# Setup factoring tutor with BlackBoard Learn:

Our tutor has been registered with TCSG’s blackboard learn instance, so it can be added to an existing blackboard shell as an LTI enabled link. This will let students connect to the tutor without having to create a separate account.

To add the link to a blackboard page, select the “Web Link” option from the “Build Content” menu:

Graphical user interface, application

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When the creation page pops up, you can give the link a name, such as “Polynomial Factoring Tutor”. Next, enter the URL: <https://tutor.apprentice.ai/lti/launch/> and check the box designating that this link is to an LTI Tool Provider. Finally, select “No” for the option to “Enable Evaluation”. See screenshot for an example of what it looks like to create an LTI enabled link:

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# Using the tutor for the first time:

Once the link has been added either you (the instructor) or the students can click on the link from blackboard to gain access to the polynomial factoring tutoring system.

The very first time a user logs into the system, they will be asked for consent to utilize their data for research purposes. They can either accept or decline; regardless of their choice they can still use the tutor.

Once logged in the student, the student will be presented with polynomial factoring problems of four types:

* Factoring with leading coefficient 1
* Factoring by grouping
* Factoring with area “box” method
* Factoring with slip and slide method

Each tutor will provide them with personalized guidance on how to factor polynomials using each method.

Note, at first it might seem that the tutor does not provide sufficient instruction/detail regarding how to solve each problem. However, whenever a student is stuck they can click the “Ask for Hint!” button on the bottom of the page to request a contextualized hint message and guidance. If the hint message is not helping, then the student can choose the “Next Hint” button to get a more detailed hint. After several hints, the tutor always provides students with a valid correct next step answer as a bottom out hint. This serves as a worked example for situations where the student is really stuck.

Here is an example of what it looks like when a student selects the hint button for the first step on an area “box” method problem. Note, the field for the next step is highlighted and there is a hint message on the bottom describing to the student how to perform the next step:

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# Adaptive Problem Selection

Given each input from the student, the tutor estimates the likelihood that the student knows how to perform each of the steps for each of the different types of problems. The tutor leverages these estimates to intelligently select which kind of problem to give the student next. Currently, the system gives them problems of a type that contains a step with at least one unmastered skill. This ensures they do not spend their time practicing problems of a type they have already mastered. Once a student has mastered all of the problem types, they will get a popup message letting them know and then the system will simply provide the student with problems of a random type.

Information about the models estimates of a student’s skills can be accessed via the “My Profile” button at the top right of the tutor.

Here is an example of what a profile looks like; although we may update the visualization for the learning profile to make it more usable:

Graphical user interface, text, application

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Once you are on the profile page, you can return to the tutor by choosing the “Home” button and the selecting the “Factoring Polynomials” option.