Using Variables and Expressions in PHP

Session 5

Objectives

- *Explain the use of identifiers*
- *Explain the data types in PHP*
- *Explain the use of variables and constants*
- *Explain the scope of variables in PHP*
- *Explain the use of HTTP environment variables*

Introduction

- A variable
  - Is a named memory location
  - Stores different types of data
  - Contains data that keep on changing during execution

- An expression is a combination of:
  - Variables
  - Constants
  - Functions
  - Operators

Identifiers

- Are names given to various elements of a program such as variables, constants, arrays, functions, and classes

- Rules to be followed while naming identifiers are as follows:
  - It must begin with a letter
  - It must contain only letters (A to Z) or digits (0-9)
  - It must not have any special characters including blank space
  - An underscore (_) character can be used to add space in the identifier to make it more readable

- Valid identifiers names are `firstnum`, `lname`, `net_sal`, `add8num`, and `NewNum`

- Variable is an identifier whose value keeps changing throughout the execution of a program

- Variable has:
  - **Name** - refers to the variable
  - **Data type** - refers to the type of data that the variable can store

- Variables are used to store:
  - User information
  - Intermediate data such as calculated results
  - Values returned by the functions

- Rules to be followed for a variable are as follows:
  - Its not mandatory to declare a variable before assignment
  - A variable is automatically declared at the time of initialization
  - A variable is of the same data type as the value stored in it
  - Variable name is preceded by a dollar sign (`$`) and can only contain alpha-numeric characters and underscores
  - Value to the variable is assigned with the equal to (`=`) operator, with the variable on the left side and the expression on the right side
  - A variable created without any value assigned to it, takes the default value of `NULL`
  - A variable is case-sensitive

- PHP supports primitive data types that are categorized as follows:
  - Scalar Types
    - Integer
    - Float
    - String
    - Boolean
  - Compound Types
    - Array
    - Object
  - Special Types
    - Resource
    - Null
  - Constants

Scalar Types

- Integer
  - Stores whole numbers without decimal points
  - Range from -2,147,483,648 to +2,147,483,647
- Float
  - Data type size is 8 bytes
  - Range from -2.2E–308 to 1.8E+308
  - Can include a decimal point, +/- sign, and an exponential value
- String
  - Is a sequence of characters
  - Is enclosed within single quotes or double quotes
- Boolean
  - Stores one of the two values, `True` or `False`

Compound Types

- Array
  - Stores multiple values in one single variable
  - Element can be accessed using its index
  - Are classified as follows:
    - **Numeric array** - an array with a numeric index
    - **Associative array** - an array where each ID key is associated with a value
    - **Multidimensional array** - an array containing one or more arrays
- Object
  - Is an instance of a user-defined class
  - Is used for any object reference

Special Types

- Resource
  - Hold references to resources external to PHP, such as:
    - Database connections
    - Database query
    - Open file
    - Other external types

- NULL
  - Is a variable with `NULL` value
  - A variable is considered to be `NULL` in following cases:
    - Variable has been assigned the constant value `NULL`
    - Variable has not been set to any value yet
    - Variable has been `unset()`

Initializing a variable

Syntax

```
$variable_name = value;
```

Where,

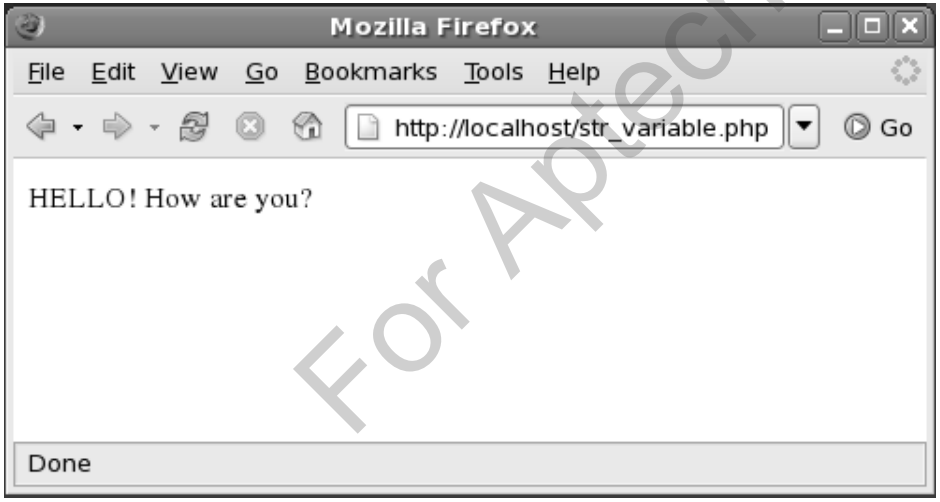
- **$variable_name** - specifies the name of the variable
- **value** - specifies the value the variable will store

- Storing a string value in a variable
  - Enter the code and save it in a script named **str_variable.php**

Snippet

```
<?php
$message = "HELLO! How are you?";
echo $message;
?>
```

Displays the following output:



In the code, the **$message** variable will be declared as the string variable because the value assigned to it is of string data type.

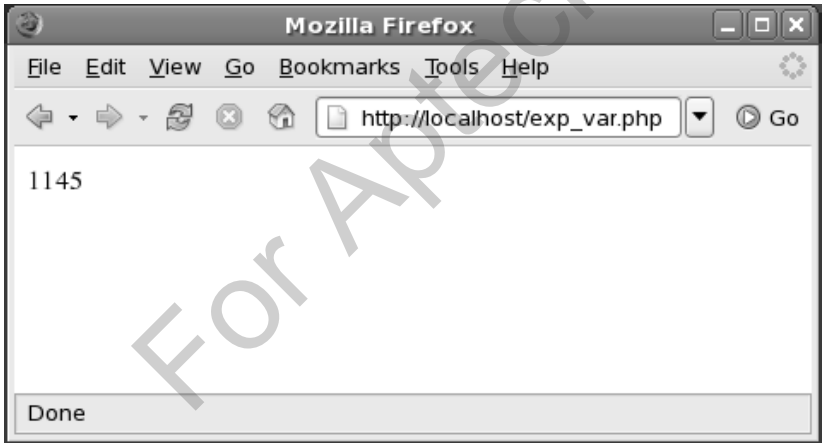
The string is enclosed within the double quotes.

- Storing the value of an expression in a variable
  - Enter the following code and save in a script named **exp_var.php**

Snippet

```
<?php
$number1 = 1019;
$number2 = 126;
$number5 = $number1 + $number2;
echo $number5;
?>
```

Displays the following output:



In the code, the **$number5** variable will be declared as an integer variable and the value of the addition expression **($number1 + $number2)** is assigned to it.

- To assign a value to a variable by referencing another variable

Syntax

```
$new_varname = & $old_varname
```

Where,

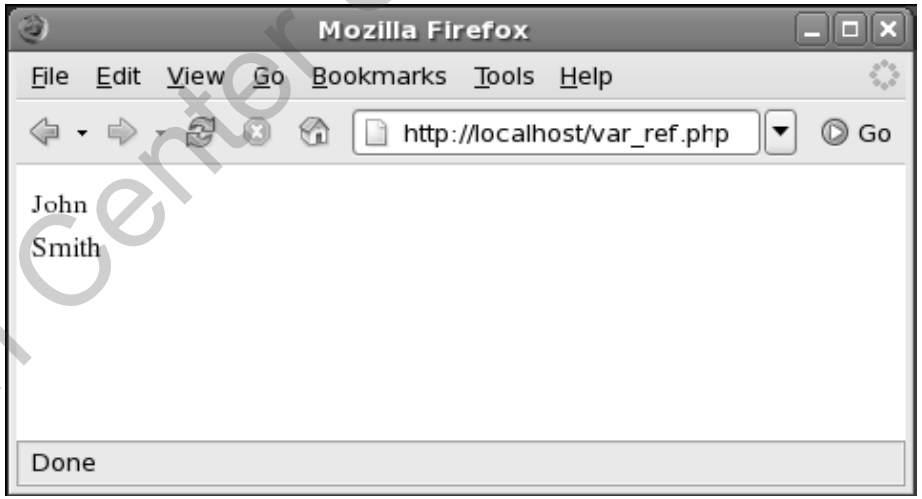
- **$new_varname** - defines the new variable name
- **$old_varname** - specifies the other variable name whose value is to be assigned

- Assigning the value of one variable to another variable
  - Enter the following code and save in a script named **exp_var.php**

Snippet

```
<?php
$Fname = "John";
$Lname = "Smith";
$name =& $Fname;
echo $name;
echo "<br>";
echo $Lname;
echo "<br>";
?>
```

Displays the following output:



In the code, the variables, **$Fname and $Lname** are string variables.

The reference of the **$Fname** variable is assigned to the **$name** variable using the equal to and ampersand symbols.

- Constants
  - Are identifiers containing values that do not change throughout the execution of a program
  - Are case-sensitive
  - Are static, meaning constants once defined cannot be changed
  - Are declared using the `define()` function
  - Are accessed from anywhere in the script

- Declaring a Constant using `define()` function

Syntax

```
define(string_name, mixed_value)
```

Where,

- **string_name -** defines the variable name for the constant
- **mixed_value -** specifies a numeric or string value

- Declaring the constant, **NAME**, containing a string value
  - Enter the code as shown, in a script named **dec_con.php**

Snippet

```
<?php
//Enable error reporting
error_reporting(-1);
define("NAME", "John Smith");
echo NAME;
echo "<br>";
echo name;
echo "<br>";
?>
```

Displays the following output:

The code snippet declares a constant "**NAME**" and assigns a string value to it.

On executing the statement, `echo NAME`, the string value stored in the constant will be displayed.

The declaration of the constant is case sensitive. Therefore, the statement `echo name` displays the text name.

Scope of Variables

- Is the context within which a variable is defined
- Is the lifetime of a variable from the time the variable is created to the time the execution of the script ends
- Different scopes that a variable can have are as follows:
  - Local
  - Global
  - Static

Local Variables

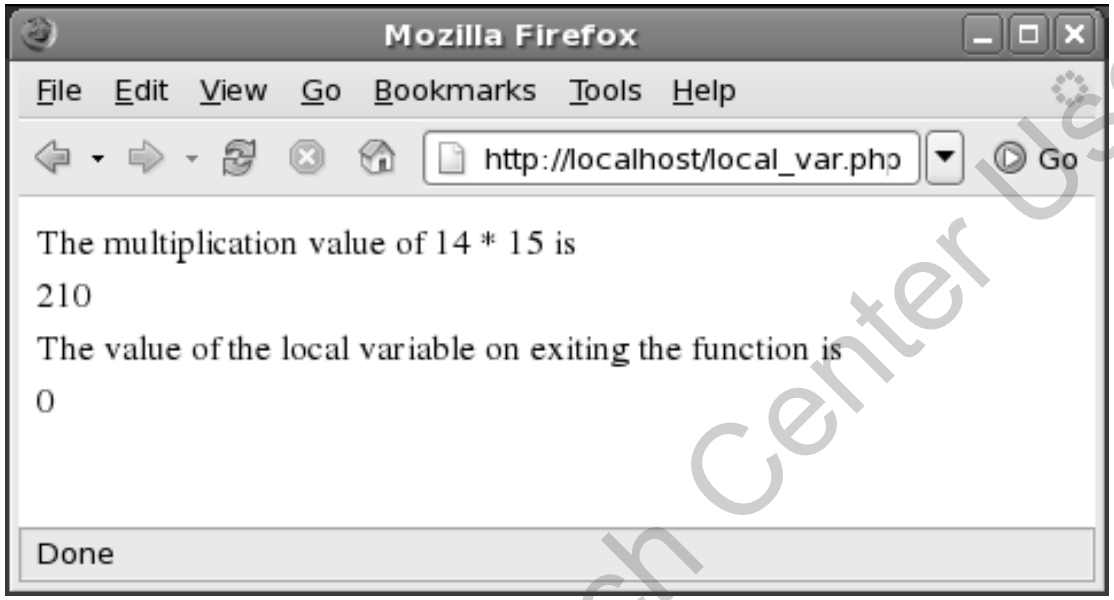
- Local variable
  - Is a variable initialized and used inside a function
  - Is similar to a normal variable
  - Is declared inside a function
  - Its lifetime begins when the function is called, and ends when the function is completed

- Displaying the use of local variables

Snippet

```
<?php
$num2 = 0;
echo "The multiplication value of 14 * 15 is <br>";
function multiply()
{
$num1=14;
$num2=15;
$num2=$num1 * $num2;
echo $num2;
}
multiply();
echo " <br> The value of the local variable on exiting the function is
<br>";
echo $num2;
?>
```

Displays the following output:



The variable **num1** and **num2** are declared as local variables inside the **multiply()** function

The **multiply()** function is executed when PHP script invokes the function

Global Variables

- Global Variable
  - Is a variable retaining its value throughout with the lifetime of a Web page
  - Is declared within the function using global keyword
  - Is accessed from any part of the program
- Declaring a global variable

Syntax

```
global $var_name;
```

Where,

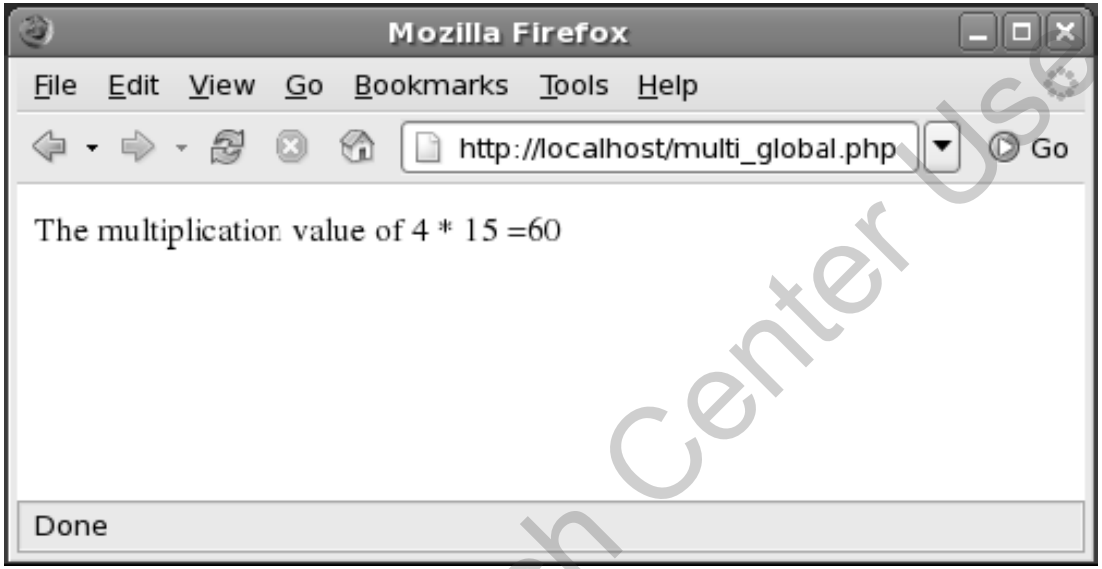
- **$var_name** - defines the global variable name

- Displaying multiplication of two numbers using global variables
  - Enter the code in a script named **multi_global.php**

Snippet

```
<?php
$var1 = 4;
$var2 = 15;
function multiply()
{
global $var1, $var2;
$var2 = $var1 * $var2;
echo $var2;
}
echo "The multiplication value of 4 * 15 =";
multiply();
?>
```

Displays the following output:



The variables **var1** and **var2** are initialized outside the function and declared as global variables within the **multiply()** function

- Static Variables
  - Retains its value even after the function terminates
  - Are only accessible from within the function they are declared and their value remains intact between function calls
  - Can be initialized during declaration and the static declarations are resolved during compile time
  - Are commonly used in the recursive functions

Syntax

```
static $var_name = value;
```

Where,

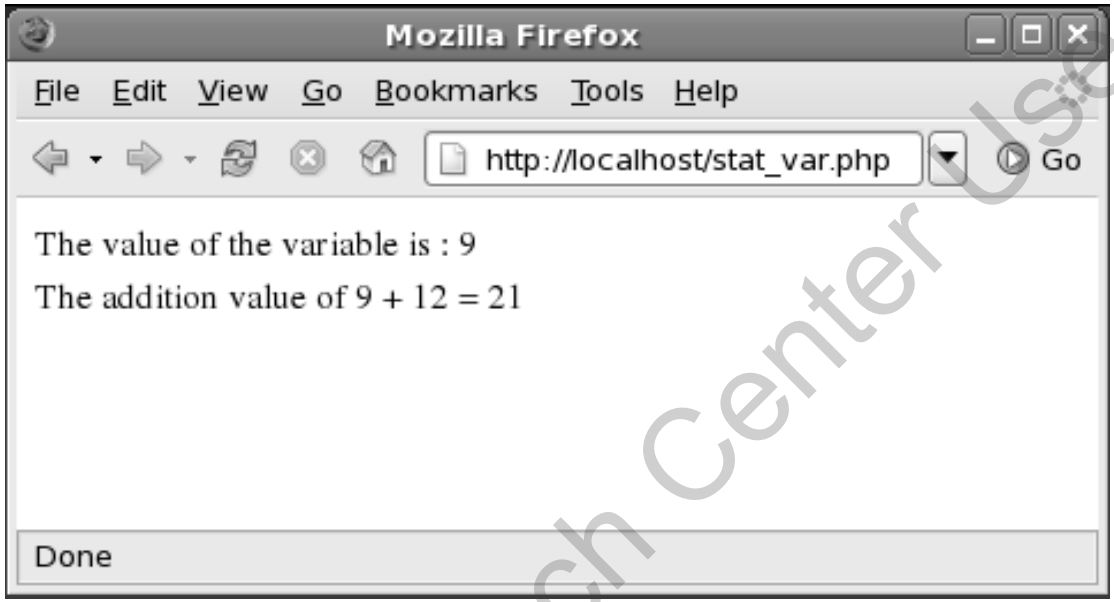
- **var_name** - defines the variable name
- **value** - specifies the value of the variable

- Illustrating the use of a static variable
  - Enter the code as shown in a script named **stat_var.php**

Snippet

```
<?php
$var1;
function sum()
{
        static $var1 = 9;
        $var2 = $var1 + 12;
echo "The value of the variable is : $var1<br>";
echo "The addition value of 9 + 12 = ";
echo "$var2<br>";
}
sum();
?>
```

Displays the following output:



In the code, the first time the function **`sum()`** is called, the static variable **`$var1`** is set to zero, and incremented to display 1 as output.

The value of **`$var1`** is maintained for subsequent calls. Therefore, the next function call will increment the value of `$var1` by one and print 2.

The variable, **`var1`** is declared as a static variable. The variable **`var1`** is local to the **`sum()`** function but retains its value throughout the program.

HTTP Environment Variables

- Environment variables are:
  - System-defined variables
  - Similar to the user-defined variables and begin with dollar (`$`) sign
- Environment variables provide information about:
  - Transactions between the client and the server
  - HTTP request or response

HTTP Environment Variables

- Environment variables are as follows:
  - SERVER_NAME
  - SERVER_PROTOCOL
  - SERVER_PORT
  - $_COOKIE
  - HTTP_USER_AGENT
  - HTTP_ACCEPT
  - HTTP_FROM

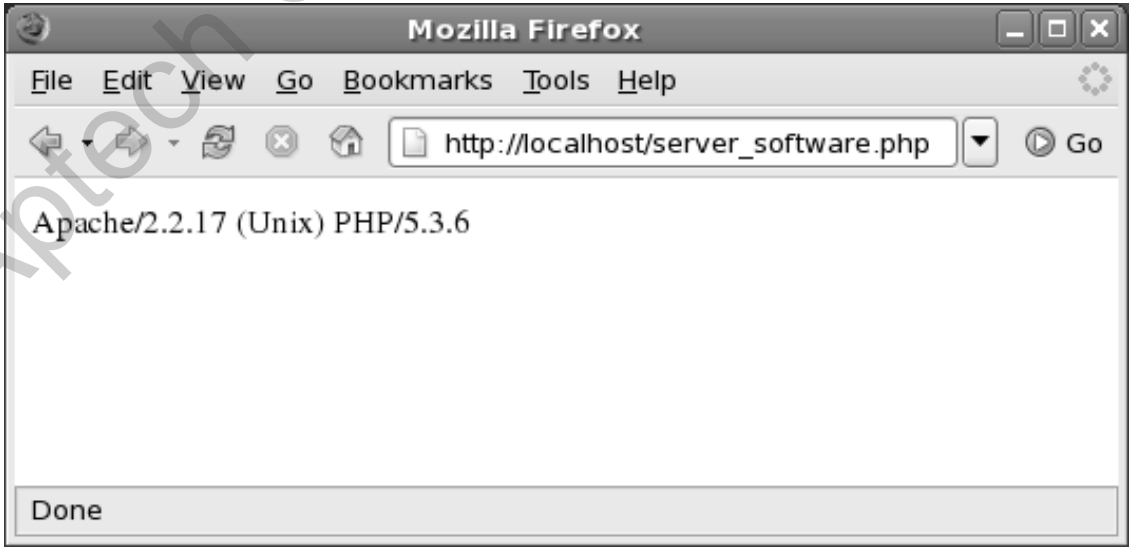
SERVER_SOFTWARE

- Server identification string specified in the headers when responding to requests
- Returns the name and the version of the server software

Snippet

```
<?php
echo $_SERVER['SERVER_SOFTWARE'];
?>
```

- Displays the following output:



SERVER_NAME

- Returns the name of the server host under which the current script is executing
- The host name can be:
  - The Internet Protocol (IP) address or
  - The Domain Name System (DNS) name of the server

Snippet

```
<?php
echo
$_SERVER['SERVER_NAME'];
?>
```

Output:

SERVER_PROTOCOL

- Returns the name and version number of the protocol via which the page was requested

Snippet

```
<?php
echo $_SERVER['SERVER_PROTOCOL'];
?>
```

- Displays the following output:

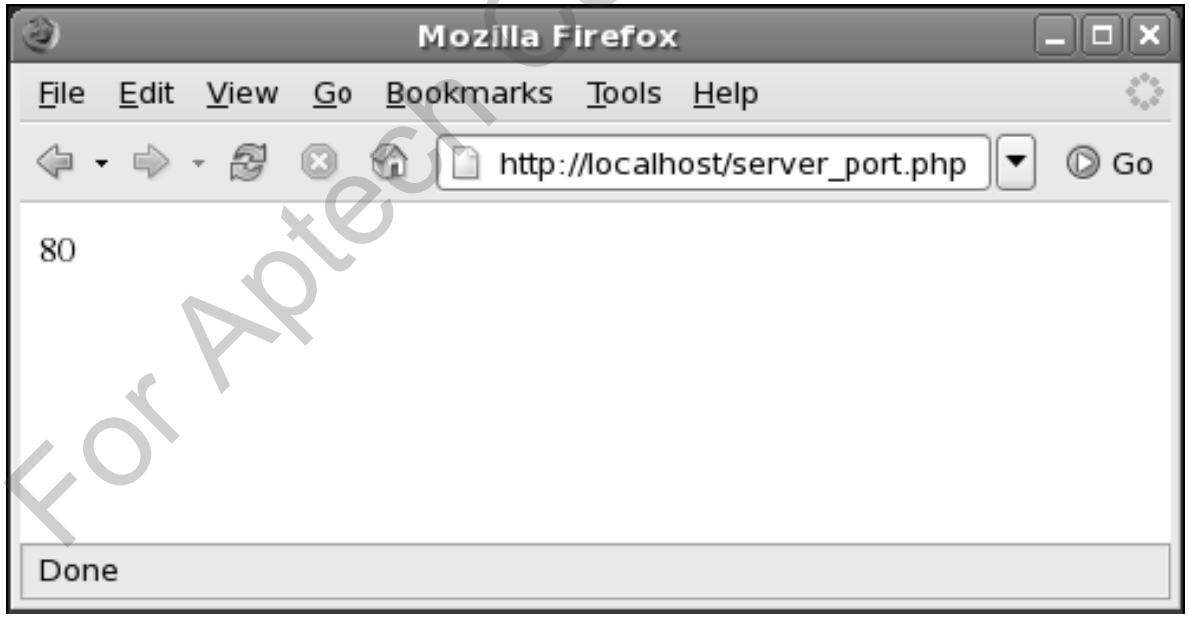
SERVER_PORT

- Returns the server port number for the script

Snippet

```
<?php
echo $_SERVER['SERVER_PORT'];
?>
```

- Displays the following output:



$_COOKIE

- Returns the content of the recently used cookie which are:
  - Saved as a text file
  - Sent back to the server when the browser requests to display a page

Snippet

```
<?php
$Month = 86400 + time();
setcookie('Name', 'Jerry', $Month);
echo "The cookie has been set.";
?>
```

- Displays the following output:

- Retrieving the value of the cookie

Snippet

```
<?php
if(isset($_COOKIE['Name']))
        {
        $last = $_COOKIE['Name'];
        echo "Welcome back! <br> Your name is ". $last;
        }
else
        {
        echo "Welcome to our site!";
        }
?>
```

Displays the following output:

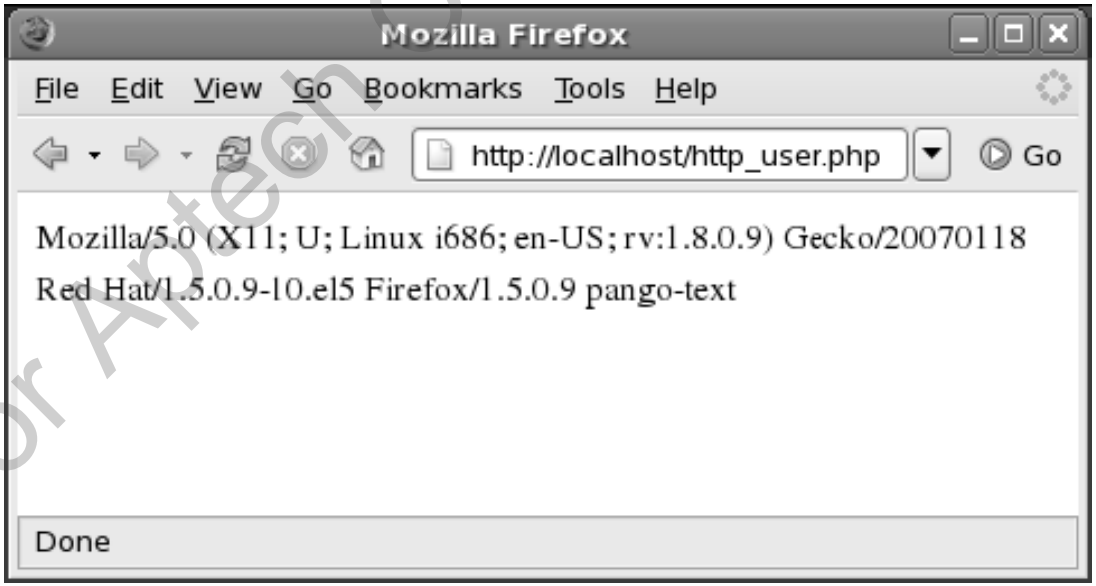
HTTP_USER_AGENT

- The following code returns the name of the browser to the client:

Snippet

```
<?php
echo $_SERVER['HTTP_USER_AGENT'];
?>
```

Displays the following output:



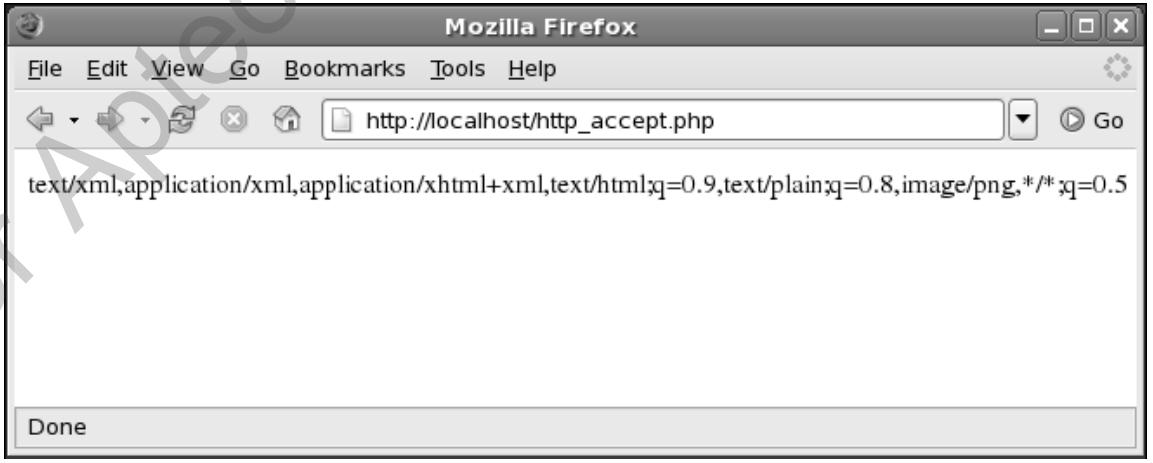
HTTP_ACCEPT

- Returns the contents of the Accept: header if there is a current request
- Lists the media types the client will accept

Snippet

```
<?php
echo $_SERVER['HTTP_ACCEPT'];
?>
```

Displays the following output:



Summary

- Identifiers are names given to different elements of a program such as, variables, constants, arrays, and classes
- A variable is an identifier whose value keeps changing. Variables are used to store data values. A dollar ($) symbol must be included before a variable name
- Constants are identifiers whose values do not change throughout the execution of a program. They are declared using the define() function
- The scope of a variable defines the availability of the variable in a program in which it is declared. The different scopes of a variable are local, global, and static

Summary

- A variable initialized and used inside a function is called a local variable. When a variable retains its value throughout the lifetime of the Web page, it is called the global variable. It is declared using the keyword global within the function
- The static variable retains its value even after the function terminates. It is declared using the keyword static with the variable name
- Environment variables are system-defined variables that can be used in any PHP script
- The $_COOKIE environment variable returns the content of the recently used cookie