# The QAOA Algorithm

- **Description**. The high-level idea of the QAOA algorithm is that we start with a superposition of all possible solutions. We can get this superposition by applying a Hadamard gate to each qubit. We can then run all of our OR gates, then evaluate the solution. Once we've evaluated the solution, we can run the mixer to try to find a better solution. Typically, we would perform these steps many times, but for now let's just try running each step a single time. This will give us the following circuit.
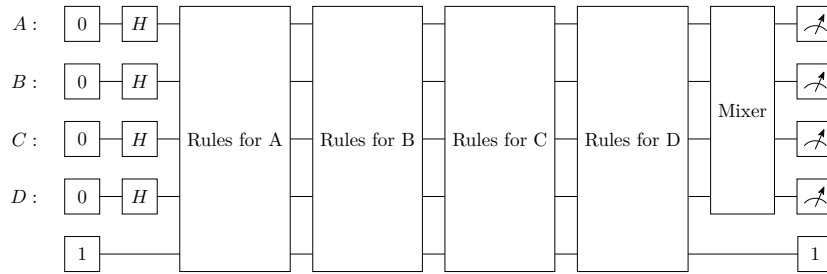
  The idea here is that the Z-rotations and the X-rotations will interact, and ideally bring us towards a better solution. Of course, we will need to know all of the angles before we can actually write down this circuit using gates. In practice, finding these angles can be hard and is the most challenging part of making QAOA work. However, finding these angles is a classical machine learning problem, and we have chosen to omit it.

  - The angle for rule blocks will be $\theta = \pi/4$.
  - The four angles for the mixer will be $\gamma_1 = \pi$ and $\gamma_2 = \pi/2$ and $\gamma_3 = \pi$ and $\gamma_4 = \pi/2$.

  Your goal is to create this circuit in the simulator.

- **Submission**. A screenshot of the circuit and the Quirk file.