Mathworks Software Supported Environments

The tables below show the platforms supported by the Mathworks MATLAB/Simulink software used for programming your robot, used for the virtual game field (Autonomous Programming Challenge), and used in the robot modeling challenge. All platforms below can be used in our BEST Simulink Summer Workshop training series, with the exception of some lessons pertaining to the VEX Cortex support package (which requires a Windows operating system).

MATLAB Environment Support for BEST Robotics Challenges			
	MATLAB Desktop (Windows)	MATLAB Desktop (Mac)	MATLAB Online
Autonomous Programming Challenge	✓	✓	✓
Robot Modeling Challenge	✓ (Recommended)	✓ (Recommended)	✓
Robotics Competition	✓		

MATLAB Features by Environment					
	Simulate models	Generate Simulation Videos	Control Models Interactively	Interact with Environment Visuals	Program VEX-Cortex
MATLAB Desktop (Windows)	✓	✓	✓	✓	✓
MATLAB Desktop (MAC)	✓	✓	✓	✓	
MATLAB Online	✓	✓			

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MATLAB/Simulink Online

Access MATLAB Online at http://matlab.mathworks.com

MATLAB Online is available to anyone with a free Mathworks account (which is required for any installation of the software).

1. Create your Free Mathworks Account at www.mathworks.com using a valid email address.

2. Request Mathworks software at https://www.mathworks.com/best-robotics, or have your teacher request it and provide the license information to you.

3. Link your Mathworks Account (in step 1)

   Link your Mathworks account with the BEST Robotics license that you received by email (step 2). Login at www.mathworks.com with your free account (see step 1). In the upper right of the screen, click your account icon (with your initals) and select Link License. Enter the license/activation key that was received in the email when you requested the mathworks software or get this license/activation key from your teacher.
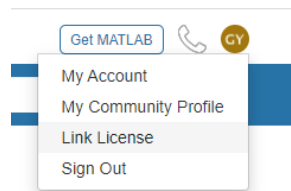
4. You are now ready to use MATLAB Online. Simply navigate your browser to https://matlab.mathworks.com.

5. You will need to install the Robotics Playground Add-On in MATLAB Online just as if you were installing on your PC (see section below). This will also install the BEST Robotics App, just as on the PC.

6. All files are pulled from your MATLAB drive, a cloud-based drive. You transfer files to/from the MATLAB drive using the Upload and Download buttons on the menu.

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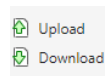
BEST APC   with MATLAB Online

To use MATLAB Online for the Autonomous Programming Challenge, follow these steps:

- Once your mathworks account is created and linked with the BEST license, navigate to http://matlab.mathworks.com, the familiar MATLAB window will appear.
- You will need to install the Robotics Playground Add-On just as if you were installing on your PC. This will also install the BEST Robotics App, just as on the PC.
- All files are pulled from your MATLAB drive, a cloud-based drive. You transfer files to/from the MATLAB drive using the Upload and Download buttons on the menu.

Upload
Download
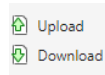
- Open the Autonomous template and create your new Simulink model (autonomous program). Be sure to save your new model under a unique name.
- Mechanics Explorer in MATLAB Online is limited in functionality.
  - There is no "video creator" functionality. You must use Windows Game Bar screen capture to create any video.
  - Camera view defaults to ground-level side view. You must use your middle mouse button to change the view.
    - Middle button + mouse movement will rotate the view at the point of click.
   - Middle button + scroll wheel will resize the view (zoom in/out).

Mathworks Robotics Playground Add-On

After you have [requested and installed the Mathworks MATLAB/Simulink software,](#) you will need to install the Robotics Playground Add-On to get access to the virtual game field components.

Un-installing an Earlier Version

If you have a previous installation of the Robotics Playground, you may need to uninstall it and re-install a newer version. Check the version available in the Add-Ons Explorer.

From the MATLAB window, follow these steps to Un-install the previous version.
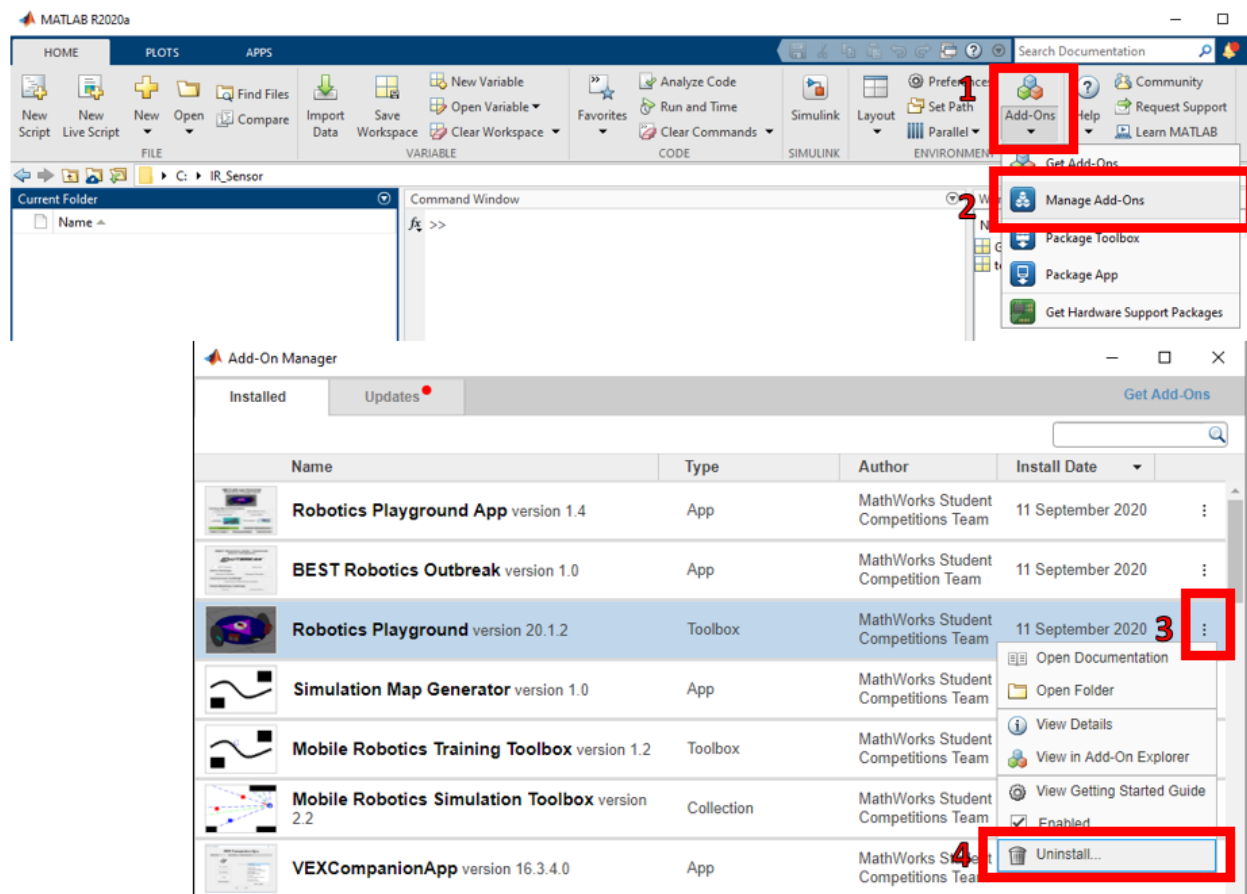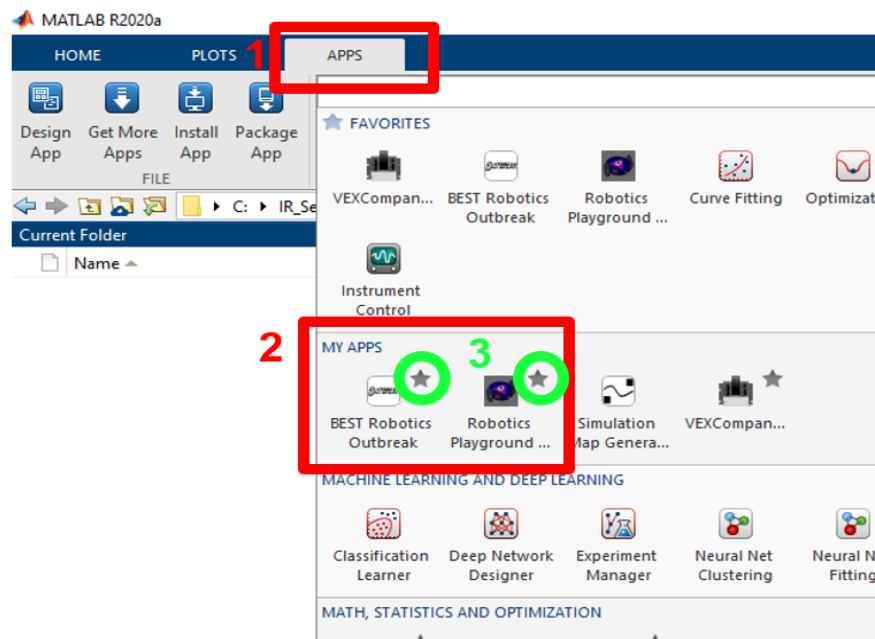

Install the Robotics Playground Add-On

From the MATLAB window, follow these steps to install the latest version of the Robotics Playground Add-On. Click Add-On, enter "Robotics Playground" in the search window and click the magnifying glass. Click on the APP name. When the APP information comes up, there will be an "Add" button on the far right to initiate the installation. After installation, the information will be updated to indicate that the APP has been installed (as shown in the picture).
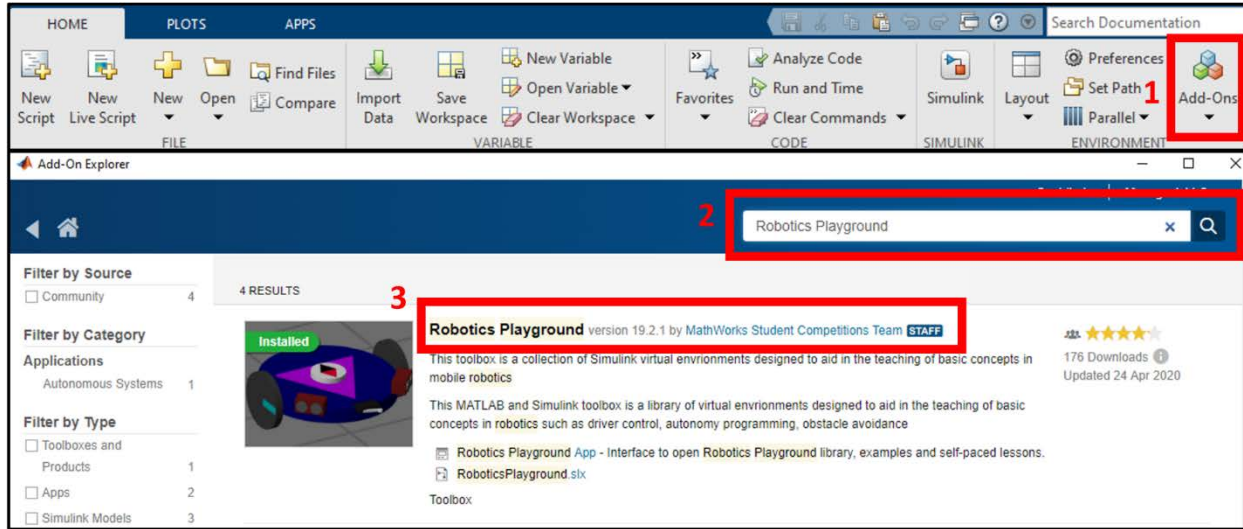
MATLAB APPS

After installing the Robotics Playground Add-On, two new apps are now available for BEST Robotics users. These are the BEST Robotics 2021 Demo Daze App and the Robotics Playground App. You can find and open these Apps by following the steps shown from the MATLAB window. Click on the STAR next to the app to make it a favorite for quick access in the future from the APPS menu.

The Robotics Playground App contains links to general playground environments, examples, documentation and lessons (a portion of which are taught in the Simulink Summer Workshop).
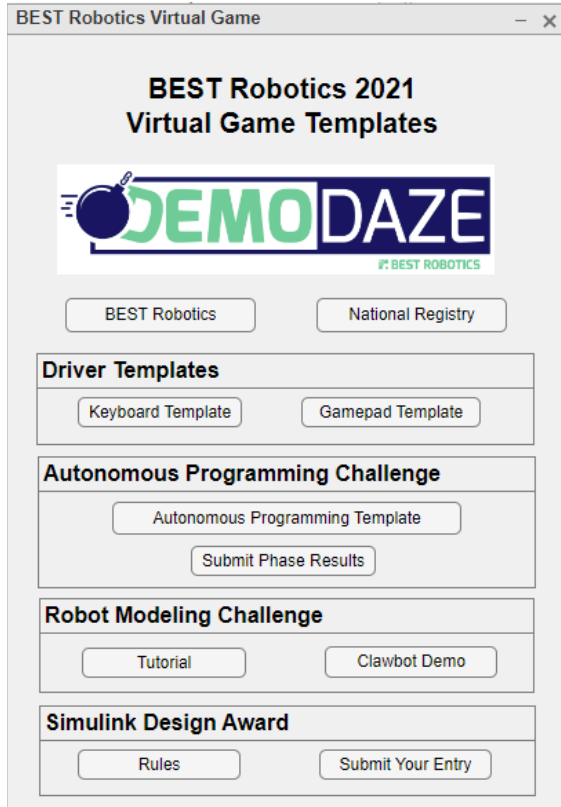
The BEST Robotics 2023 DemoDaze App contains quick links to templates for the Autonomous Programing and Robot Modeling Challenges. It also contains quick links to tutorials and examples for the Robot modeling challenge and the Simulink Design Award.

Robotics Playground Files

Upon installation of the Robotics Playground Add-On, the files will get stored here:

C:\Users\JohnDoe\Documents\MATLAB\Add-Ons\Toolboxes\Robotics Playground\examples\BESTRoboticsDemoDaze

This is the default location when opening the models from the BEST APP. The template models and practice field configurations will always be pulled from this folder.

There are 3 Template Simulink models available to be used as starter models. For driver-controlled, there is a Keyboard template and a Gamepad template. These are not used in any current BEST Challenges.

For autonomous, there is a single template. Click the appropriate button on the BEST Robotics 2021 DemoDaze App to open the template file. On the first opening, be patient as the model may load a bit slower the first time.

After opening and modifying a template (as you start your own programming), always use SAVE AS for your modified model and save it to a folder of your choice so that you do not overwrite the original

templates in the above folder. If you DO overwrite the above template models, you will need to retrieve them by uninstalling/re-installing the Robotics Playground Add-On.

If the Game Config files provided by BEST Robotics are stored in the "local" directory with your simulink model, they will always be found. The tool will always search the current folder first.

Robot Model Challenge

The BEST Robotics 2021 DemoDaze App also has quick links to some supporting instructions and examples for the Robot Modeling Challenge. The Tutorial is a two-part Robot Modeling blog written by Mathworks that walks you through how to use the Simscape Multibody tool to model the physical aspects of your robot. It covers how to import your own CAD models as well. The Clawbot Demo is a model of the VEX Robotics Clawbot design. You can open this model and see an example of how the modeling was done. This example is what is covered in the tutorial mentioned.