Variables

In programming, a variable is a container (storage area) to hold data. To indicate the storage area, each variable should be given a unique name (<u>identifier</u>). Variable names are just the symbolic representation of a memory location. The values, or data, contained in variables are classified into categories known as data types. In this chapter, you will learn about PHP variables and data types and the operation that can be performed on them. In a program you can put any value into it, and then retrieve the value later for use in calculation. Each variable will contain different values at different times, depending on the requirements.

Rules of variable name declarations:

The variable value can be change during the execution of program. The name you assign to a variable is called identifier. Some rules of variable declaration are following.

- Identifier/Variable name must be start a dollar sign $ sign like $salary, $name etc.
- Identifier/Variable may contain uppercase and lowercase Letters, Numbers, or underscore. The first character after dollar sign must be a letter.
- Identifier/Variable cannot contain special character and spaces.
- Identifier/Variable are case sensitive.
- Identifier/Variable cannot contain reserve words or keywords of PHP language.

Convention Of variable:

$variableName = Content ;

$Father_Name = Content;

$ConvanceAllownace = Content;

White spaces between variable names is not allowed.

Constants/Literals

A constant is a value or an identifier whose value cannot be altered during the execution of the script or program. A constant is case-sensitive by default. By convention, constant identifiers are always uppercase. Instead, we use the ***define()*** function to create constant.

Syntax: ***define("variableName", "assign the value") ;***

Example

```php
<?php
define('MIN_VALUE', '0.0');
define('MAX_VALUE', '200.0');
define('PI', '3.142');
define('CountryName', 'Pakistan');
echo "Minimum value is   ". MIN_VALUE . "</br>";
echo "Maximum value iss ".MAX_VALUE  . "</br>";
echo "PI value is            ".PI            . "</br>";
echo "Country Name is ". CountryName   . "</br>";
 ?>
```
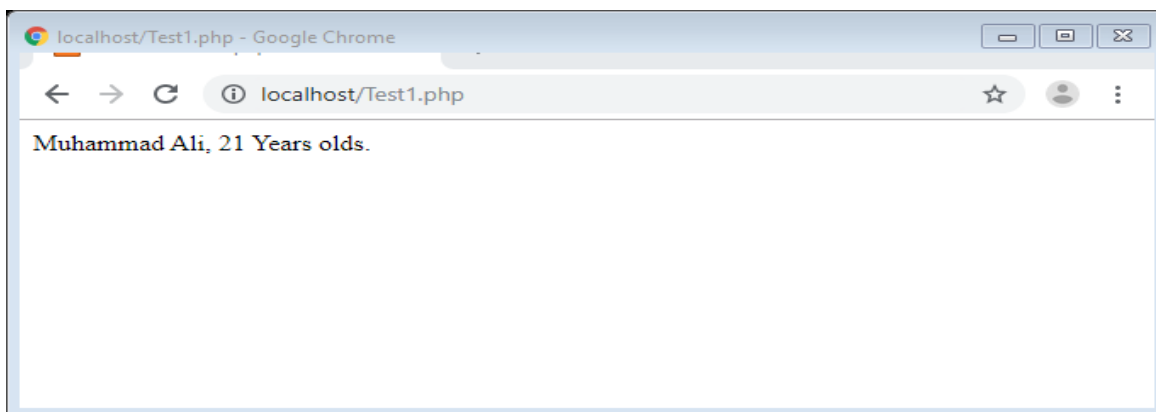
```
Minimum Value is 0.0
Maximum Value is 200.0
PI value is 3.142
Country Name is Pakistan
```
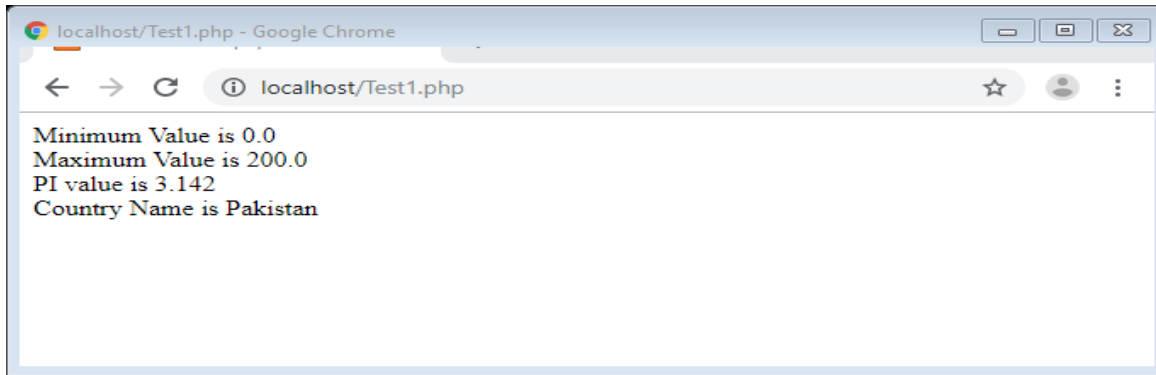
Concatenation

The PHP concatenation operator (.) is used to combine two string or other type's values to create one string.

```php
<?php
    $name = "Muhammad Ali";
    $age  = 21;
    $newstring = $name .", " . $age . " Years olds.";
    echo $newstring;
?>
```



```
Muhammad Ali, 21 Years olds.
```

Note: *Here dot (.) use for concatenation between the two values*

Declaring and Initializations of variable:

The process of specifying and creating a variable name is called declaring the variable. In PHP you must declare and initialize a variable in the same statement.

Syntax: *$Variable_Name = value Initialize;*

The value you assign to a variable can be a literal string, a number or character or a Boolean value.

Explanation:

$Name = "Sara Khan";

Here "Sara Khan " is a string value assign in variable $Name

$BasicSalary = 45000;

Here 45000 is a integer numeric value assign in variable $salary.

$Male = True;

Here True is a Boolean value in $Male variable

Displaying the Variable value

To display a variable with the echo statement, you simply pass the variable name to the echo or print statement, but without enclosing or closing it in quotation marks, as follows.
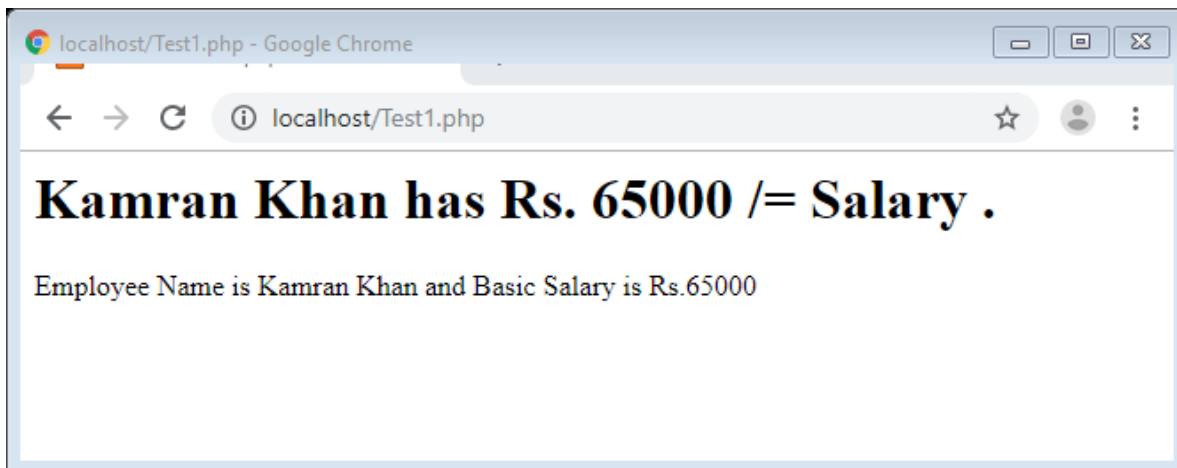
```php
<?php
  $Emp_Name = "Kamran Khan";
  $BasicSalary = 65000;
  echo "<h1> $Emp_Name  has Rs. $BasicSalary /= Salary . </h1>";
  echo " Employee Name is  ", $Emp_Name ," and Basic Salary is Rs.", $BasicSalary ;
?>
```


Variables can store data of different types, and different data types can do different things. A variable's specific data type is very important in programming because the data type helps determine the manner in which the value is stored and how much memory the computer allocates for the data stored in the variable. The data type also governs the kinds of operations that can be performed on a variable.

PHP supports the following data types:

Data Type	Description
String	The any text with in the double quotation like "House N# 98 Block 19 F.B. Area Karachi". You can use single or double quotes:
Integer	An integer data type is a non-decimal number between -2,147,483,648 and 2,147,483,647. An integer must have at least one digit and must not have a decimal point can be either positive or negative. Integer data type store 4 bytes occupied.
Float-Point/Double	A float (floating point number) is a number with a decimal point or a number in exponential form. Integer data type store 4 bytes occupied.
Boolean	A Boolean represents two possible states: TRUE or FALSE.
Object	An object is a data type which stores data and information on how to process that data. In PHP, an object must be explicitly declared. First we must declare a class of object. For this, we use the class keyword. A class is a structure that can contain properties and methods.
NULL	A variable of data type NULL is a variable that has no value assigned to it. Variables can also be emptied by setting the value to NULL or null.

Strongly/Static typed Programming

Strongly or Static typed programming language is in every variable must be declared with a data type and data type cannot be change after declaration. Java and C++ are strongly or Static typed programming languages.

Loosely/Dynamic typed Programming

A loosely typed Programming is a programming language that does not require a variable to be defined. You can declare a variable, but it doesn't require you to classify the type of variable. Loose typing is also known as dynamic typing because the data type for a variable can be change after it has been declared. PHP and Perl is a loosely typed programming language.

The PHP scripting engine automatically determines what type of data is stored in a variable and assigns the variable's data type accordingly. The following code demonstrates how a variable's data type's changes automatically each time the variable is assigned a new literal value. ***gettype()*** function is use to tell us the variable type.
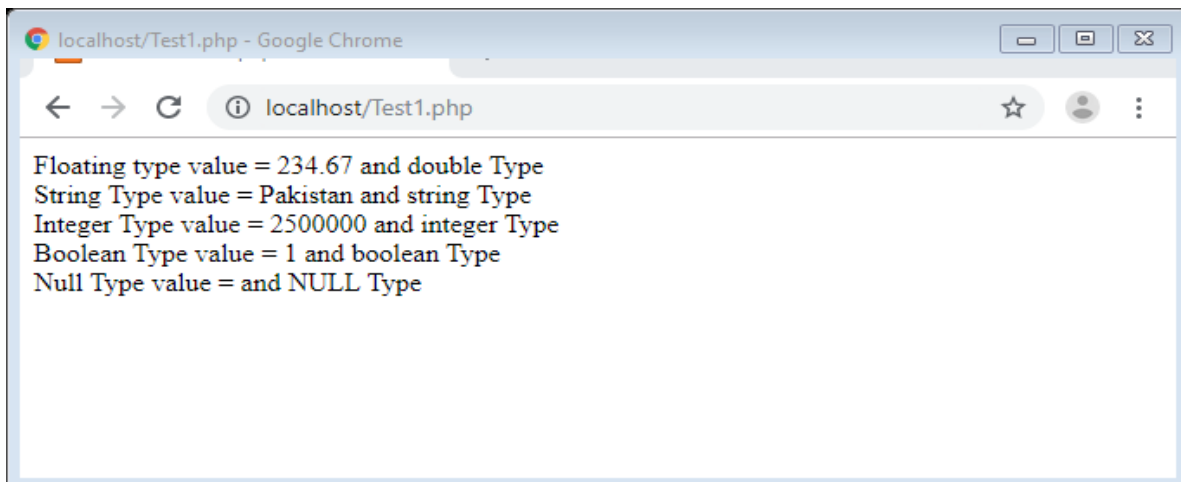
Example

```php
<?php
$VariableTypeChange =  234.67;  # Here value in double or floating point type
echo "Floating type value =  $VariableTypeChange  and ";
```

echo gettype($VariableTypeChange)." Type </br>";

$VariableTypeChange = "Pakistan"; **#Here value in String type**

echo "String Type value = $VariableTypeChange   and ";

echo gettype($VariableTypeChange)." Type </br>";

$VariableTypeChange = 2500000;   **#Here value in Integer type**

echo "Integer Type value = $VariableTypeChange and ";

echo gettype($VariableTypeChange)." Type </br>";

$VariableTypeChange = True;   **#Here value in Boolean type**

echo "Boolean Type value = $VariableTypeChange and ";

echo gettype($VariableTypeChange)." Type </br>";

$VariableTypeChange = NULL;   **#Here value in NULL or empty type**

echo "Null Type value = $VariableTypeChange   and ";

echo gettype($VariableTypeChange)." Type </br>";

?>

```
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Floating type value = 234.67 and double Type
String Type value = Pakistan and string Type
Integer Type value = 2500000 and integer Type
Boolean Type value = 1 and boolean Type
Null Type value = and NULL Type
```

Formatting data output with printf() function:

The printf() function outputs message with specified format. printf() takes a string argument called a format string, usually followed by one or more additional arguments containing the string or strings to format. It then outputs the result.

<?php
```
  $number=9;
  $str="Beijing";
  printf("There are %u million bicycles in %s.",$number,$str);
```
?>

The arg1, arg2, ++ parameters will be inserted at percent (%) signs in the main string. This function works "step-by-step". At the first % sign, arg1 is inserted, at the second % sign, arg2 is inserted, etc. one more example of all formatted specified.
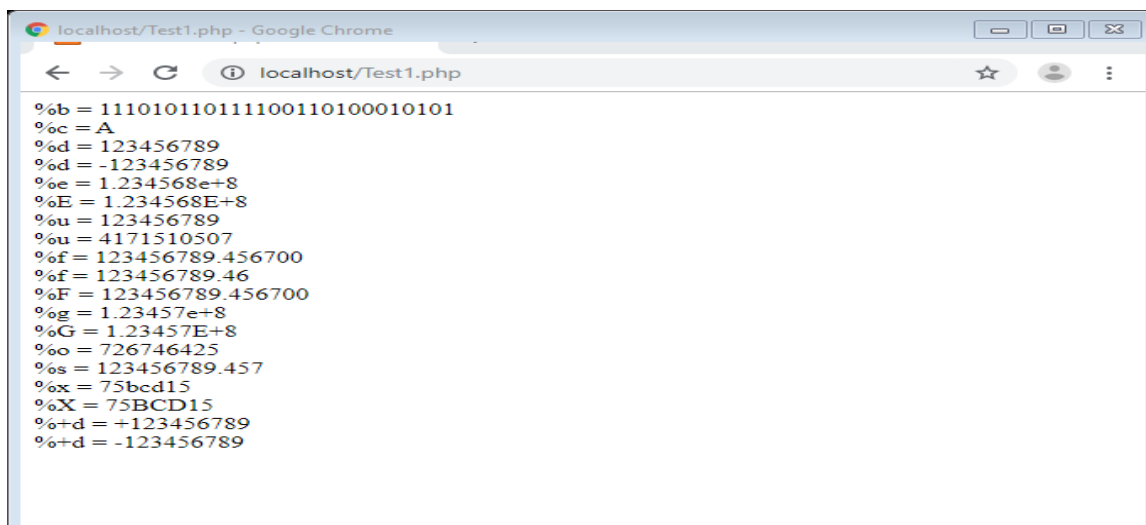
```php
<?php
 $num1 = 123456789.4567;
 $num2 = -123456789.4567;
 $char = 65; // The ASCII Character 50 is 2
// Note: The format value "%%" returns a percent sign
printf("%%b = %b <br>",$num1); // Binary number
printf("%%c = %c <br>",$char); // The ASCII Character
printf("%%d = %20d <br>",$num1); // Signed decimal number
printf("%%d = %20d <br>",$num2); // Signed decimal number
printf("%%e = %20e <br>",$num1); // Scientific notation (lowercase)
printf("%%E = %20E <br>",$num1); // Scientific notation (uppercase)
printf("%%u = %20u <br>",$num1); // Unsigned decimal number (positive)
printf("%%u = %20u <br>",$num2); // Unsigned decimal number (negative)
printf("%%f = %20f <br>",$num1); // Floating-point number (local settings aware)
printf("%%f = %20.2f <br>",$num1); // Floating-point number (local settings aware)
printf("%%F = %F <br>",$num1); // Floating-point number (not local settings aware)
printf("%%g = %g <br>",$num1); // Shorter of %e and %f
printf("%%G = %G <br>",$num1); // Shorter of %E and %f
printf("%%o = %o <br>",$num1); // Octal number
printf("%%s = %s <br>",$num1); // String
printf("%%x = %x <br>",$num1); // Hexadecimal number (lowercase)
printf("%%X = %X <br>",$num1); // Hexadecimal number (uppercase)
printf("%%+d = %+d <br>",$num1); // Sign specifier (positive)
printf("%%+d = %+d <br>",$num2); // Sign specifier (negative)
?>
```


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localhost/Test1.php

```
%b = 111010110111100110100010101
%c = A
%d = 123456789
%d = -123456789
%e = 1.234568e+8
%E = 1.234568E+8
%u = 123456789
%u = 4171510507
%f = 123456789.456700
%f = 123456789.46
%F = 123456789.456700
%g = 1.23457e+8
%G = 1.23457E+8
%o = 726746425
%s = 123456789.457
%x = 75bcd15
%X = 75BCD15
%+d = +123456789
%+d = -123456789
```

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Exercise

Theory Questions:

1. What difference between variables and constant?
2. Name and describe the four data type in PHP.
3. Explain the purpose of the NULL data type.
4. What do you mean by strongly and loosely typed programming?
5. What is Concatenation?

Practical Questions:

1. Write a simple program of the following output using Constants.

    Employee code is 001

    Employee Name is ABC

    Employee Salary is 25000

    Working Hours are 7.5

2. Repeat the above program using Variables.

    Hint: Save the given data at 4 memory locations respectively and print on the screen.

3. How do you make a constant name case insensitive?
4. How do you declare a constant in PHP with example?
5. Write make a simple program to set your G.R No. and Name in the variables and display G.R No. and name by echo and print functions.

Objective & MCQ's

1. Positive and negative number and 0 with no decimal places belong to which data type.
    a) Double
    b) Float
    c) String
    d) Integer
2. Which of the following is a valid variable name?
    a) TotalSalary ;
    b) $Total Salary
    c) $TotalSalary;
    d) $Total-Salary;
3. Which is the correct syntax for declaring a variable and assigning it a string?
    a) $Name="Muhammad";
    b) $Name=Muhammad;
    c) "Muhmmad"= $Name;
    d) $Name = "Muahammad"

4. How many decimal places does an integer store
    a) One decimal
    b) Two decimal
    c) Three decimal
    d) Integer does not store decimal places.

5. Variable name must be starting which symbol.
    a) _ (under score)
    b) @
    c) $
    d) %

6. Combine the two or more string or other value by using concatenation____ symbol
    a) &
    b) *
    c) #
    d) . (dot)

7. String constant value
    a) Must be enclosed in double quotes
    b) Must be enclosed in commas
    c) Must be enclosed in round parentheses
    d) Must be square brackets

8. A constant is case-sensitive by default. By convention, constant identifiers are always____.
    a) Lower case
    b) Camel case
    c) Upper case
    d) Normal case

9. We use the _____ function to create constant.
    a) define()
    b) Include
    c) redefine
    d) constant

10. A loosely typed programming language _____.
    a) Does not required data typed of a variables to be declared.
    b) Requires data types of variables to be declared
    c) Does not have variable
    d) Does not have different data types.