

If-Else / Switch Statements

Teaching your program to make decisions ■

■ What You Will Learn

- How if-else lets your program choose different paths
- Chaining multiple conditions with else-if
- When to use switch instead of long if-else chains
- Nested conditions and logical operators (&&, ||, !)

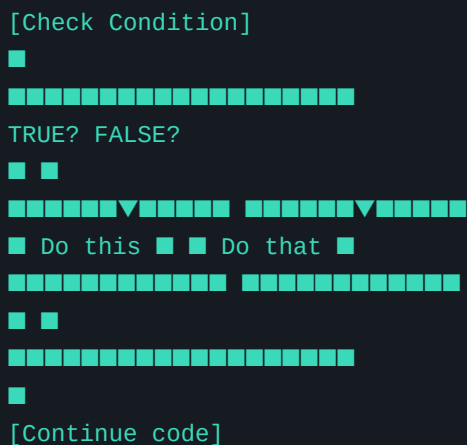
■ Intuition First

Every day you make decisions: *If it rains* → *carry umbrella*. *Else* → *wear sunglasses*. That's **if-else**. Your program does the same thing — it checks a condition, and based on whether it's true or false, it takes a different action.

■ Think Like This

Imagine a traffic light. If RED → stop. Else if YELLOW → slow down. Else (GREEN) → go. Your if-else is exactly this decision tree — one path gets taken, rest are skipped.

■ Visual: Decision Tree



■ ■ How It Works

■ Time & Space Complexity

■ TIME COMPLEXITY

$O(1)$

■ SPACE COMPLEXITY

$O(1)$

Simple conditions are checked in constant time. No data size involved.

■ Common Mistakes

■ Missing break in switch

Without break, execution 'falls through' to the next case! Always add break unless you intentionally want fall-through.

■ Using = instead of == in conditions

if ($x = 5$) is WRONG — that's assignment, not comparison. Use if ($x == 5$) to check equality.

■ Practice Problems

#	Problem	Difficulty
1	Check if a number is positive, negative, or zero	Easy
2	Print day name from number 1-7 using switch	Easy
3	Grade calculator: A(90+), B(75+), C(60+), Fail(below 60)	Easy
4	Check if a year is a leap year	Medium
5	Simple menu-driven calculator using switch	Medium

■ Quick Revision Box

- ✓ if runs when condition is TRUE
- ✓ else-if checks next condition when previous was FALSE
- ✓ else is the fallback — runs when nothing matched
- ✓ switch is cleaner for many exact-value checks
- ✓ Always add break in switch cases
- ✓ $\&\&$ = AND, $\|\|$ = OR, $!$ = NOT

■ Visual Thinking

■ Imagine It Like This

Think of a railway track with switches (points). Each condition is a switch that diverts the train onto a different track. Only one track gets used — the first one where the switch is TRUE. Animation: show a ball rolling down a branching path, diverted at each if-check.