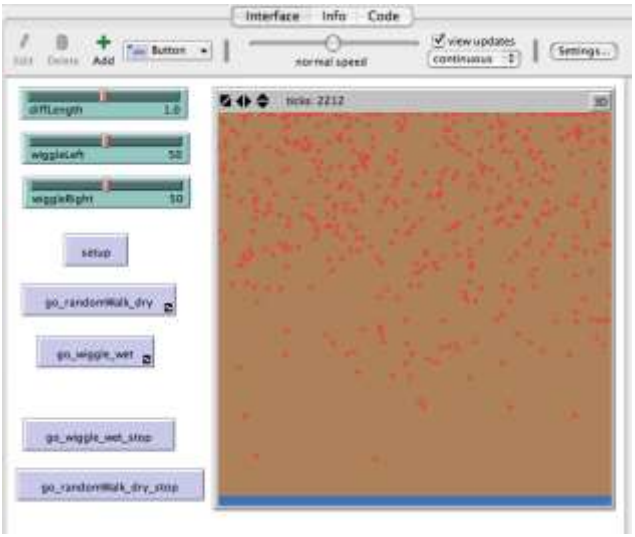
CS108L Computer Science for All
Module 4: NetLogo Experiments using Random Walk and Wiggle Walk



In this lab, you will be writing a program that lets you experiment with two types of turtle movement: the "***random walk***" and the "***wiggle walk***".

Basic Setup:

- Set max-pxcor and max-pycor to 200.
- Set patch-size = 1
- Turn on horizontal wrapping, turn off vertical wrapping.
- "Setup" button clears the world and creates agents and patches as follows:
    - Reset ticks at the beginning of the "Setup" procedures.
    - Agents:
        - Create 500 turtles that represent the contaminant.
        - Make them red, size 10, and with an initial heading of 180.
        - Place them at the top of the world (use the command setxy [random x-coordinate] [max y-coordinate])
    - Patches:
        - Set patch color to brown.
        - Color the bottom of the world blue to represent the aquafier in the "Setup" button using an if-statement conditional.
- Create 3 sliders:
    - Diffusion Length (titled: diffLength) with min value = 0.1, max value = 2, and increment = 0.1.
    - Wiggle Left (titled: wiggleLeft) with min value = 0, max value = 100, and increment = 1.

  - Wiggle Right (titled: wiggleRight) with min value = 0; max value = 100, and increment = 1.
- Create 2 Go buttons:
  - 1st button titled "go_random_dry": procedure uses random walk and turtles move forward diffLength.
  - 2nd button titled "go_wiggle_wet": procedure uses wiggle walk and turtles move forward diffLength. Will also use the angles from the variable wiggleLeft and wiggleRight.
- Each Go button includes the command tick at the end of the procedure.

For each experiment you will:

1) Set the sliders to the correct numbers for that experiment.
2) Run the experiment.
3) Record the number of ticks it takes for your contaminants to reach blue water table on your experimental data sheet in Google Sheets.
4) Repeat the experiment (steps 1-3 above) 10 times, recording the number of ticks in the data sheet each time.
5) Go to the next experiment and start.

Students will be assigned one of the following contaminants.

Values of diffLength for Each Contaminant	
Contaminants	**diffLength**
Petroleum	0.2
Pesticide	1.3
Benzene	2.0
Bacteria	0.7

Students must use all of the following experimental configurations. This results in a total of 40 experimental trials.

Wetness Levels for the Experiments Conducted			
Wetness Level	**Procedure Used**	**wiggleLeft Value**	**wiggleRight Value**
Dry	**go_random_dry**	N/A	N/A
Moist	**go_wiggle_wet**	100	100
Wet	**go_wiggle_wet**	70	70
Saturated	**go_wiggle_wet**	45	45

Module 4: NetLogo Experiments in Random Walk and Wiggle Walk Grading Rubric (20 Points Total)		
Done	Points	Task

	2	A:
		• Submit a NetLogo source code with the file name: M1.*firstname*.*lastname*.nlogo.
		• The first few lines of your Code tab are comments including the following:
		`;Student's Name:`
		`;School:`
		`;Teacher's Name:`
		`;Date:`
		• A Google Sheet is created, named correctly, and contains the elements described in the assignment.
		• Initialize the procedures you have written (using comments).

	3	B: • Include appropriate in-line comments that also recorded who wrote which section of the submitted code.
	2	C. • Include a detailed Info tab. See Coding Standards Guidelines for more information.
	2	D: • Your sliders are set up correctly as stated in the directions above.
	5	E: • When **setup** is clicked, the NetLogo world is cleared, the world is colored brown, a blue water table appears at the bottom and 500 contaminant turtles appear at the top. • When **go_random_dry** is clicked, your contaminants (turtles) start at the top and repeatedly take one step of length diffLength per tick in a random. • When **go_wiggle_wet** is clicked, your contaminants (turtles) start at the top and repeatedly take one step per tick in a wiggle walk.
	4	F: Data is collected correctly in the Google Sheet. Data includes: • The contaminant assigned to you and the results of each of the 40 experiments you ran. • The average number of steps of the 10 experiments you ran for your contaminant at each wetness level (a total of 4 averages). • The average number of steps calculated by students of the three types of contaminants different from your own.
	2	G:

		• Create a graph of average number of ticks on the vertical (y) axis versus the wetness level on the horizontal (x) axis. Your graph must include the 16 averages reported in the google sheet.
	1	H: • (Extra Credit) Program your turtle (contaminant) to stop automatically when it touches the blue patches.
	1	I: • (Extra Credit) Run the experiment for a different contaminant. Input the data for that contaminant *on a different Google sheet under that contaminant*, name it *EC_firstname_lastname*, and create a graph using this new data.