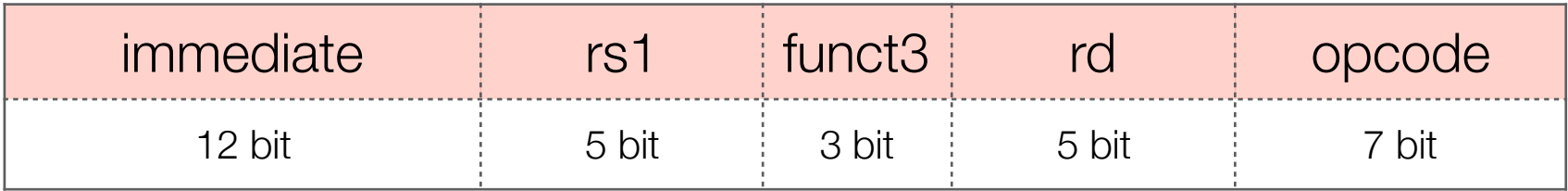




**Decode** **-Remember**

- The opcode specifies the instruction format in which the instruction is encoded.
- After decoding the binary code of the instruction, the processor knows what instruction and parameters it is dealing with.
- Example **ADDI**:
  - Immediate instructions contain bits that are interpreted as numerical value that is retrieved using shifting operations.
  - 5 bit are enough to encode 32 registers.



# Execute

- The execution of every RISC-U instruction has a well-defined effect. It changes the state of the machine only at a specific location involving little data.
- At most two registers or one register and one memory location are modified by an instruction.
  - Every instruction modifies the **PC**.
  - Most instructions which modify **data** (another register or memory location) have trivial control flow (PC to next instruction).
  - Control-flow instructions have a more sophisticated **control flow**, that is, they may change the PC using relative or absolute addressing.

# Decode -Remember

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| immediate | rs1   | funct3 | rd    | opcode |
|-----------|-------|--------|-------|--------|
| 12 bit    | 5 bit | 3 bit  | 5 bit | 7 bit  |

# Decoding Instructions

- Each instruction can be uniquely identified by certain parts of the 32 bits called **opcode**, **funct3** and **funct7** code.
- When the instruction is known, the meaning of the remaining bits of the instruction becomes clear.

