Part 1: Outputs – Smart Motor

1. Follow your teacher's directions to build the testbed.
   1. Follow the directions in Inkling labeled **TESTBED** to build the testbed.
2. Connect the following:
   1. Battery to Robot Brain
   2. Smart Cable to each of the Smart Motors; push connectors until a “click” is heard
   3. Smart Cables from Smart Motors to ports 1 and 6 of Robot Brain (order does not matter); push connectors until a “click” is heard
3. Start the preloaded Sensors program.
   1. Turn on the Controller by pressing the key.
   2. Turn on the Robot Brain by selecting the check mark symbol.
   3. Use the up and down arrow keys on the brain to highlight the preloaded **Demos** list of programs.
   4. Select the check mark symbol again to open the list.
   5. Use the up and down arrow keys on the brain to highlight the preloaded **Sensors** program.
   6. Select the check mark symbol again to select “Run”.
4. Record your results in the table below and then answer the questions.

|  |  |  |
| --- | --- | --- |
|  | Direction of Rotation  (clockwise or counterclockwise) | Speed  (fast, medium, slow) |
| Joystick “A” Full Forward |  |  |
| Joystick “A” Full Backward |  |  |
| Joystick “A” Partial Backward |  |  |
| Joystick “D” Full Forward |  |  |
| Joystick “D” Full Backward |  |  |
| Joystick “D” Partial Backward |  |  |

If you had two wheels on a car connected to Smart Motors and you pushed both joysticks forward, predict your car’s movement.

If you had two wheels on a car connected to Smart Motors and you pulled both joysticks backward, predict your car’s movement.

If you had two wheels on a car connected to Smart Motors and you pushed one joystick forward and the other joystick backward, predict your car’s movement.

Part 2: Inputs – Bumper Switch

1. Connect the following:
   1. Move the Smart Cable from port 1 to 4 of Robot Brain.
   2. Remove the other Smart Motor cable from the Robot Brain.
   3. Connect a Smart Cable to Bumper Switch and to port 2 of Robot Brain.
2. Start the preloaded Sensors program the same way you did in the previous section “Part 1”.
3. Locate the “R” buttons on the front of the controller in front of the right joystick.
4. Record your results in the table below and then answer the questions that follow.

|  |  |  |
| --- | --- | --- |
|  | Direction of Rotation  (clockwise or counterclockwise) | Speed  (fast, medium, slow) |
| Top “R” button pressed |  |  |
| Bottom “R” button pressed |  |  |
| Top “R” button pressed partially |  |  |
| Bottom “R” button pressed partially |  |  |
| Bumper switch pressed and top “R” button pressed |  |  |
| Bumper switch pressed and bottom “R” button pressed |  |  |

What was the difference between pressing the joysticks in Part 1 and using these buttons in Part 2?

Can you think of a specific use when you would want the joystick control style?

Can you think of a specific use when you would want the R button control style?

What uses can you think of for the bumper switch?

Part 3: Inputs – Touch LED

1. Connect the following:
   1. Remove the Bumper Switch cable from the Robot Brain.
   2. Remove the Smart Motor cable from port 4 of the Robot Brain.
   3. Connect Smart Cable for Smart Motors to ports 1 and 6 of Robot Brain.
   4. Connect Smart Cable by connecting Touch LED to any other port of Robot Brain.
2. Start the preloaded Sensors program the same way you did in the previous section “Part 1”.
3. Record your observations.

|  |  |  |
| --- | --- | --- |
|  | Direction of Rotation  (clockwise, counterclockwise, none, both) | Speed  (variable or none) |
| Initial color of Touch LED | | |
| Joystick “A” pushed forward |  |  |
| Joystick “A” pulled backward |  |  |
| Joystick “D” pushed forward |  |  |
| Joystick “D” pulled backward |  |  |
| Touch LED color after “Touch” | | |
| Joystick “A” pushed forward |  |  |
| Joystick “A” pulled backward |  |  |
| Joystick “D” pushed forward |  |  |
| Joystick “D” pulled backward |  |  |

Describe what happened to motor function when you pressed the Touch LED.

Can you think of specific uses for a Touch LED sensor?

Part 4: Inputs – Color Sensor

1. Ensure that the battery is connected to the Robot Brain.
   1. Confirm that the Smart Cables for the Smart Motors are connected to ports 1 and 6 of Robot Brain.
   2. Connect Smart Cable for Color Sensor to any other port of Robot Brain.
2. Start the preloaded Sensors program the same way you did in the previous section “Part 1”.
3. Record your observations.

|  |  |  |
| --- | --- | --- |
|  | Direction of Rotation  (clockwise, counterclockwise, none, both) | Speed  (variable or none) |
| Initially tested | | |
| Joystick “A” pushed forward |  |  |
| Joystick “D” pushed forward |  |  |
| After **RED** color block waved under Color Sensor | | |
| Joystick “A” pushed forward |  |  |
| Joystick “D” pushed forward |  |  |
| After **GREEN** color block waved under Color Sensor | | |
| Joystick “A” pushed forward |  |  |
| Joystick “D” pushed forward |  |  |

Describe what happened to motor function when you waved the RED color block under the Color Sensor.

Describe what happened to motor function when you waved the GREEN color block under the Color Sensor.

Can you think of specific uses for a Color Sensor?