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### **Consensus Problem**

- Every processor has an input.
- Termination: Eventually every nonfaulty processor must decide on a value.
  - decision is irrevocable!
- Agreement: All decisions by nonfaulty processors must be the same.
- Validity: If all inputs are the same, then the decision of a nonfaulty processor must equal the common input.

### **Agreement Condition**

- The agreement condition above requires "exact agreement"
- The output must be exactly equal

# FLP Impossibility Result

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- Fischer, Lynch, Paterson (FLP) showed that consensus (satisfying above conditions) is impossible in an asynchronous system where any one process may fail

No bound on message delay

# Circumventing FLP

To circumvent FLP, we must relax one of the conditions required above for exact consensus:

Examples:

Approximate agreement (instead of exact)

Sometimes algorithm may not terminate in finite time