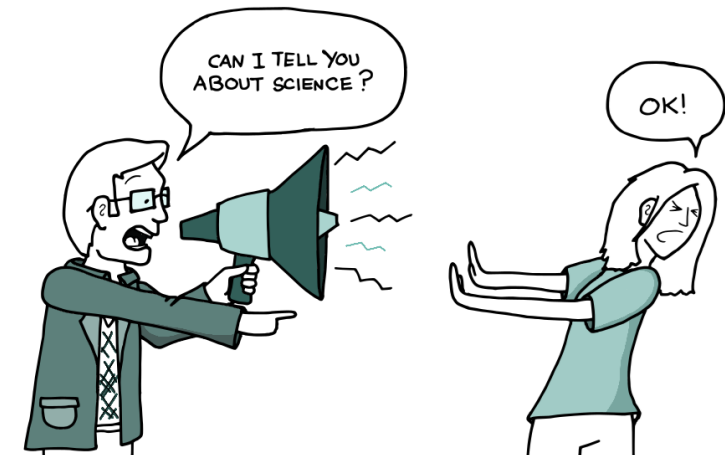
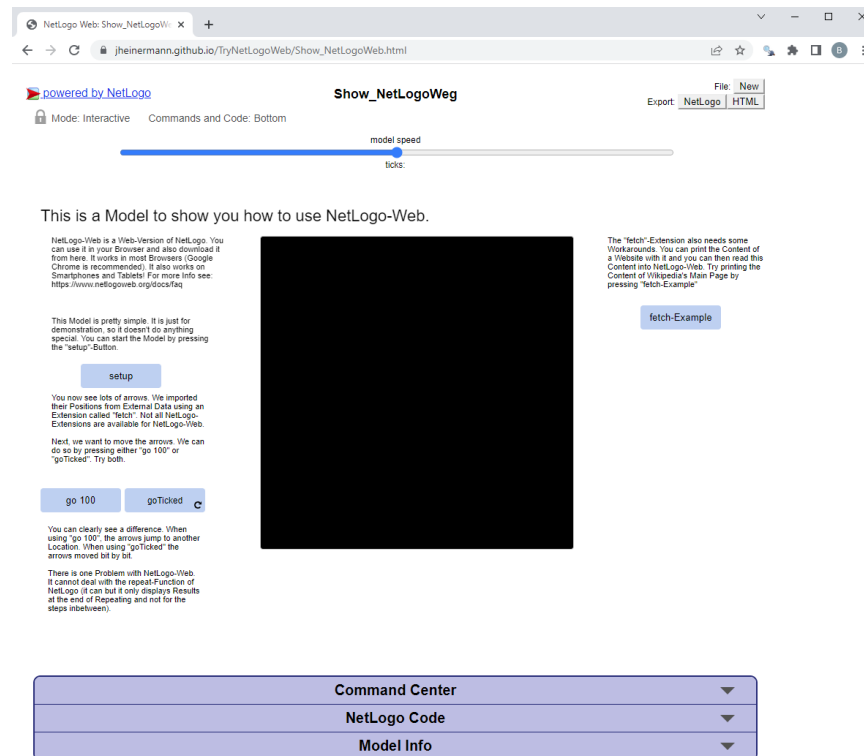


NetLogoWeb

What it is and how to use it

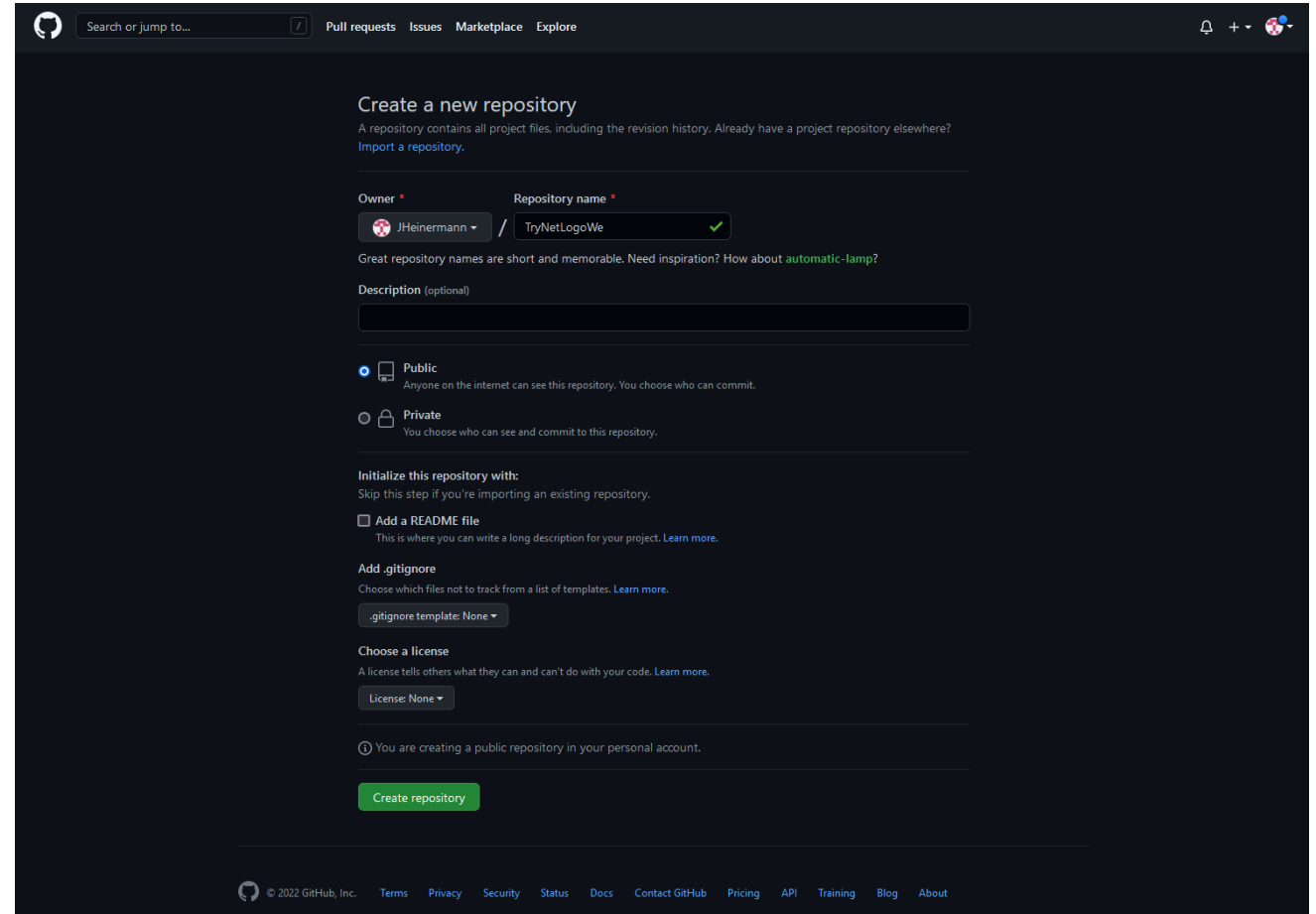
What is NetLogoWeb

- A NetLogo Environment that runs on Browsers (including Tablets, Smartphones, ...)
- A handy Tool for Science Communication



Steps to get your Model running on GitHub

- Create a new Repository
- Make it Public
(otherwise you cannot create a page)



The screenshot shows the GitHub 'Create a new repository' page. At the top, there's a navigation bar with the GitHub logo, a search bar, and links for 'Pull requests', 'Issues', 'Marketplace', and 'Explore'. Below this, the main heading is 'Create a new repository'. A subtext explains that a repository contains all project files, including revision history, and offers a link to 'Import a repository'. The form fields include: 'Owner' (set to 'JHeinermann'), 'Repository name' (set to 'TryNetLogoWe' with a green checkmark), and 'Description (optional)' (empty). Under 'Visibility', the 'Public' option is selected with a radio button, while 'Private' is unselected. The 'Initialize this repository with' section has a checkbox for 'Add a README file' which is unchecked. Below this is the 'Add .gitignore' section with a dropdown menu set to '.gitignore template: None'. The 'Choose a license' section has a dropdown menu set to 'License: None'. A note at the bottom states 'You are creating a public repository in your personal account.' A green 'Create repository' button is at the bottom of the form. The footer of the page includes the GitHub logo, copyright information '© 2022 GitHub, Inc.', and links for 'Terms', 'Privacy', 'Security', 'Status', 'Docs', 'Contact GitHub', 'Pricing', 'API', 'Training', 'Blog', and 'About'.

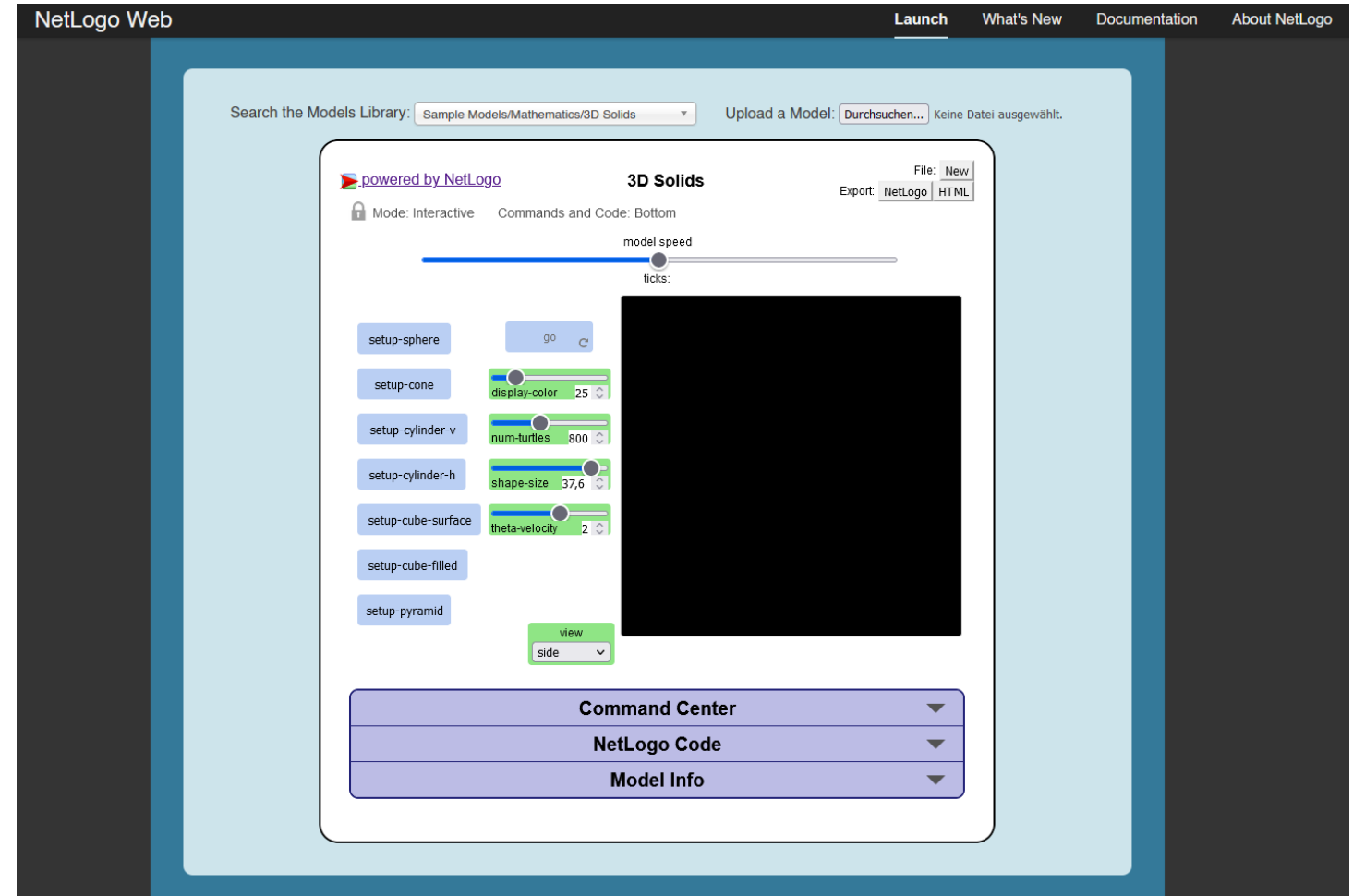
Steps to get your Model running on GitHub

- Go to NetLogo Web (<https://www.netlogoweb.org/>)
- Click on NetLogo Web



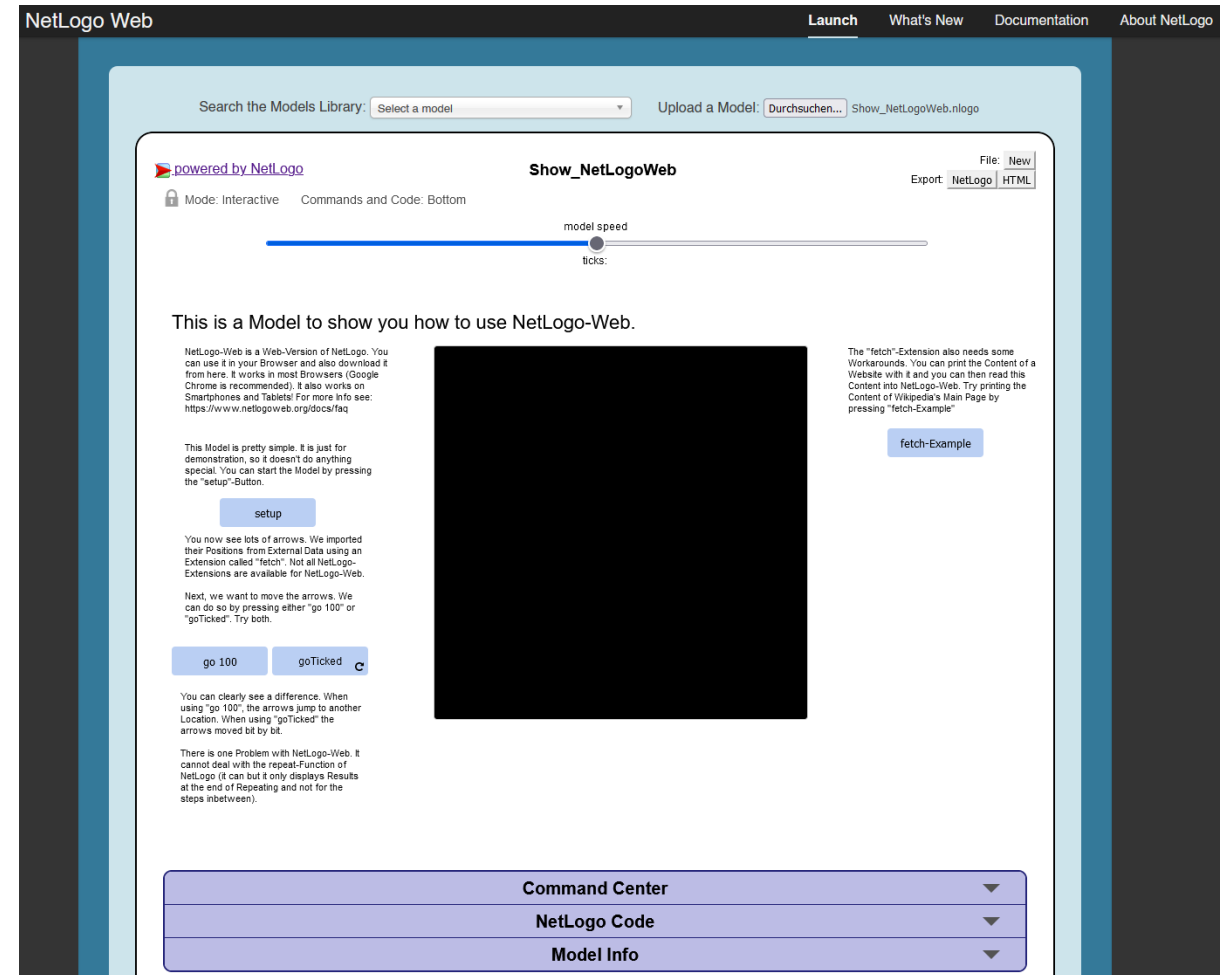
Steps to get your Model running on GitHub

- Upload a Model



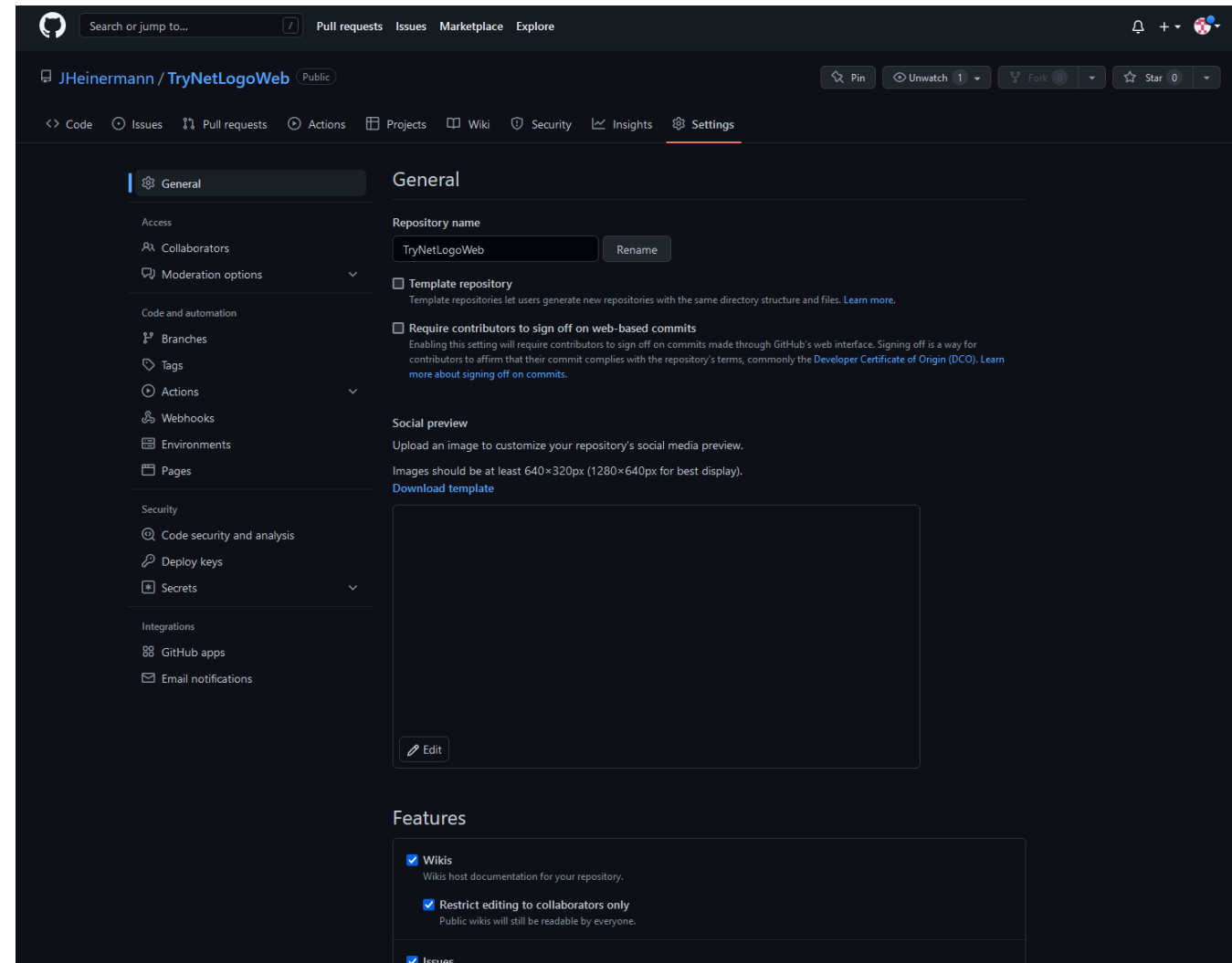
Steps to get your Model running on GitHub

- Export the HTML



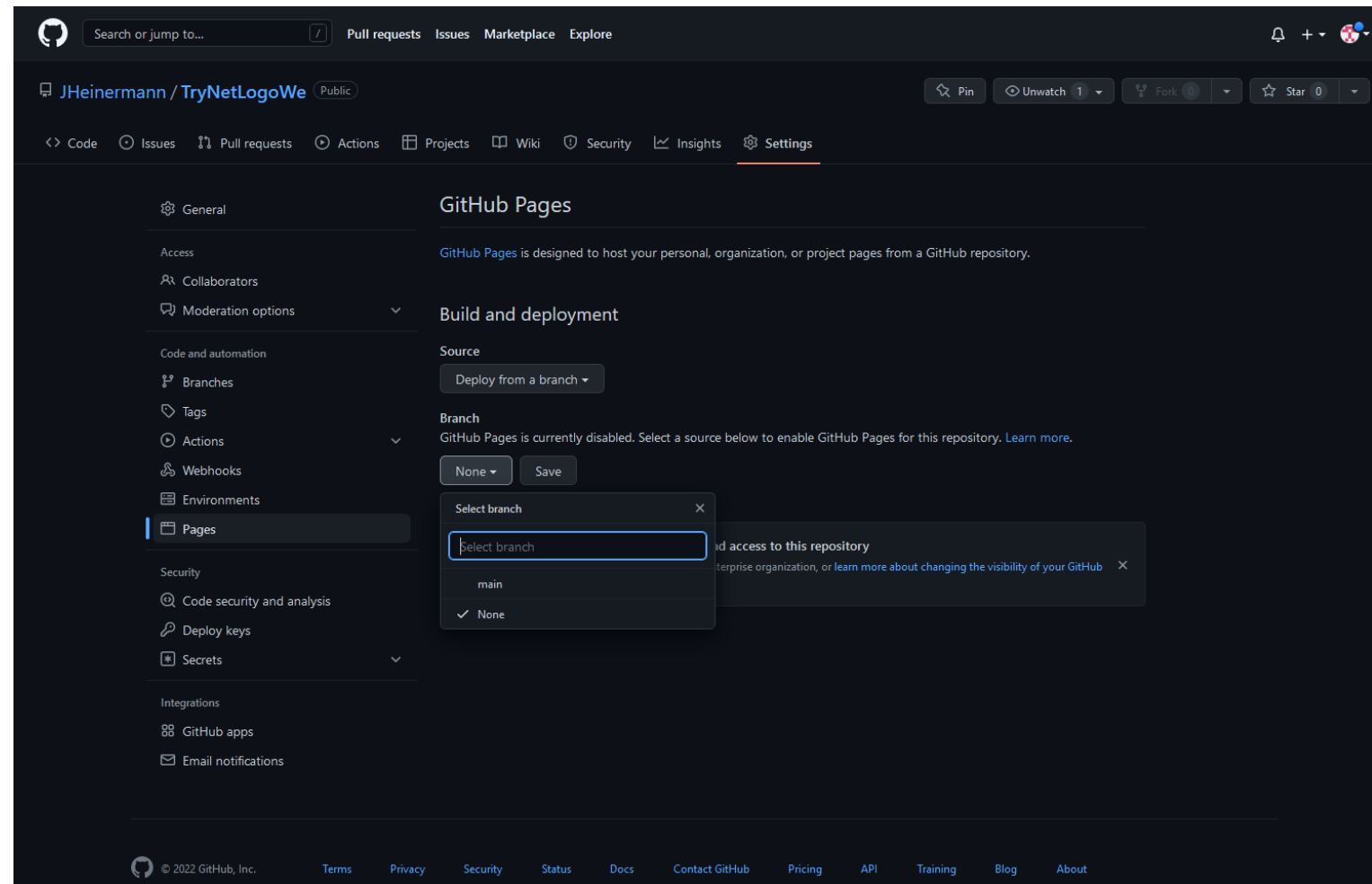
Steps to get your Model running on GitHub

- Upload your HTML-File
- Go to Settings
- Go to Pages



Steps to get your Model running on GitHub

- Create a GitHub Page (basically a Website on GitHub). The Browser then ready the HTML instead of displaying it as code.
- Under „Branch“, select a branch that you want to transform into a Page (I used the Main Branch here)



Steps to get your Model running on GitHub

- After a couple of moments you can access your Model through:
<http://YourUsername/YourRepository/FileName.html>

The screenshot shows a web browser window with the address bar displaying 'jheinemann.github.io/TryNetLogoWeb/Show_NetLogoWeb.html'. The page title is 'Show_NetLogoWeg'. At the top, it says 'powered by NetLogo'. Below this, there's a 'Mode: Interactive' indicator and 'Commands and Code: Bottom'. A 'model speed' slider is visible, set to 'ticks:'. On the right, there's a 'File: New' button and an 'Export' dropdown menu with 'NetLogo' and 'HTML' options.

The main content area contains a large black rectangle representing the model's view. To the left of this rectangle, there's a 'setup' button. Below it, text explains that the model is simple and uses a 'fetch' extension to import data from Wikipedia. It mentions that pressing 'go 100' or 'goTicked' will move the arrows. There are two buttons: 'go 100' and 'goTicked'. Below these, text explains that 'go 100' moves arrows to a new location, while 'goTicked' moves them bit by bit. At the bottom, there's a note about a problem with the repeat-function of NetLogo.

To the right of the black rectangle, there's a 'fetch-Example' button. Above it, text explains that the 'fetch' extension needs some workarounds and that the content of Wikipedia's main page can be printed into the NetLogo web.

At the bottom of the interface, there's a 'Command Center' section with three tabs: 'Command Center', 'NetLogo Code', and 'Model Info'. Each tab has a dropdown arrow.

Extensions

- Not all NetLogo Extensions are supported e.g.:
 - Arduino
 - Bitmap
 - GIS
 - Gogo
 - LevelSpace
 - Network
 - Palette
 - Profiler
 - Python
 - R
 - Rnd
 - Sound
 - Time
 - Vid
 - View2.5D

Two Tipps for NetLogo Web

- Importing External Data is possible but a little tricky
- Repeating is not the way to go in NetLogo Web

Import Data

- Importing External Data is possible either locally or from a Website using the „fetch“-Extension
- You can use `fetch:url „http://xyz“` to print (or save) the code of a Website.
You can Import Data if it is available as .txt (for example on GitHub).

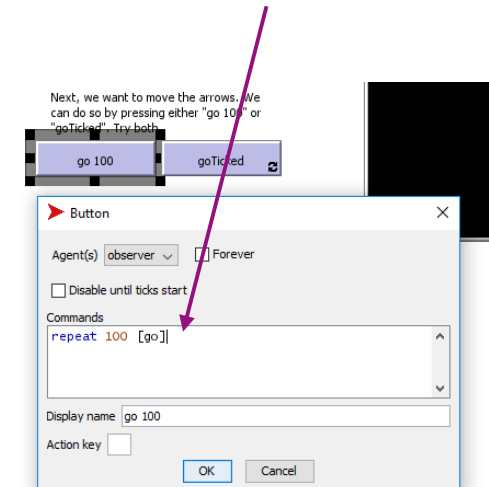
```
83 ; _____
84 ; _____ Import External Data
85 ; _____
86 to-report ImportCoords
87   ; To Import External Data, we need the Data to be stored in one Line with Tabs as Separators (See R-Script "Write_Data.R").
88   ; We can then Import Data with "fetch"-Extension. This Extension prints the Content of a Page if we put it in Square Brackets and read it.
89   let xCoords read-from-string (word "[" fetch:url "https://raw.githubusercontent.com/JHeinermann/TryNetLogoWeb/main/X_Coords.txt" "]")
90   let yCoords read-from-string (word "[" fetch:url "https://raw.githubusercontent.com/JHeinermann/TryNetLogoWeb/main/Y_Coords.txt" "]")
91   report (list xCoords yCoords)
92 end
93
94 to-report ImportCoords-Together
95   ; We can also Import a whole Data Frame. The Problem is that this is stored in one Line again. With a little help, we can transform that into a Data Frame again
96   report data.frame (read-from-string (word "[" fetch:url "https://raw.githubusercontent.com/JHeinermann/TryNetLogoWeb/main/XY_Coords.txt" "]")) 2
97 end
107 ; Make a Data Frame with ncol numbers of columns from a single List (InList).
108 to-report data.frame [InList ncol]
109   let outdata (list)
110   let xstart 0
111   repeat ((length InList) / ncol) [
112     set outdata lput (sublist InList (xstart) (xstart + ncol)) outdata
113     set xstart xstart + ncol
114   ]
115   report outdata
116 end
```

Go repeat

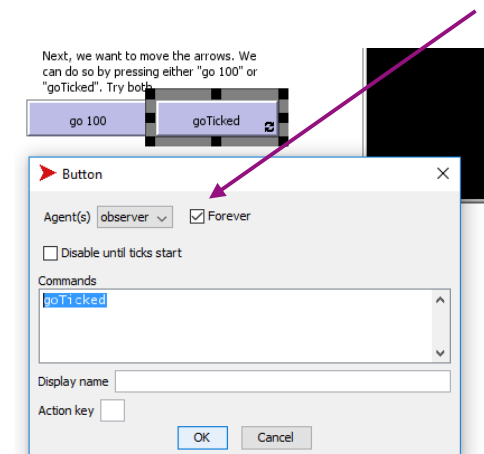
- NetLogo Web cannot display changes inside a „repeat“-Loop in the UI. You therefore need a little Workaround:
- You create a looping button and stop it after the desired amount of repetitions.

```
45 ;  
46 ; _____ Repeating Procedures  
47 ;  
48 ; NetLogoWeb has some problems with repeating Procedure. The changes in the world just don't show in the UI. We therefore need a little Trick.  
49 ; For more Info see: https://www.netlogoweb.org/docs/faq#repeat-go  
50  
51 ; We can compare the repeat Version and the Workaround.  
52 ; This is the general Procedure used for both Versions. With the Button in the UI we repeat this go-Procedure 100 times ("go 100").  
53 ; We just move turtles, so nothing special.  
54 to go  
55   ask turtles [  
56     set heading (heading + random 5 - random 5)  
57     fd 1  
58   ]  
59   tick  
60 end  
61  
62 ; This is the Workaround.  
63 ; We install a counter (ticked) and count the number of Repetitions. We then stop after 100 Repetitions.  
64 ; This way, we can loop (forever) this procedure inside the Button.  
65 to goTicked  
66   set ticked ticked + 1  
67   go  
68   if ticked > 99 [  
69     set ticked 0  
70     stop  
71   ]  
72 end
```

does not work with UI



does work



Examples of Models

NetLogo Web: Show_NetLogoWeb

powered by NetLogo

Mode: Interactive Commands and Code: Bottom

model speed

ticks:

This is a Model to show you how to use NetLogo-Web.

NetLogo-Web is a Web-Version of NetLogo. You can use it in your Browser and also download it from here. It works in most Browsers (Google Chrome is recommended). It also works on Smartphones and Tablets! For more info see: <https://www.netlogoweb.org/docs/faq>

This Model is pretty simple. It is just for demonstration, so it doesn't do anything special. You can start the Model by pressing the "setup"-Button.

setup

You now see lots of arrows. We imported their Positions from External Data using an Extension called "fetch". Not all NetLogo-Extensions are available for NetLogo-Web.

Next, we want to move the arrows. We can do so by pressing either "go 100" or "goTicked". Try both.

go 100 goTicked

You can clearly see a difference. When using "go 100", the arrows jump to another Location. When using "goTicked" the arrows moved bit by bit.

There is one Problem with NetLogo-Web. It cannot deal with the repeat-Function of NetLogo (it can but it only displays Results at the end of Repeating and not for the steps inbetween).

The "fetch"-Extension also needs some Workarounds. You can print the Content of a Website with it and you can then read this Content into NetLogo-Web. Try printing the Content of Wikipedia's Main Page by pressing "fetch-Example"

fetch-Example

Command Center

NetLogo Code

Model Info

NetLogo Web: OneTreeShadow_ellipsoid

powered by NetLogo

Mode: Interactive Commands and Code: Bottom

model speed

ticks:

This is a shading model that calculates the shadow-casting of one tree to the ground. You can easily run the model if you follow the instructions.

During the Simulation

If the Simulation takes forever, increase the Model Speed using the Slider above!

The Model now simulates the Shading of one Tree to the Ground. If PlotShadow? is turned on, you can even see the shadow on the World Map below. If you don't see it, try to decrease the Model Speed a bit.

The Model is now running for one Year. You can see the Day of Year on the right.

DOY 1 for example is January 1st. DOY 365 is December 31st.

You also see the current Time in Decimals. 15.50 for example is 15.30.

The model is stopping if DOY 365 and Hour 24 is reached. But you can also manually stop the Simulation if you press "go on year" again. You can resume the Simulation by pressing the Button again.

After the Simulation

The Simulation is finished, if DOY (Day of Year) 365 is reached. The DOY is then automatically reset to 1.

On the World Map you now see that some Areas are colored grey. The Shades of grey represent the Light that reached the Ground during one year. White means that this piece of Ground was never shaded. The darker the Ground, the more Shade was cast on that piece of Ground during one year.

You can now start a new Simulation at another Weather Station. This Weather Station will be located at another Altitude. Different Altitudes lead to different Shading Patterns.

You can also change the Crown Shape. Disks will always cast Shadows of the same Size to the Ground. Ellipsoid Crowns will lead to different Shadow Sizes and thus change the Pattern of Shading over the year.

Where on the Ground cast a Tree the most Shadow? To analyse this, you can Highlight the Pieces of Ground that were shaded the most. First Choose a Percentage of the Amount of Shading that you want to highlight, then press "Highlight Top Shaded Patches".

You see that a lot of Shading is close to the Tree and the Influence of the Tree to Ground in a bigger Distance is relatively small.

This Analysis helps us to decide, how we want to implement the Shading into a final Model with many Trees.

Highlight Top Shaded Patches

Top_Patches_Percentage 50

Before the Simulation

First, pick:

- a Tree Height
- a Crown Radius
- the Crown Transmissibility (how much light [%] goes through the Tree Crown?)
- if the Crown is shape as a Disk on top of the Tree or if it's an Ellipsoid (basically a 3D Ellipse)
- the Time Increment which defines the amount of time that passes at every time step

Second, choose a weather Station. There are 5 Weather Stations to choose from. They are located along a Latitude gradient from 17 (Belize) to 70 (Croker River).

Then define the Start and End of the Growing Season. These are the (Julian) Day of Year (1 = 1st January).

If you want to plot the shadows during the model simulation, then turn "PlotShadow" on. This makes the model much slower!

Finally, press "setup" and then "go one year".

At the end of the Model run, you can see the amount of light that reaches the ground. In areas shaded by the Tree, this amount is decreased. Heavily shaded areas appear black.

setup go one year

TreeHeight 30 [m]

TreeCrownRadius 5

CrownTransmissi... 10 [%]

Crown_Shape

Disk

TimeIncrement 1 [Minutes]

WeatherStation

Lindenberg

latitude

52.217

StartofGrowingSeason 120

EndofGrowingSeason 272

PlotShadow? ☒

go-one

Command Center

NetLogo Code

Model Info

You can use it on your smartphone!



Why NetLogo Web is great!

- Easy to use for people without modelling experience
- Easy to access for everyone with an internet connection
- Easy to download
- Easy to share
- You can get a DOI for your Repository



What to consider

- People might open the model before they read something about it
 - You need a self-explanatory description inside the model
- I recommend to split the description into 3 parts:

The screenshot shows the NetLogo web presentation for the 'OneTreeShadow_ellipsoid' model. At the top, it says 'powered by NetLogo' and 'File: New'. Below that, 'Export: NetLogo HTML' is visible. The main interface includes a 'model speed' slider set to 'ticks: 198273'. The central area is divided into three sections: 'Before the Simulation', 'During the Simulation', and 'After the Simulation'. The 'Before the Simulation' section lists instructions for setting up the model, including 'TreeHeight' (30 [m]). The 'During the Simulation' section explains the simulation process and includes a 'go one year' button. The 'After the Simulation' section describes the results and includes a 'DOY' (138) and 'Hour' (16.55) display. The interface also features a 'setup' button and a 'World Map' area.

powered by NetLogo

File: New

Export: NetLogo HTML

Mode: Interactive Commands and Code: Bottom

model speed

ticks: 198273

Before the Simulation

This is a shading model that calculates the shadow-casting of one tree to the ground. You can easily run the model if you follow the instructions.

First, pick:

- a Tree Height
- a Crown Radius
- the Crown Transmissibility (how much light [%] goes through the Tree Crown?)

TreeHeight 30 [m]

setup go one year

During the Simulation

If the Simulation takes forever, increase the Model Speed using the Slider above!

The Model now simulates the Shading of one Tree to the Ground. If PlotShadow? is turned on, you can even see the shadow on the World Map below. If you don't see it, try to decrease the Model Speed a bit.

The Model is now running for one Year. You can see the Day of Year on the right.

DOY 138

Hour 16.55

After the Simulation

The Simulation is finished, if DOY (Day of Year) 365 is reached. The DOY is then automatically reset to 1.

On the World Map you now see that some Areas are colored grey. The Shades of grey represent the Light that reached the Ground during one year. White means that this piece of Ground was never shaded. The darker the Ground, the more Shade was cast on that piece of Ground during one year.

You can now start a new Simulation at another Weather Station. This Weather Station will be located at another Altitude. Different Altitudes lead to different Shading Patterns.

You can also change the Crown Shape. Disks will