

Digital Logic and Minecraft Implementation

Author: Jian Wei Heng, Xu Shun Jie, Lu Yong Han

Fu Jen Catholic University

May 21, 2025

Table of Contents

- 1 Digital Logic Basics
- 2 Minecraft Implementation

Basic Concepts of Digital Logic

- Digital logic uses binary system (0 and 1)
- 0 represents low voltage (Low)
- 1 represents high voltage (High)
- These states can be implemented through circuits



Figure: Example of 0 and 1 in Minecraft Redstone Circuit

Basic Logic Gates

- AND Gate: Output is 1 only when both inputs are 1
- OR Gate: Output is 1 when any input is 1
- NOT Gate: Output is opposite of input
- NAND Gate: AND Gate output inverted
- NOR Gate: OR Gate output inverted

Logic Gate Truth Tables

AND Gate

| Input A | Input B | Output |
|---------|---------|--------|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

Logic Gate Truth Tables

OR Gate

| Input A | Input B | Output |
|---------|---------|--------|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

Logic Gate Truth Tables

NOT Gate

| Input | Output |
|-------|--------|
| 0 | 1 |
| 1 | 0 |

Redstone System in Minecraft

- Redstone Dust: Transmits signals
- Redstone Torch: Generates signals
- Redstone Repeater: Delays and amplifies signals
- Redstone Comparator: Compares signal strengths

Logic Gate Implementation in Minecraft

Basic Logic Gates

- NOT Gate: Using redstone torch
- AND Gate: Using two redstone torches in series
- OR Gate: Using two redstone torches in parallel

Note

In Minecraft, the on/off state of redstone torches is opposite to the logic gate input/output

Practical Applications in Minecraft

- Automatic Door Systems
- Trap Mechanisms
- Automatic Farms
- Item Sorting Systems

Thank You

Thank you for listening!