Plan for the Quantum computer demo

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1 Description for the demo

We have built a 4 qubit prototype *costing only £10* and uses a rechargeable battery. We use LEDs to show the qubits and there are buttons for user input, we have also written some quantum algorithms which you can run and see what happens to the qubits as it runs. We would like to build a 16 qubit version, however we require more funds to pursue this.

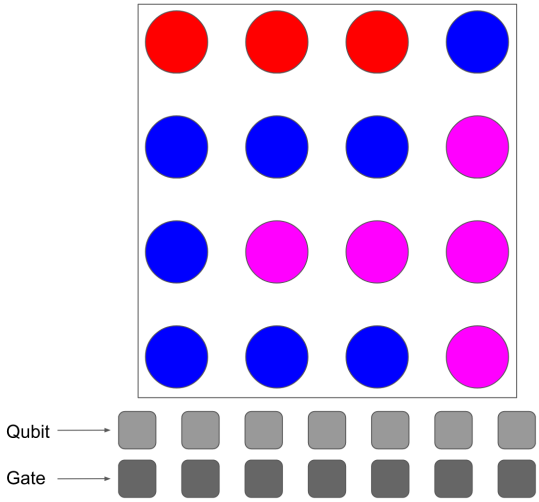

Figure 1: Artist's impression of the 16-qubit quantum computer. Qubits are denoted by circles with the colour representing their state. The buttons below control the device.

2 Things to be done

- Poster explaining the demo and what the different qubit colours mean

- A list of quantum algorithms to be implemented
- Rules for a game, start out in certain pattern and have to use quantum gates to get to a target pattern
- QKD protocol across the grid of 16 qubits
- Discussion on how to represent the qubits using Leds
- Ideas for how we should layout the qubit leds and button placements
- Building external housing and colour-scheme

3 Part list

3.1 Necessary – £214.00

- LEDs: £1 each, £16.00 in total for 16
- LED drivers: £0.72 each, £5.76 for 8 chips
- Buttons: £1 each, £20.00 in total for 20 buttons (may need bigger buttons later for the final demo)
- Shift registers: £0.32 each, £1.60 for 5 chips
- Transistors: £0.12 each, £6.00 for 50
- Resistors: £5.00
- Breadboard and prototyping (reusable for other projects): £50
- Microcontroller (dsPIC33F): £4.54
- Memory chip: £1.68 each, £5.04
- Final PCB: Under £100.

3.2 Optional – £110.00

- Development board: £110.00