L5

Turing machines

- Strong Church Turing thesis
  - any algorithmic process can be simulated efficiently using a Turing machine
- Modification of the Church Turing Hypothesis
  - States that a function on the natural numbers can be calculated by an effective method iff it is computable by a Turing machine
- Quantum computers can disprove that - it can solve some problems more efficiently than a Turing machine

Information Theory

- Shannon - mathematical concept of information
  - noiseless channel coding
  - noisy channel coding
  - Error-correcting codes
- Benc Schumacher made a quantum analogue to Shannon's noiseless coding theorem
  - in the process defined the quantum bit or qubit as a tangible physical resource
- A version of the noisy channel coding theorem is an open problem