

Become a Rapid Developer

Module 5

Add Custom Logic to your app



Module 5 – Add Custom Logic to your app

5.1 Adding custom logic

In the previous modules you built your app and created the scheduling functionality. Congratulations! Jimmy already has an app that he can work with now. From here on you are going to see how you can make the app even better, by adding more advanced functionalities to the app. Think of automatically filling in the course when scheduling a training from the course overview page and automatically calculating the end date of a training event. By adding these functionalities, you will make the LearnNow app more efficient and easy to use.

The next feature that Jimmy requested is to be able to schedule a training event more efficiently. He wants this, because it is the main purpose of the app and he will use this functionality quite often.

During planning, the SCRUM team identifies two tasks for this user story:

- Schedule a training event from the Course overview page, with the selected course prefilled
- Automatically calculate the end date of a training event, based on the start date and the duration.

You'll use microflows to tackle the first user story in this module, and return to the second one in module 7.

Let's get started!

5.2 Introducing Microflows

The Basics

Microflows are an important part of Mendix Studio. Microflows add logic to your app. Logic is used to make your app smarter, automate things, and make it maintainable. An example is a microflow that automatically prefills course data into the Course Overview page (which is actually one of the things you'll do in this module). A lot of out-of-the-box logic is already built into the platform, but all custom logic is done with microflows. That's why there are a lot of best practices for developing microflows.

Modeled Instead of Programmed

Microflow logic is modeled using a visual editor, which makes it very accessible for everyone involved. The graphical notation of microflows is based on the Business Process Modeling Notation (BPMN). BPMN is a standardized graphical notation for drawing business processes in a workflow. By using this notation, you can model your custom logic instead of programming it with code, making it easy to interpret for all team members and even stakeholders. This notation essentially creates a common language that people with an IT background and people with a business background can understand. Another benefit of modeling the behavior instead of programming, is that it's a lot easier to maintain the logic. If you need to change something in a

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microflow someone else built or you built months ago, you don't have to spend a lot of time reading hundreds of lines of code. You can just quickly interpret the microflow and get to work!

When Do You Need Microflows?

You'll need microflows in the following scenarios:

- You want to extend or change default behavior, for example:
 - Extending the behavior of default buttons (New, Edit, etc.) with additional actions, as in a validation check
- You want to handle business specific processes, for example:
 - Checking if a selected trainee meets the prerequisites of a course
 - Automatically determining the course end-date based on the start-date
- You want to integrate with other systems, databases, web services, etc., for example:
 - Integrating with a personnel database to pull users

The Mendix Platform Handles Standard Actions

For example, the **CREATE BUTTON** (Add) creates a new object and opens a page that contains the new object. So, the default New button is a fixed set of the standard actions **Create object** and **Show page**.

Microflows Handle Custom Actions

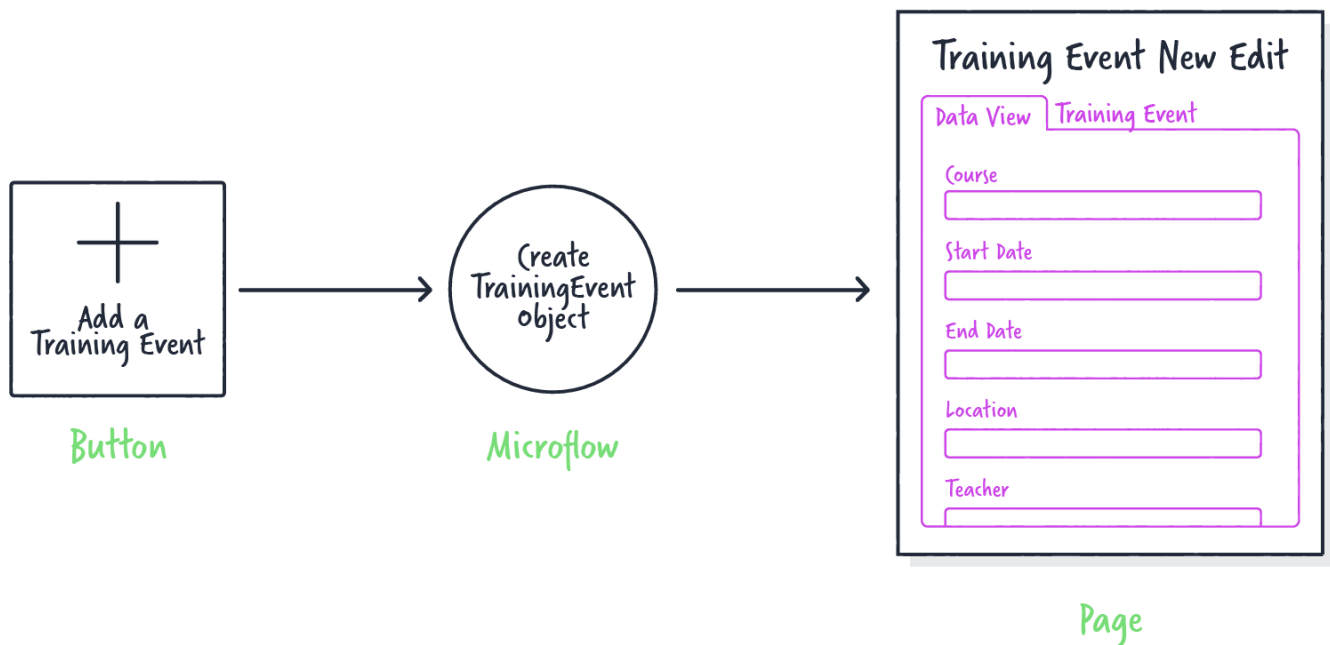
To create your own process, you model a microflow. With microflows, you can create your own set of actions in their own order using the same actions as the default buttons use.

Now let's dive back into Jimmy's app!

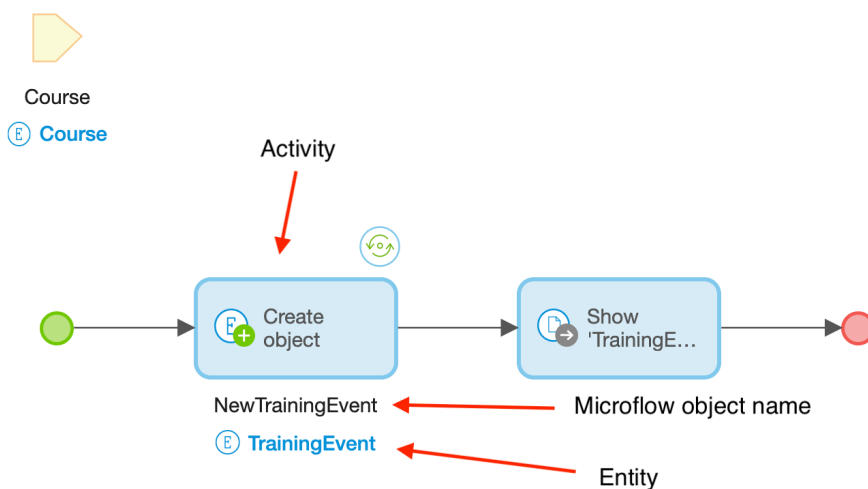
5.2.1 Understand the need for a microflow

In lecture 4.8.3, you created a button that allows Jimmy to add a training event directly from the homepage.

This default behavior is implemented with a standard action, as you have seen in the previous lecture. Below you can see what a microflow for that default action would look like.



Mendix offers this functionality as a default behavior. If you would have built the microflow for that action yourself, it would have looked like this:

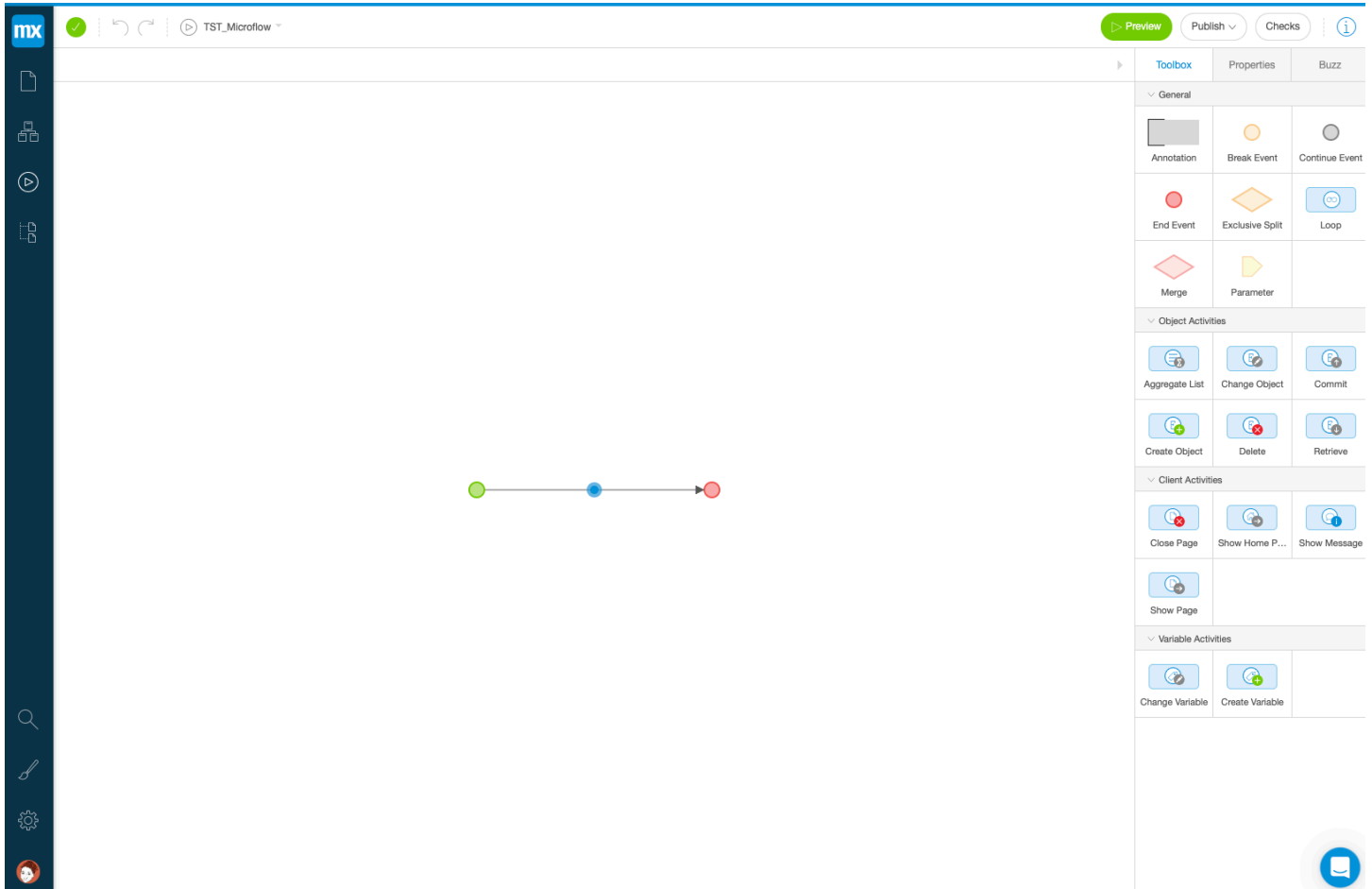


In the next lecture you are going to learn how you can build your own microflows from scratch. That will allow you to add functionalities to your app, that are not part of Mendix default actions.

5.3 Elements of a microflow

This is the microflow editor screen, on it you see a green dot (a start event), a red dot (an end event) and a line with an arrow in between (the flow). On this line you will later on add the activities (blue blocks) and decisions (diamonds) that form the custom logic of the microflow.

The Toolbox contains all kinds of components that you can add to the microflow. Here is a brief description of each of those components:





Events

Events represent the start and end points of a microflow.

Graphic	Name	Description
	Start Event	A start event is the starting point of the microflow. A microflow can only have one start event.
	End Event	An end event represents the end of the microflow. Depending on the return type of the microflow, in some cases a value must be specified. There can be more than one end event. This depends on the number possible outcomes of your microflow.

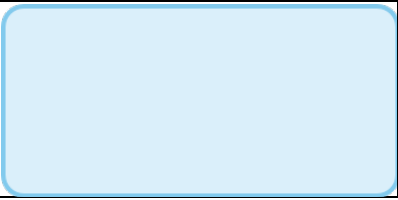
Flows

Flows form the connection between elements.

Graphic	Name	Description
	Sequence Flow	A sequence flow is an arrow on which all elements that form the logic of the microflow will be placed. The elements will be executed in sequence (in the direction of the arrow), so the order in which you place the elements is important!
	Annotation flow	An annotation flow is a connection that can be used to connect an annotation to another element, to visually show that this annotation says something about this element.

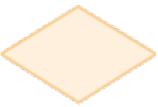
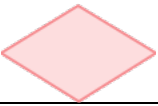
Activities

Activities are the actions that are executed in a microflow.

Graphic	Name	Description
	Activity	An activity does something. There are all kinds of activities. Create or delete an object, open a page, show a message, etc, etc.

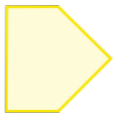

Decisions

Decisions deal with making choices and merging different paths again.

Graphic	Name	Description
	Decision	Decision defines a choice based on a condition (a check). This decision will result in several outgoing flows, one for every possible outcome. The microflow will follow only one of the outgoing flows, based on the outcome of the check. Decisions are defined using microflow expressions. These will be explained in more detail later on.
	Merge	A merge can be used to combine multiple sequence flows back into one. If a choice is made in a microflow and afterwards some common work needs to be done, you can combine the two (or more) paths using a merge.

Artifacts

Artifacts provide the microflow with input and allow comments to be made.

Graphic	Name	Description
 <p>NewTrainer</p> 	Parameter	<p>A parameter is data that serves as input for the microflow. Parameters are filled at the location from where the microflow is triggered.</p> <p>For example: You click on a specific course in the course overview and then click on a button that triggers a microflow. Then the course you selected in the</p>

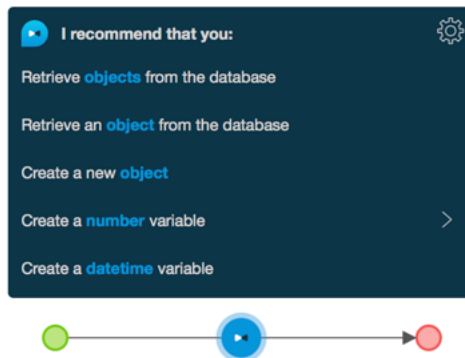
		overview page will be the input parameter for that microflow.
<div> <div></div> <p>Lorem ipsum dolor sit amet consectetur adipiscing elit.</p> </div>	Annotation	An annotation is an element that can be used to put comments in a microflow. These annotations don't really do anything, apart from serve as a reference for developers.

5.3.1 Configure Mendix Assist

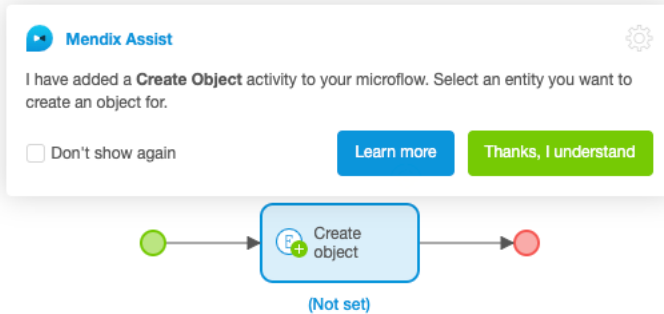
Mendix Assist is an Artificial-Intelligence powered agent that helps you configure microflows in Mendix Studio. It uses Machine Learning analysis to recommend the next step in a microflow, and Deep Learning to detect best practice patterns in microflows. Moreover, Mendix Assist keeps learning, analyzing any new microflows to make developing new apps even easier! You can find more information regarding Mendix Assist [here](#). Please note that as we want to teach you the logic of building microflows, we will not be using Mendix Assist in this course, but it's still worth taking a minute to find out a little more about how Mendix Assist works.

How does it work?

When building a microflow in Mendix Studio, you can click on the blue **dot**, for a suggestion to appear. Mendix Assist will give you a number of options regarding what you can do next.



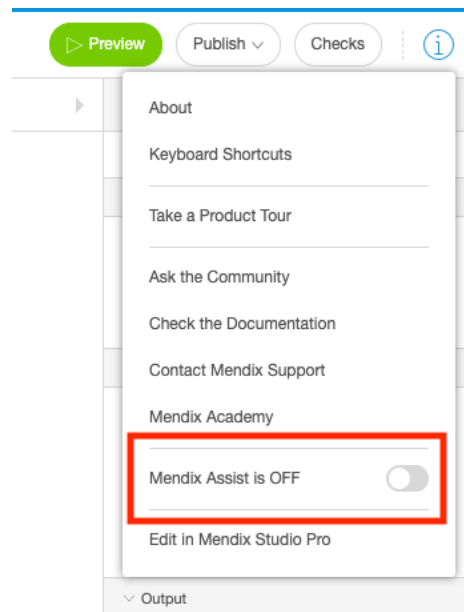
By selecting an action that you want to take, it will automatically be placed in your microflow. You can then click **Learn more** to open the relevant documentation file, or **Thanks, I understand**, to close the dialogue window and continue building your microflow.



Deactivate Mendix Assist

Although Mendix Assist is a great feature, you can learn so much more about the essence of microflows by creating them from scratch yourself, so it's best to turn Mendix Assist off for now.

In Mendix Studio, click the **information button** on the top-right of your page. Then just slide the button to the left. Easy as that!

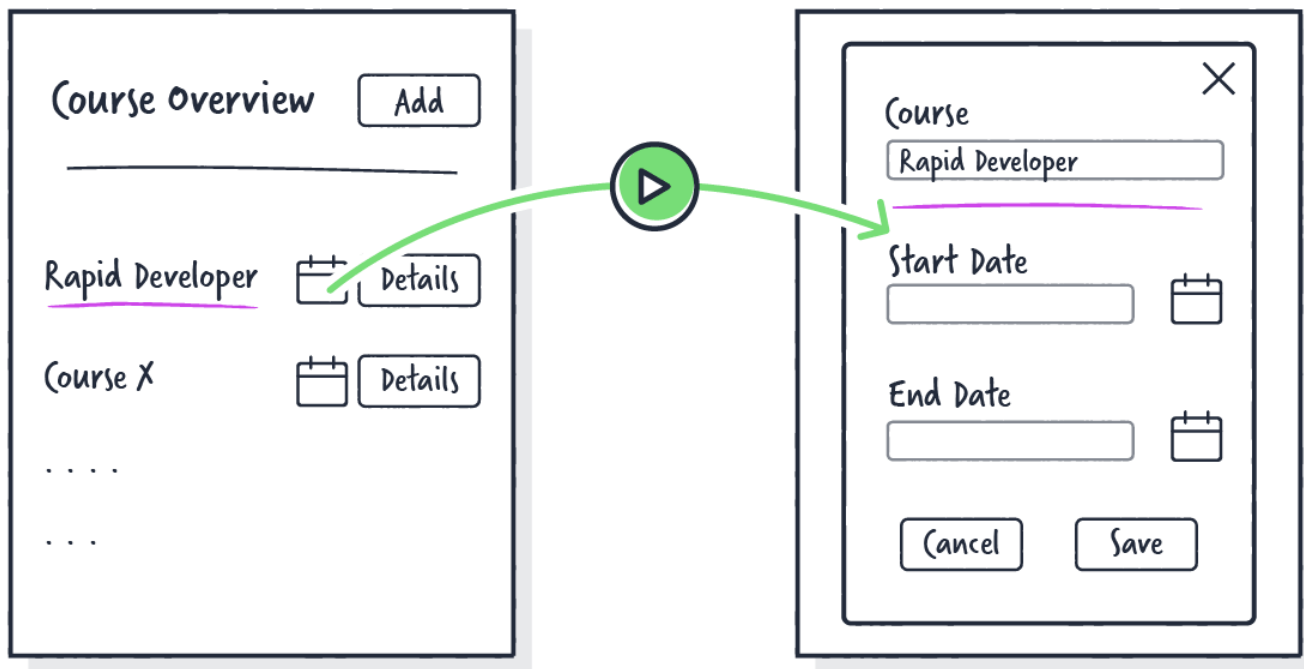


Now you are all set to get started!

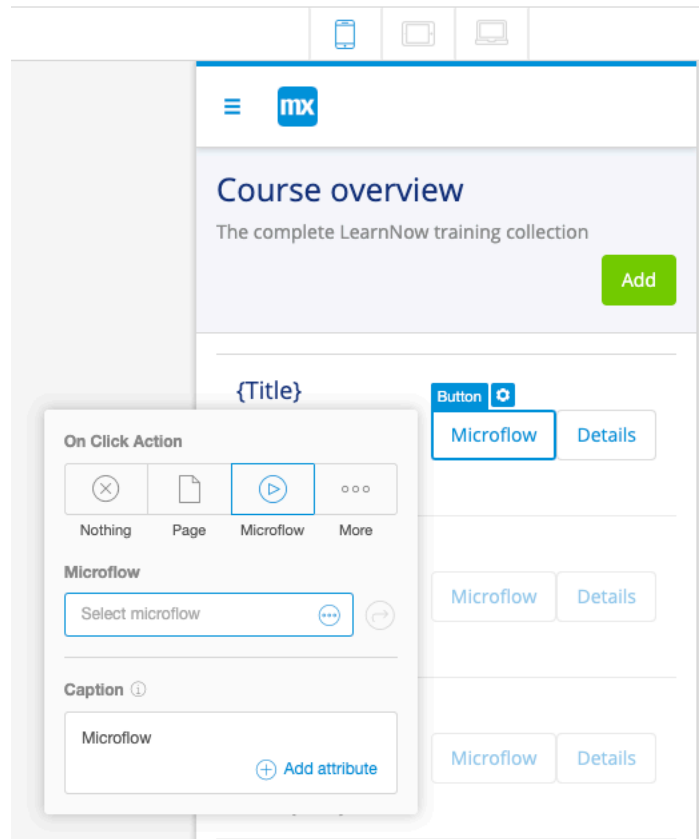
5.3.2 Use a microflow to schedule a training event from the course overview

The first task in the user story is to schedule a training event from the Course overview page, with the course already selected.

To achieve this, you will add a button to the list view on the Course Overview page, that creates a new training event. This button will need a microflow that creates a training event object and opens the TrainingEvent_NewEdit page.



1. First, you need to create a new microflow. Go to the **Course Overview** page. In the **Toolbox**, look for the **Call Microflow** button and drag it on top of the **Details** button in the List View. When you release it, it will be placed next to the Details button.

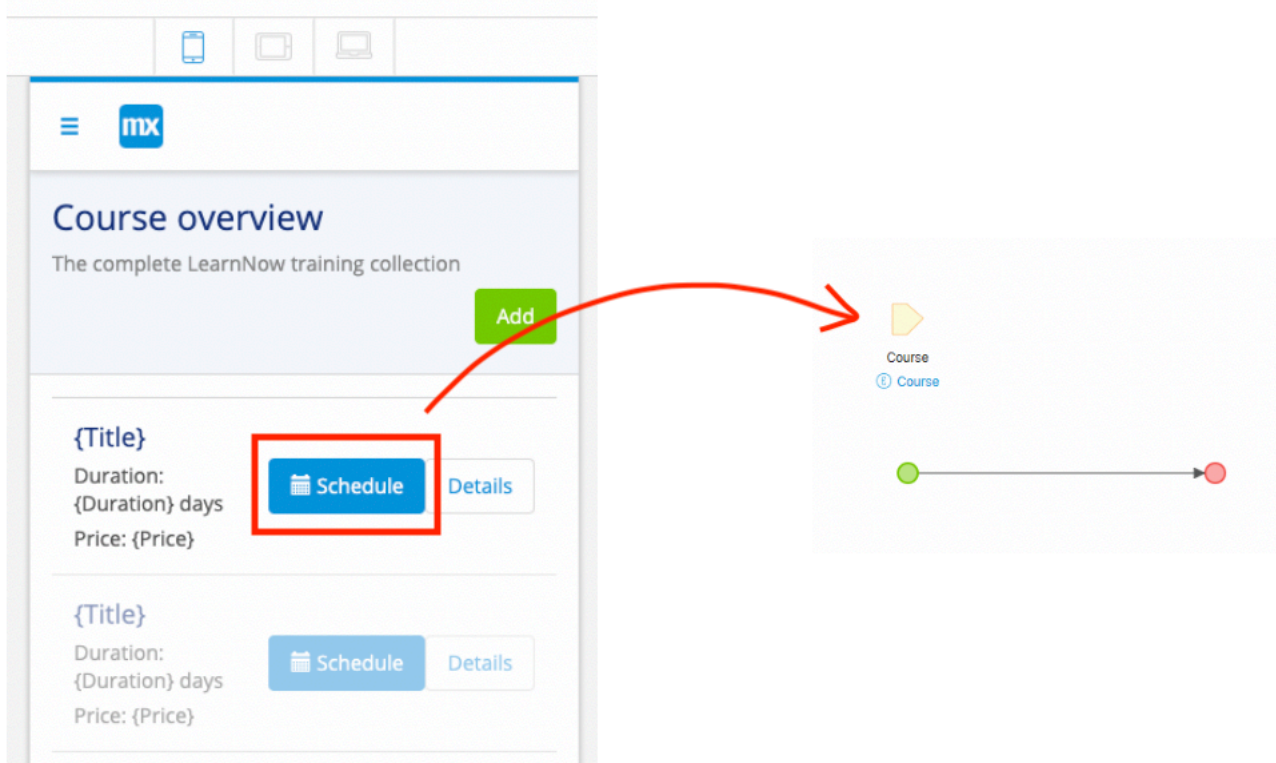


2. Set the caption to **Schedule** and select the **Calendar** icon, to really make clear to the end user what this button will do. Give this button the **Primary** style, so it stands out from the Details button.
3. In the **Properties** pane, click **Select microflow** to open the microflow selection window. From there create a new microflow. Remember the naming convention *Prefix_Entity_Operation*? Following that convention, a good name for this microflow would be **ACT_Course_ScheduleTrainingEvent**.

The microflow looks like this:



This microflow has a start and an end event with a flow between them. You can also see a **Parameter** of type **Course**. This Parameter represents the course for which you want to schedule a training event.



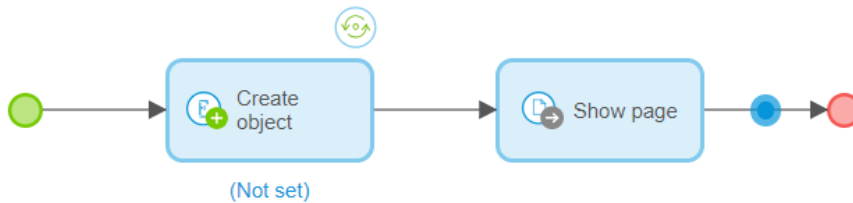
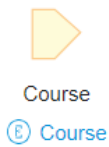
The best way to do add activities on a microflow is to start at the end and work your way to the beginning. Ask yourself the question:

What do my users expect when they click this button?

In this case the user (Jimmy) wants to go from the Course Overview page to the detail page of TrainingEvent and the Course field should be filled in automatically. There he can fill in the details for his new training event. When he clicks Save, the new information should be stored in the database.

You start by adding activities to your microflow so it knows what to do. Once you are done with that, you will configure the activities.

1. In the **Toolbox**, find the **Show Page** activity and place it on the flow, between the start and end event.
2. The **Show Page** event will open the **TrainingEvent_NewEdit** page. This page needs a **TrainingEvent** object but the microflow does not have that object yet. In order to create it, you need another activity. In the **Toolbox**, find the **Create Object** activity and place it on the microflow, between the start event and the **Show Page** activity.



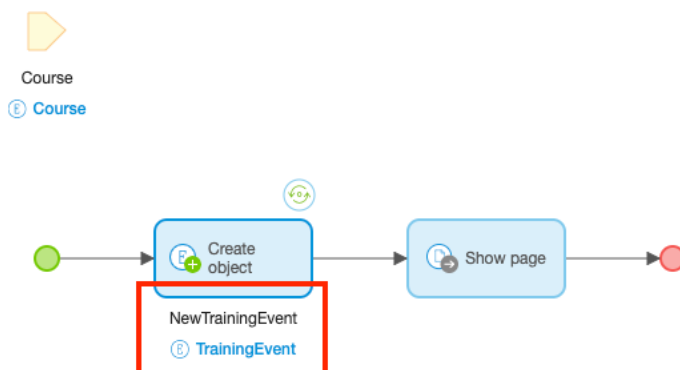
You now have added a button to call the microflow, and also the activities in the microflow. In the next lecture you will learn how you can configure these activities, so that the microflow behaves the way you want it to!

5.3.3 Configure the microflow

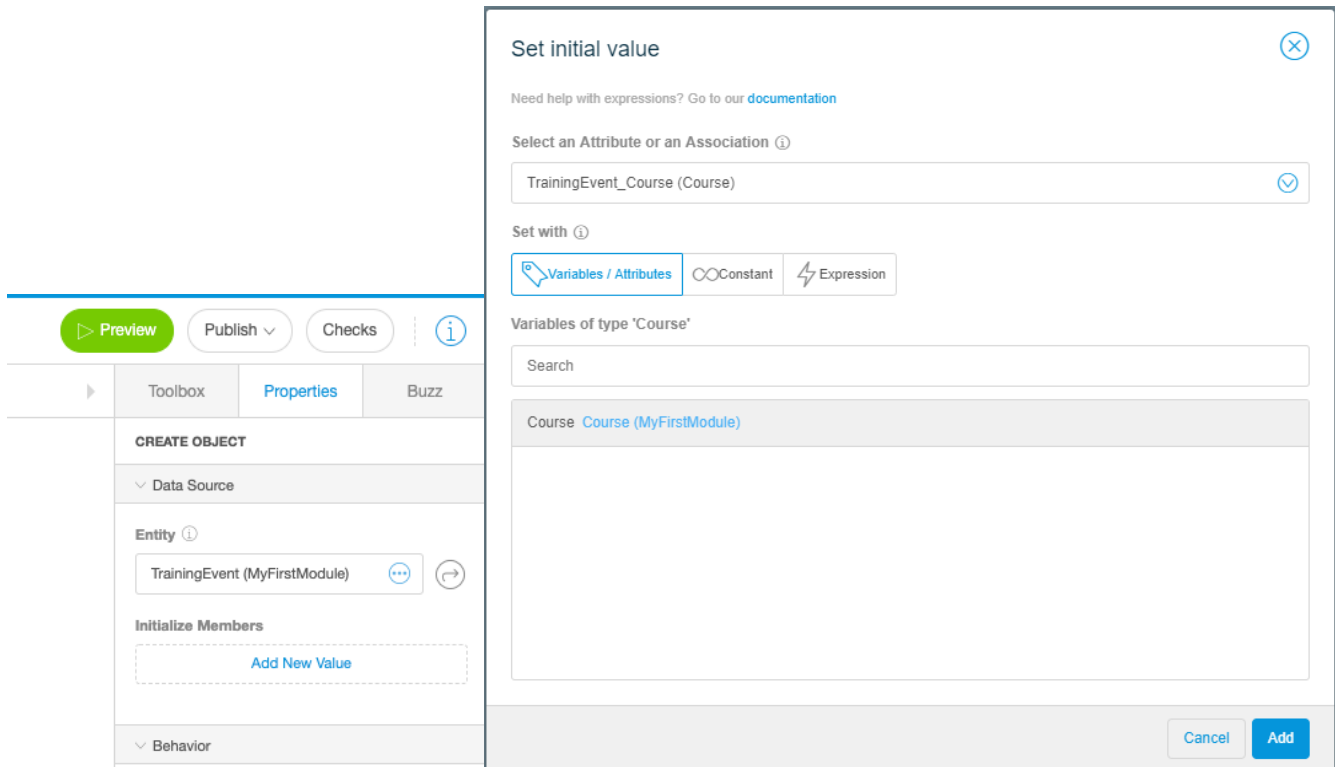
You have created the microflow, now it's time to configure its activities!

Let's start with the Create Object activity:

1. With the **Create Object** activity selected, go to the **Properties** pane. Select the entity for which you want to create an object. In this case, that is the **TrainingEvent** entity. See how the **Variable Name** is automatically set to **NewTrainingEvent**? Variables always need a unique name, so the microflow knows which variable you are referring to. Mendix Studio will try to help you with naming variables when possible. In this case, the variable is a training event and it's new, so Mendix Studio generates the name NewTrainingEvent for you.



- Under **Initialize Members**, click **Add New Value**. Open the **Select an attribute or association** dropdown to see the options. You see that you can set the value of the StartDate, EndDate, Course, Location or Teacher. In this case you need to set the value of the Course to the Course that is available as the Parameter in the microflow.
- Next you need to assign the **Parameter** to the **Association**. Click **Variables / Attributes** and select **Course** from the list. This will prefill the **Course** association on your **TrainingEvent** page so the **TrainingEvent_NewEdit** page will have the right **Course** selected.



What is a Variable?

A variable is a symbolic name associated with a value. This value can be changed. You can view a variable as a box. Adding something to that box would be assigning a value to that variable. You can then move this variable along. Later, you can add something more to the box, or replace its content with something else. That would be changing the value of the variable. In addition, you can also peak into the box to see what is inside. This would be checking the variable.

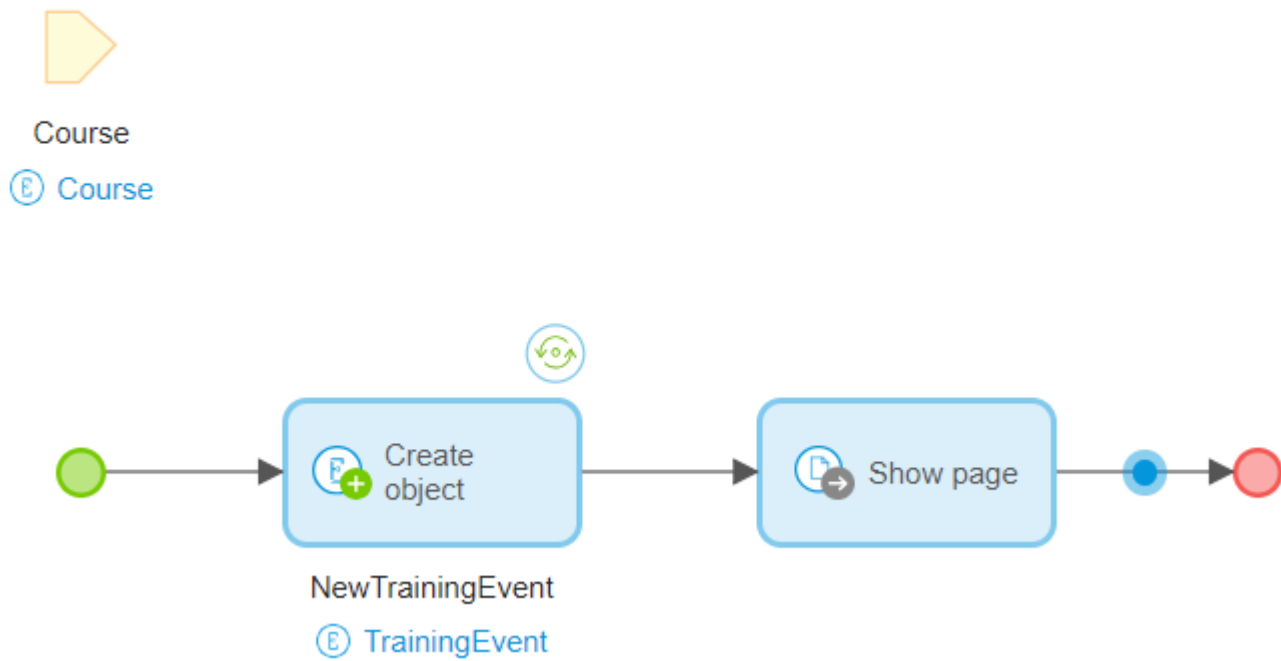
An example of variable could be PriceStrawberry. That variable would store the price of a jar of strawberry. You can set the initial value of that variable (for example to 2,50). Note that the type of data you store in a variable should always be the same type. Then you can use the variable to perform other calculations. For example, ProfitStrawberry = PriceStrawberry – CostStrawberry (where ProfitStrawberry and CostStrawberry the variables for the profit and the cost of production). You can also give the variable a new value. If there is a special offer for example, you can set a new value for the strawberry to be PriceStrawberry/2. Then the new value stored inside the PriceStrawberry would then become 1,25.

Now that you configured the Create Object activity, time to configure the Show Page activity:

- With the **Show Page** activity selected, go to the **Properties** pane. There, select **TrainingEvent_NewEdit** page.

2. Set the **Object to Pass** to **NewTrainingEvent**.

At the end, your microflow will look like this.



5.4 Summary

Congratulations, you worked on Mendix Studio to automate some processes within the LearnNow app and helped Jimmy save some time! In this module you learnt:

- What are microflows and when you need to use them
- What are the various elements of a microflow
- How you can add custom logic to your app by using a microflow

Check the next module to learn how you can switch to Mendix Studio Pro to automate your app even more!

5.5 Knowledge Check

1. What are microflows?
 - a) A way to describe the whole application process flow.
 - b) Modeled custom behavior of a default button.
 - c) The custom logic of a Mendix application.
 - d) Small development processes.

2. What are three microflow components?
 - a) Activity, Decision, Decision table.
 - b) Activity, Decision, Parameter.
 - c) Exclusive merge, Parameter, Activity.
 - d) Activity, Inclusive split, parameter.

3. How many start events can a microflow have?
 - a) One
 - b) This depends on the trigger of the microflow
 - c) This depends on the number of input parameters
 - d) Unlimited

4. Microflows can be triggered by:
 - a) Widget event, Action button, Default button
 - b) Default button, Navigation layout, Widget event
 - c) Entity event, Action button, Widget event
 - d) Entity event, Action button, Container

Answers:

1-c, 2-b, 3-a, 4-c

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