The Bumper Turtles model created in this lab requires the use of Boolean logic and conditional control flow. The basic rules are:

1. Each turtle starts in the middle of a random patch.
2. At each tick, every turtle looks ahead one patch in its current heading.
   a. If the patch ahead is black then the turtle makes a U-Turn.
   b. If the patch ahead is blue, then the turtle makes a 90° left turn.
   c. If the patch ahead is red, then the turtle makes a 90° right turn.
   d. If the patch ahead is green, there are two options available: if there is another turtle in that patch then the turtle makes a U-Turn; otherwise, the turtle runs one step forward on the turf.

Module 5: Bumper Turtles Grading Rubric (20 Points Total)

<table>
<thead>
<tr>
<th>Done</th>
<th>Points</th>
<th>Task</th>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td>A:</td>
</tr>
<tr>
<td></td>
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<td>● Submit one document to your instructor: NetLogo source code named: M4firstname.lastname.nlogo.</td>
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<td></td>
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<td>● The first few lines of your code tab are comments including your name, the date, your school, and the assignment name.</td>
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| 3 | B:  
  - The code in the code tab of your program is appropriately documented with “inline comments”. |
| 2 | C:  
  - Complete all sections in the Info tab. |
| 1 | D:  
  - Your Setup button creates at least 2 turtles. Each turtle must have unique coordinates.  
  - Every time the setup button is pressed, the turtles you create are always created in the same set of unique locations. |
| 4 | E:  
  - The Go button moves turtles along a path that loops. |
| 3 | F:  
  - There are at least a total of 10 black, red and/or blue patches that affect the path of the turtles. |
| 3 | G:  
  - Whenever one of your turtles turns from its path to avoid another turtle, it later returns to its path. Hint: add a black patch to cause the turtle to turn back around. |
| 3 | H:  
  - There is at least one patch where two different turtle paths cross. |
| 2 | I: (Extra Credit)  
  - All of your turtle movement works as required.  
  - You have at least 5 turtles  
  - Your turtle paths cross each other in at least 5 places  
  - There are at least 25 black, red and/or blue patches that affect the path of the turtles. |
| 2 | J: (Extra Credit)  
  - Make the program in 3D (see “Bumper Turtles” video for details). You will need a separate netlogo file. Please name it M4.firstname.lastname.3D.nlogo. |