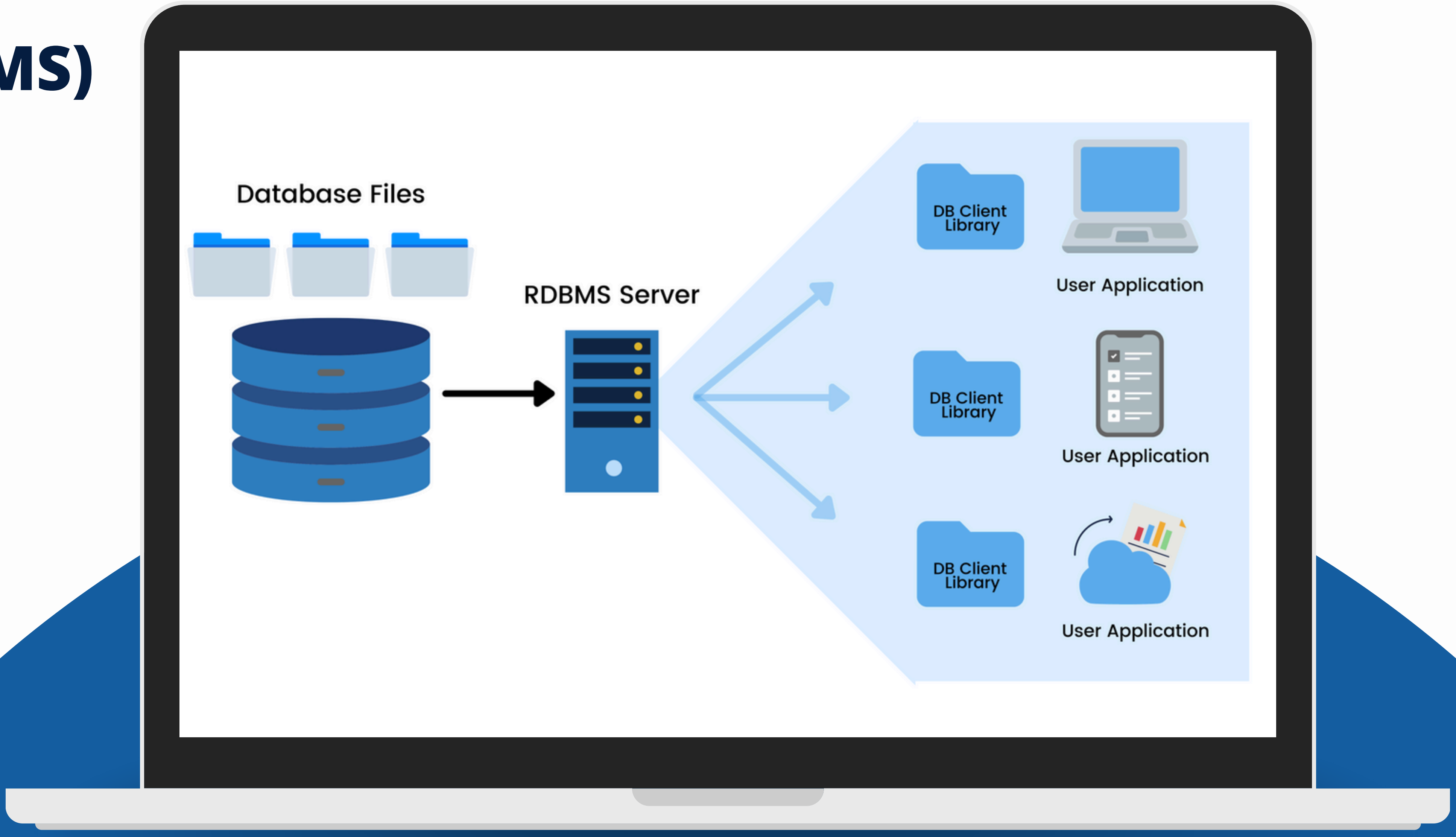
Database Management System (DBMS)



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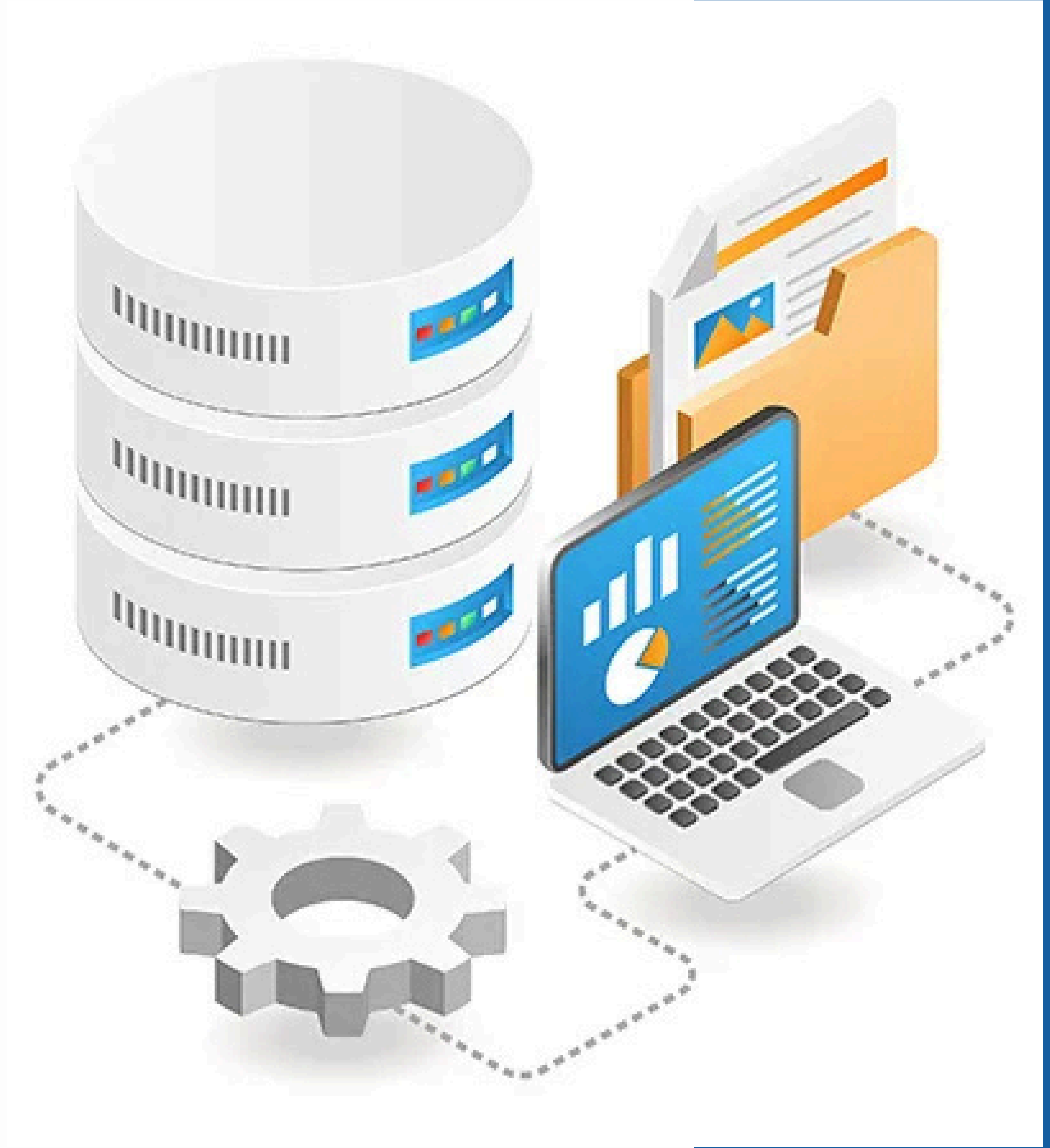
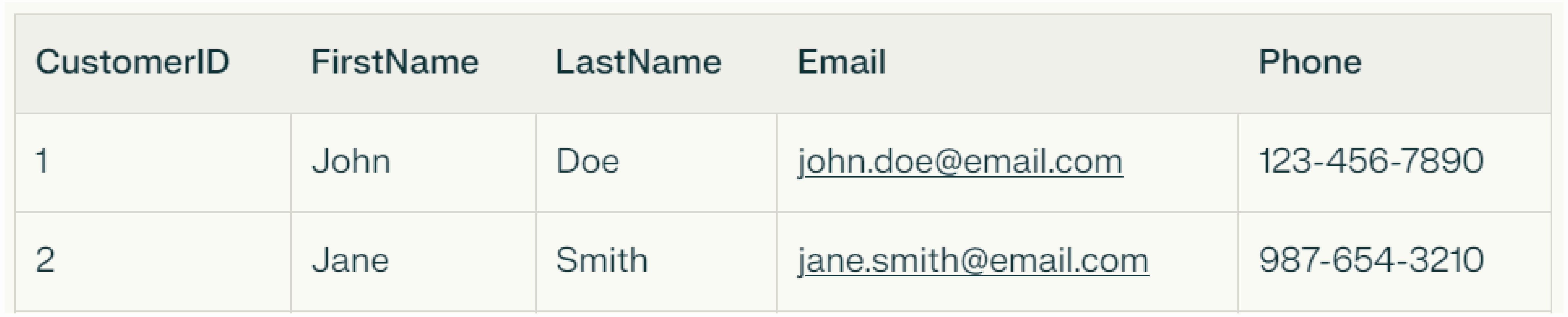
Overview



What is Database ?

A database is an organized collection of data that allows for easy access and management. It structures data into tables, rows, and columns, and uses indexing to facilitate the quick retrieval of relevant information.



CustomerID	FirstName	LastName	Email	Phone
1	John	Doe	john.doe@email.com	123-456-7890
2	Jane	Smith	jane.smith@email.com	987-654-3210

Overview of Database Management Systems (DBMS)

A Database Management System (DBMS) is software that simplifies creating, managing, and using databases. It links users to the database, making it easy to store, retrieve, and process data.

Core functionalities of a DBMS include:

- **Data Storage:** The DBMS keeps data stored securely and organized, making it easy to access and manage.
- **Data Manipulation:** Users can easily insert, update, delete, and retrieve data, allowing for dynamic interaction with the information.
- **Data Security:** A strong DBMS keeps stored data safe from unauthorized access
- **User Access Control:** System sets different access levels for users to maintain data security and privacy.
- **Data Backup and Recovery:** The DBMS offers tools for regularly backing up data and restoring it if it's lost or damaged.

Importance of Databases in Modern Applications

- **Organized Storage:** Keeps data organized for easy access.
- **Reliable Information:** Makes sure data is correct and up-to-date.
- **Growth-Friendly:** Easily handles more data and users as needed.
- **Data Security:** Keeps sensitive information safe with secure access.
- **Multiple Users:** Allows several people to access data at the same time for better teamwork.
- **Data Backup:** Regularly saves copies of data for quick recovery if something goes wrong.
- **Easy Searching:** Lets users find specific information quickly and easily.
- **Less Duplication:** Reduces repeated data storage, keeping everything organized.
- **Easy Sharing:** Makes it simple to share data between different applications and users.

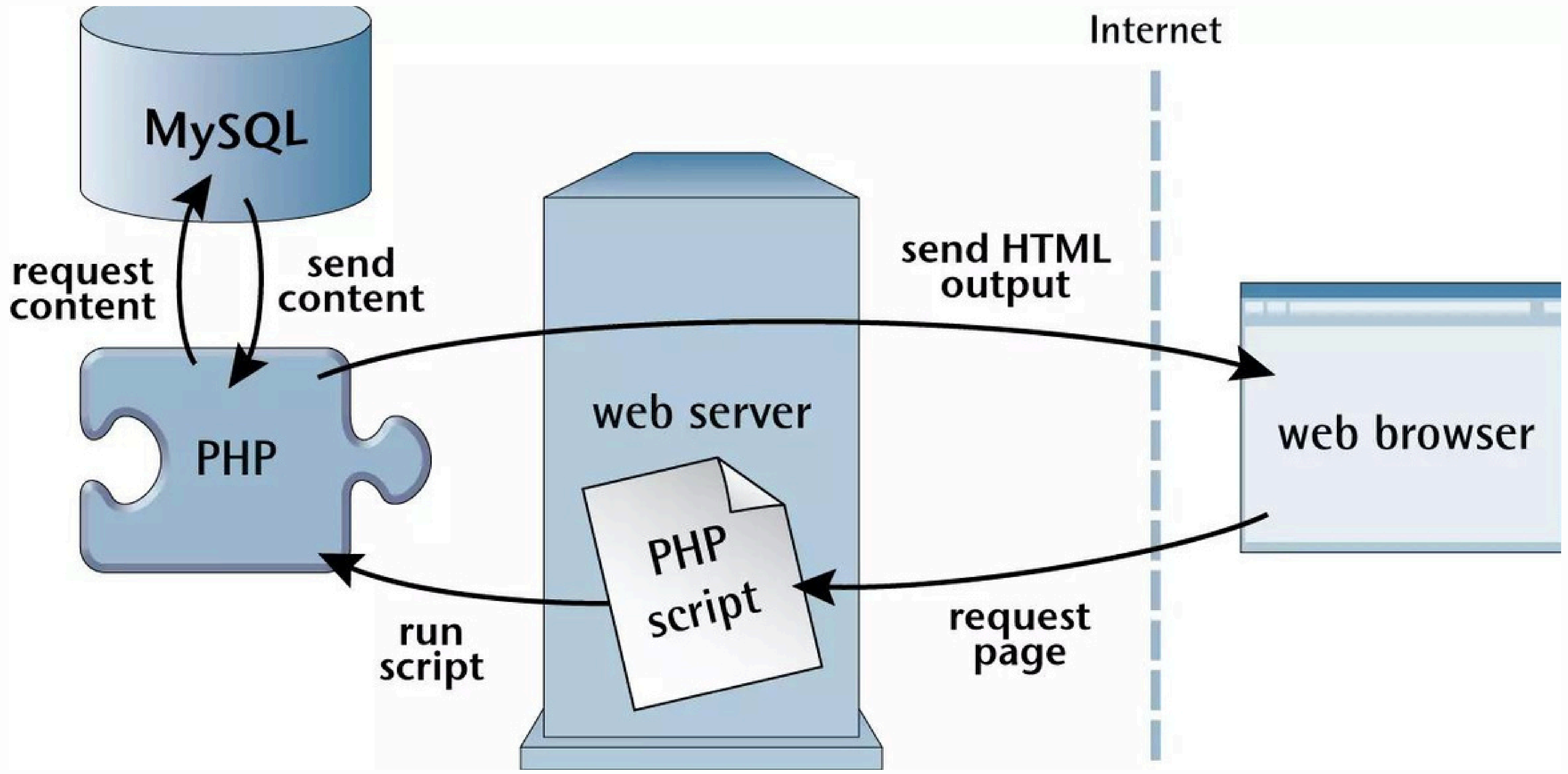
What is PHP

PHP stands for Hypertext Preprocessor. It is an open-source, server-side scripting language, specifically designed for web development. PHP is particularly effective for creating dynamic and interactive web pages, making it a popular choice for building modern websites and applications.

Why use PHP ?

- PHP can generate dynamic page content
- It allows the creation, opening, reading, writing, deletion, and closing of files on the server.
- PHP can collect and process data from forms submitted by users.
- It can send and receive cookies.
- It offers tools for managing user authentication and controlling access to various parts of a website.
- PHP is highly compatible with various platforms, including Windows, Linux, Unix, and macOS.

Understand how a web application runs with PHP and MySQL.



When a user accesses a web page, their browser sends a request to the web server. The server processes this request by executing a PHP script. If the script requires data, it communicates with the MySQL database to retrieve or update information as necessary. Once the data is processed, PHP generates an HTML response and sends it back to the browser. The browser then renders the content, allowing the user to view and interact with the page.

This smooth process updates content in real-time, giving users a responsive and engaging experience.

Why Use a Local Server?

A local server for PHP development is an environment installed on your computer that lets you develop, test, and debug PHP applications locally before moving them to a live server.

This environment replicates the conditions of a web server, including essential components such as a web server (e.g., Apache or Nginx), a database server (e.g., MySQL or MariaDB), and the PHP programming language.

Tools for installing and configuring PHP and MySQL.

Local Server

Laragon : https://laragon.org/download/

XAMPP : https://www.apachefriends.org/download.html

Code Editor

Notepad++ : https://laragon.org/download/

VS Code : https://code.visualstudio.com/download

Browser

Google Chrome : https://www.google.com/chrome/

Basic Syntax

PHP Tags : A PHP script begins with **<?php** and ends with **?>**. This allows the PHP parser to identify which parts of the document are PHP code and which are HTML.
Here’s a simple example:

```
<?php
// PHP code goes here
?>
```

Embedding PHP in HTML : PHP can be embedded directly within HTML. For instance:

```
<html>
<body>
    <h1>My first PHP page</h1>
    <?php
    echo "Hello World!";
    ?>
</body>
</html>
```

File Extension : PHP files typically use the **.php** extension, indicating that they contain PHP code which will be executed on the server.

Statement Termination : Each PHP statement must end with a semicolon (;). This is similar to languages like C and C++,

PHP Variables : A variable in PHP is the name of the **memory location that holds data**. In PHP, a variable is declared using the **$** sign followed by the variable name. The main way to store information in PHP program is by using a variable.

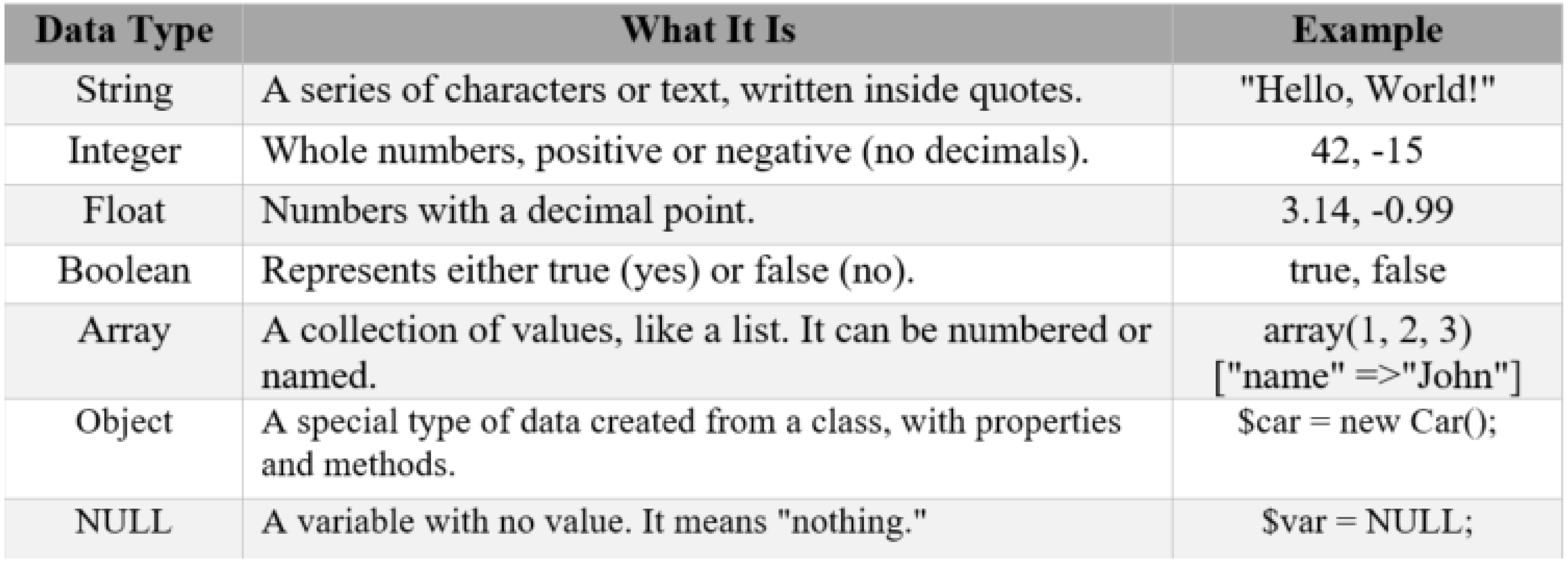
```php
$name = "John"; // String variable
$age = 30;      // Integer variable
```

Rules for PHP variables : A variable starts with the $ sign, followed by the name of the variable names are **case-sensitive** ($age and $AGE are two different variables) One must keep in mind that variable names in PHP names must start with a letter or underscore and no numbers.

Example : $name, $fastName, $fast_name

Data Type

Variables can store data of different types, and different data types can do different things.



Data Type	What It Is	Example
String	A series of characters or text, written inside quotes.	"Hello, World!"
Integer	Whole numbers, positive or negative (no decimals).	42, -15
Float	Numbers with a decimal point.	3.14, -0.99
Boolean	Represents either true (yes) or false (no).	true, false
Array	A collection of values, like a list. It can be numbered or named.	array(1, 2, 3) ["name" =>"John"]
Object	A special type of data created from a class, with properties and methods.	$car = new Car();
NULL	A variable with no value. It means "nothing."	$var = NULL;

PHP Comments

A comment in PHP code is a line that is not executed as a part of the program. Its only purpose is to be read by someone who is looking at the code.

Syntax for single-line comments:

```php
<?php
// This is a single-line comment
# This is also a single-line comment
?>
```

Syntax for multiple-line comments:

```php
<?php
/*
This is a multiple-lines comment block
that spans over multiple
lines
*/
?>
```

PHP echo and print Statements

echo and print are more or less the same. They are both used to output data to the screen. The differences are small: echo has no return value while print has a return value of 1. echo can take multiple parameters (although such usage is rare) while print can take one argument. echo is marginally faster than print.

PHP Operators

An operator is a symbol or set of symbols used to perform operations on variables or values.

Arithmetic Operators : These are used to perform mathematical calculations.

Operator	Description	Example	Result
`+`	Addition	`5 + 3`	`8`
`-`	Subtraction	`5 - 3`	`2`
`*`	Multiplication	`5 * 3`	`15`
`/`	Division	`6 / 3`	`2`
`%`	Modulus (remainder)	`5 % 3`	`2`

Assignment Operators : These assign values to variables.

Operator	Description	Example	Meaning
`=`	Assign value	`$x = 5`	`$x` is `5`
`+=`	Add and assign	`$x += 3`	`$x = $x + 3`
`-=`	Subtract and assign	`$x -= 2`	`$x = $x - 2`
`*=`	Multiply and assign	`$x *= 2`	`$x = $x * 2`
`/=`	Divide and assign	`$x /= 2`	`$x = $x / 2`
`%=`	Modulus and assign	`$x %= 2`	`$x = $x % 2`

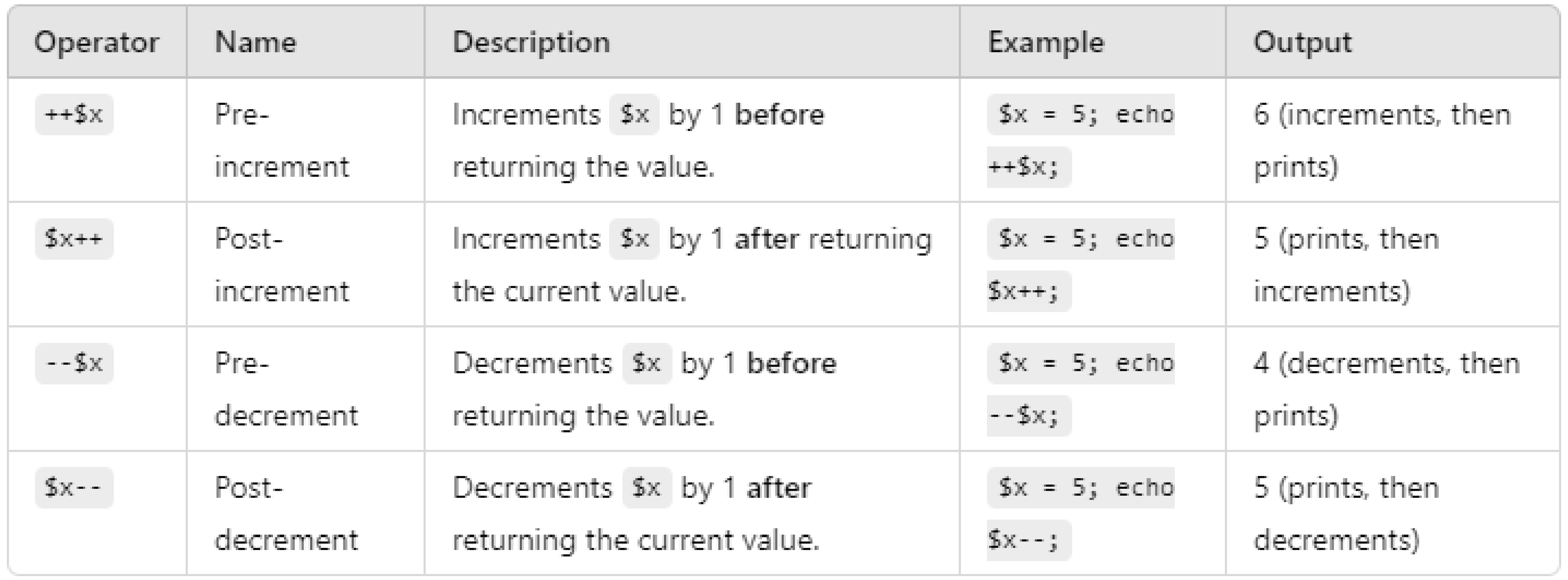
Comparison Operators : These compare two values and return true or false.

Operator	Description	Example	Result
`==`	Equal to	`5 == 3`	`false`
`===`	Identical (same type)	`5 === "5"`	`false`
`!=`	Not equal to	`5 != 3`	`true`
`<>`	Not equal to	`5 <> 3`	`true`
`!==`	Not identical	`5 !== "5"`	`true`
`>`	Greater than	`5 > 3`	`true`
`<`	Less than	`5 < 3`	`false`
`>=`	Greater than or equal to	`5 >= 3`	`true`
`<=`	Less than or equal to	`5 <= 3`	`false`

Logical Operators : These are used to combine conditional statements.

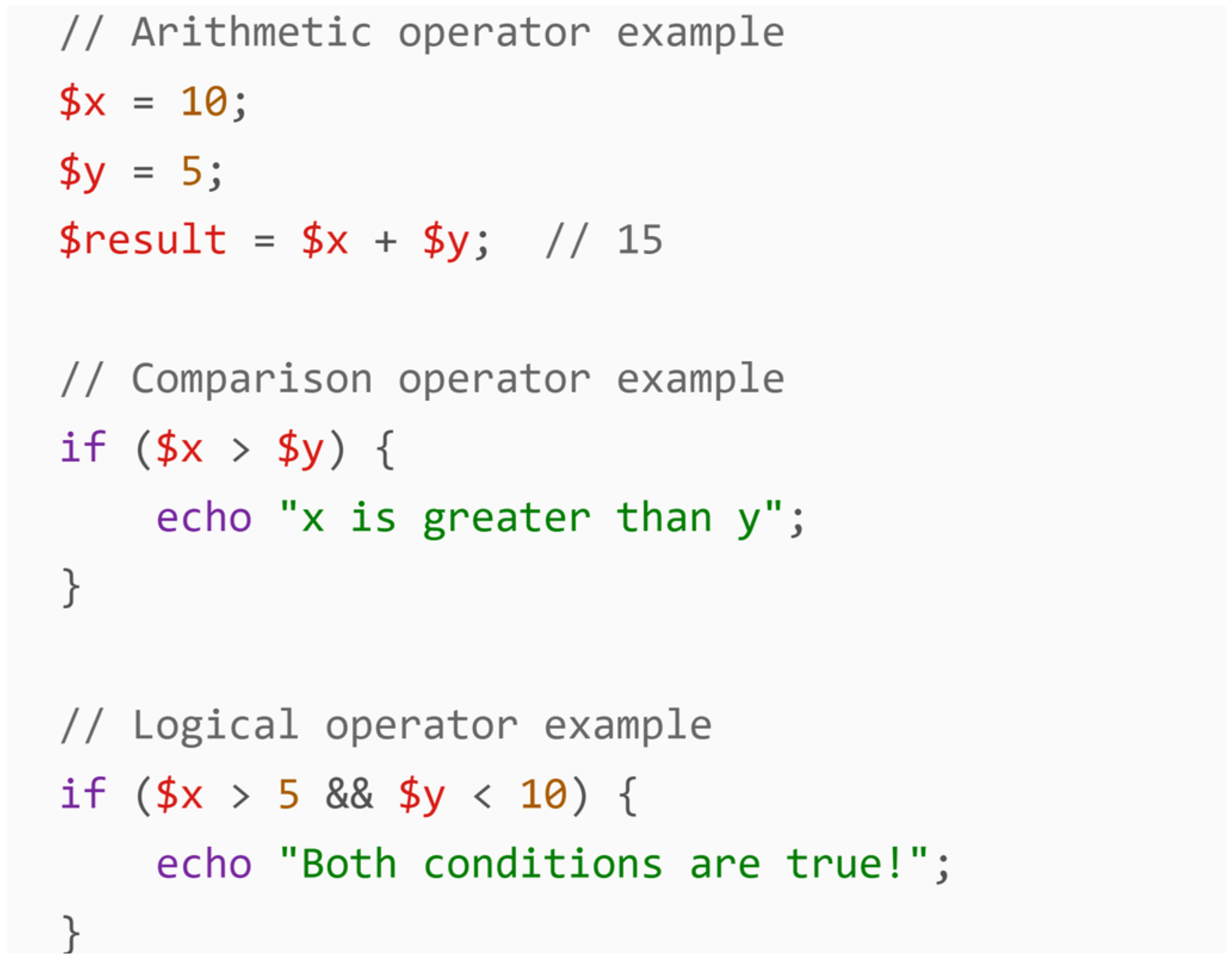
Operator	Description	Example	Result
`&&`	And	`true && false`	`false`
||	OR	true && false	true
`!`	Not	`!true`	`false`

Increment/Decrement Operators : These are used to increase or decrease the value of a variable by 1.



Operator	Name	Description	Example	Output
`++$x`	Pre-increment	Increments `$x` by 1 **before** returning the value.	`$x = 5; echo ++$x;`	6 (increments, then prints)
`$x++`	Post-increment	Increments `$x` by 1 **after** returning the current value.	`$x = 5; echo $x++;`	5 (prints, then increments)
`--$x`	Pre-decrement	Decrements `$x` by 1 **before** returning the value.	`$x = 5; echo --$x;`	4 (decrements, then prints)
`$x--`	Post-decrement	Decrements `$x` by 1 **after** returning the current value.	`$x = 5; echo $x--;`	5 (prints, then decrements)

Example:



```
// Arithmetic operator example
$x = 10;
$y = 5;
$result = $x + $y;  // 15

// Comparison operator example
if ($x > $y) {
    echo "x is greater than y";
}

// Logical operator example
if ($x > 5 && $y < 10) {
    echo "Both conditions are true!";
}
```

PHP Conditional Statements

In PHP, conditional statements allow you to perform different actions based on different conditions. Here are the basic types of conditional statements in PHP:

1. if Statement : Executes code if the specified condition is true.

Syntax :

```
if (condition) {
  code to be executed if condition is true;
}
```

Example 1 : Determine if a given number is positive

```
<?php
$number = 5;

if ($number > 0) {
    echo "The number is positive.";
}
?>
```

Example 2 : Check if a person is eligible to vote based on their age.

```
<?php
$age = 18;

if ($age >= 18) {
    echo "You are eligible to vote.";
}
?>
```

2. If-Else Statement : The if...else statement executes a block of code if a condition is true, and another block of code if that condition is false.

Syntax :

```
if (condition) {
  code to be executed if condition is true;
} else {
  code to be executed if condition is false;
}
```

Example 1 : You need to check if a person is eligible to vote. A person must be at least 18 years old to vote. If they are eligible, display a message indicating they can vote; otherwise, let them know they cannot.

```php
<?php
$age = 16;

if ($age >= 18) {
    echo "You are eligible to vote!";
} else {
    echo "You are not eligible to vote.";
}
?>
```

Example 2 : You are building a simple login system. If a user enters the correct username and password, show a welcome message; otherwise, inform them that the login failed.

```php
<?php
    $username_input = "john_doe";
    $password_input = "password123";

   $stored_username = "john_doe";
   $stored_password = "password123";

if ($username_input == $stored_username && $password_input == $stored_password) {
    echo "Welcome, $username_input!";
} else {
    echo "Login failed. Please try again.";
}
?>
```

2. if...elseif...else Statement : The if...elseif...else statement in PHP allows you to evaluate multiple conditions in a structured way. It provides a way to execute different blocks of code based on various conditions

```
if (condition1) {
    // Code to execute if condition1 is true
} elseif (condition2) {
    // Code to execute if condition2 is true
} else {
    // Code to execute if none of the conditions are true
}
```

Example 1 : Write a PHP script to assign a letter grade based on a student's score.

```
<?php
$score = 85;

if ($score >= 90) {
    echo "Grade: A";
} elseif ($score >= 80) {
    echo "Grade: B";
} elseif ($score >= 70) {
    echo "Grade: C";
} elseif ($score >= 60) {
    echo "Grade: D";
} else {
    echo "Grade: F";
}
?>
```

Example 2 : Create a PHP script that checks the temperature and indicates whether it is hot, warm, or cold. If the temperature is above 30 degrees Celsius, display "It's hot." If it's between 15 and 30 degrees, display "It's warm." Otherwise, display "It's cold.

```
<?php
$temperature = 25;

if ($temperature > 30) {
    echo "It's hot.";
} elseif ($temperature >= 15 && $temperature <= 30) {
    echo "It's warm.";
} else {
    echo "It's cold.";
}
?>
```

2. PHP switch Statement : The switch statement in PHP is used to execute one block of code among many based on the value of a variable or expression. It is often used as an alternative to multiple if...elseif...else statements when you need to compare the same variable against different values.

```
switch (expression) {
    case value1:
        // Code to execute if expression matches value1
        break;
    case value2:
        // Code to execute if expression matches value2
        break;
    // Add more cases as needed
    default:
        // Code to execute if no cases match
}
```

Example 1 : This example checks the color of a fruit based on its name.

```
<?php
$fruit = "apple";

switch ($fruit) {
    case "apple":
        echo "Apples are red.";
        break;
    case "banana":
        echo "Bananas are yellow.";
        break;
    case "orange":
        echo "Oranges are orange.";
        break;
    default:
        echo "Unknown fruit.";
        break;
}
?>
```

Example 2 : Create a simple calculator that performs operations based on the input operator.

```
<?php
$num1 = 10;
$num2 = 5;
$operator = "+";

switch ($operator) {
    case "+":
        echo $num1 + $num2;
        break;
    case "-":
        echo $num1 - $num2;
        break;
    case "*":
        echo $num1 * $num2;
        break;
    case "/":
        if ($num2 != 0) {
            echo $num1 / $num2;
        } else {
            echo "Cannot divide by zero.";
        }
        break;
    default:
        echo "Invalid operator";
        break;
}
?>
```

Loop

In PHP, loops are used to execute a block of code repeatedly, as long as a certain condition is true. There are four types of loops in PHP:

1. while Loop : The while loop continues to run as long as the condition is true.

Syntax :

```
while (condition is true) {
  // Code to be executed while the condition is true
}
```

Example 1 : Here's a simple example that uses a while loop to print numbers from 1 to 5:

```
<?php
$counter = 1;
while ($counter <= 5) {
    echo $counter . "<br>";
    $counter++;
}
?>
```

This will output : 1 2 3 4 5

In this example:

- The $counter variable is initialized to 1.
- While loop continues executing the code inside its block as long as the condition $counter <= 5 is true.
- Inside the loop, echo $counter . "<br>"; prints the current value of $counter followed by a line break (<br>).
- After each iteration of the loop, $counter is incremented using the $counter++ statement.

2. do...while Loop : The do...while loop is similar to the while loop, but it always executes the block of code at least once, even if the condition is false.

Syntax :
```
do {
  //code to be executed;
} while (condition is true);
```

Example 1 : Here's a simple example that uses a do...while loop to print numbers from 1 to 5:

```
<?php
$counter = 1;
do {
    echo $counter . "<br>";
    $counter++;
} while ($counter <= 5);
?>
```

In this example:

- The do block contains the code to be executed. It echoes the current value of the $counter variable.
- The loop continues (while ($counter <= 5)) as long as the condition is true. The loop increments the $counter variable in each iteration.
- Since the loop condition is checked at the end of the loop, the block of code inside the do will be executed at least once, even if the initial condition is false.

This will output : 1 2 3 4 5

3. for Loop : The for loop is used when you know in advance how many times the block of code should run.

Syntax :

```
for (initialization; condition; increment/decremen) {
  // code to be executed for each iteration;
}
```

Example 1 : Here's a simple example that uses a for loop to print numbers from 1 to 5:

```
<?php
for ($counter = 1; $counter <= 5; $counter++) {
    echo $counter . "<br>";
}
?>
```

This will output : 1 2 3 4 5

In this example:

- The for loop consists of three parts:
- Initialization: $counter = 1; initializes the loop control variable $counter to 1.
- Condition: $counter <= 5; specifies the condition for the loop to continue executing. As long as this condition is true, the loop will continue.
- Increment/Decrement: $counter++ increments the value of $counter by 1 after each iteration of the loop.
- Inside the loop, echo $counter . "<br>"; prints the current value of $counter followed by a line break (<br>).

The for loop is particularly useful when you know in advance how many times you want to execute a block of code.

Example 1 : Here's a simple example that uses a for loop to print even numbers up to a specified limit:

```php
<?php
$endNumber = 10;
echo "Even numbers up to $endNumber: ";
for ($i = 2; $i <= $endNumber; $i++) {
    if ($i % 2 == 0) {
        echo "$i ";
    }
}
?>
```

This will output : 2 4 6 8 10

Note: Even numbers are those numbers Mod(%) 2 and the remainder will be 0. For example, if the entered number is 8 and when '8 % 2' is calculated the result will be 0 so it is an even number.

3. PHP foreach Loop : The foreach loop in PHP is used to iterate over arrays and objects. It provides a simple way to loop through each element in an array or each property in an object. The basic syntax of a foreach loop is as follows:

Syntax :

```
foreach ($array as $value) {
  // Code to be executed for each $value
}
```

Example 1 : Here's an example that uses foreach to iterate over an array:

```
<?php
$colors = array("Red", "Green", "Blue");
foreach ($colors as $color) {
    echo $color . "<br>";
}
?>
```

In this example:

- The foreach loop iterates over each element in the $colors array.
- The current element's value is assigned to the variable $color in each iteration.
- Inside the loop, echo $color . "<br>"; prints each color followed by a line break (<br>).

This will output: Red Green Blue

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```
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$colors = array("Red", "Green", "Blue");
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    echo $color . "<br>";
}
?>
```

This will output: Red Green Blue

In this example:

- The foreach loop iterates over each element in the $colors array.
- The current element's value is assigned to the variable $color in each iteration.
- Inside the loop, echo $color . "<br>"; prints each color followed by a line break (<br>).

<html>
<body> <?phpecho "<h1>Test</h1>"; ?> </body> </html>

THANK YOU!

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