MIPS Data Transfer Instructions

Opcode rt, immed (rs)

- rt: the loaded or stored value
- immed (rs): the memory address
  - rs: base address
  - immed: signed 16-bit offset value (displacement)
- full address = base + offset
  - allows a full 32 bit address
  - can address ± 32KB from base address

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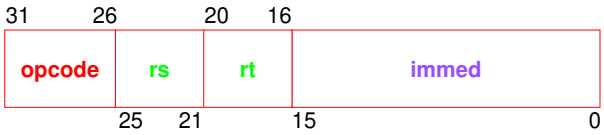
Some examples:

```
lw  $8, 46($10)      # $8 = memory[$10+46]
sw  $8, 46($10)      # memory[$10+46] = $8

lb  $9, -256($10)    # $9 =
                         sign-extended (memory[$10-256])
lbu $9, -256($10)    # $9 =
                         zero-extended (memory[$10-256])
sh  $9, -256($10)    # memory[$10-256] = the least
                         significant halfword of $9
```

I-type Format

I-type format used for data transfer instructions



- **opcode** = operation
  - opcode = data transfer instruction
- **rs** = base address
- **rt** = register value that is loaded from or stored to memory
- **immed** = address offset in bytes, $\pm 2^{15}$
  - sign-extended when used (replicate msb)

```
lw $14, 8($sp)
```

35	29	14	8