Arduino Software Functions & Concepts – Basic Electronics Course

Function / Concept	Description	Used In Module(s)
`setup()`	Initialization function, runs once	All modules
`loop()`	Main program loop, runs repeatedly	All modules
`pinMode(pin, mode)`	Sets a pin as INPUT or OUTPUT	1, 2, 3, 5, 6, 7
`digitalWrite(pin, value)`	Sets a digital pin HIGH or LOW	1, 2, 3, 5, 7
`digitalRead(pin)`	Reads value (HIGH/LOW) from digital pin	2, 3
`delay(ms)`	Pauses execution for a number of milliseconds	1, 2, 3, 4, 5, 6, 7, 8
`analogRead(pin)`	Reads analog value (0–1023) from a pin	4, 5, 6, 7
`map(val, inMin, inMax, outMin, outMax)`	Re-maps a number from one range to another	5, 6
`constrain(val, min, max)`	Limits a value within a specific range	5, 6
`Serial.begin(baudRate)`	Starts serial communication	4, 6, 7, 8
`Serial.print()` / `Serial.println()`	Sends data to Serial Monitor	4, 5, 6, 7, 8
`Serial.available()`	Checks if serial input is available	8
`Serial.read()`	Reads incoming serial data	8
Variables (`int`, `long`, `float`, `bool`)	Use appropriate data types for state and calculations	All modules
Conditional statements (`if`, `else`)	Basic decision-making in code	2, 3, 4, 5, 6, 7, 8
`for` loops	Iterate through arrays or repeated tasks	5, 6
Arrays (`int ledPins[]`)	Store pin numbers or values in a list	5, 6
Arithmetic (`+`, `-`, `*`, `/`)	Used in calculations, especially for voltage math	4, 5, 6
Logical operators (`==`, `<`, `>`, `&&`, `||`)	Used in conditions for control logic	2, 3, 4, 6, 7, 8
State variables (`bool`, toggles)	Track system state or mode	3, 7, 8