o. Wire colors

We are now in a position to summarize the full rainbow of colors that Logisim wires can take on. The following little circuit illustrates all of them at once.



- **Gray:** The wire's bit width is unknown. This occurs because the wire is not attached to any components' inputs and outputs. (All inputs and outputs have a defined bit width.)
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- **Blue:** The wire carries a one-bit value, but nothing is driving a specific value onto the wire. We call this a *floating* bit; some people call it a *high-impedance* value. In this example, the component placing a value onto the wire is a three-state pin, so it can emit this floating value.

- **Dark green:** The wire is carrying a one-bit 0 value.
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- **Bright green:** The wire is carrying a one-bit 1 value.
- 0 0
- Black: The wire is carrying a multi-bit value. Some or all of the bits may not be specified.



• **Red:** The wire is carrying an error value. This often arises because a gate cannot determine the proper output, perhaps because it has no inputs. It could also arise because two components are trying to send different values onto the wire; this is what happens in the above example, where one input pin places 0 onto the wire while another places 1 onto the same wire, causing a conflict. Multi-bit wires will turn red when any of the bits carried are error values.

• **Orange:** The components attached to the wire do not agree in bit width. An orange wire is effectively "broken": It does not carry values between components. Here, we've attached a twobit component to a one-bit component, so they are incompatible.