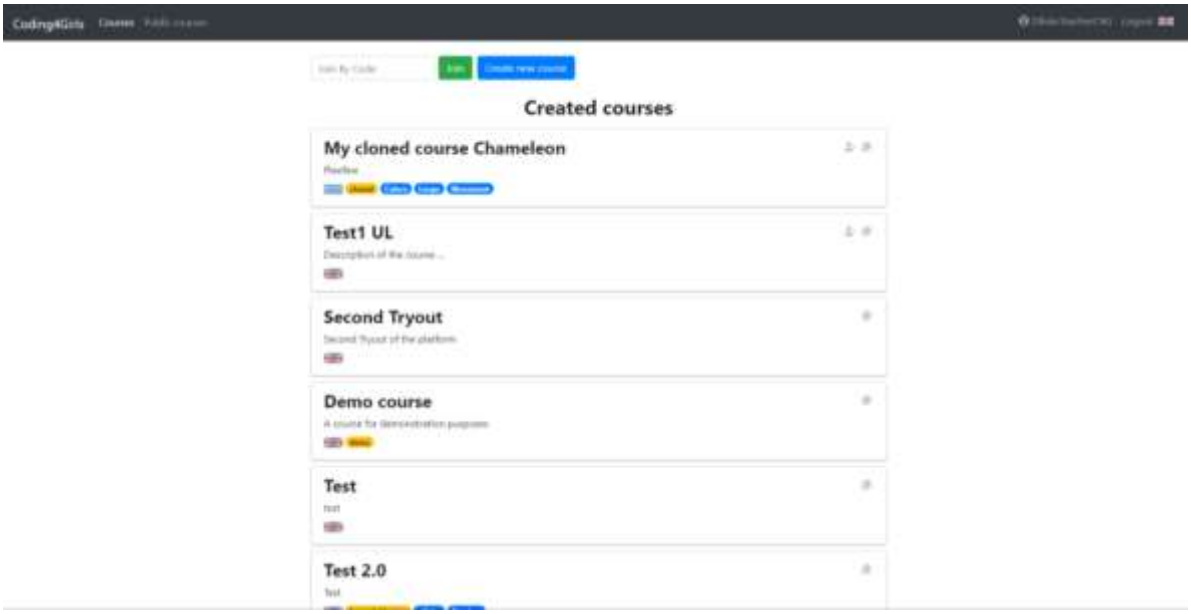


Figure 9: The courses page

The principle of pairing a course with an access code gives us an elegant way to deal with a host of usual issues in that kind of platform (such as scheduling, rights, etc.) as you can only access a course if you have the code for it and you need nothing more than your code and an account to access the data you need. It's akin to a subscription system. In order to unsubscribe from a course that you haven't created, you simply have to click on this little icon  .

As we can see on figure 8, some courses do display this  icon and some others do not, marking if the course has been created by the user (and hence is part of their core list of courses) or by another teacher (and hence can be subscribed or unsubscribed at will).

To help teachers categorize courses visually, the platform provides a tag system that gives the ability to the teachers to make some keywords appear as badges on the courses list. Yellow badges, such as 

, represent the tags defined at the level of the entire course of the lobby and the blue ones, like 

, are the tags that appear on each of the course's challenges.

The ability to copy or clone a course is provided, accessed by clicking this icon  . When this button is used, the entire contents of the copied course (with the exception of all the enrolled students' answers) are now at

your disposal as if it was one of your own courses. A pop-up will appear asking you to fill in a new name, description and code for the course. Remember that course codes are supposed to be unique.

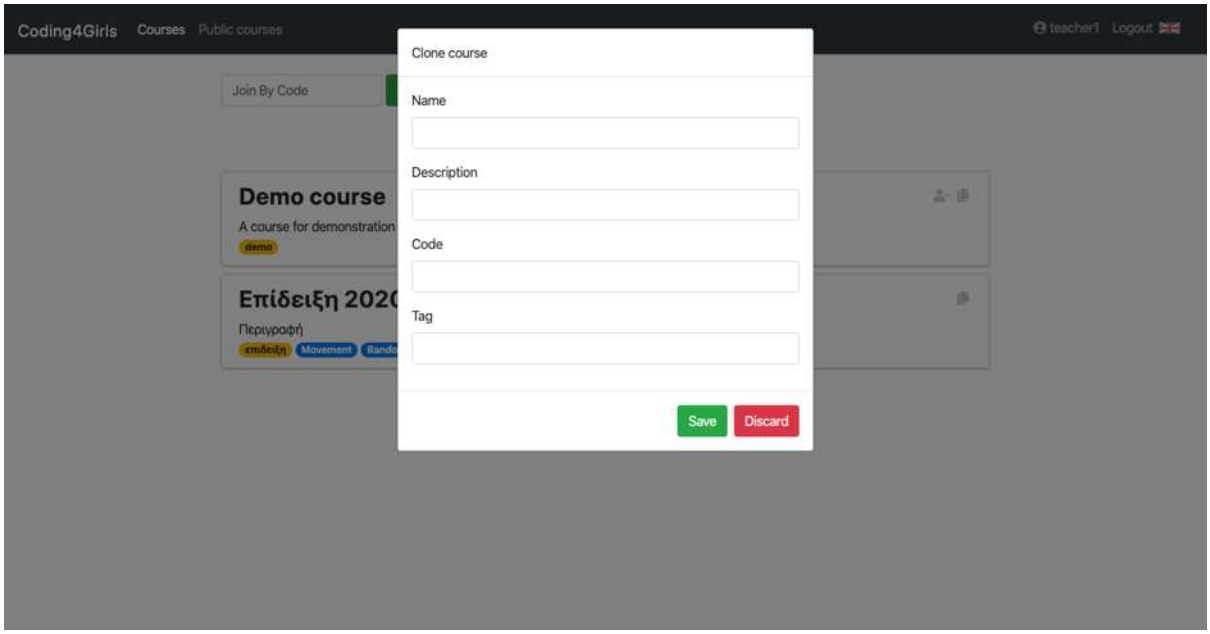


Figure 10: Clone course window

PUBLIC COURSES

The teacher platform also presents a repository of courses created by other fellow teachers and platform users that intended their creation to be publicly available to all the users.

In order to reuse a public course in your own classroom, simply copy/clone by clicking on the icon and it will appear in your list of own courses.

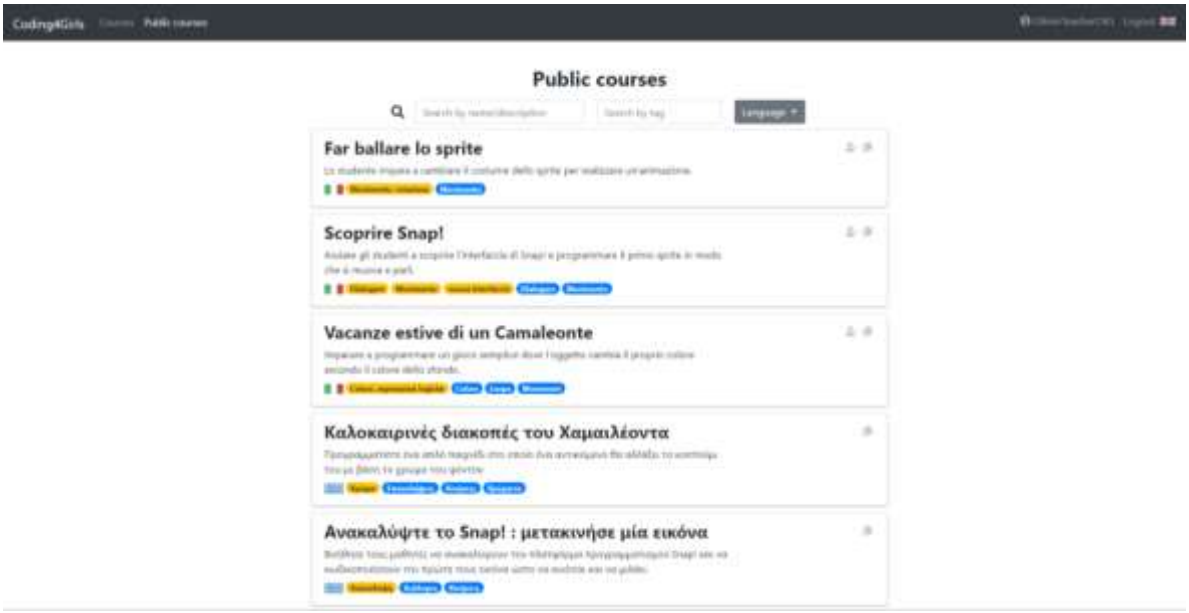


Figure 11: Public courses

Courses can be filtered by language, associated tags or name as the complete list of public courses can be quite long.

EXPLORING A COURSE

By clicking on a course (either in the Courses or the Public Courses menu), the teacher can access the collection of challenges inside the course. If there are no challenges created, a grayed out “None” will be there instead.

On the left of the page there is a list which contains the current enrolled members of the course (this information is displayed only if the course is yours).

In the figures below, the account we are using is not the one that created this lobby. In this case, we still have access to the contents of the course and its challenges but they can’t be modified and the access in the users’ solutions is restricted.

Pressing the button Course Settings will take you to the settings of the course. The layout of the page is exactly the same with the course creation page but it is prefilled with the details of the current course. Those can only be modified by the creator.

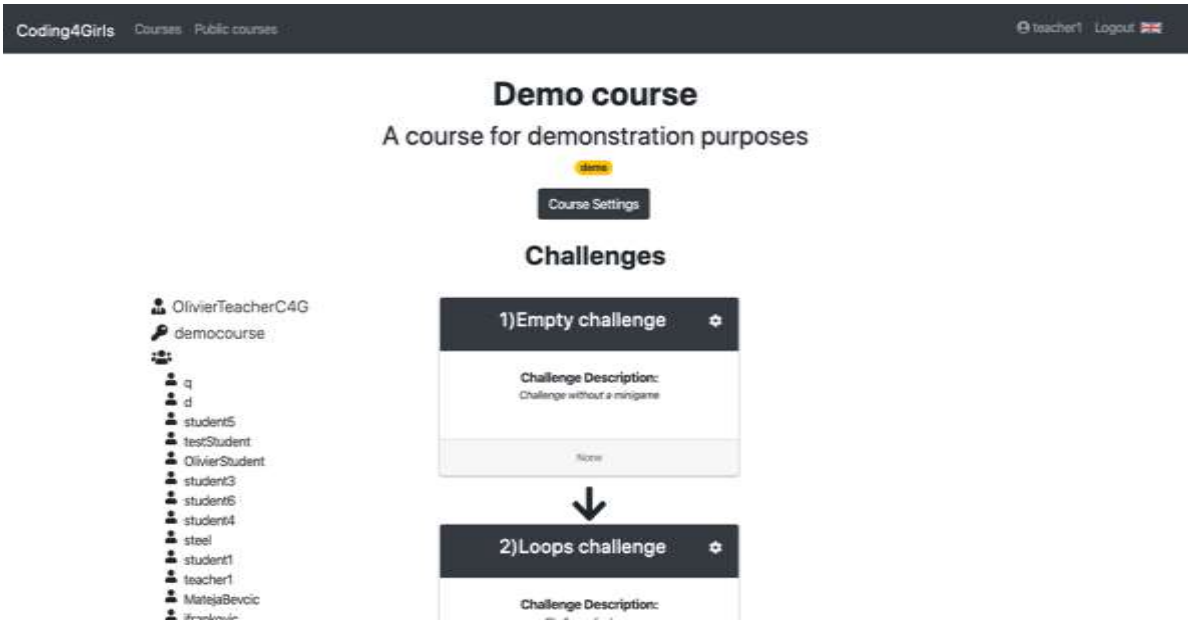


Figure 12: A course page with challenges

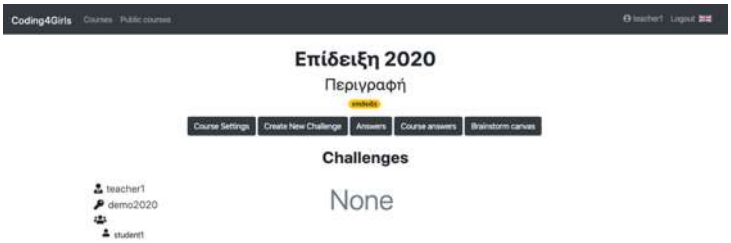


Figure 13: An empty course page

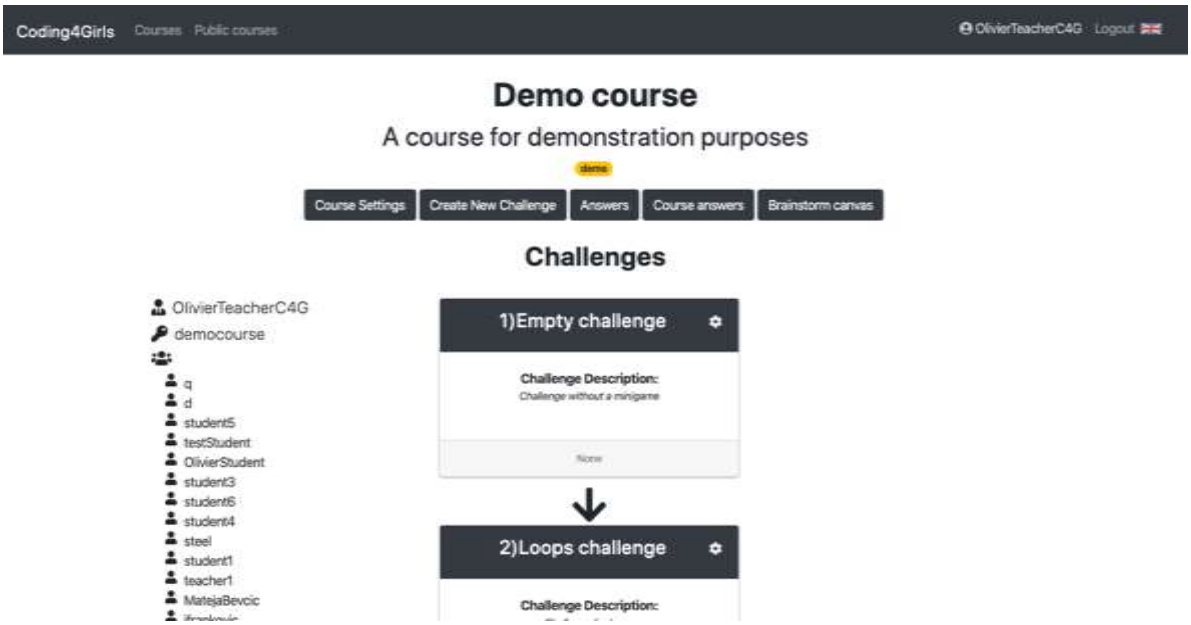
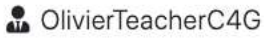


Figure 14: Course page viewed by the course creator

On the side menu, useful details about the course can be seen. Here 

the creator's name is mentioned. Below that, the password of the course appears as 

and finally, the members of the course can be seen in a list

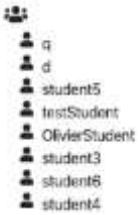


Figure 15 : The member list of course

Here, challenges are organized in boxes, containing the following information from top to bottom:

- The name of the challenge. The number on their name shows their current index.
- A description underneath

- The mini game of this challenge at the bottom.

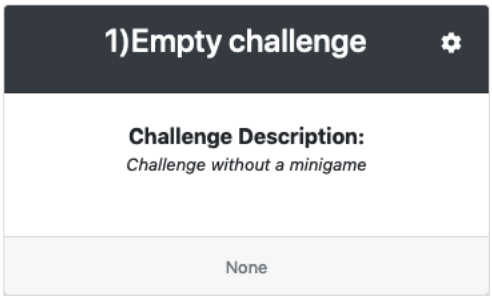


Figure 16: The challenges information boxes

The arrow is used as a visual clue to indicate the order of the challenges. The teachers can change this order by simply dragging the challenge boxes and dropping them in the position they want. The changes are saved automatically.

Pressing the cog on the top corner opens the challenge settings page. This page, like course settings, is similar to the challenge creation page (of course with the values of the selected challenge prefilled) so more details can be found in the following pages.

3. CREATION OF A NEW COURSE

When inside the Courses menu, pressing the button Create new course will lead you to a new screen that allows you to create a new course. The following information is required:

- Name
- Code
- Description
- Learning objectives and expected learning outcomes
- Tags
- Public course

You can create one or multiple tags that will appear on the courses list as yellow badges. Multiple tags are separated using the semi-colon character ";" that acts as the delimiter between different tags. If you want to tag your course as being for age 12 and being about loops, then you would type "age12;loops" in the Tag field.

By checking the Public course checkbox, the created course will be public. Public courses will be visible by all teachers and will not register the answers from the users. A good practice is to use public courses in classes only for demonstration purposes and clone/copy them to make them your own if you want to use them for an actual course where you will want to use the full capacity of the platform.

Select the language of the course by clicking on the flag box and selecting the one corresponding to your course's language. Eight language flags are available in the framework of the C4G project: English Greek, Turkish, Bulgarian, Croatian, Italian, Slovenian, and Portuguese.

Below are 3 tabs each containing a different window: "Instructions", "Snap Template" and "Brainstorm canvas".

At the bottom of the screen (don't forget to scroll down to see them), you can find the "Save" button that creates the new course and the "Discard" button that cancels the creation and takes you back to the courses page.

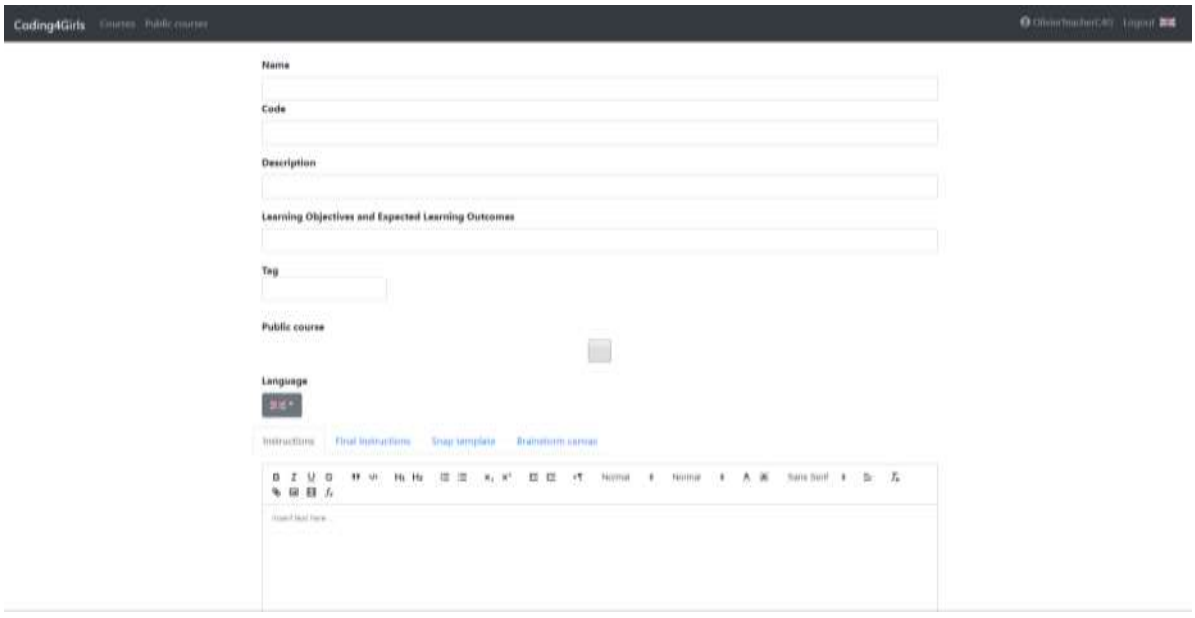


Figure 17: The course creation screen

INSTRUCTIONS TAB

In the instructions tab the teacher can fill some information for the students about the content of the course. It will be displayed to the user in-game at the very beginning of their course, before the Snap! canvas containing the issue in code is presented. It should typically contain a global presentation of the situation and the issue at hand and should introduce the following screen, the canvas of Snap! code that the students will need to use to solve the problem.

The instructions tab contains a rich text editor allowing teachers to make the instructions more visual pleasing. It also allows the use of embedded videos and images. The icons and the functionality of the editor are similar to the ones found in the most common text editors and will be not explained here.

Two sets of instructions exist for the teachers to fill:

Global instruction presenting the problem and displayed as the very first screen the students will see in the course

Final instructions that will be displayed when the students have followed all the courses challenges, just before they are asked to write the code to solve the main problem. This set of instruction should present a recap of what the overarching problem is and what the students have now learnt to solve it.

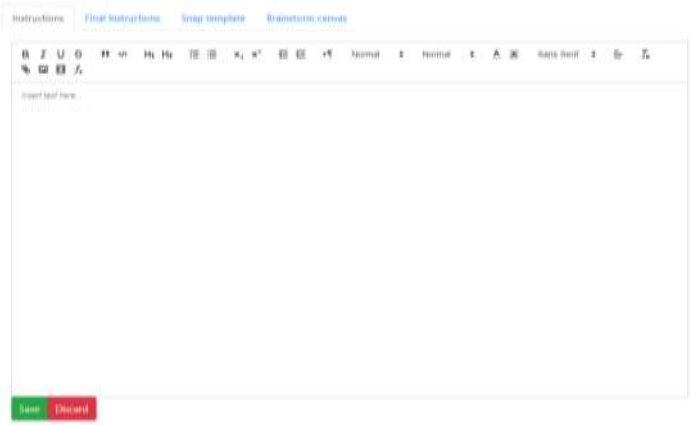


Figure 18: The instructions editor

SNAP! TEMPLATE

This template present the problem to be solved, both at the very beginning at the course and in the end of it when the students have now learnt all the knowledge they need. It should present the problem in a certain context. Figure 13 presents the example of a course where the students will need to write code to move a sprite representing a chameleon around the screen and dynamically change its physical appearance based on the background. The Snap! template only shows the background and all the chameleon related asset, with no line of code already written. The very first time the students see it (at the very beginning of the course) the students can begin trying to solve the issue, but should lack the knowledge to do so fully. The second time the students are presented this template, after they have completed all the courses challenges, they should now be able to fully complete the task.

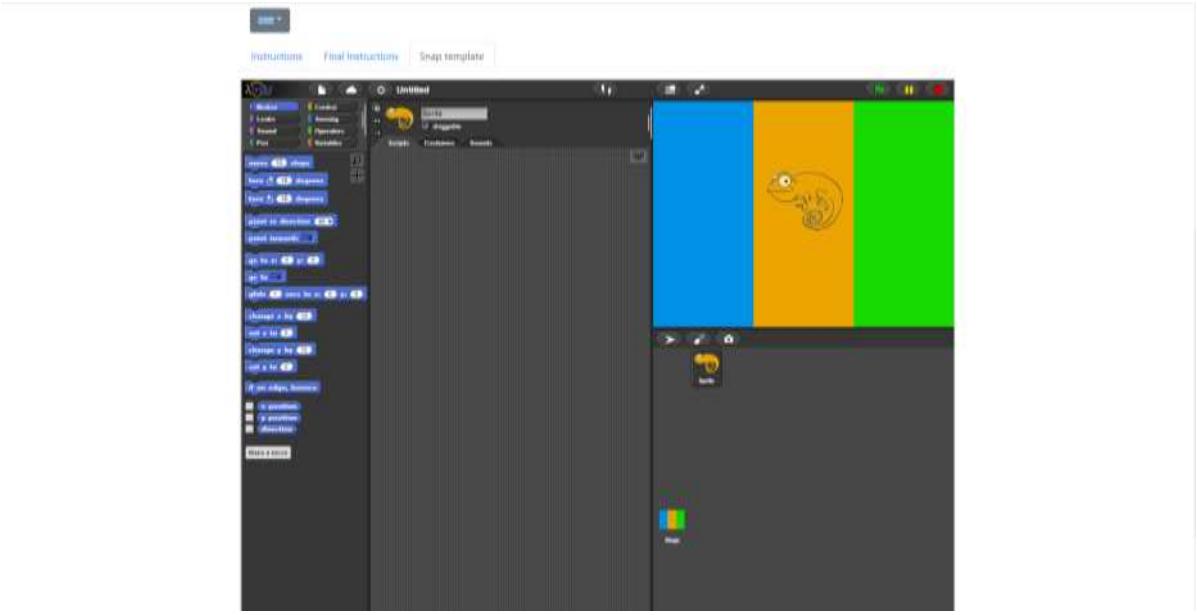


Figure 19: The Snap! template of the chameleon course

IMPORTING DATA INTO A SNAP! CANVAS

Rather than creating their own Snap! canvas for the students to work on every time, Snap! offers the possibility to import files. Those files can be entire solutions or simply assets such as graphics or sounds.

A good practice for a teacher would be to start their course from the end with a full solution loaded as the very last step of the course, and then remove parts of the solution one by one up until arriving at the very beginning of the course with an empty solution.

In order to import something in Snap!, you need to click on this icon  in the Snap! menu bar. Then select Open (see figure 20), and click on the Computer icon (see figure 21). This will open the usual window (depends on your operating system, the Windows one is showed figure 22) to select a file. Click on the file you want and then Open (or double click on the file) to import it inside the Snap! canvas.

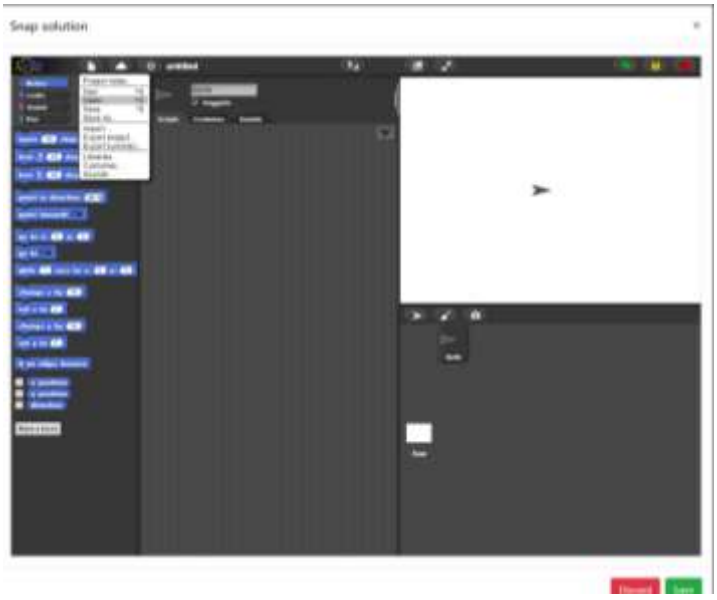


Figure 20: Importing menu

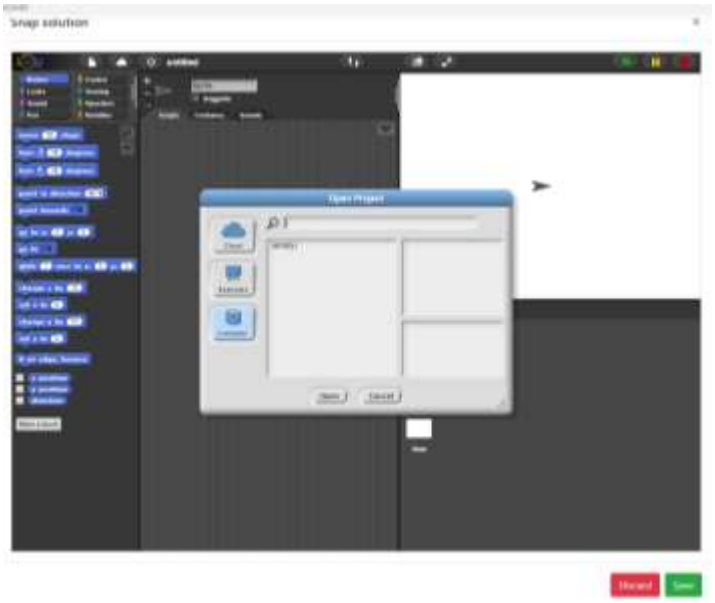


Figure 21: Import window

Figure 22: Selecting a local Snap! xml file

Files containing a full (code + assets) Snap! solution are usually in the *.xml format. Sounds are usually in *.mp3, *.wav format and images in *.png or *.jpg format. This might vary a lot, especially between operating systems.

Be careful, there is currently a 3Mb size limit for any uploaded file. If you receive an error message while or after uploading a file, it might very well be linked to this limit. Try to upload as small as possible files.

Once a file has been uploaded, you can use it as if it was a native part of Snap!. Figure 23 shows the example of a full Snap! activity uploaded, with both the code and assets ready to be used.

Note that you can import file for any Snap! canvas in your course, whether it's the canvas concerning the main issue, one showing one step of an activity or a solution canvas.

Figure 23: A full Snap! activity has been imported

BRAINSTORM CANVAS

The brainstorm canvas is the place where all the students in the course can communicate and share ideas about how to solve the problem that has been presented to them. The teacher can promote or guide this procedure by placing some post-it which will be visible to all students the moment they enter the canvas.

Figure 24: The brainstorm canvas

The canvas will resize automatically to fit all the notes.

Pressing  allows you to create a new post-it.

POST-IT NOTES

By default the default post-it note is only text, with the message “Edit me Double Click me” displayed. “Edit me” is in italic and “Double click me” is in bold, showcasing from the get-go the formatting capacities of the post-it text engine.

Figure 25: The default post-it

In order to avoid issues with users concurrently working on the same canvas, when a user adds a new note, the note won't appear directly on the canvas but it will open a pop-up instead. There, the post-it can be modified as it was directly on canvas and by clicking save it will show up to all the other users too.

Figure 26: Add new note pop-up

To change this text the user has to double click on the post-it (double tap on mobile) on the pen icon on the bottom left and to destroy the post-it the user has to click on the trashcan icon on the bottom right. In order to confirm deletion, the button has to stay pressed for a certain amount of time before the note is deleted. Once the blue bar on top of the screen is full, the post-it is deleted. This mechanism has been introduced to avoid any possible accidental deletion.

Figure 27: Post-it getting deleted

When clicking on the text editing button, new icons appear on the bottom of the text, one for adding a photo and one for adding a video. By clicking on the floppy disk icon the user will change any modifications that been done. Clicking on the color disk at the bottom will change accordingly the post-it color.

Figure 28: Editing the text

All the changes done to a post-it are immediately shown to all the other members of the team if they are consulting the brainstorm canvas at the same time.

When the user wants to add a photo, they are prompted with a button asking them to select a file from their hard drive. The said file will be automatically and transparently be displayed on the screen, being uploaded to our servers for them to handle it.

Figure 29: Inserting a photo

The icon at the right of the camera icon is a text icon, in case the user wants to go back to a text only post.

Figure 30: a photo embedded in a post-it

If the user wants to insert a video, they are prompted with a message asking them to copy here the URL of the video. Youtube, Vimeo and Dailymotion are supported at the moment.

Figure 31: Inserting a video

Figure 32: A video embedded in a post-it

At the bottom right of the post-it we can see a padlock icon. It is open when the post-it is editable or locked when the post-it cannot be edited. Only teachers have the possibility of locking and unlocking post-its, students can only know if a post is locked or not without being able to act on it.

Grabbing the little triangle symbol at the bottom left of a post-it allows to resize the post it to the desired size. This is especially useful if the post-it contains a huge photo or a long text, as otherwise the content will just overflow the post-it.

Figure 33: Example of content overflowing

To avoid such overflow, please re-dimension your post-it accordingly.

POST-ITS ENRICHED TEXT RULES

The complete reference for the enrich text rule is available at this URL: https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet.

Note: not all functionalities described on this web page have been implemented in DesignIT.

Headers can be defined by using # symbols (the more # there are, the smaller the header's text) or alternatively by underlining the text with the = symbol.

Figure 34: Post-it containing various headers

Emphasis (italic, bold, bold and italics or strike through) can be obtained by placing the text between * and _. If we write *italics* or _italics_ the post-it will display *italics*, **strong** or __strong__ are displayed as **strong**, and **_italics strong_** are displayed as ***italics strong***. Finally ~~strike~~ is displayed as ~~strike~~.

Figure 35: Post-it containing emphasis

The system also supports bullet point lists, numbered lists and hypertext links (see the linked URL above for more details).

Figure 36: A post-it containing lists

CREATING THE COURSE'S CHALLENGES

Once a course has been created, click on it to access its detailed presentation. Being the course owner grants you access to more buttons than the only Course Settings presented above. The buttons accessible to the owner are the following:

- Create New Challenge The challenge creation page
- Answers The answers for each challenge by each user
- Course answers The answers of the course challenge by each user
- Brainstorm canvas The brainstorm canvas

CREATE NEW CHALLENGE

The challenge creation page is similar to the course creation page, especially in the upper part of the page. Each challenge needs to have a name specified and a short description.

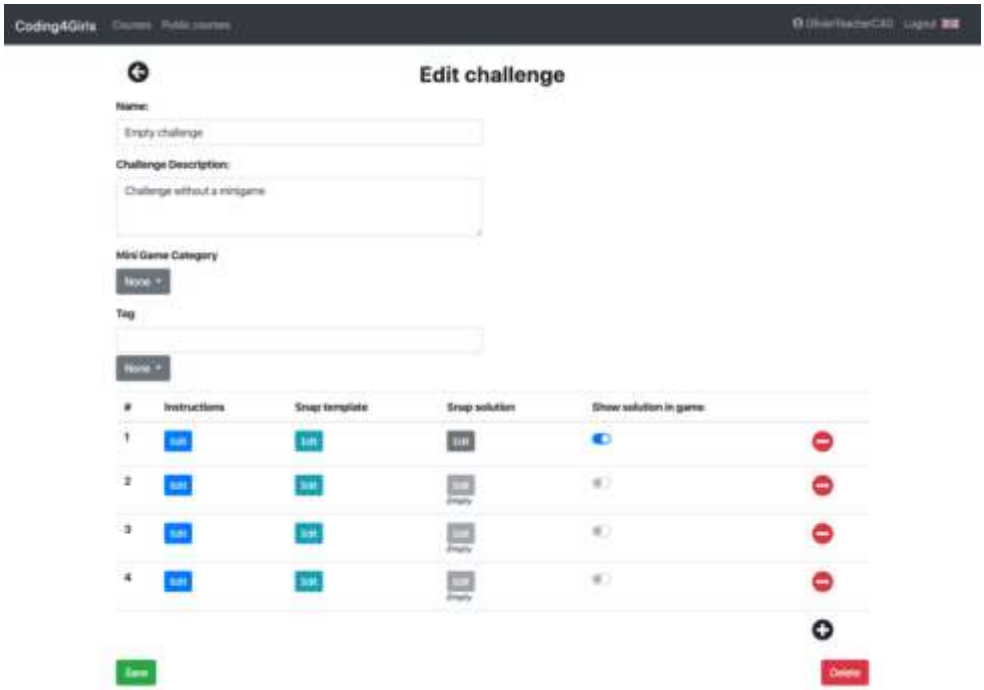


Figure 37: The challenge creation page

The teacher can also choose to attach a minigame to the challenge using the dropdown menu. The menu items with the colored background indicate the category of the items below. Items without a background are selectable. The categories are related with programming topics.

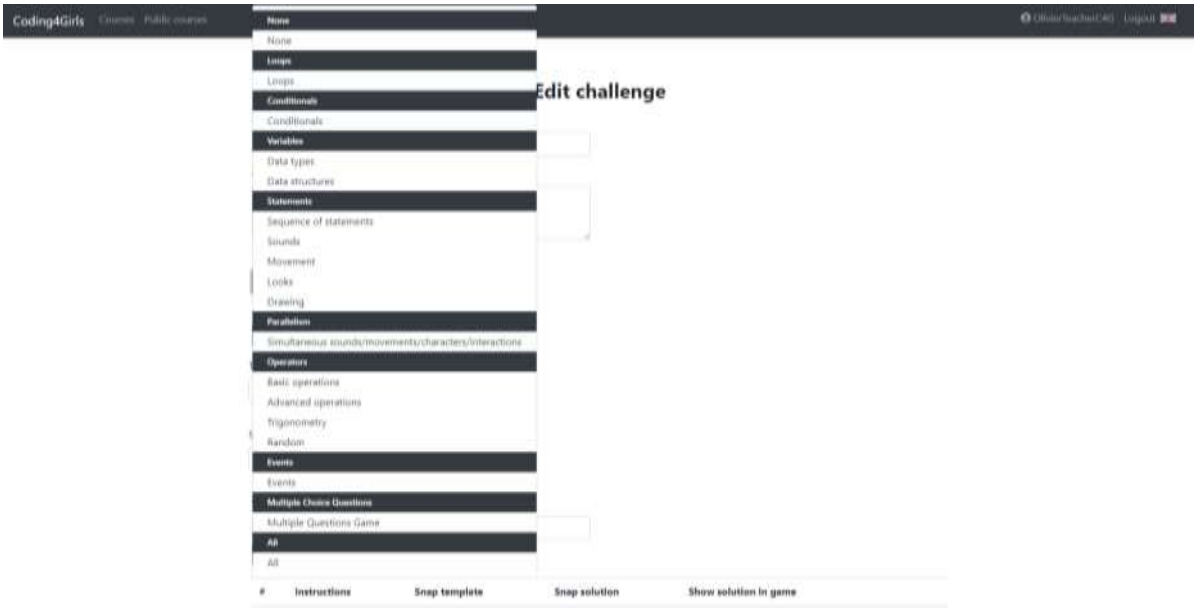


Figure 38: The minigames dropdown menu

Attaching a minigame to a challenge is optional; the user can decide to attach no minigame at all if needed. Selecting the All category allows the user to select any minigame available.

Figure 39: The All category

There are a total of 11 minigames available for the moment, corresponding to the basic principle of coding in Snap! (plus the multiple choice question one). When a concept and associated minigames have been chosen to be in a challenge, the teacher will have to define the corresponding parameters.

Figure 40: A minigame with one variable

If the mini-game requires questions to be asked and answers to be found, the teacher will need to supply them.

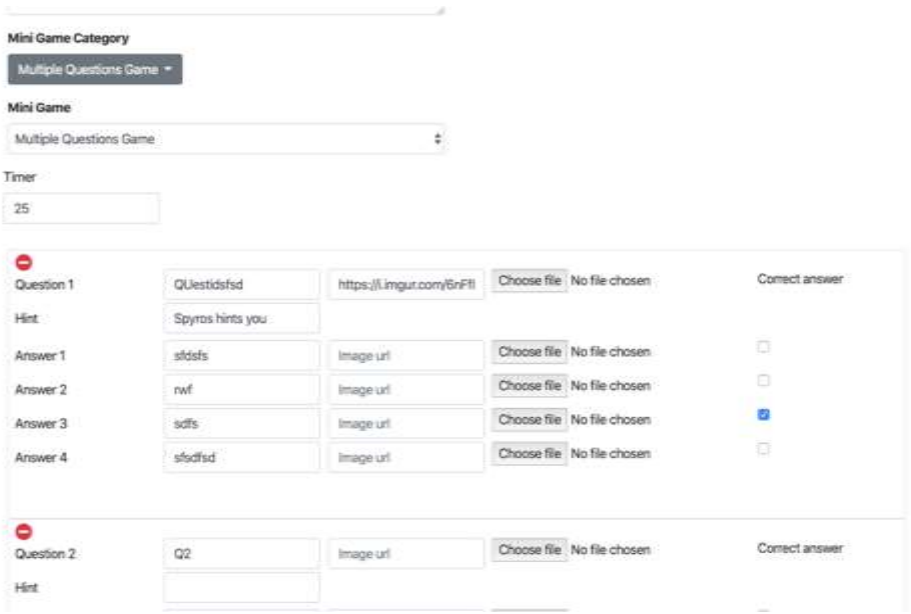


Figure 41: A minigame with dynamic amount of questions

In the minigame of “Multiple Questions”, clicking the ⊕ adds one question and it can be removed with ⊖.

Also, where image upload is allowed, you can either provide your own URL or upload a picture using the “Browse…” button.

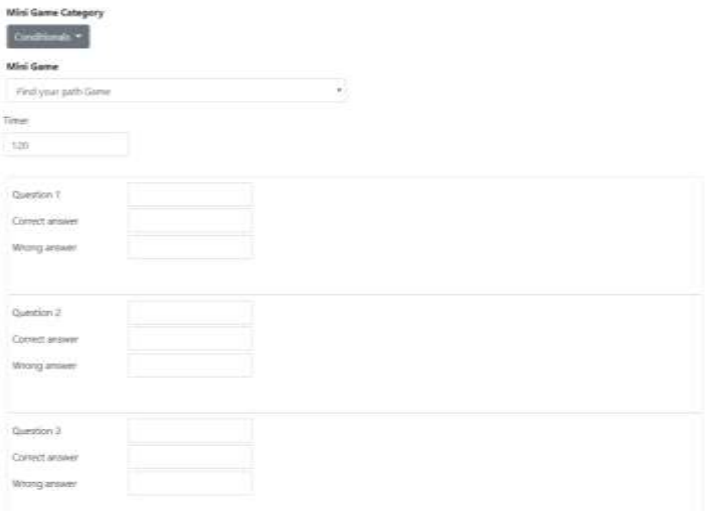


Figure 42: a minigame with a fixed amount of questions

For all minigames, when there are both the timer and score inputs, they need to be defined to a value because the minigame will end if the player reaches the score or the timer end (So a low score will make the minigame end probably too fast).

List of Tags	Minigame associated
Loops	Match3
Conditionals	Find your path
Variables	
Variables - Data types	Inventory
Variables - Data structures	Inventory
Statements	
Statements - Sequence of statements	Stepping Game
Statements - Sounds	Sound Game
Statements - Movement	Stepping Game
Statements - Looks (appearance of a sprite in snap)	Snake game
Statements - Drawing	Puzzle
Parallelism	
Parallelism - Simultaneous sounds/movements/characters/interactions	Pattern matching
Operators	
Operators - Basic operations	Pattern matching
Operators - Advanced operations	Pattern matching
Operators - Trigonometry	Pattern matching
Operators - Random	Dice Game
Events	Variation of the Stepping Game
Extra Quizz Game	Multiple choice questions

Figure 43: Table of minigames

The tags system works in the same way as the lobby tags. There is also a dropdown menu with some predefined tags.

At the bottom of the page, we can see the list of activities, divided into the instructions/Snap! activity/Snap ! solution steps. You need to have at least one activity per challenge, and you can create one clicking on the plus icon  . You can also delete one (but not if you have exactly one) by clicking on the minus icon  . There are five named columns on that section. The first one represents the number of the level. The second (Instructions) allows you to edit the instructions for the activity (using the same editor as in lobby). The third one (Snap template) allows you to edit the template you want to prefill for your users. The fourth one (Snap solution) allows you to present to the students a solution for that activity. Both last two columns use Snap!. Finally, the fifth column (Show solution in game) is a toggle, that will make the snap solution to appear after students submit their work. *Keep in mind that if the toggle is enabled and the snap solution is empty, an empty snap will appear.*

ANSWERS

All the Snap! answers the students have submitted in each challenge can be found here, displayed in a table. The table contains each user and its details for every challenge that exists in the course and the rows can be sorted either by username, first name, last name, challenge name or solved challenges, both ascending and descending order.

When there isn't a submitted solution the "Solution link" column will be empty. Otherwise, the row will be highlighted and the word "Solution" will appear on the last column and clicking on it, it will show you the submission of the user.

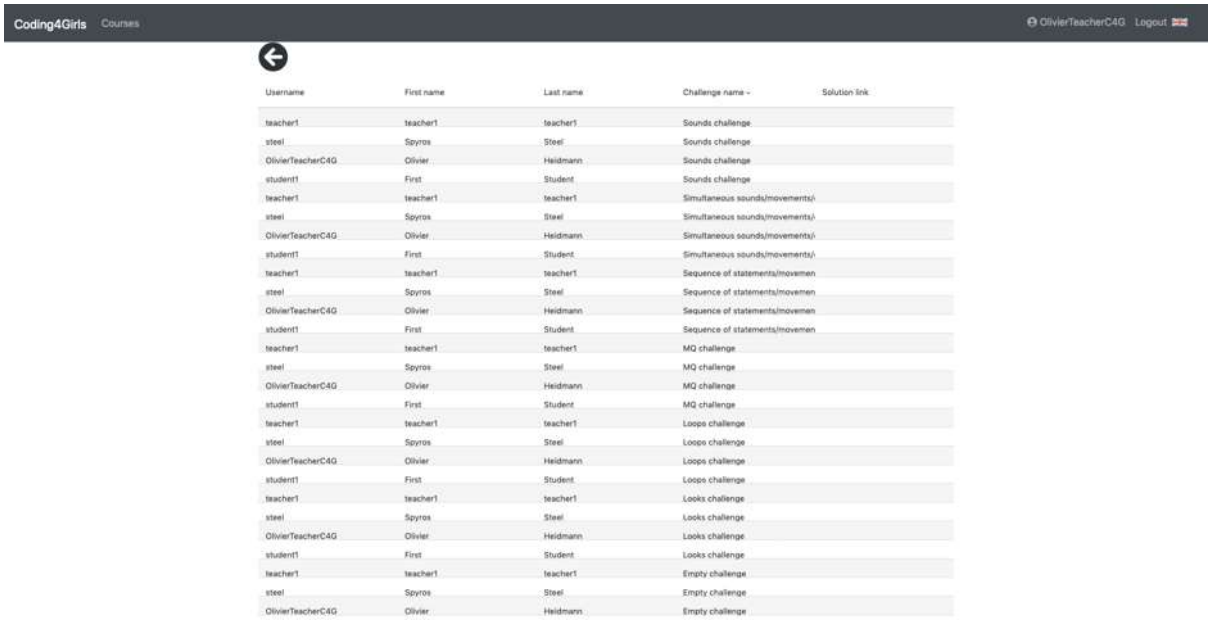


Figure 44: Answers for the challenges by user

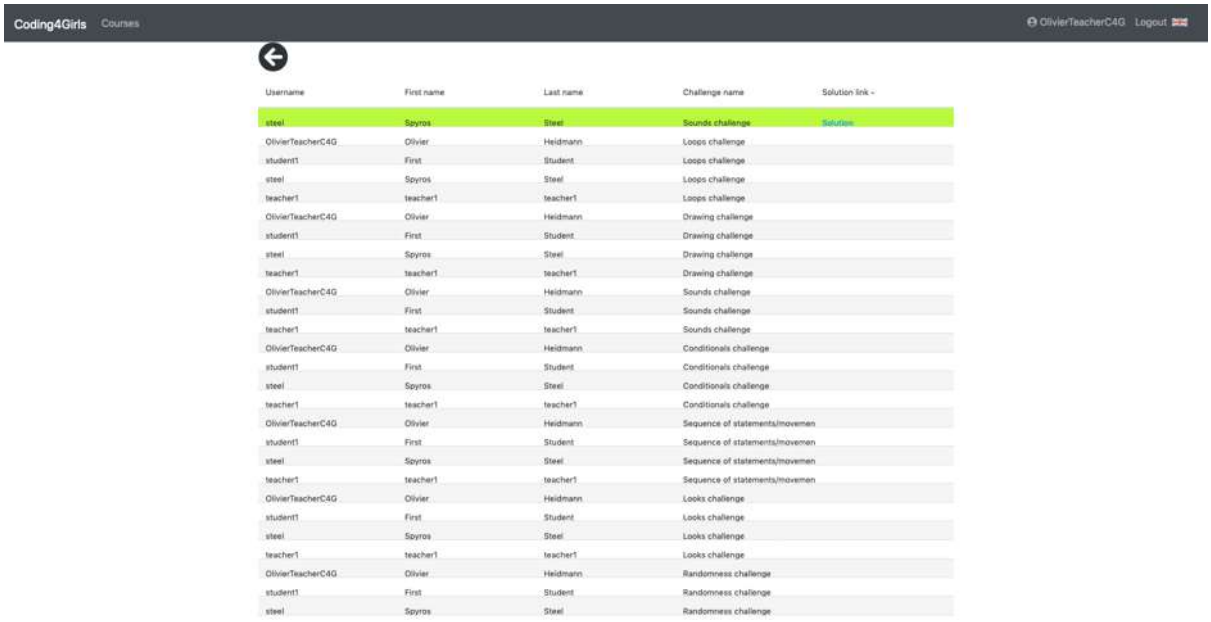


Figure 45: The answers of the challenge by users with a solution

COURSE ANSWERS

The course answers page contains a similar table without the challenge name column. Again, rows containing users who have submitted an answer will be highlighted.

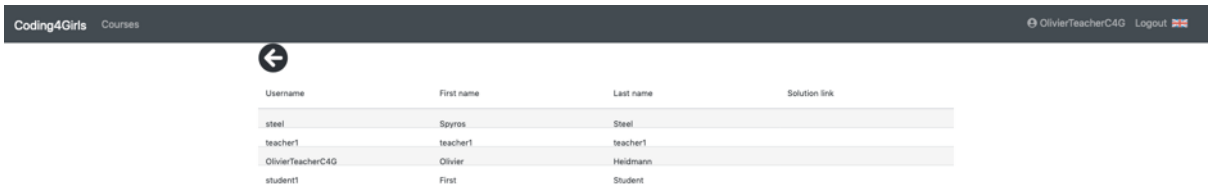


Figure 46: The answers of the course challenge

TABLE OF FIGURES