

<Hello World/>

Advanced Software Engineering – Project

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1. Introduction

“Hello World” is a web application developed using WebRatio, which serves as a platform for users to learn programming languages through various courses. The application offers a comprehensive learning experience, providing a series of lessons accompanied by video tutorials and exercises to assess the user's understanding of the material.

Each course is taught and followed by a tutor to whom users can write to clarify any doubts about the lessons or exercises. The platform, to encourage collaboration among its users, includes forums where users can discuss and exchange ideas on how to solve the assigned exercises.

The system consists of 4 views: home, user, tutor, administration.

Let's start looking at the implementation details, starting from the Domain Model.

2. Domain Model

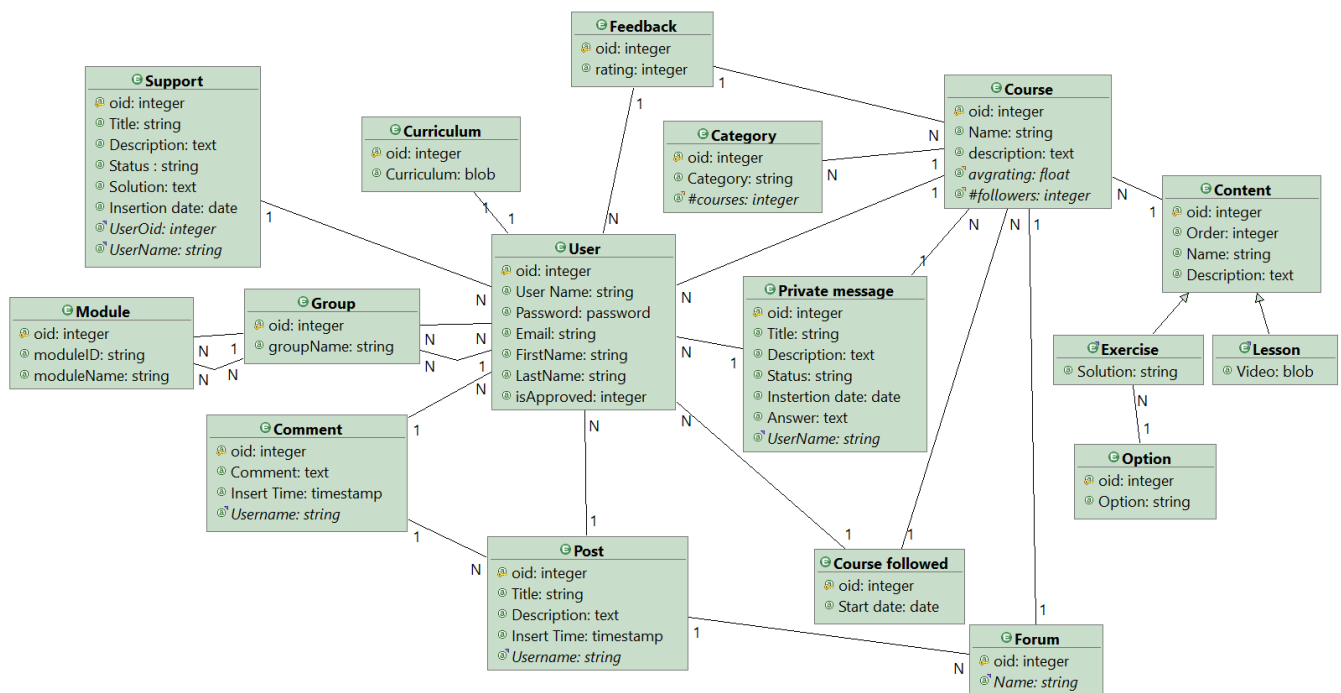


Figure 1: Domain Model

Using the Entity-Relationship notation, we have defined the data structure used by the Web application. The domain model is mapped onto an Apache Derby database.

The User Model is the portion of the Domain Model considered by the Login Operation to check the user credentials. It is composed of the **User**, **Group** and **Module** entities and the relationships between them. These three entities are automatically added to the Domain Model when you create a new Web Project and, since they are fundamental for user authentication, they cannot be deleted.

We added 14 new entities:

- **Course:** it stores all the information about a course including some statistics obtained through calculated attributes.
- **Content:** this entity stores all the course materials, which can be classified into two types:
 - **Lesson:** in addition to the content information, it includes a video lesson or tutorial.
 - **Exercise:** exercises can be modeled as either open-ended questions or quizzes with multiple options.
 - The options for a quiz are stored in the **Option** entity.
- **Course followed:** this entity tracks the courses that a specific user has followed.
- **Forum:** each course has a dedicated forum where users and tutors can post and engage in discussions.
- **Post:** this entity records the content of posts, the timestamp of when they were posted, and the username of the poster.
- **Comment:** users and tutors can comment on posts. This entity stores the content of comments, the timestamp of their insertion, and the username of the profile that made the comment.
- **Private message:** users can also send private messages to the tutor. For each course, there is a dedicated messaging system where users can write to seek clarifications or ask questions privately.
- **Category:** each course is part of a category. The categories are typically named after the programming language that the course teaches. The existence of these categories also greatly helps users in searching for courses related to the programming language they are interested in.
- **Feedback:** this entity tracks the ratings that users give to a specific course. The feedback is expressed as an integer value ranging from 1 to 5.
- **Curriculum:** if the user is a tutor, they are required to provide their personal information along with a curriculum vitae (CV). The curriculum vitae is then evaluated by the administration, and if it meets the requirements, the tutor is granted access to the platform.
- **Support:** tutors and users can send support requests to the administrator regarding various aspects or issues on the platform. This entity stores the corresponding information.

3. Home view

The home view is the first page shown, it is public and accessible by everyone.

On the platform there are three groups of users:

- Administrators
- Tutors
- Regular users

To perform actions on the site, users are required to log in. If a user does not have credentials, they must register on the same page. After logging in, the user will be redirected to the corresponding site view.

The user registration does not need any confirmation. The tutor needs the approval of the administrator.

This is how this view is modelled in WebRatio:

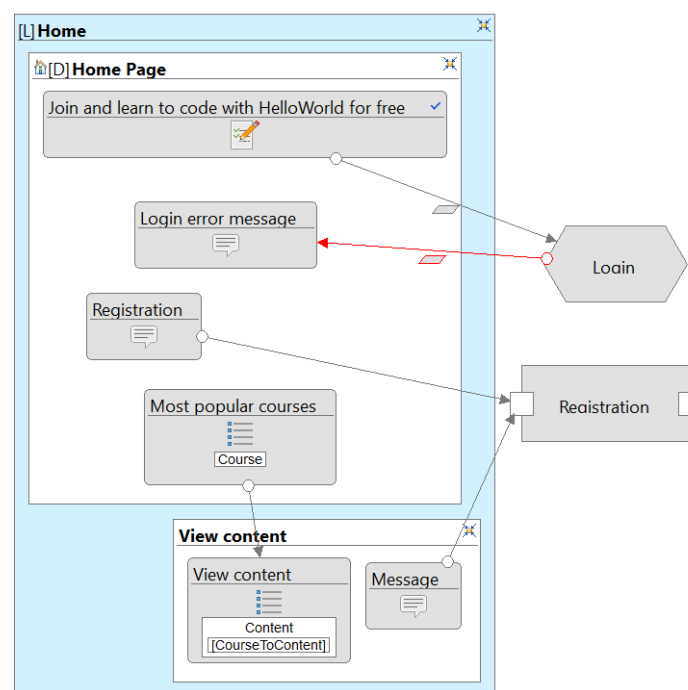


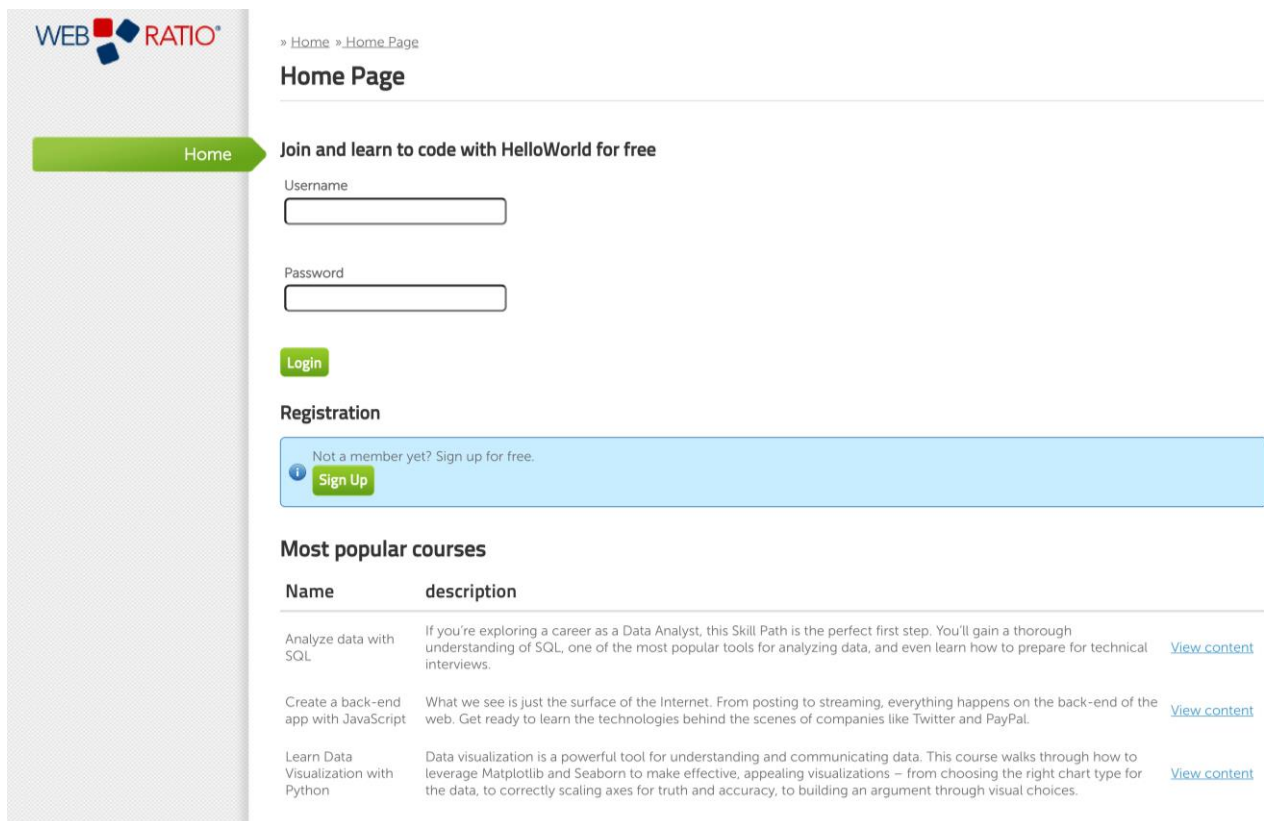
Figure 2: Home view

At the top section of this homepage, there is a form for entering authentication credentials.

A message prompts users to sign up for the platform in order to access the course material.

In the lower section of the homepage, new users who are unfamiliar with the platform can get a little overview of the available courses by browsing through a list of the three most popular courses. The popularity of these courses is determined by the number of followers. This feature is useful for new users as it provides an idea of the platform's organization and the kind of topics covered.

This is what the generated page looks like:



The screenshot shows the 'Home Page' of the WEB RATIO application. On the left is a vertical sidebar with a 'Home' button. The main content area has a breadcrumb trail '» Home » Home Page' and a title 'Home Page'. Below the title is a section 'Join and learn to code with HelloWorld for free' containing 'Username' and 'Password' input fields, a 'Login' button, and a 'Registration' section with a 'Sign Up' button. A light blue banner below the registration section says 'Not a member yet? Sign up for free.' The bottom section, 'Most popular courses', contains a table with three rows of course information.

Name	description	
Analyze data with SQL	If you're exploring a career as a Data Analyst, this Skill Path is the perfect first step. You'll gain a thorough understanding of SQL, one of the most popular tools for analyzing data, and even learn how to prepare for technical interviews.	View content
Create a back-end app with JavaScript	What we see is just the surface of the Internet. From posting to streaming, everything happens on the back-end of the web. Get ready to learn the technologies behind the scenes of companies like Twitter and PayPal.	View content
Learn Data Visualization with Python	Data visualization is a powerful tool for understanding and communicating data. This course walks through how to leverage Matplotlib and Seaborn to make effective, appealing visualizations – from choosing the right chart type for the data, to correctly scaling axes for truth and accuracy, to building an argument through visual choices.	View content

Figure 3: Home page

The registration module is modeled as follows:

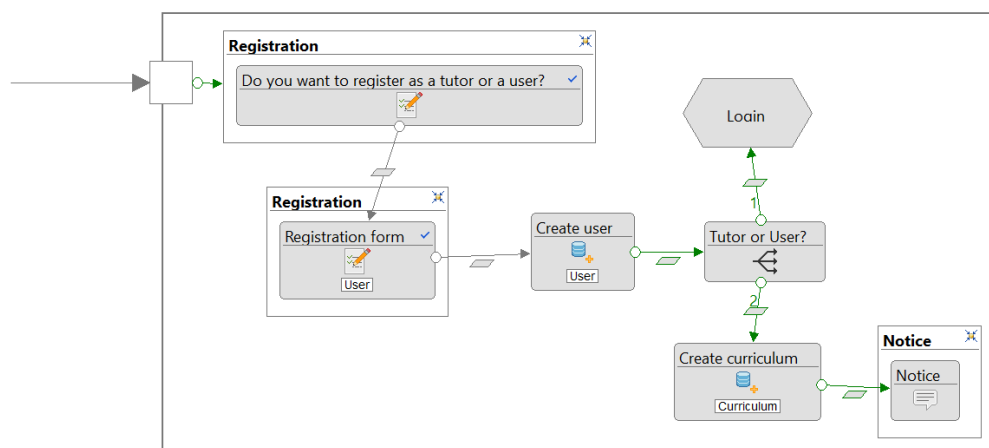


Figure 4: Registration module

The form presented to users during the registration process differs based on whether they want to register as a tutor or a regular user.

Tutors have an additional information field to fill in: their curriculum vitae.

Registration for regular users does not require any confirmation. Therefore, after creating a user instance in the database, regular users are automatically logged in. On the other hand, tutors need to wait for their curriculum vitae to be evaluated by the administration. If their curriculum meets the requirements, tutors are granted access to the platform.

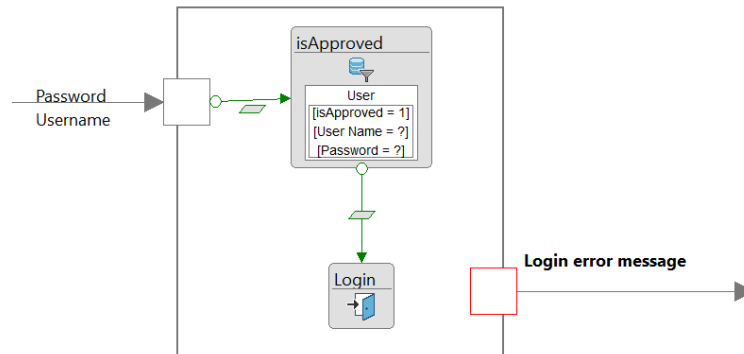


Figure 5: Login action

The figure above depicts the login action. Regular users can always access the platform after registration, while tutors can only access it if they have already been approved.

This is the generated registration form for tutors. For users, the curriculum field is "hidden" using a visibility condition.

WEB RATIO®

» Registration

Registration

Registration form

Username

Password

Confirm password

Email

First name

Last name

Curriculum
 Nessun f...lezionato

Terms and Conditions
☐ Accept Terms and Conditions

Figure 6: Registration form

4. Administration view

This is how the administration view is modelled in WebRatio:

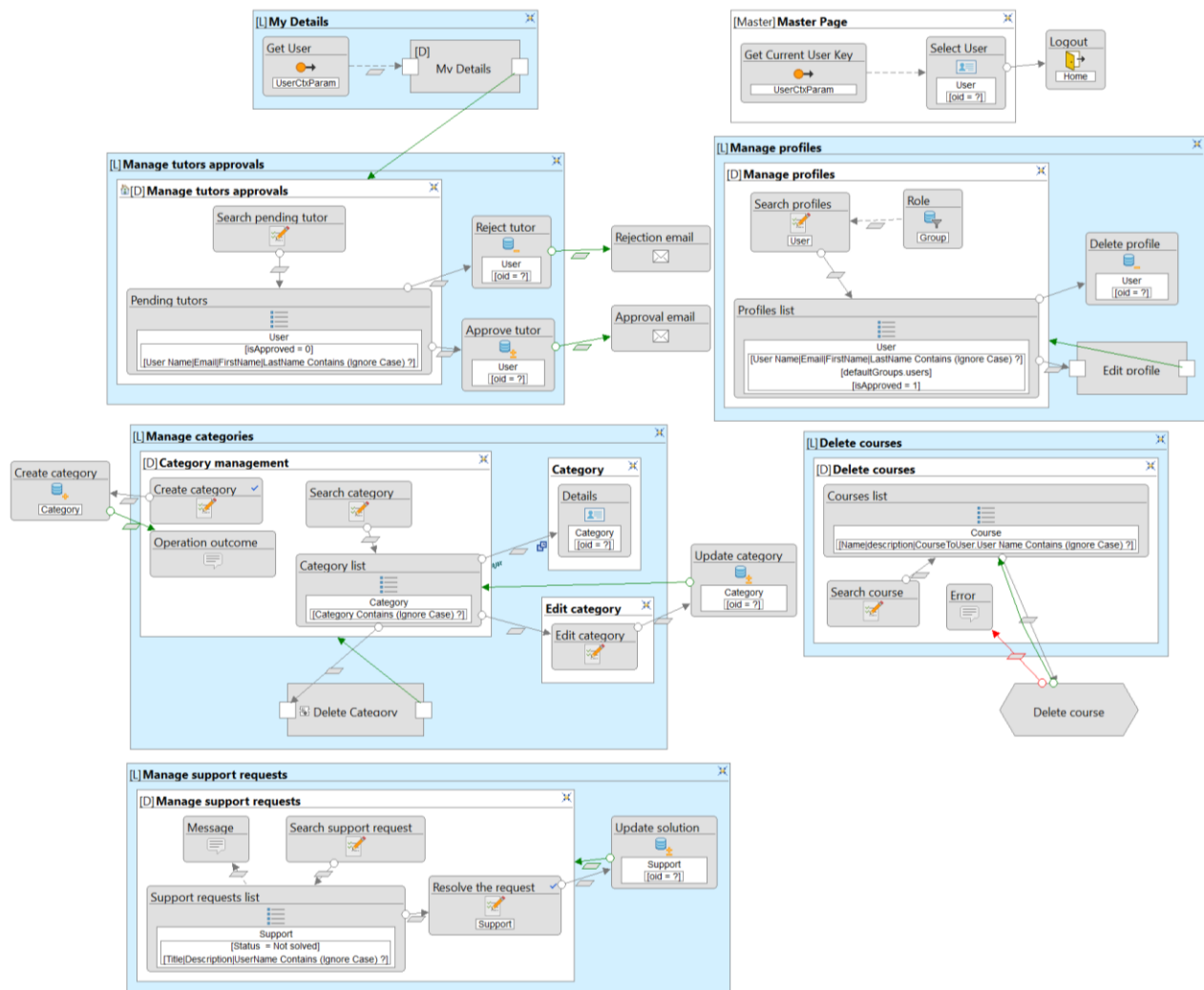


Figure 7: Administration view

After logging in, every view includes a master page that allows users to log out from any page at any time. We chose to put the logout button in upper right part of the page, as shown in the next picture.

The home page of the administration panel is dedicated to managing tutor approvals. The administrator is shown a list of all the pending tutors, and based on their curriculum, they can approve or reject them.

If a tutor is approved, the attribute “isApproved” related to the user with that oid is set to 1. An email is then sent to the tutor, notifying them that they can now log in to the platform and start uploading courses.

On the other hand, if a tutor is rejected, they are removed from the database. Additionally, a rejection email is sent to the tutor, informing them of the decision.

[» Manage tutors approvals](#) » [Manage tutors approvals](#)

Logout

Manage tutors approvals
Manage profiles
Manage categories
Delete courses
Manage support requests
My Details

Manage tutors approvals

Search pending tutor

Search

Search

Pending tutors

oid	User Name	Email	FirstName	LastName	Curriculum		
9	diana	diana@test.com	Diana	Marino	CV5352645.pdf	Approve	Reject
10	jacopo	jacopo@test.com	Jacopo	Baresi	CV5352645.pdf	Approve	Reject
19	samu	samu@test.com	Samuele	Lombardi	CV5352645.pdf	Approve	Reject

Generated by WebRatio®

Figure 8: Manage tutor approvals section

A search function to search through the tutor approvals is implemented through a form component.

The administrator can also edit and delete profiles:

[» Manage profiles](#) » [Manage profiles](#)

Logout

Manage tutors approvals
Manage profiles
Manage categories
Delete courses
Manage support requests
My Details

Manage profiles

Search profiles

Search

Role
No selection

Search

Profiles list

oid	User Name	Email	FirstName	LastName	groupName		
1	user	user@test.com	user	user	User	Edit	Delete
2	admin	admin@test.com	admin	admin	Administrator	Edit	Delete
3	manager	manager@test.com	manager	manager	Administrator	Edit	Delete
4	ciro	ciro@test.com	Ciro	Immobile	User	Edit	Delete
5	alessio	alessio.ferrone97@gmail.com	Alessio	Ferrone	Tutor	Edit	Delete
6	LeonardoDV	leo@test.com	Leonardo	Da Vinci	Tutor	Edit	Delete
7	jess	iamdiuzza@gmail.com	Jessica	Frabotta	Tutor	Edit	Delete
8	paola	paola@test.com	Paola	Milano	User	Edit	Delete
11	mau	maurizio@test.com	Maurizio	Sarri	Tutor	Edit	Delete
12	cris	cris@test.com	Cristiano	Bianchi	User	Edit	Delete

Figure 9: Manage profiles section

The page includes a search function that allows the administrator to perform searches based on user groups too. This functionality is provided through a preloaded selection field in a form component.

This is the "Profile Details" module, which is frequently used in the project. In the "My Details" section, each user can edit their profile data using this module. Additionally, the administrator has the ability to edit the profile of any user on the platform through this module.

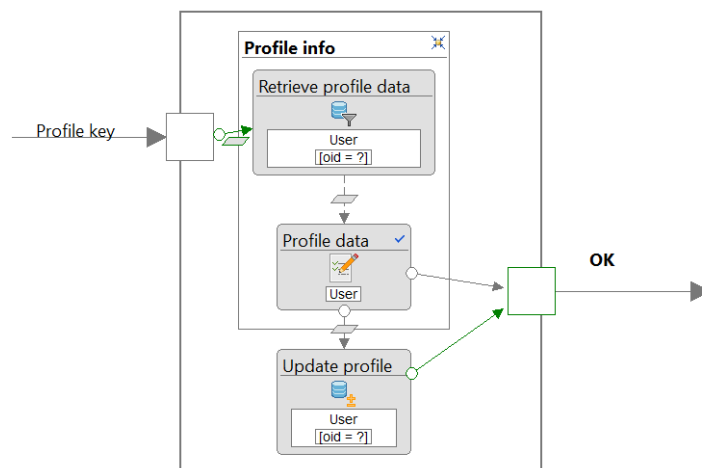


Figure 10: Profile details module

This is how the module works:

- The information about a profile is retrieved from the database using a specific user oid.
- The fields of a form component are preloaded with the retrieved data.
- The fields are editable, when the modifications are made, just save the new information.
- The "Save" navigation flow sets the parameter binding required to update the user instance in the database.

Figure 11: Profile info page

As mentioned earlier, each course is associated with a category. The presence of categories assists users in finding courses that are relevant to the programming language they are interested in.

One of the tasks of the administrator is to manage categories. They can perform the following actions:

- Create new categories by filling out a form.
- Edit existing categories using a preloaded form, similar to the one used for profile editing.
- Search for a specific category using another form.
- Check the number of courses associated with a particular category.

The screenshot shows the 'Category management' section of the WebRatio application. The sidebar on the left contains links for 'Manage tutors approvals', 'Manage profiles', 'Manage categories' (highlighted), 'Delete courses', 'Manage support requests', and 'My Details'. The top navigation bar shows the breadcrumb '» Manage categories » Category management' and a 'Logout' button. The main content area is divided into three sections: 'Search category' with a search input and a 'Search' button; 'Create category' with a 'Category name' input and a 'Save' button; and 'Category list'. The 'Category list' section contains a table with columns 'oid' and 'Category'. The table lists seven categories: 1 Python, 2 JavaScript, 3 C++, 4 C, 5 Java, 6 SQL, and 7 C#. Each row has a 'Details' link, an 'Edit' link, and a 'Delete' link. A 'Category Details' modal is open for the first category, showing 'Category Python' and '#courses 3'. The footer of the page says 'Generated by WebRatio®'.

oid	Category	Details	Edit	Delete
1	Python	Details	Edit	Delete
2	JavaScript	Details	Edit	Delete
3	C++	Details	Edit	Delete
4	C	Details	Edit	Delete
5	Java	Details	Edit	Delete
6	SQL	Details	Edit	Delete
7	C#	Details	Edit	Delete

Figure 12: Category management section

The most complex function of this section is the deletion of a category, which is handled by the "Delete category" module.

Within this module, a switch component is utilized to determine the number of courses associated with a specific category. If this number is 0, the category is promptly deleted. However, if there are courses associated with the category, they must be reassigned to another category before the deletion can be completed.

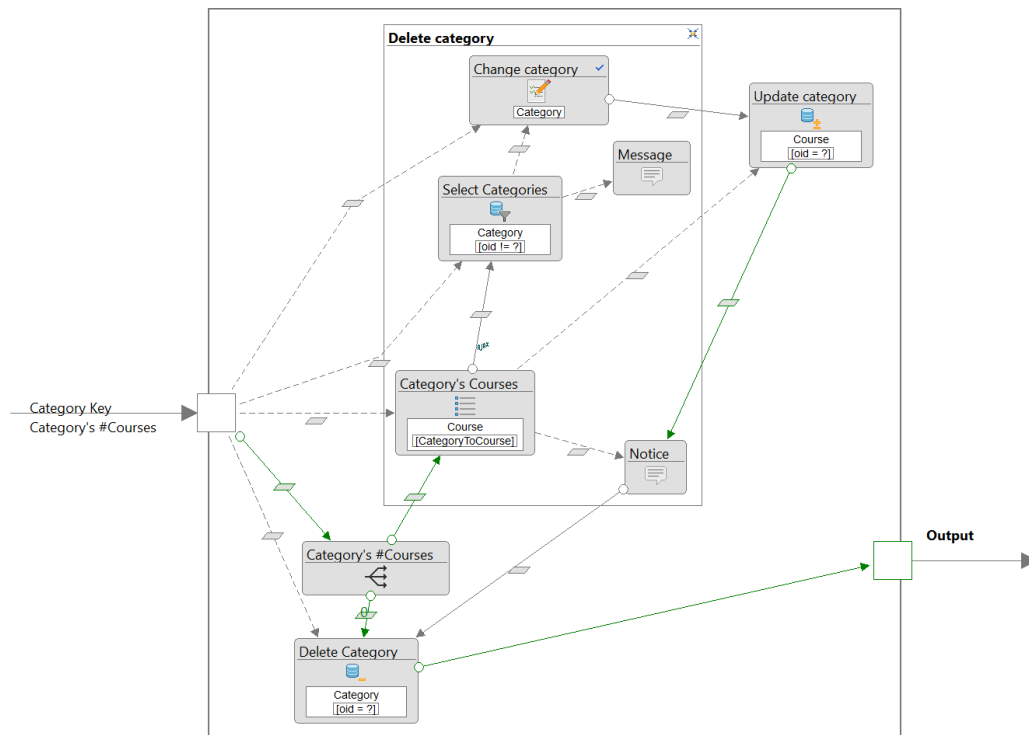


Figure 12: Delete category module

This is what the generated page looks like when there are courses in the category:

» Manage categories » Delete category

Delete category

[Logout](#)

Manage tutors approvals

Manage profiles

Manage categories

Delete courses

Manage support requests

My Details

Notice

These are the courses associated with the category you want to delete. Assign ALL of them to another category to proceed with the removal.

Message

Change the category for the course "Learn Python 3".

Category's Courses

oid	Name	description	
6	Learn Python 3	Learn the basics of Python 3, one of the most powerful, versatile, and in-demand programming languages today.	Assign
12	Learn Intermediate Python 3	Continue your Python 3 learning journey with Learn Intermediate Python 3. Intermediate Python 3 is a stepping stone to taking your skills to the next level. This course will provide you with the knowledge to make your Python code cleaner, more efficient, and more manageable. We'll also dive under the hood of fundamental concepts that will deepen your understanding of the Python language.	Assign
13	Learn Data Visualization with Python	Data visualization is a powerful tool for understanding and communicating data. This course walks through how to leverage Matplotlib and Seaborn to make effective, appealing visualizations – from choosing the right chart type for the data, to correctly scaling axes for truth and accuracy, to building an argument through visual choices.	Assign

Change category

Category

No selection

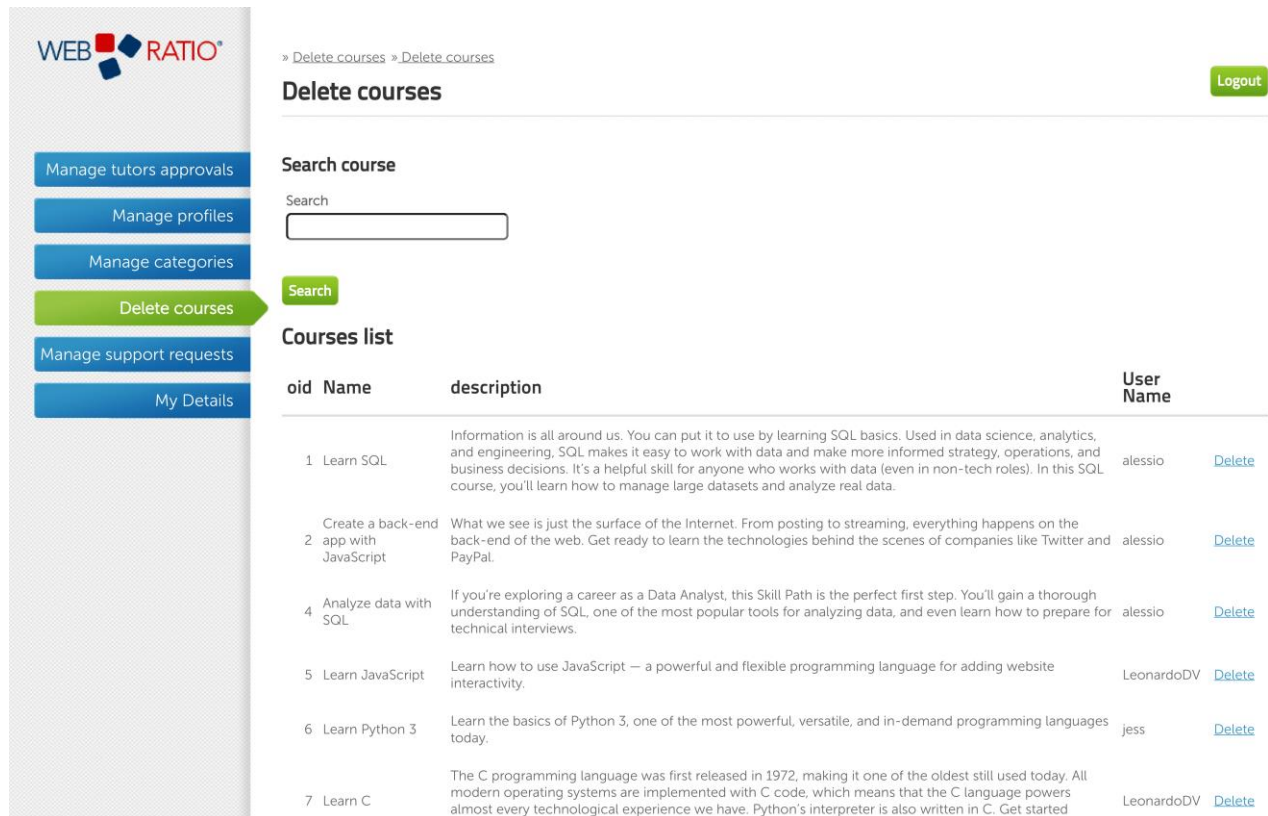
[Save](#)

Generated by WebRatio®

Figure 12: Delete category page

After all the courses have been reassigned, a button labeled 'Delete category' appears and the category can finally be deleted.

In the "Delete courses" section, the administrator can view, search, and delete any course available on the platform.



The screenshot displays the 'Delete courses' section of the WEB RATIO administrator interface. On the left is a sidebar with navigation buttons: 'Manage tutors approvals', 'Manage profiles', 'Manage categories', 'Delete courses' (highlighted in green), 'Manage support requests', and 'My Details'. The main content area has a breadcrumb trail '» Delete courses » Delete courses' and a 'Logout' button. Below the breadcrumb is a 'Search course' section with a text input field and a 'Search' button. The 'Courses list' section contains a table with columns 'oid', 'Name', 'description', and 'User Name'. The table lists seven courses, each with a 'Delete' link.

oid	Name	description	User Name
1	Learn SQL	Information is all around us. You can put it to use by learning SQL basics. Used in data science, analytics, and engineering. SQL makes it easy to work with data and make more informed strategy, operations, and business decisions. It's a helpful skill for anyone who works with data (even in non-tech roles). In this SQL course, you'll learn how to manage large datasets and analyze real data.	alessio Delete
2	Create a back-end app with JavaScript	What we see is just the surface of the Internet. From posting to streaming, everything happens on the back-end of the web. Get ready to learn the technologies behind the scenes of companies like Twitter and PayPal.	alessio Delete
4	Analyze data with SQL	If you're exploring a career as a Data Analyst, this Skill Path is the perfect first step. You'll gain a thorough understanding of SQL, one of the most popular tools for analyzing data, and even learn how to prepare for technical interviews.	alessio Delete
5	Learn JavaScript	Learn how to use JavaScript — a powerful and flexible programming language for adding website interactivity.	LeonardoDV Delete
6	Learn Python 3	Learn the basics of Python 3, one of the most powerful, versatile, and in-demand programming languages today.	jess Delete
7	Learn C	The C programming language was first released in 1972, making it one of the oldest still used today. All modern operating systems are implemented with C code, which means that the C language powers almost every technological experience we have. Python's interpreter is also written in C. Get started	LeonardoDV Delete

Figure 12: Delete courses section


The last function of the administrator is to respond to support requests sent by tutors and users.

This panel includes a list of all pending support requests, indicated by the status "Not solved". The administrator can search through the list and click on the "Resolve" button to provide an answer to the support request.

Once the administrator resolves the support request, its status is changed to "Solved". The user or tutor who submitted the support request can then view the solution proposed by the administrator in the corresponding support request section.

Further details about this aspect will be provided in the description of the other views.

The support requests are sorted in chronological order, from the oldest to the newest. This ensures that the administrator prioritizes answering the questions that were received first.



Manage tutors approvals

Manage profiles

Manage categories

Delete courses

Manage support requests

My Details

» Manage support requests » Manage support requests

Logout

Manage support requests

Search support request

Search

Search

Support requests list

Insertion date	UserOid	UserName	Title	Description
6/11/23	4	ciro	Error accessing course content	I enrolled in a course, but I'm unable to access the course materials. When I click on the lessons, it redirects me to an error page. Can you assist me in accessing the course content? Resolve
6/11/23	6	LeonardoDV	Profile removal	How can I remove my profile? Resolve
6/11/23	7	jess	Video management	How can I change the name of an already created video? Resolve
6/11/23	5	alessio	Request for support to modify the lessons of a course.	Hello, I would like to edit the lessons of a video but I don't know how to do it. Thank you in advance for your help. Resolve
6/13/23	20	fab	Error submitting answer to quiz	Hello, I completed the quiz for the 'Learn C' course, but when I tried to submit my answer, I received an error message. It seems like my quiz submission is not going through. Could you look into this and help me submit my quiz successfully? Resolve

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Figure 13: Manage support request section

5. Tutor view

This is how the tutor view is modelled in WebRatio:

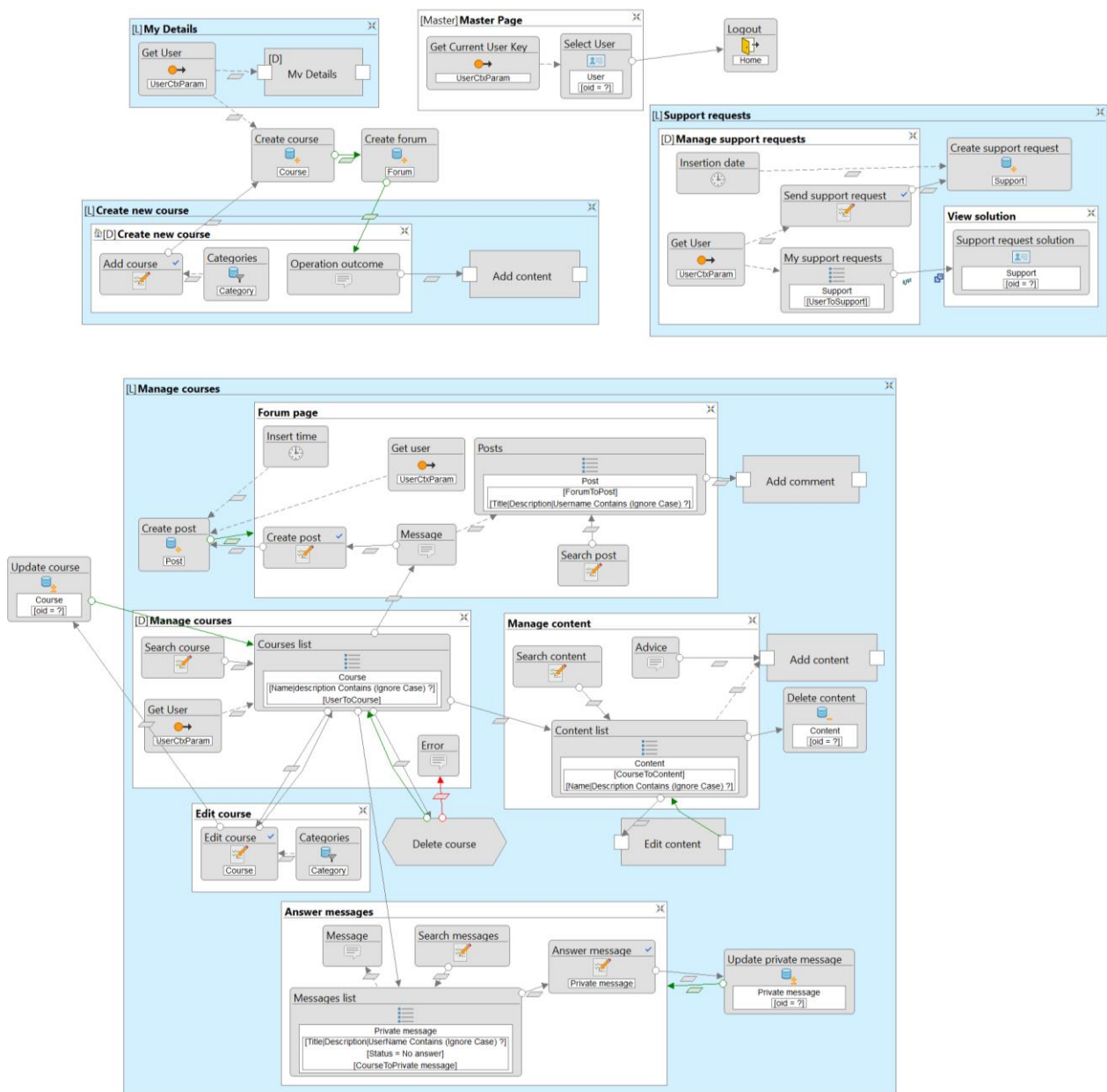


Figure 14: Tutor view

The master page for the logout and the "My Details" section to modify the profile are almost identical to the ones we saw for the Administration view.

The first section shown to the tutor is the one that allows them to create new courses. In order to create a new course, the tutor must fill out a form that asks for the name of the course, a description of it, and a category selected from the options stored in the database.

Submitting the form allows us to gather the necessary information for creating a course instance in the database. Simultaneously, an associated forum for the course is instantiated.

After creating a course, the tutor has the option to add content immediately or at a later time in the 'Manage courses' section.

If the tutor chooses the first option, they can easily add content by following these steps:

- Click on the button labeled 'Add Content,' which will be displayed once the course has been created.
- Two new forms will appear, providing the tutor with the necessary fields to insert all the required information for creating lessons or exercises.

This picture displays how the page appears after creating a new course:

WEB RATIO®

» Create new course » Create new course

Create new course

Logout

Create new course

Manage courses

Support requests

My Details

Add course

Name

Description

Category

No selection

Save

Operation outcome

The course "Build Basic Android Apps with Java" was added successfully. Do you want to add a lesson or an exercise to it?

Add content

Generated by WebRatio®

Figure 15: Create course section

These are the additional forms shown when the tutor clicks on “Add content”:

WEB RATIO®

» Create new course » Add content

Add content Logout

Add lesson

Name

Description

Video Nessun fi...lezionato

Display order

Add exercise

Name

Question

Display order

Figure 16: Add content page

After clicking "Save," a new window will appear, presenting an additional form where the tutor can add options and the solution:

WEB RATIO®

» Create new course » Add content

Add content Logout

Add lesson

Name

Description

Video Ne

Display order

Course content

Order	Name	Description
1	Lesson 1	Get started with Android and Java.

Figure 17: Add content page (options and solution window)

The process of adding content is modelled through 2 modules, “Add content” and “Add options and solution”. As previously mentioned, tutors have the flexibility to add content either immediately or at a later time within the 'Manage Courses' section. In both cases the content addition is implemented using these modules.

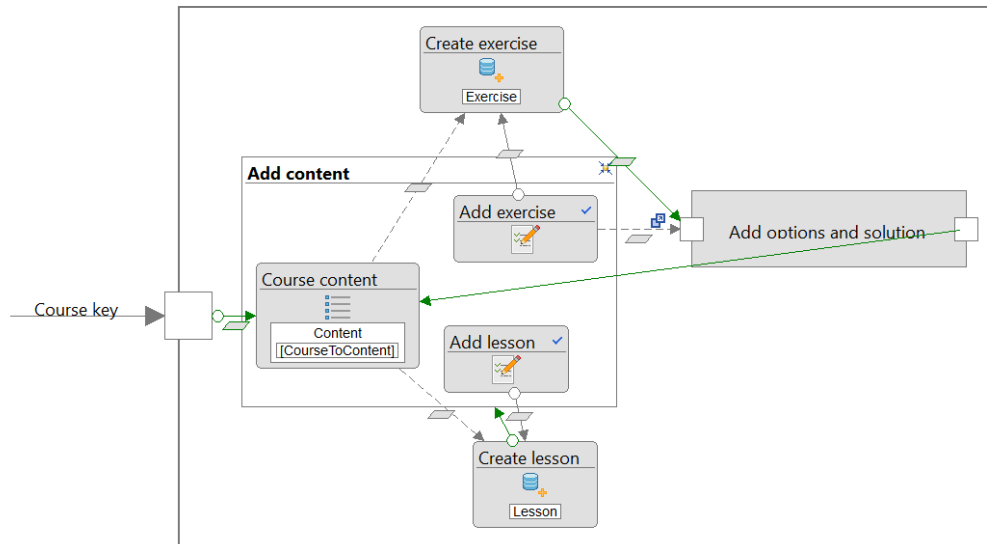


Figure 18: Add content module

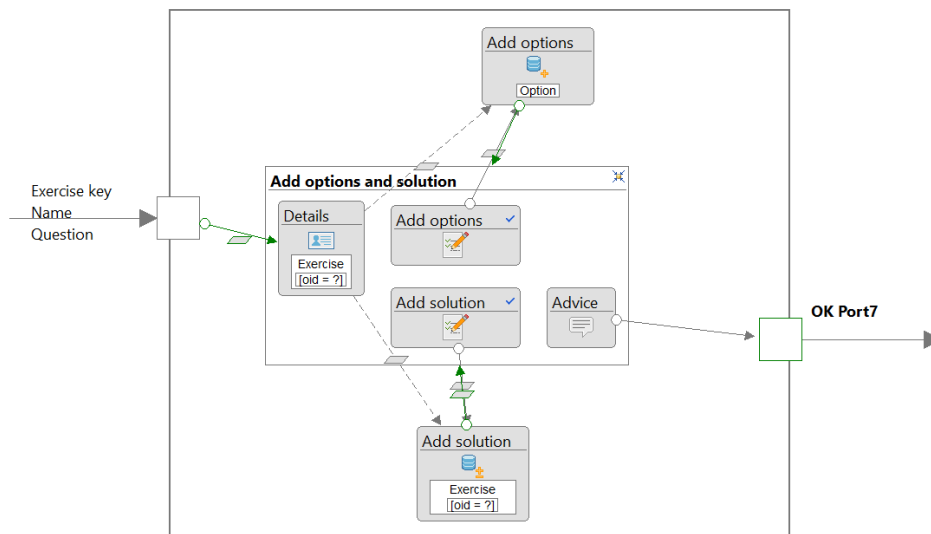


Figure 19: Add options and solution

Let’s now talk about the section which has the highest number of tasks in this view: “Manage courses”.

This section allows tutors to monitor the courses they have created. They can access a comprehensive list of their courses, search for specific ones, and view various statistics such as the average rating provided by followers and the number of followers for each course.

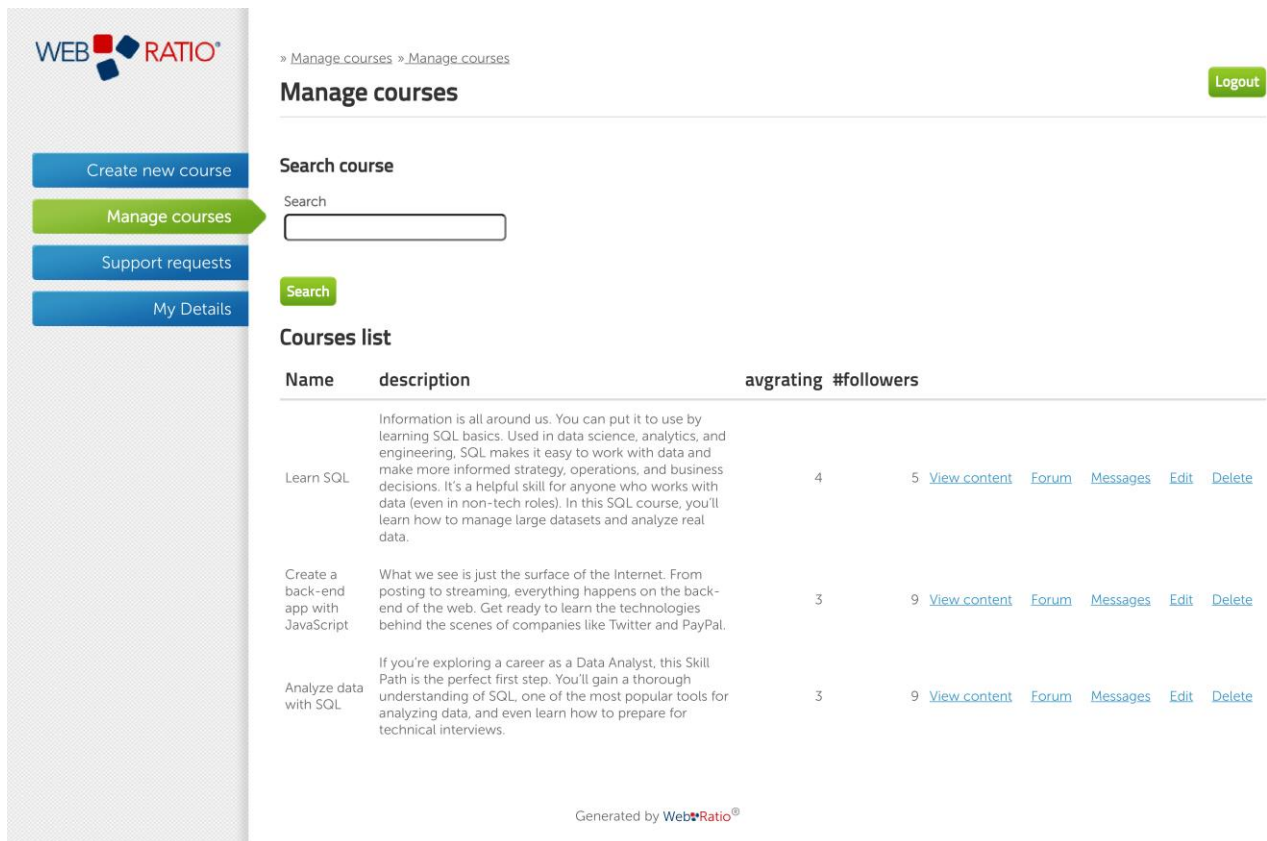


Figure 19: Manage courses section

When the tutor clicks on the corresponding button, it triggers a series of events:

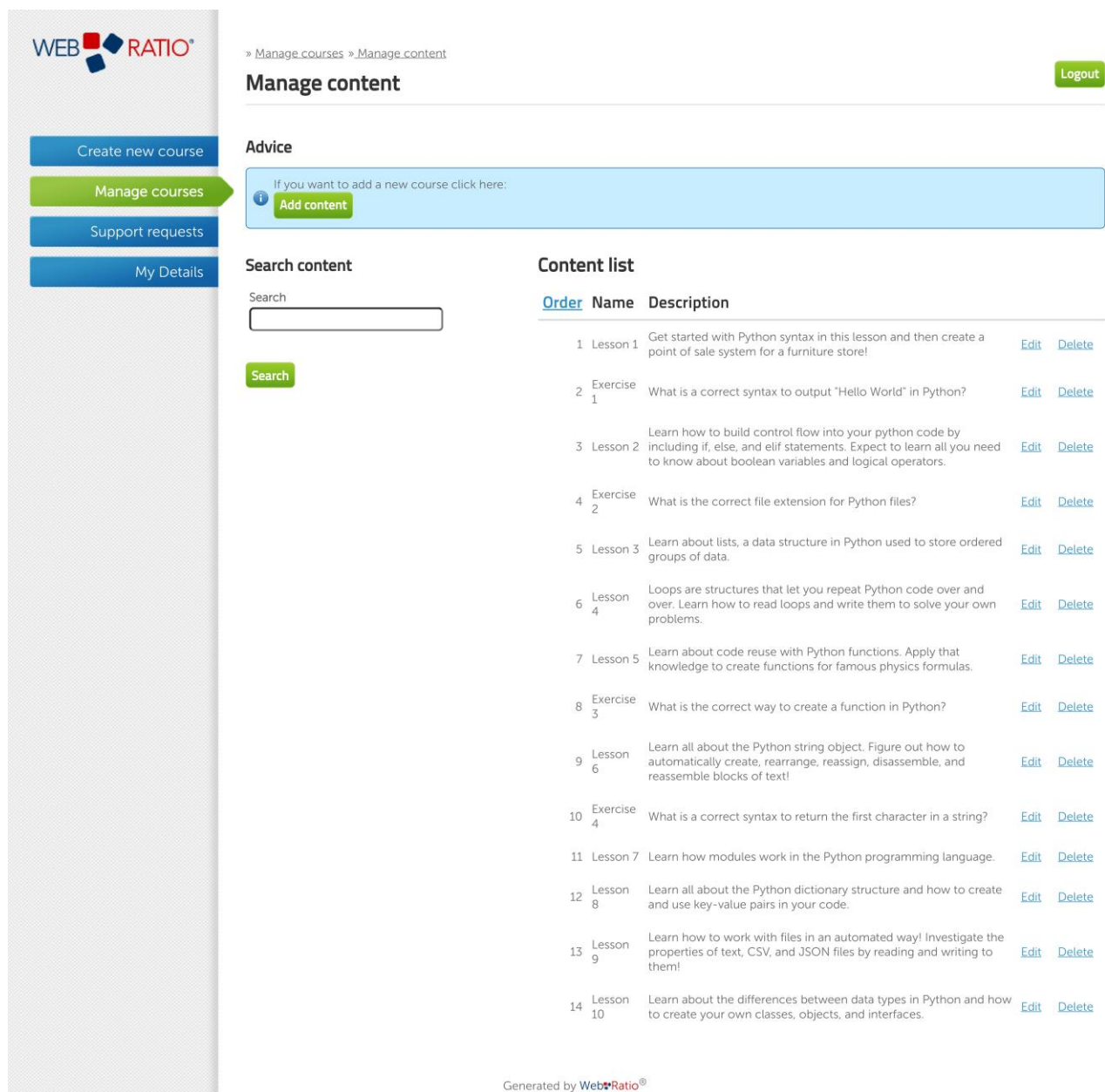
- "View content": this action opens another page that enables the tutor to manage the course contents. The page provides options to add, edit, and delete course materials.
- "Forum": this action grants the tutor access to the course forum, where they can participate in discussions and interact with students.
- "Messages": by clicking on this button, the tutor can check for any private messages specifically related to the course. This feature allows them to address questions or concerns from students.
- "Edit": this action allows the tutor to modify the course information, including its name, description, and category.
- "Delete": by selecting this option, the tutor can delete the course along with all its associated content.

Let's explore how each of them works and how they were modelled.

By clicking on "View content," the page "Manage content" will open. In this section, the tutor can access the content uploaded to the course and perform various actions such as adding additional lessons or exercises, editing existing content, or deleting them. Similarly to other sections of the application, the tutor can search in the list content by using keywords.

The operation of content addition is implemented through with the "Add content" module seen before.

Deleting content is a straightforward process implemented through a delete operation component. When the tutor selects the content they wish to remove, the component removes the instance with the corresponding oid.



The screenshot displays the 'Manage content' page of the WebRatio application. The page layout includes a sidebar on the left with navigation links: 'Create new course', 'Manage courses' (highlighted), 'Support requests', and 'My Details'. The top navigation bar shows the breadcrumb '» Manage courses » Manage content' and a 'Logout' button. The main content area is titled 'Manage content' and contains an 'Advice' section with a message: 'If you want to add a new course click here:' and an 'Add content' button. Below this is a 'Search content' section with a search input field and a 'Search' button. The 'Content list' section features a table with columns 'Order', 'Name', 'Description', 'Edit', and 'Delete'. The table lists 14 items, alternating between lessons and exercises, each with a brief description and links to edit or delete the content.

Order	Name	Description	Edit	Delete
1	Lesson 1	Get started with Python syntax in this lesson and then create a point of sale system for a furniture store!	Edit	Delete
2	Exercise 1	What is a correct syntax to output "Hello World" in Python?	Edit	Delete
3	Lesson 2	Learn how to build control flow into your python code by including if, else, and elif statements. Expect to learn all you need to know about boolean variables and logical operators.	Edit	Delete
4	Exercise 2	What is the correct file extension for Python files?	Edit	Delete
5	Lesson 3	Learn about lists, a data structure in Python used to store ordered groups of data.	Edit	Delete
6	Lesson 4	Loops are structures that let you repeat Python code over and over. Learn how to read loops and write them to solve your own problems.	Edit	Delete
7	Lesson 5	Learn about code reuse with Python functions. Apply that knowledge to create functions for famous physics formulas.	Edit	Delete
8	Exercise 3	What is the correct way to create a function in Python?	Edit	Delete
9	Lesson 6	Learn all about the Python string object. Figure out how to automatically create, rearrange, reassign, disassemble, and reassemble blocks of text!	Edit	Delete
10	Exercise 4	What is a correct syntax to return the first character in a string?	Edit	Delete
11	Lesson 7	Learn how modules work in the Python programming language.	Edit	Delete
12	Lesson 8	Learn all about the Python dictionary structure and how to create and use key-value pairs in your code.	Edit	Delete
13	Lesson 9	Learn how to work with files in an automated way! Investigate the properties of text, CSV, and JSON files by reading and writing to them!	Edit	Delete
14	Lesson 10	Learn about the differences between data types in Python and how to create your own classes, objects, and interfaces.	Edit	Delete

Generated by WebRatio®

Figure 20: Manage content page

The “Edit” function is a little bit more articulated.

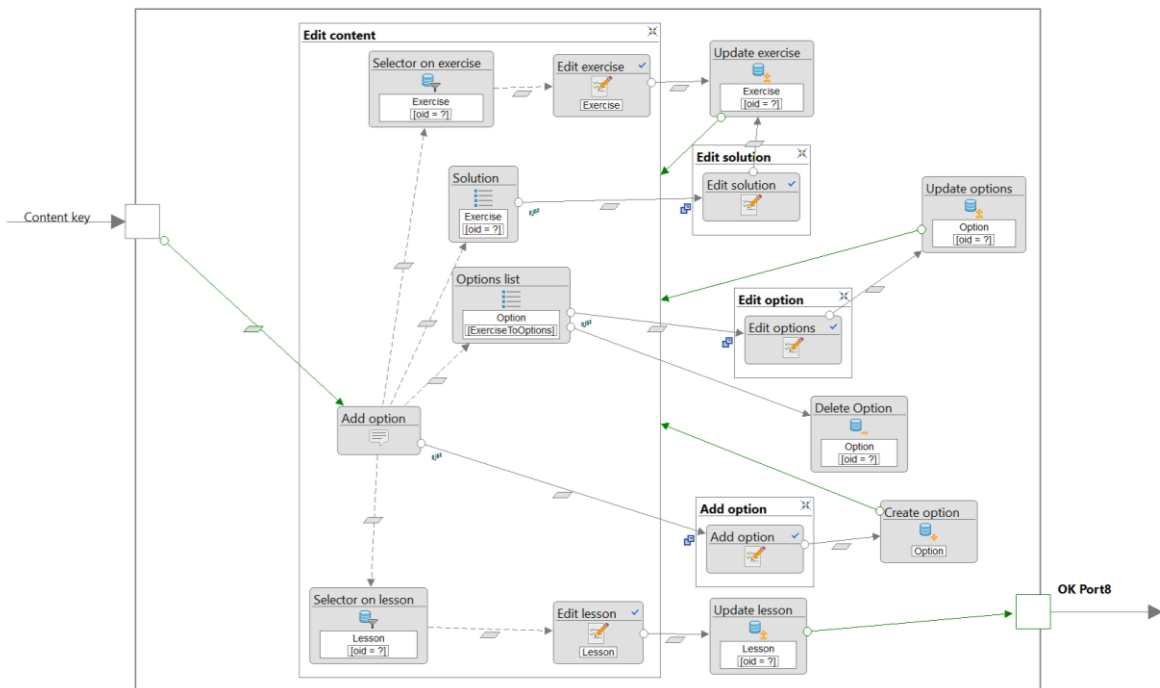


Figure 21: Edit content module

Based on the fact that the content is a lesson or an exercise, a different modifiable and precompiled form is shown.

To achieve this, we implemented a visibility condition that determines which form to display.

If the content is an exercise, the tutor is provided with additional operations such as adding new options, editing existing options, or deleting them.

Furthermore, the solution for the exercise can also be edited.

WEB RATIO®

» Manage courses » Edit content

Edit content [Logout](#)

Create new course

Manage courses

Support requests

My Details

Add option

If you want to add a new option click on "Add option".

[Add option](#)

Edit exercise

Name

Exercise 1

Question

What is a correct syntax to output "Hello World" in Python?

Display order

2

[Save](#)

Options list

Option	Edit	Delete
echo("Hello World");	Edit	Delete
p("Hello World")	Edit	Delete
print ("Hello World");	Edit	Delete
echo "Hello World"	Edit	Delete

Solution

Solution

print("Hello World") [Edit](#)

Generated by WebRatio®

Figure 22: Manage content page

When the tutor clicks on "Add option" or the "Edit" button in the options list or next to the solution, a window, that resembles the one seen earlier on the "Add content" page, will open.

In this window, the tutor can enter the desired modifications.

Edit options

Option

p("Hello World")

[Save](#)

Figure 23: Edit option window

By clicking on the button “Forum” in the “Manage courses” main list, the tutor can access to the course forum.

On the forum page, there is a list of all the posts, sorted by the time they were inserted (with the newest posts shown first in descending order). Each post also displays the username of the person who posted it. At the top of the page, there is a button to create a new post and a search form.

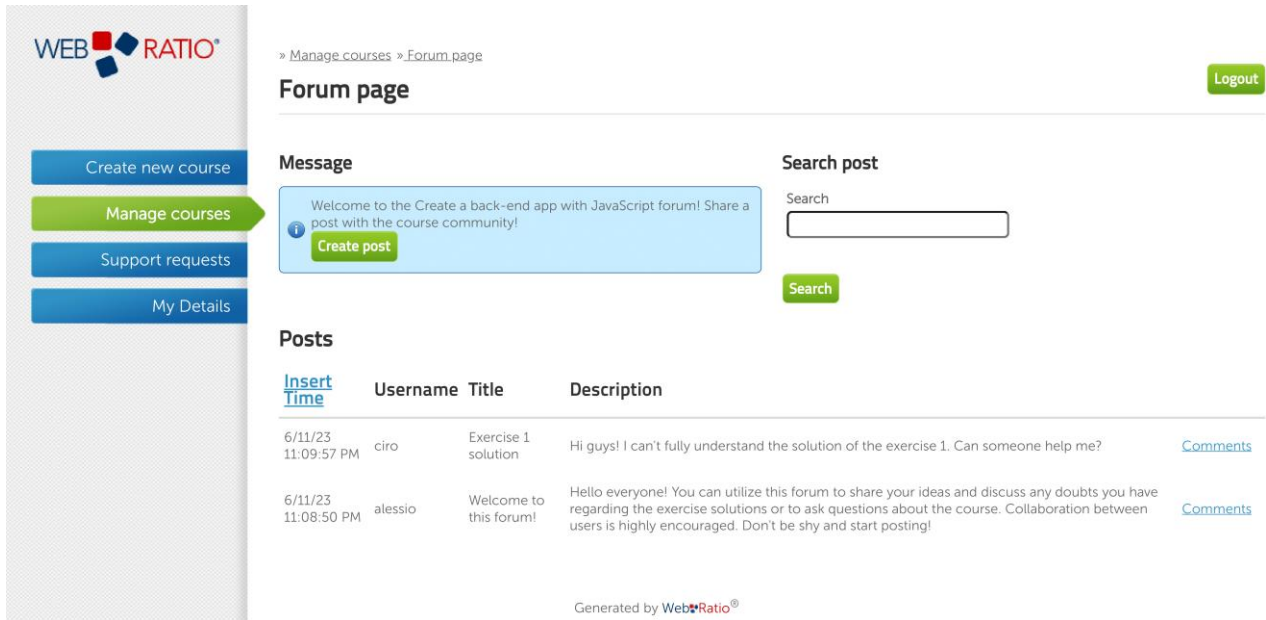


Figure 24: Forum page

To add a comment on a post the tutor has to click on the “Comments” button.

The module “Add comments” is used to implement the comments page and its functions:

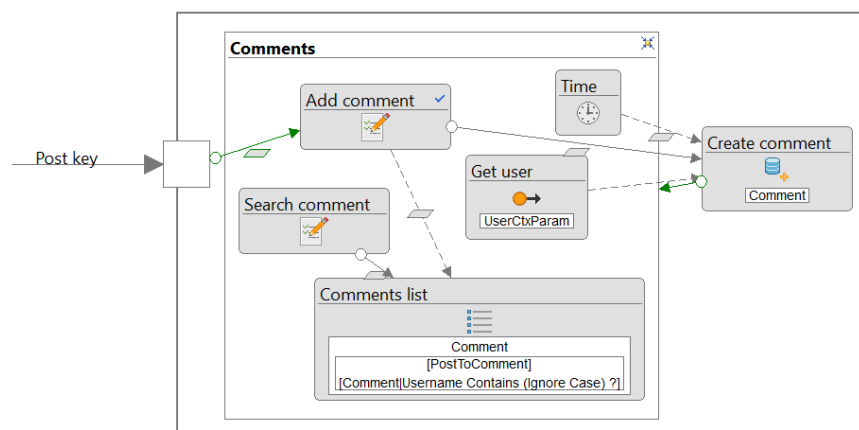


Figure 25: Add comment module

This is how the generated page looks:

WEB RATIO®

» Manage courses » Comments

Logout

Create new course

Manage courses

Support requests

My Details

Comments

Add comment

Comment

Search comment

Search

Search

Save

Comments list

Insert Time ^	Username	Comment
6/11/23 11:11:21 PM	edo	The answer is <script> because: 1. Separation of Concerns: The <script> element allows us to separate the JavaScript code from the HTML markup, promoting a clearer separation of concerns between the structure (HTML), presentation (CSS), and behavior (JavaScript) of a web page. This improves code maintainability and readability. 2. Code Reusability: By placing JavaScript code in external files and using the <script src='filename.js'></script> syntax, we can reuse the same JavaScript code across multiple HTML documents. This promotes code modularity and reduces redundancy. 3. Progressive Enhancement: Placing JavaScript at the end of the HTML document, just before the closing </body> tag, ensures that the HTML content is loaded and rendered first. This approach enhances the user experience by allowing the page to display content even if JavaScript is disabled or takes longer to load. 4. Asynchronous Loading: The <script> element supports attributes like async and defer that control how the browser fetches and executes the JavaScript code. These attributes allow us to optimize the loading and execution of JavaScript, improving page performance and user experience.
6/11/23 11:12:37 PM	ciro	Thank you very much! Now it's all very clear.
6/11/23 11:14:38 PM	cris	Thanks edo, your explanation was very helpful for me too!

Generated by WebRatio®

Figure 26: Comments page

The user who follows a course can ask questions to the tutor and the community publicly, or privately contact the tutor. Each course has a sort of "mailbox" to help tutors organize the various messages they receive.

Private messages are organized similarly to support requests, but in this case, the recipient is the tutor instead of the administrator. The properties of a message include:

- Insertion date: this field is used to order the list of messages from oldest to newest.
- Username: this indicates the username of the user who is asking for clarification.
- Title: similar to the subject line in an email, the title helps understand the topic of the message.
- Description: this field contains the actual question or clarification being requested.
- Status: the status can be "No answer" or "Answered," depending on whether the tutor has already replied or not.

[Create new course](#)
[Manage courses](#)
[Support requests](#)
[My Details](#)

» [Manage courses](#) » [Answer messages](#)

Logout

Answer messages

Search messages

Search

Messages list

Insertion date	UserName	Title	Description	Status
6/11/23	ciro	Handling exceptions	Hi Tutor, I'm currently working on a Java program, and I'm having trouble understanding how to handle exceptions. I have a method that reads input from a file, and I want to handle any potential errors that may occur during the file reading process. Could you please explain how to use try-catch blocks effectively for exception handling in Java? Additionally, I would appreciate any guidance on the best practices for handling different types of exceptions in my program. Thank you in advance for your help. Best regards.	No answer Answer

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Figure 27: Answer messages page

By clicking on "Answer," appears a form component where the tutor can enter their response to the user's message.

Continuing with the "Manage courses" functions, there are two remaining options: "Edit" and "Delete":

- "Delete" allows the tutor to remove the selected course from the database.
- "Edit" opens a new page displaying a summary of the previous information about the course, along with the possibility of modifying and updating the database accordingly.

[Create new course](#)
[Manage courses](#)
[Support requests](#)
[My Details](#)

» [Manage courses](#) » [Edit course](#)

Logout

Edit course

Edit course

Name

Description

Learn the basics of Python 3, one of the most powerful, versatile, and in-demand programming languages today.

Category

Python

Save

Cancel

Generated by WebRatio®

Figure 28: Edit course page

Now, let's analyze the last section of the tutor view: "Support requests."

We have already discussed how support requests work for the administrator, but let's see how they function for tutors and users.

WEB-RATIO®

» Support requests » Manage support requests

Logout

Create new course

Manage courses

Support requests

My Details

Manage support requests

Send support request

Title

Description

Send

My support requests

Insertion date	Title	Description	Status
6/11/23	Video management	How can I change the name of an already created video?	Not solved Details
6/11/23	Where are my courses?	I can't access my courses. How can I solve this?	Solved Details

Generated by Web-Ratio®

Figure 28: Support requests section

At the top of the page, there is a form for submitting support request information.

In the lower part of the page, there is a list of previously submitted support requests, ordered by insertion date. The list displays the title, description, and status of each request.

By clicking on the "Details" button, a window opens showing the solution (if available) and a summary of the support request.

Support request solution

Title Where are my courses?

Description I can't access my courses. How can I solve this?

Solution Search for the option "Manage courses" in the menu on the left. There you can find your courses.

Figure 29: Support request details

6. User view

This is how the tutor view is modelled in WebRatio:

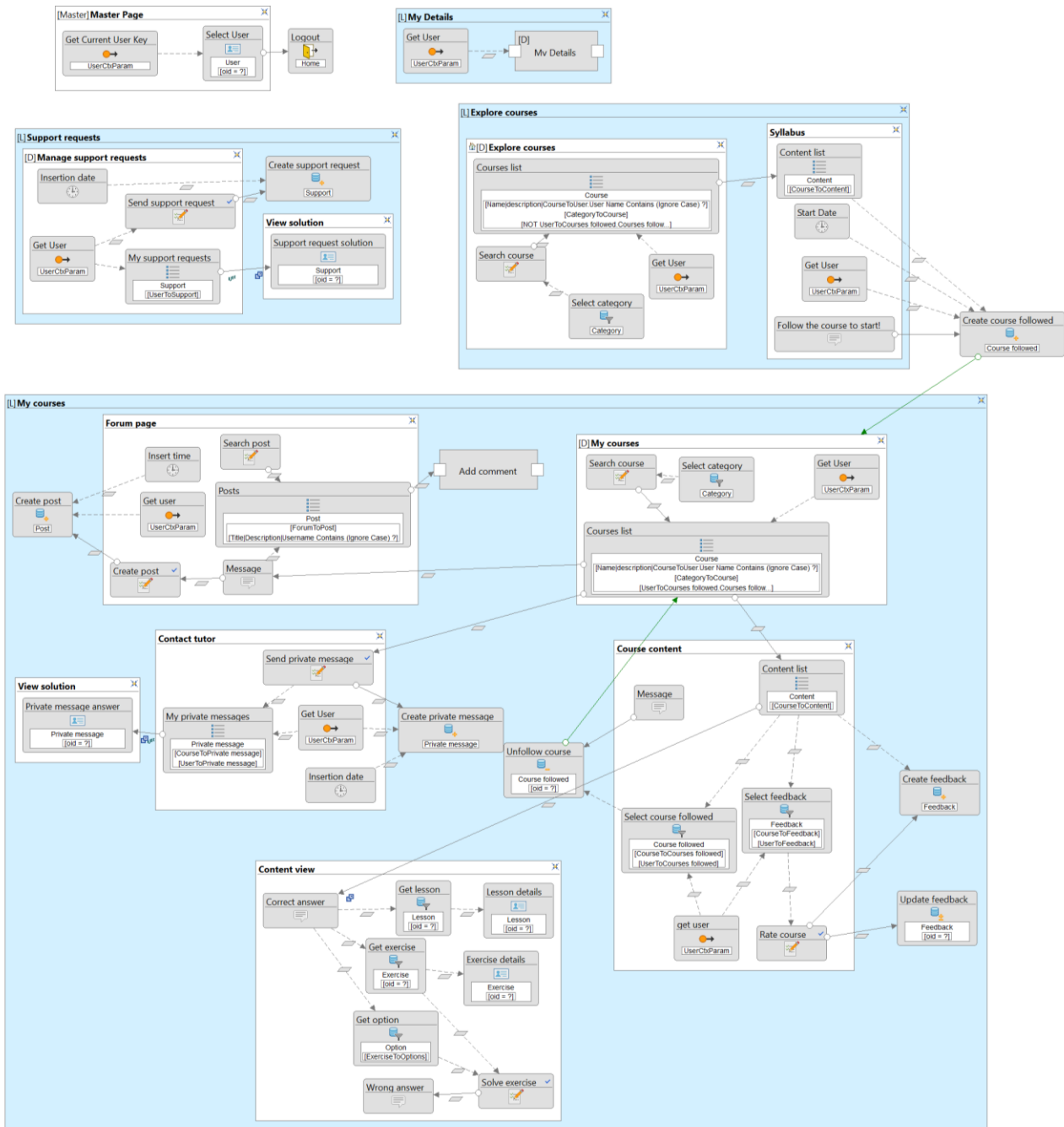



Figure 30: User view

The master page for the logout, the "My Details" and "Support requests" sections are almost identical to the ones we saw for the Tutor view.

The "Explore courses" section view serves as the home for this view. Here, users can access all the courses available on the platform, search for specific courses (including by category), and view the content of each course by clicking on "View content."

By default, the course list is ordered based on the number of followers each course has, with the most popular courses displayed first. However, users also have the option to sort the list based on the average rating given by users who follow the course.



[Explore courses](#)
[My courses](#)
[Support requests](#)
[My Details](#)

» [Explore courses](#) » [Explore courses](#)

Explore courses

Logout

Search course

Search

Search with category

No selection

Search

Courses list

oid	Name	description	User Name	Category	avgrating	#followers
4	Analyze data with SQL	If you're exploring a career as a Data Analyst, this Skill Path is the perfect first step. You'll gain a thorough understanding of SQL, one of the most popular tools for analyzing data, and even learn how to prepare for technical interviews.	alessio	SQL	3	9 View content
13	Learn Data Visualization with Python	Data visualization is a powerful tool for understanding and communicating data. This course walks through how to leverage Matplotlib and Seaborn to make effective, appealing visualizations – from choosing the right chart type for the data, to correctly scaling axes for truth and accuracy, to building an argument through visual choices.	mau	Python	3	6 View content
11	Learn Intermediate JavaScript	You've learned the programming fundamentals using the latest JavaScript syntax to create dynamic web apps, but you want to do more! With Intermediate JavaScript, you'll understand how to incorporate JavaScript in bigger and more complex web apps using concepts such as classes, promises, async/await, and requests.	mau	JavaScript	3	6 View content
1	Learn SQL	Information is all around us. You can put it to use by learning SQL basics. Used in data science, analytics, and engineering, SQL makes it easy to work with data and make more informed strategy, operations, and business decisions. It's a helpful skill for anyone who works with data (even in non-tech roles). In this SQL course, you'll learn how to manage large datasets and analyze real data.	alessio	SQL	4	5 View content
5	Learn JavaScript	Learn how to use JavaScript – a powerful and flexible programming language for adding website interactivity.	LeonardoDV	JavaScript	3	5 View content
10	Learn C#	The C# programming language offers flexible and comprehensive libraries that make it easy to work across operating systems. That's why it's widely used by companies like Microsoft and Stack Overflow. Whether you want to develop websites, apps, video games, or virtual reality, building your foundation is key. In this course, you'll learn C# basics so you can become a more versatile programmer.	jess	C#	2	5 View content
7	Learn C	The C programming language was first released in 1972, making it one of the oldest still used today. All modern operating systems are implemented with C code, which means that the C language powers almost every technological experience we have. Python's interpreter is also written in C. Get started learning C fundamentals to become a better programmer in any field of computer science.	LeonardoDV	C	3	4 View content
14	Build Basic Android Apps with Java	Some of our favorite apps are the simplest ones – and you don't need any coding experience to start making your own. Throughout this Skill Path, you'll build a basic Android app from start to finish. Get ready to see your work on the really small screen.	jess	Java	3	3 View content
12	Learn Intermediate Python 3	Continue your Python 3 learning journey with Learn Intermediate Python 3. Intermediate Python 3 is a stepping stone to taking your skills to the next level. This course will provide you with the knowledge to make your Python code cleaner, more efficient, and more manageable. We'll also dive under the hood of fundamental concepts that will deepen your understanding of the Python language.	mau	Python	3	3 View content

Figure 31: Explore courses section

WEB RATIO®

» Explore courses » Syllabus

Syllabus Logout

Follow the course to start!

If you want to watch the video lessons, do the exercises or talk about the course on the forum, please follow the course:

Follow

Content list

Order	Name	Description
1	Lesson 1	Learn the basics of SQL databases and build your own.
2	Exercise 1	What does SQL stand for?
3	Exercise 2	Which SQL statement is used to extract data from a database?
4	Exercise 3	Which SQL statement is used to delete data from a database?
5	Lesson 2	Write your own queries to access data and apply your SQL knowledge to complete real-world projects.
6	Exercise 4	With SQL, how do you select a column named "FirstName" from a table named "Persons"?
7	Lesson 3	Increase the number of tools in your SQL toolset by learning about aggregates, then apply them to datasets to discover new insights.
8	Lesson 4	Expand your abilities by joining multiple sources of data.
9	Lesson 5	Set up a SQL database on your own computer and practice the commands you've learned.
10	Lesson 6	Combine everything that you learned to solve real business problems.
11	Lesson 7	Dive into the more advanced SQL topics like window functions, math functions, and date functions.

Generated by WebRatio®

Figure 32: Syllabus page

When users click on "View content," a list of all the lessons and exercises for that course will appear. This list serves as the syllabus for the course. However, to actually watch the videos, solve the exercises, and participate in the forum, the user needs to follow the course. To do this, the user simply has to click on the "Follow" button located in the top half of the page.

When a user starts following a course, they are redirected to the "My courses" section, which displays all the courses they follow. These courses no longer appear in the "Explore courses" section after being followed.

The "My courses" section has a list with all the followed courses and a search form similar to the one in the "Explore courses" section.

The "My courses" section features a comprehensive list of all the courses the user is currently following, accompanied by a search form that closely resembles the one in the "Explore courses" section. Each course within the list offers three distinct options:

- "View content": allows users to see the list of exercises and lessons of the course.
 - "Forum": this option grants access to the dedicated forum for the specific course. Users can engage in discussions, seek assistance, or contribute to the community by sharing insights, questions, or thoughts.
 - "Contact tutor": users can utilize this option to communicate with the tutor directly.
- Whether seeking clarification or having specific questions about the course content, users

can write and submit their inquiries to the tutor through this feature. The tutor will then provide necessary guidance or answers to help users progress effectively.

WEB RATIO®

» My courses » My courses

My courses [Logout](#)

Explore courses

My courses

Support requests

My Details

Search course

Search

Search with category

No selection

Search

Courses list

oid	Name	description	User Name	Category
2	Create a back-end app with JavaScript	What we see is just the surface of the Internet. From posting to streaming, everything happens on the back-end of the web. Get ready to learn the technologies behind the scenes of companies like Twitter and PayPal.	alessio	JavaScript View content Forum Contact tutor
6	Learn Python 3	Learn the basics of Python 3, one of the most powerful, versatile, and in-demand programming languages today.	jess	Python View content Forum Contact tutor
9	Learn Java	Popular for its versatility and ability to create a wide variety of applications, learning Java opens up your possibilities when coding. With it, you'll be able to develop large systems, software, and mobile applications – and even create mobile apps for Android. Learn important Java coding fundamentals and practice your new skills with real-world projects.	jess	Java View content Forum Contact tutor

Generated by WebRatio®

Figure 33: My courses section

Once users click on "View content," the list of all the contents for that course will appear.

At the top of the page, there is a form with a selection field that allows users to rate the course from 1 to 5. The feedback can be updated over time, as every time a user selects a new rating, the feedback for that user is updated in the database.

Users also have the option to unfollow the course by clicking on the "Unfollow course" button.

Next to each content, there is a "View" button. When clicked, a window opens displaying the content based on its type. If the content is a lesson, the window will show the video lesson along with a brief summary of its information. On the other hand, if the content is an exercise, users will find a form to solve the quiz. The visibility of these elements is controlled through visibility conditions.

WEB RATIO®

» My courses » Course content

Course content [Logout](#)

Explore courses

My courses

Support requests

My Details

Rate course

rating
No selection

[Update rating](#)

Message

Do you want to unfollow the course? Click here:
[Unfollow course](#)

Content list

Order	Name	Description	
1	Lesson 1	Learn the fundamentals of JavaScript to start your journey towards back-end web development.	View
2	Exercise 1	Inside which HTML element do we put the JavaScript?	View
3	Lesson 2	Learn how to create more flexible programs using conditionals, control flow, functions, and scope.	View
4	Exercise 2	What is the correct syntax for referring to an external script called "xxx.js"?	View
5	Lesson 3	Learn how to use Arrays, Loops, and built-in Array methods, and then apply your skills in the Beat Mix project.	View
6	Lesson 4	Learn about using JavaScript objects to store data and functionality, and learn modern tools for writing reusable, universally usable code.	View
7	Lesson 5	Learn to build back-end servers with the popular and powerful Express.js library, then build your own API server in the Boss Machine project	View
8	Lesson 6	Learn how to create tables, create, retrieve, and update data in SQL databases, and build a data-intensive web app.	View
9	Lesson 7	Learn the Node-SQLite to connect JS and SQL in web apps, and build your first fully-integrated app back-end in the Codestrips project.	View

Generated by WebRatio®

Figure 34: My courses content

When the content is a lesson, the window shown below will open. To watch the video, users have to click on the underlined video name, and a player will open up.

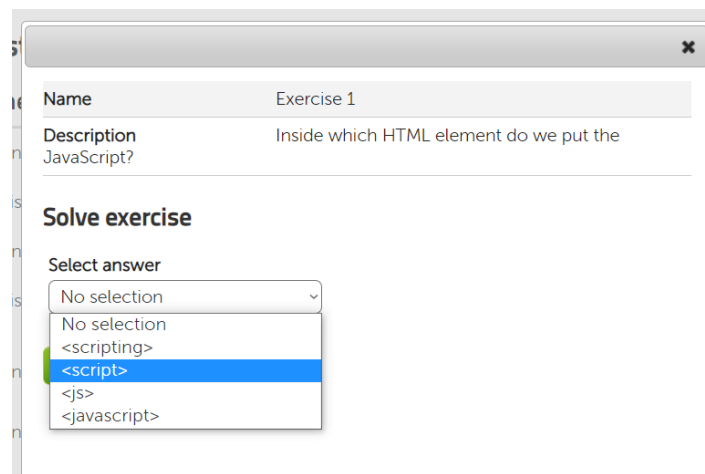
Name Lesson 1

Description Learn the fundamentals of JavaScript to start your journey towards back-end web development.

Video [JavaScript in 100 Seconds.mp4](#)

Figure 35: Lesson window

When the content is an exercise, users can answer the quiz question by selecting from the available options.

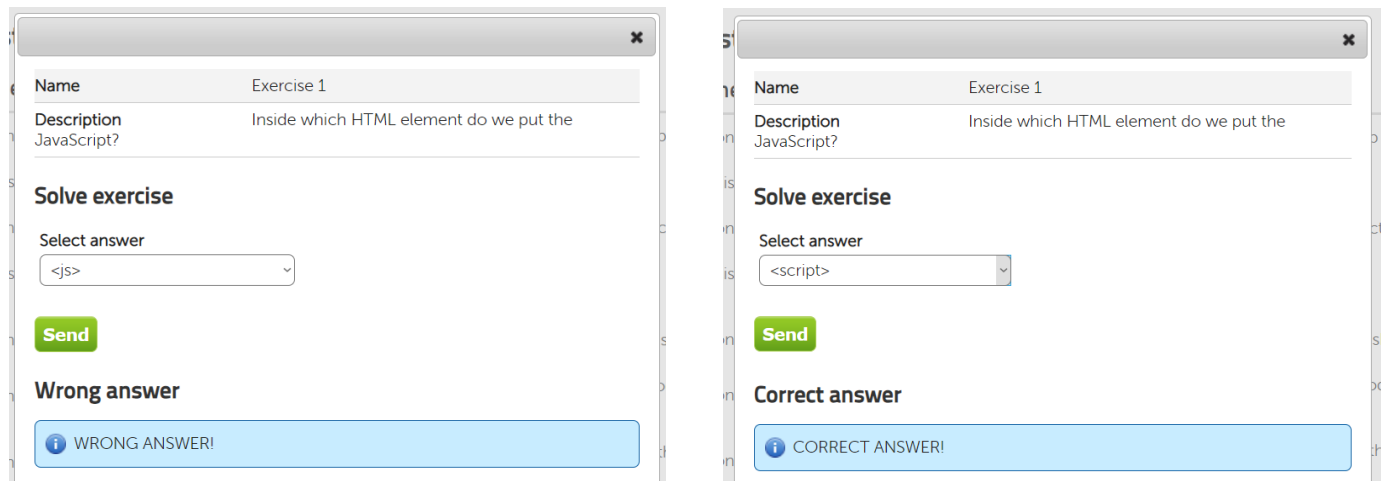


The screenshot shows a window titled "Exercise 1" with a description: "Inside which HTML element do we put the JavaScript?". Below the description is a section titled "Solve exercise" with a "Select answer" dropdown menu. The dropdown menu is open, showing the following options: "No selection", "<scripting>", "<script>" (highlighted in blue), "<js>", and "<javascript>".

Figure 36: Exercise window

When the user sends their answer, the application will compare it with the solution stored in the database at the time the exercise was created by the tutor.

Depending on whether the answer is correct or incorrect, a different message will be displayed to the user. This is achieved by using visibility conditions.



The image shows two side-by-side screenshots of the "Exercise window" after the user has submitted an answer. Both windows show the same exercise details and the "Solve exercise" section with the "Select answer" dropdown menu. The left window shows the user selected "<js>" and a green "Send" button. Below the "Send" button, a blue box displays the message "Wrong answer" with an information icon. The right window shows the user selected "<script>" and a green "Send" button. Below the "Send" button, a blue box displays the message "Correct answer" with an information icon.

Figure 37: Feedback provided to the user regarding their answer

The forum of the course can also be accessed from the "My courses" list. The functionalities and their implementation are the same as those shown in the "Tutor view."

From the “My courses” list, users can also write to the tutor to clarify doubts clicking on the “Contact tutor” button.

The screenshot displays the 'Contact tutor' interface. On the left is a sidebar with the WebRatio logo and navigation buttons: 'Explore courses', 'My courses' (highlighted), 'Support requests', and 'My Details'. The main content area has a breadcrumb trail '» My courses » Contact tutor' and a 'Logout' button. Below the breadcrumb is the 'Contact tutor' heading. A 'Send private message' section contains a 'Title' text input and a 'Description' text area. A green 'Send' button is positioned below the description area. Underneath is the 'My private messages' section, which features a table of messages. The table has columns for 'Insertion date', 'Title', 'Description', and 'Status'. One message is listed with the date '6/11/23', the title 'Difference between Python and Java', a detailed description, and a status of 'Answered' with a 'Details' link. At the bottom of the page, it says 'Generated by WebRatio®'.

Insertion date	Title	Description	Status
6/11/23	Difference between Python and Java	Dear tutor, I'm an experienced Java user and due to the recent popularity of Python, I am taking your course to learn how to use this language as well. I would like to understand the main similarities and differences between Java and Python.	Answered Details

Figure 38: Contact tutor section

At the top of the page, there is a form where the user can submit the title and description of a private message.

In the lower part of the page, there is a list of previously submitted private messages, sorted by their insertion date. The list includes the title, description, and status of each message, indicating whether it has been answered or not.

Clicking on the "Details" button opens a new window that displays the answer, if available, along with a summary of the private message that was sent.

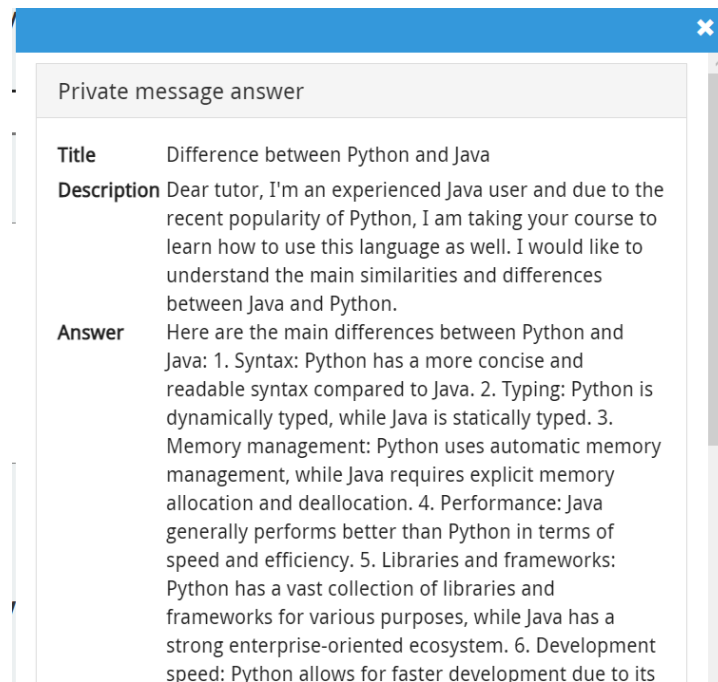


Figure 39: Private message answer window

7. Module definitions view

A Module Definition View is a container of reusable portions of an interaction flow model and action definition.

In this application were defined 2 action and 7 hybrid modules.

We already analyzed most of them in the previous paragraphs.

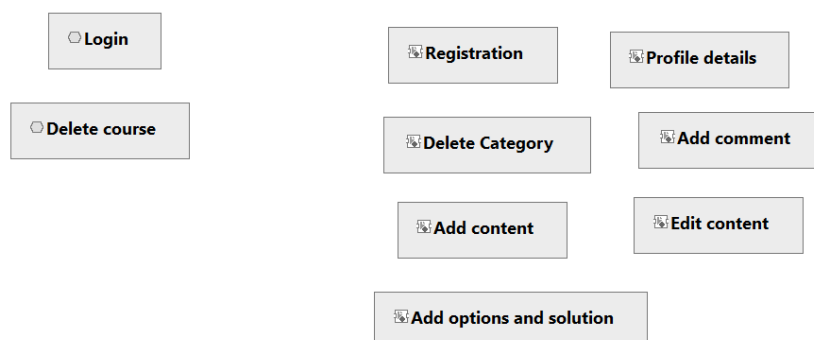


Figure 40: Module definitions view