

Thinking with Models Autograder Instructions:

Author: Joel McCarthy

Date: 08/21/2015

Overview

The netlogohomeworkgrader package, containing the autograde.py script, can be used on a directory containing student and answer subdirectories with .nlogo files. These student files will be graded against the answer files, and a grade.csv file output into the top-level directory. This instructional document should remain in the /netlogohomeworkgrader directory whenever it is reproduced.

Associated Files

The necessary python files for the autograde script should be located in a directory called /netlogohomeworkgrader which contains the files autograde.py, get_experiments.py, and grade_files.py.

autograde.py: The main script, which encapsulates the functionality of the grader package, running the full command to grade homework problem.

get_experiments.py: This module contains functions which allow the extraction of experiments from the answer .nlogo file, so they can be run on other .nlogo files.

grade_files.py: This contains all the functionality required to compare student .csv files to answer .csv files and output grades.

More details may be found in the python files themselves, which are well documented.

Running the Script

The following text has been reproduced from the help documentation of the autograde.py script and can be seen in a terminal by running "python autograde.py -h". Please note that the following commands are expected to be run from within the /netlogohomeworkgrader directory, which should contain autograde.py, get_experiments.py, and grade_files.py.

command line syntax:

```
python autograde.py [-h] -n hw_number -p prob_number  
[-m main_directory] [-d netlogo_directory]
```

args:

```
-h, --help: Prints the help documentation for this script.  
-n hw_number, --hw_number hw_number: The number of the homework to be  
graded.  
-p "problem_number1 problem_number2 ..."  
--prob_numbers "problem_number1 problem_number2 ...": The numbers of  
the problems to be graded. Can take of the form of a list of space-  
separated integers, as shown above, or a single integer with no  
quotes, for one problem (eg. -p 1).  
-m main_directory --main_dir main_directory: The main directory. Must  
contain student folders with nlogo files, as well as an answer folder.
```

- with an answer nlogo file. Leaving this blank will cause a dialog box to open in which you may select your desired directory.
- d netlogo_directory --netlogo_dir netlogo_directory: The netlogo directory. Must contain NetLogo.jar, as well as the /lib directory. Leaving this blank will cause a dialog box to open in which you may select your desired directory.
- g --grade_only: Does not produce xml or csv files for grading. Instead, looks for pre-existing files and grades them.

example command:

```
python autograde.py -n 1 -p "1 2 3" \
    -m "/home/joel/Dropbox/Research/Philosophy of Science/\
    Thinking with Models/Thinking-with-Models/autograde_sample/" \
    -d "/opt/NetLogo/netlogo-5.0.5"
```

This command will execute the autograde.py script, grading homework 1, problems 1, 2, and 3 for all student folders which it finds in the directory after -m. It will expect to find the NetLogo.jar file in the directory after -d. (Please note, this cannot be directly copied into the terminal. Will require some spaces to be deleted before it is properly runnable.)

Directory Structure, Naming Scheme, and File Details

For best results, the following directory structure and naming scheme should be used for the student and answer files. Although the autograde.py script is somewhat flexible in terms of improperly named directories, allowing users to re-select improperly named directories and files via a file explorer where practicable, the script is only guaranteed to run when this scheme is observed:

```
<top_level_directory>/
    /hw1_files
        hw1_answers.nlogo
    /hw2_files
        hw2_answers.nlogo
    ...
    /<student1_id>
        hw1_<student_id>.nlogo
        hw2_<student_id>.nlogo
        ...
    /<student2_id>
        hw1_<student_id>.nlogo
        ...
    /<student3_id>
        hw1_<student_id>.nlogo
        ...
    ...
```

There should be a top-level directory, passed in as main_dir (after -m flag), which can be named anything. Within this directory, there should be several answer directories, one for each homework, best named /hw<hw_number>_files (although any name should technically work, so long as it has non-numeric characters in it – the user will be asked to choose a new answer directory if this one is not found). There should also be a directory for each student, named

simply the student id. This is expected to be an entirely numeric name, to distinguish it from the answer directories (which must have non-numeric characters). Within the answer directory, there should be a file called `hw<hw_number>_answers.nlogo`. Similarly, in each student directory, there should be a file called `hw<hw_number>_<student_id>.nlogo`. These names must exactly follow this scheme or the script will fail.

Finally, note that the answer .nlogo file is expected to contain fully completed functions which output the correct answers, as well as the desired BehaviorSpace experiments to be run when grading student files. There should be one experiment for each problem, named simply `prob<problem_number>`. Students will be given a file called `hw<hw_number>_problemset.nlogo`, which contains the skeletons of all the necessary functions for grading, as well as those global, patch, turtle, and link variables, which must exist for grading to check. It should not contain the BehaviorSpace experiments from the answer file. The info tab in both answer and problemset files should be filled out with the homework assignment detailing the instructions for each problem.

Students should be instructed to name their files `hw<hw_number>_<student_id>.nlogo` for submission, and to leave all the existing function definition and variable names in place for proper grading.

Grading Scheme

Currently, the grading scheme is as follows:

- 0: The file does not run at all, or was not submitted.
- 3: The file runs, but all answers for the problem are incorrect.
- 3.1-10: The grade is scaled between 3.0 and 10.0, in direct proportion to the number of correct answers in the student csv file.
- 10: Perfect file.

Sample Details

The `autograde_sample` directory contains an example of the above file and naming scheme, with homework one answer file and student .nlogo files (with some deliberate mistakes for demonstration, including the fact that student 3's file is entirely missing) for homework 1 (answer subdirectory also contains the problemset file). The `autograde.py` script has been executed on it as shown above to demonstrate proper functioning. Thus, the student directory and the answer directories contain several .csv files from problem outputs, and there is a `grade.csv` file in the top-level directory, with graded problems 1, 2, and 3. For further demonstration of the script, autograde can be run for problems 4, 5, 6, and 7 if desired.