TA Embedded

#AWeekAPeripheral

BIT MANIPULATION

SET CLEAR TOGGLE TEST

TA Embedded

SET A BIT

Make a specific bit = 1 (without touching others)

REG |= (1 << n)

How it works:

1 << 5 = 0b00100000

REG |= keeps all existing bits and makes bit 5 = 1
→ It's like saying: "Force this bit ON."

Example:

- Initial REG = 0b00000000
- Final REG = 0b00100000

CLEAR A BIT

Make a specific bit = 0 (without touching others

REG &= ~(1 << n);

How it works:

~(1 << 5) = 0b11011111

- **REG &= preserves other bits but turns bit 5 to 0**

→ It's like saying: "Force this bit OFF."

Example:

Initial REG = 0b00100000

Final REG = 0b00000000

TOGGLE A BIT

Flip the value:

If it's 1 → becomes 0, if it's 0 → becomes 1

REG ^= (1 << n);

How it works:

(1 << 5) → 0b00100000

REG ^= inverts only bit 5, leaves others unchanged → "Flip this bit."

Example 1:

Initial REG = 0b00000000

Final REG = 0b00100000

Example 2:

Initial REG = 0b00100000

Final REG = 0b00000000

TEST A BIT

Check if a specific bit is 1

```
if (REG & (1 << n))  { /* Bit is 1 */ }
```

How it works:

(1 << 5) = 0b00100000

REG & (1 << 5) returns non-zero if the 5th bit is 1

→ It's like saying: "Is this bit ON?"

Example:

REG = 0b00100000 → test passes

REG = 0b00000000 → test fails

SUMMARY

Action	Code	Use Case
Set bit	`REG	Turn on feature
Clear bit	REG &= ~(1 << n);	Turn off feature, reset
Toggle bit	REG ^= (1 << n);	Blink LED, toggle output
Test bit	REG & (1 << n)	Check input pin, flag

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