THE DEUTSCH-JOZSA ALGORITHM FOR 3-QUBIT INPUT

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The Deutsch-Jozsa quantum algorithm provides an accessible example of how superposition and interference is used in quantum computation. It is one of the first examples that students of quantum information processing encounter. This tool provides an interactive experience where students gradually work their way to an understanding of the algorithm.

**Kit contents**

- $X$: 1
- $H$: 7
- $U_f$: 4
- $\times 3$
- $\times 3$
- $\times 2$

Plus cables and power supply.

**Contact**

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**The Algorithm**

The Deutsch-Jozsa problem is to determine whether a Boolean function is constant or balanced. A constant function returns the same output for all possible input values, while a balanced function returns zero for half of them and one for the others. In classical query complexity a number of function calls exponential in the input size is needed, while the quantum algorithm can solve the problem with only one call.

**Technology**

This toolbox contains a modular kit of electronic circuit boards that approximate the behavior of quantum gates, a patent pending technology that has been developed at Linköping University, Sweden.