**Unit 2 – Lab 2**

**Colliding Buggies**

**Part I**

In this lab we want to use our computational model of motion to predict where two cars moving at different speeds will collide with one another. Your first step is to collect all of the information you will need in order to construct a simulation of this scenario.

1. What pieces of information will you need to find about the buggies to predict where they will collide?
2. Discuss with your group and write down the procedure you will follow to find the information you listed above.
3. Collect your data and record it all below. If you perform any mathematical operations to find the information you need show those as well.

**Part II**

Now that you have collected all the information you need, create a simulation of the two cars using the starter code found here: <https://tinyurl.com/yclk7v4k>.

1. Complete the next-x function in the starter code so that it can be used to move **both** cars (rather than writing a separate function for each car). Think carefully about information you will need to give this function so that it will work for either car. Use a design recipe to help you with this process if necessary.
2. Once your next-x function works, test the simulation out for a few simple sets of initial conditions. Does it behave the way you expect it to? Explain.
3. What assumptions does this simulation make? How might those assumptions affect the predictions it makes?

**Part III**

Ask your teacher for the initial positions of your buggies and the directions they will travel.

1. Record your initial conditions in the table below.

|  |  |  |
| --- | --- | --- |
|  | **Car 1** | **Car 2** |
| **Starting Position** |  |  |
| **Direction of Travel** |  |  |

1. Use your simulation to predict where and when the two cars will meet and record them below.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

1. Test your predictions using buggies. Take several trials and record all of your results in the space below.
2. Evaluate how well your simulation models the motion of the two buggies. Write your thoughts on a whiteboard. Consider the following points:

* How reliable were your experimental results?
* How might the assumptions of the simulation affect the predictions?
* What assumptions did you make in your initial conditions? How might they have affected your results?