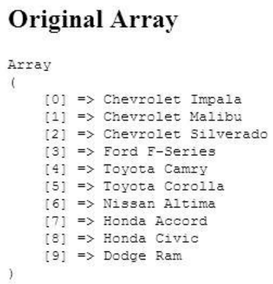
Lecture No: 5
Topic: Manipulating Arrays

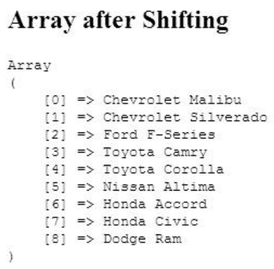
Objectives:
In this chapter, you will:
- Manipulate array elements
- Declare and initialize associative arrays
- Iterate through an array
- Find and extract elements and values
- Sort, combine, and compare arrays
- Understand multidimensional arrays
- Use arrays in Web forms

Adding and Removing Elements from the Beginning of an Array
- The array_shift() function removes the first element from the beginning of an array
  - Pass the name of the array whose first element you want to remove
- The array_unshift() function adds one or more elements to the beginning of an array
  - Pass the name of an array followed by comma-separated values for each element you want to add

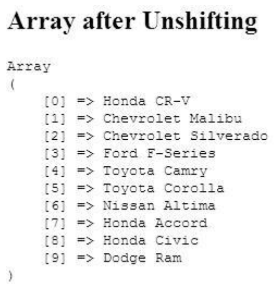
Sample code:
```
$TopSellers = array(
    "Chevrolet Impala",
    "Chevrolet Malibu",
    "Chevrolet Silverado",
    "Ford F-Series",
    "Toyota Camry",
    "Toyota Corolla",
    "Nissan Altima",
    "Honda Accord",
    "Honda Civic",
    "Dodge Ram");
array_shift($TopSellers);
array_unshift($TopSellers, "Honda CR-V");
echo "<pre>\n";
print_r($TopSellers);
echo "</pre>\n";
```



Original Array
```
Array
(
    [0] => Chevrolet Impala
    [1] => Chevrolet Malibu
    [2] => Chevrolet Silverado
    [3] => Ford F-Series
    [4] => Toyota Camry
    [5] => Toyota Corolla
    [6] => Nissan Altima
    [7] => Honda Accord
    [8] => Honda Civic
    [9] => Dodge Ram
)
```



Array after Shifting
```
Array
(
    [0] => Chevrolet Malibu
    [1] => Chevrolet Silverado
    [2] => Ford F-Series
    [3] => Toyota Camry
    [4] => Toyota Corolla
    [5] => Nissan Altima
    [6] => Honda Accord
    [7] => Honda Civic
    [8] => Dodge Ram
)
```



Array after Unshifting
```
Array
(
    [0] => Honda CR-V
    [1] => Chevrolet Malibu
    [2] => Chevrolet Silverado
    [3] => Ford F-Series
    [4] => Toyota Camry
    [5] => Toyota Corolla
    [6] => Nissan Altima
    [7] => Honda Accord
    [8] => Honda Civic
    [9] => Dodge Ram
)
```

REFERENCE: PHP Programming with MySQL 2nd Edition

Adding and Removing Elements from the End of an Array

- The array_pop() function removes the last element from the end of an array
  - Pass the name of the array whose last element you want to remove
- The array_push() function adds one or more elements to the end of an array
  - Pass the name of an array followed by comma-separated values for each element you want to add

Sample code:

```
$HospitalDepts = array(
   "Anesthesia",
   "Molecular Biology",
   "Neurology",
   "Pediatrics");
array_pop($HospitalDepts); // Removes "Pediatrics"
array_push($HospitalDepts, "Psychiatry", "Pulmonary Diseases");
```

Adding and Removing Elements Within an Array

- The array_splice() function adds or removes array elements
- The array_splice() function renumbers the indexes in the array
- The syntax for the array_splice() function is:

array_splice(*array_name*, *start*, *characters_to_delete*, *values_to_insert*);

- To add an element within an array, include a value of 0 as the third argument of the array_splice() function

```
$HospitalDepts = array(
   "Anesthesia",        // first element (0)
   "Molecular Biology",   // second element (1)
   "Neurology",         // third element (2)
   "Pediatrics");       // fourth element (3)
array_splice($HospitalDepts, 3, 0, "Ophthalmology");
```

- To add more than one element within an array, pass the array() construct as the fourth argument of the array_splice() function
- Separate the new element values by commas

```
        $HospitalDepts = array(
   "Anesthesia",        // first element (0)
   "Molecular Biology",   // second element (1)
   "Neurology",         // third element (2)
   "Pediatrics");       // fourth element (3)
        array_splice($HospitalDepts, 3, 0, array("Opthalmology", "Otolaryngology"));
```

- Delete array elements by omitting the fourth argument from the array_splice() function

```
$HospitalDepts = array(
   "Anesthesia",        // first element (0)
```

REFERENCE: PHP Programming with MySQL 2nd Edition

```
    "Molecular Biology",   // second element (1)
    "Neurology",          // third element (2)
    "Pediatrics");        // fourth element (3)
array_splice($HospitalDepts, 1, 2);
```

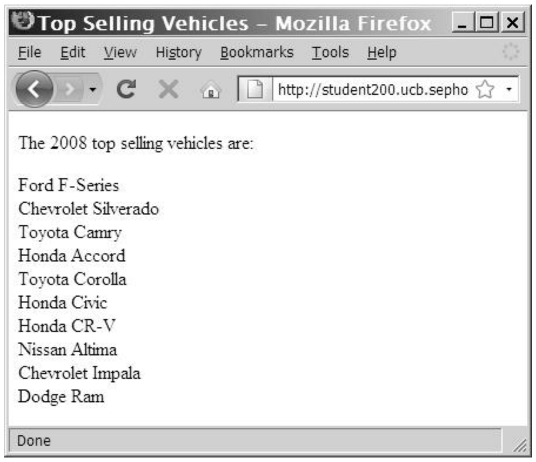
- The unset() function removes array elements and other variables
- Pass to the unset() function the array name and index number of the element you want to remove
- To remove multiple elements, separate each index name and element number with commas
  unset($HospitalDepts[1], $HospitalDepts[2]);

Removing Duplicate Elements

- The array_unique() function removes duplicate elements from an array
- Pass to the array_unique() function the name of the array from which you want to remove duplicate elements
- The array_values() and array_unique() functions do not operate directly on an array
- The array_unique() function does renumber the indexes after removing duplicate values in an array

Sample Code:

```
$TopSellers = array(
    "Ford F-Series", "Chevrolet  Silverado", "Toyota Camry",
    "Honda Accord", "Toyota Corolla", "Ford F-Series", "Honda Civic",
    "Honda CR-V", "Honda Accord", "Nissan Altima", "Toyota Camry",
    "Chevrolet Impala", "Dodge Ram", "Honda CR-V");
echo "<p>The 2008 top selling vehicles are:</p><p>";
$TopSellers = array_unique($TopSellers);
$TopSellers = array_values($TopSellers);
for ($i=0; $i<count($ TopSellers); ++$i) {
    echo "{$TopSellers[$i]}<br />";
}
echo "</p>";
```

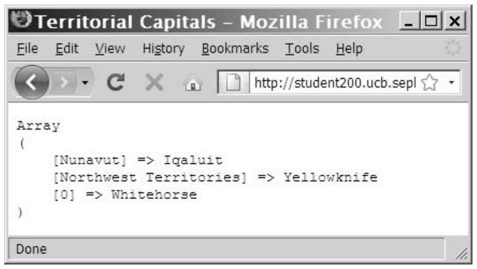

Top Selling Vehicles – Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://student200.ucb.sepho
Done

```
The 2008 top selling vehicles are:

Ford F-Series
Chevrolet Silverado
Toyota Camry
Honda Accord
Toyota Corolla
Honda Civic
Honda CR-V
Nissan Altima
Chevrolet Impala
Dodge Ram
```

Declaring and Initializing Associative Arrays

- With associative arrays, you specify an element's key by using the array operator (=>)
  - The syntax for declaring and initializing an associative array is:
    $array_name = array(*key*=>*value*, ...);

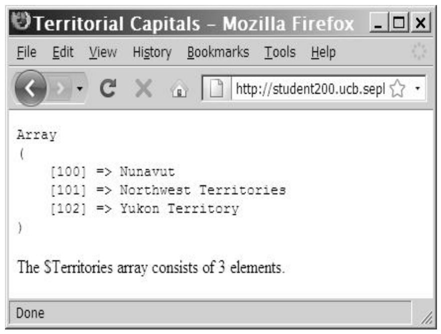
```
$Territories[100] = "Nunavut";
$Territories[] = "Northwest Territories";
$Territories[] = "Yukon Territory";
echo "<pre>\n";
print_r($Territories);
echo "</pre>\n";
echo '<p>The $Territories array consists of ',
```


Territorial Capitals – Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://student200.ucb.sepl
Done

```
Array
(
    [Nunavut] => Iqaluit
    [Northwest Territories] => Yellowknife
    [0] => Whitehorse
)
```

REFERENCE: PHP Programming with MySQL 2nd Edition

count($Territories), " elements.</p>\n";

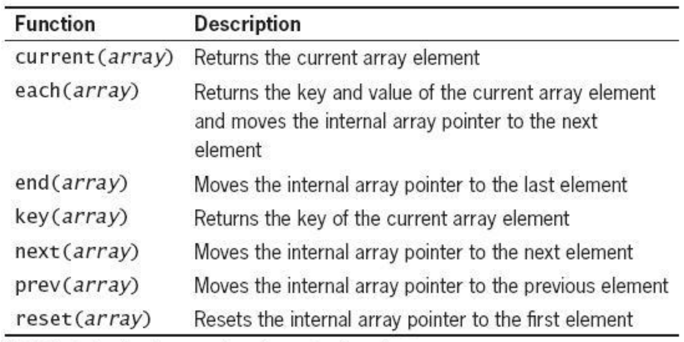

Territorial Capitals – Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://student200.ucb.sepl
Done

```
Array
(
    [100] => Nunavut
    [101] => Northwest Territories
    [102] => Yukon Territory
)
```

The $Territories array consists of 3 elements.

Iterating Through an Array

- The **internal array pointer** refers to the currently selected element in an array



Function	Description
current(*array*)	Returns the current array element
each(*array*)	Returns the key and value of the current array element and moves the internal array pointer to the next element
end(*array*)	Moves the internal array pointer to the last element
key(*array*)	Returns the key of the current array element
next(*array*)	Moves the internal array pointer to the next element
prev(*array*)	Moves the internal array pointer to the previous element
reset(*array*)	Resets the internal array pointer to the first element

Table 6-1 Array pointer iteration functions

Finding and Extracting Elements and Values

- One of the most basic methods for finding a value in an array is to use a looping statement to iterate through the array until you find the value
- Rather than write custom code to find a value, use the in_array() and array_search() functions to determine whether a value exists in an array

Determining if a Value Exists

- The in_array() function returns a Boolean value of true if a given value exists in an array
- The array_search() function determines whether a given value exists in an array and:
  - Returns the index or key of the first matching element if the value exists, or
  - Returns FALSE if the value does not exist

if (in_array("Neurology", $HospitalDepts))
echo "<p>The hospital has a Neurology department.</p>";

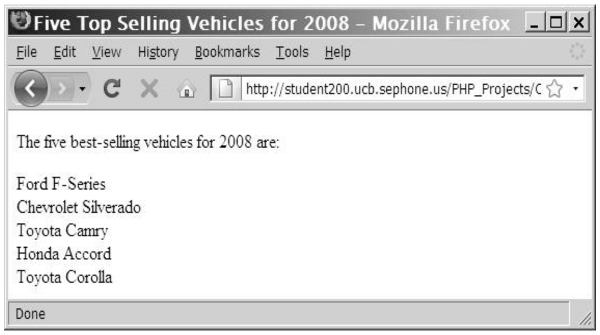
- The array_key_exists() function determines whether a given index or key exists
- You pass two arguments to the array_key_exists() function:
  - The first argument represents the key to search for
  - The second argument represents the name of the array in which to search

```
$ScreenNames["Dancer"] = "Daryl";
$ScreenNames["Fat Man"] = "Dennis";
$ScreenNames["Assassin"] = "Jennifer";
if (array_key_exists("Fat Man", $ScreenNames))
    echo "<p>{$ScreenNames['Fat Man']} is already
    'Fat Man'.</p>\n";
else {
        $ScreenNames["Fat Man"] = "Don";
        echo "<p>{$ScreenNames['Fat Man']} is now
        'Fat Man'.</p>";
    }
```

Returning a Portion of an Array

- The array_slice() function returns a portion of an array and assigns it to another array
- The syntax for the array_slice() function is:
  array_slice(*array_name*, *start*, *characters_to_return*);

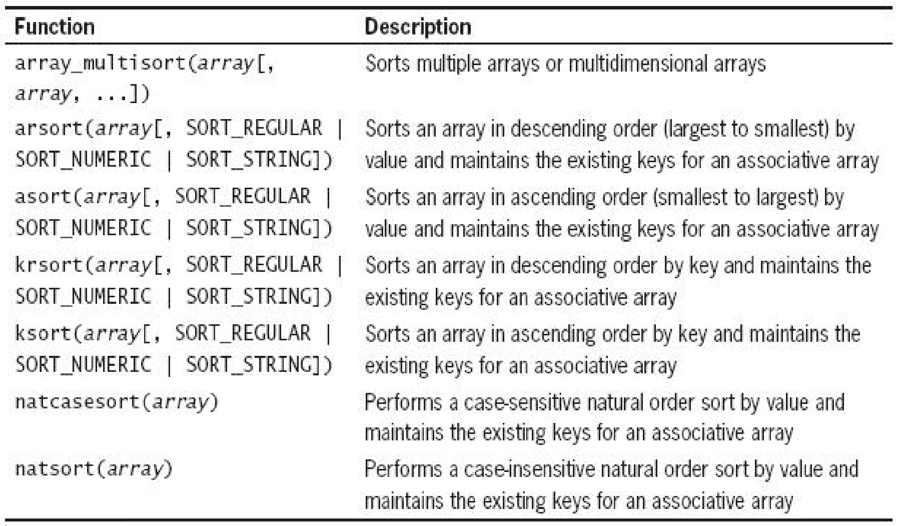
```
// This array is ordered by sales, high to low.
$TopSellers = array("Ford F-Series", "Chevrolet Silverado", "Toyota Camry", "Honda Accord", "Toyota
Corolla", "Honda Civic", "Nissan Altima", "Chevrolet Impala", "Dodge Ram", "Honda CR-V");
$FiveTopSellers = array_slice($TopSellers, 0, 5);
echo "<p>The five best-selling vehicles for 2008 are:</p>\n";
for ($i=0; $i<count($FiveTopSellers); ++$i) {
   echo "{$FiveTopSellers[$i]}<br />\n";
}
```


Five Top Selling Vehicles for 2008 – Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://student200.ucb.sephone.us/PHP_Projects/C
Done

```
The five best-selling vehicles for 2008 are:

Ford F-Series
Chevrolet Silverado
Toyota Camry
Honda Accord
Toyota Corolla
```

Sorting Arrays

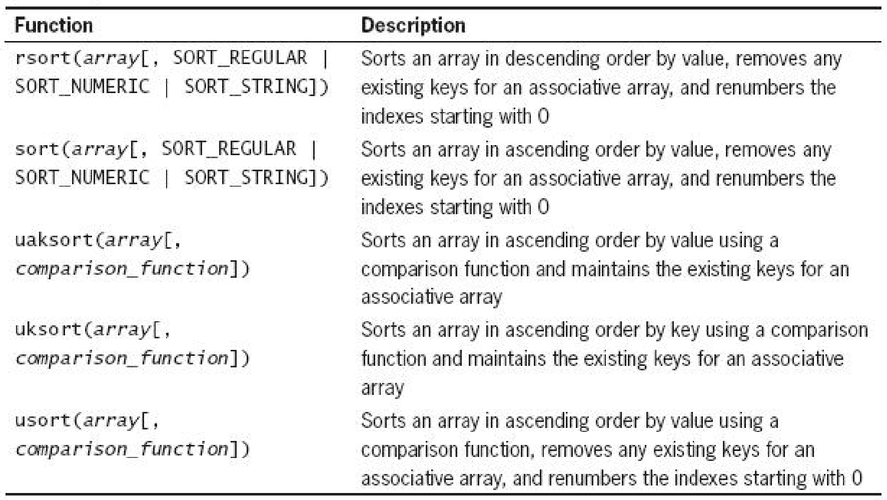
- The most commonly used array sorting functions are:
  - sort() and rsort() for indexed arrays
  - ksort() and krsort() for associative arrays



Function	Description
`array_multisort(array[, array, ...])`	Sorts multiple arrays or multidimensional arrays
`arsort(array[, SORT_REGULAR | SORT_NUMERIC | SORT_STRING])`	Sorts an array in descending order (largest to smallest) by value and maintains the existing keys for an associative array
`asort(array[, SORT_REGULAR | SORT_NUMERIC | SORT_STRING])`	Sorts an array in ascending order (smallest to largest) by value and maintains the existing keys for an associative array
`krsort(array[, SORT_REGULAR | SORT_NUMERIC | SORT_STRING])`	Sorts an array in descending order by key and maintains the existing keys for an associative array
`ksort(array[, SORT_REGULAR | SORT_NUMERIC | SORT_STRING])`	Sorts an array in ascending order by key and maintains the existing keys for an associative array
`natcasesort(array)`	Performs a case-sensitive natural order sort by value and maintains the existing keys for an associative array
`natsort(array)`	Performs a case-insensitive natural order sort by value and maintains the existing keys for an associative array

Table 6-2 Array sorting functions *(continues)*

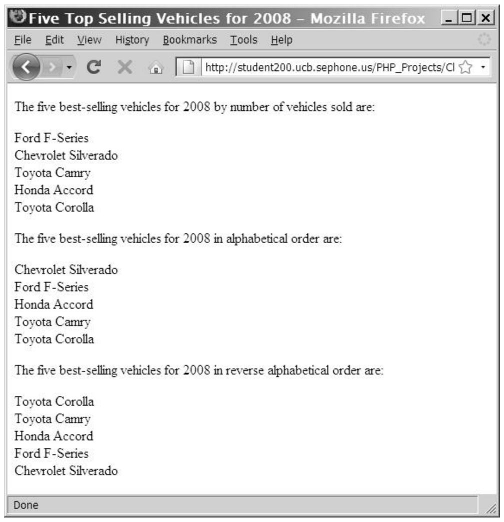
(continued)



Function	Description
`rsort(array[, SORT_REGULAR | SORT_NUMERIC | SORT_STRING])`	Sorts an array in descending order by value, removes any existing keys for an associative array, and renumbers the indexes starting with 0
`sort(array[, SORT_REGULAR | SORT_NUMERIC | SORT_STRING])`	Sorts an array in ascending order by value, removes any existing keys for an associative array, and renumbers the indexes starting with 0
`uaksort(array[, comparison_function])`	Sorts an array in ascending order by value using a comparison function and maintains the existing keys for an associative array
`uksort(array[, comparison_function])`	Sorts an array in ascending order by key using a comparison function and maintains the existing keys for an associative array
`usort(array[, comparison_function])`	Sorts an array in ascending order by value using a comparison function, removes any existing keys for an associative array, and renumbers the indexes starting with 0

Table 6-2 Array sorting functions

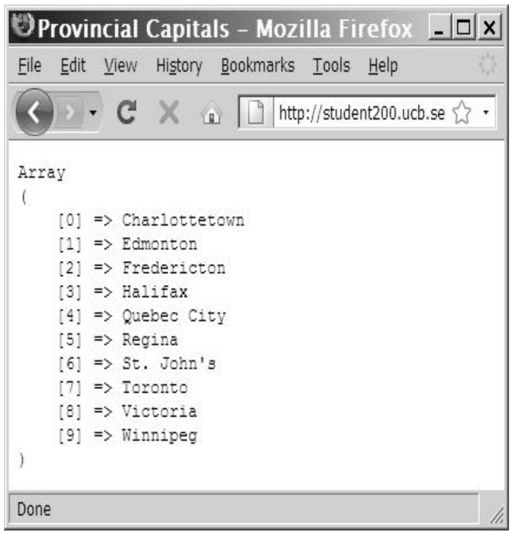
- If the sort() and rsort() functions are used on an associative array, the keys are replaced with indexes



```
The five best-selling vehicles for 2008 by number of vehicles sold are:

Ford F-Series
Chevrolet Silverado
Toyota Camry
Honda Accord
Toyota Corolla

The five best-selling vehicles for 2008 in alphabetical order are:

Chevrolet Silverado
Ford F-Series
Honda Accord
Toyota Camry
Toyota Corolla

The five best-selling vehicles for 2008 in reverse alphabetical order are:

Toyota Corolla
Toyota Camry
Honda Accord
Ford F-Series
Chevrolet Silverado
```

Figure 6-12 Output of an

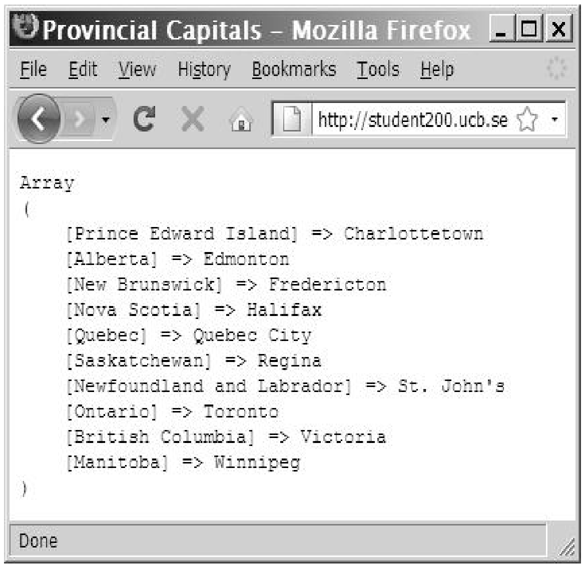
array after applying the sort() and rsort() functions



```
Array
(
    [0] => Charlottetown
    [1] => Edmonton
    [2] => Fredericton
    [3] => Halifax
    [4] => Quebec City
    [5] => Regina
    [6] => St. John's
    [7] => Toronto
    [8] => Victoria
    [9] => Winnipeg
)
```

Figure 6-13 Output of an associative array after sorting with the sort() function

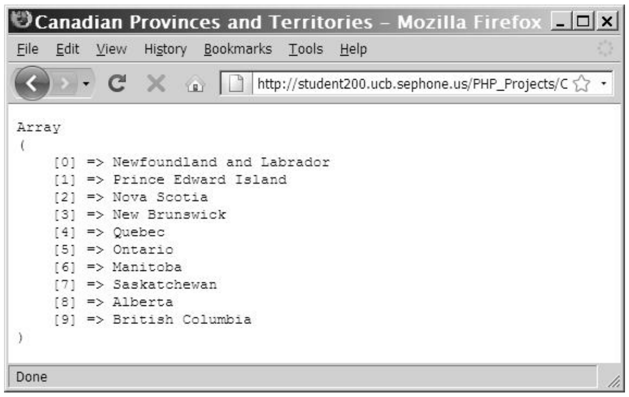
Figure 6-14 Output of an associative array after sorting with the asort() function



```
Array
(
    [Prince Edward Island] => Charlottetown
    [Alberta] => Edmonton
    [New Brunswick] => Fredericton
    [Nova Scotia] => Halifax
    [Quebec] => Quebec City
    [Saskatchewan] => Regina
    [Newfoundland and Labrador] => St. John's
    [Ontario] => Toronto
    [British Columbia] => Victoria
    [Manitoba] => Winnipeg
)
```

Figure 6-15 Output of

an associative array after sorting with the ksort() function



```
Array
(
    [0] => Newfoundland and Labrador
    [1] => Prince Edward Island
    [2] => Nova Scotia
    [3] => New Brunswick
    [4] => Quebec
    [5] => Ontario
    [6] => Manitoba
    [7] => Saskatchewan
    [8] => Alberta
    [9] => British Columbia
)
```

REFERENCE: PHP Programming with MySQL 2nd Edition

Combining Arrays

- To append one array to another, use the addition (+) or the compound assignment operator (+=)
- To merge two or more arrays use the array_merge() function
- The syntax for the array_merge() function is:

  new_array = array_merge($*array1*, $*array2*, $*array3*, ...);

Combining Arrays (continued)

```
$Provinces = array("Newfoundland and Labrador", "Prince Edward Island", "Nova Scotia", "New
Brunswick", "Quebec", "Ontario", "Manitoba", "Saskatchewan", "Alberta", "British Columbia");
$Territories = array("Nunavut", "Northwest Territories", "Yukon Territory");
$Canada = $Provinces + $Territories;
echo "<pre>\n";
print_r($Canada);
echo "</pre>\n";
```

Comparing Arrays

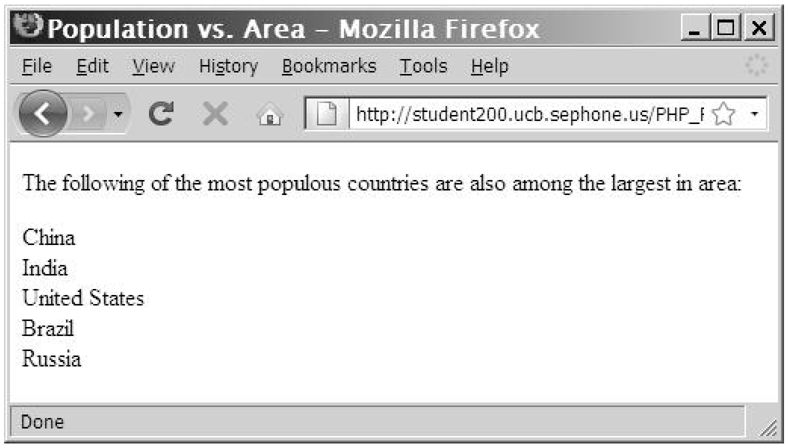
- The array_diff() function returns an array of elements that exist in one array but not in any other arrays to which it is compared
- The syntax for the array_diff() function is:

  new_array = array_diff($*array1*, $*array2*, $*array3*, ...);
- The array_intersect() function returns an array of elements that exist in all of the arrays that are compared
- The syntax for the array_intersect() function is:

  new_array = array_intersect($*array1*, $*array2*, $*array3*, ...);

sample code:

```
$ProvincialCapitals = array("Newfoundland and Labrador"=>"St. John's", "Prince Edward
Island"=>"Charlottetown", "Nova Scotia"=>"Halifax", "New Brunswick"=>"Fredericton",
"Quebec"=>"Quebec City", "Ontario"=>"Toronto", "Manitoba"=>"Winnipeg", "Saskatchewan"=>"Regina",
"Alberta"=>"Edmonton", "British
Columbia"=>"Victoria");
$TerritorialCapitals =
array("Nunavut"=>"Iqaluit", "Northwest
Territories"=>"Yellowknife", "Yukon
Territory"=>"Whitehorse");
$CanadianCapitals = $ProvincialCapitals +
$TerritorialCapitals;
echo "<pre>\n";
print_r($CanadianCapitals);
echo "</pre>\n";
```


Population vs. Area – Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://student200.ucb.sephone.us/PHP_
Done

```
The following of the most populous countries are also among the largest in area:

China
India
United States
Brazil
Russia
```

REFERENCE: PHP Programming with MySQL 2nd Edition

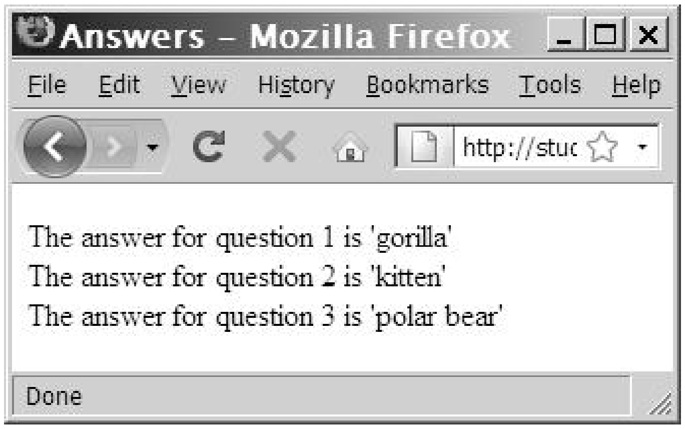
```
$Provinces = array("Newfoundland and Labrador", "Prince Edward Island", "Nova Scotia", "New Brunswick", "Quebec", "Ontario", "Manitoba", "Saskatchewan", "Alberta", "British Columbia");
$Territories = array("Nunavut", "Northwest Territories", "Yukon Territory");
$Canada = array_merge($Provinces, $Territories);
```

Using Arrays in Web Forms

- Store form data in an array by appending an opening and closing ([]) to the value of the name attribute
- Data from any element with the same value for the *name* attribute will be appended to an array with that name

Sample code:

```
<form method='post' action='ProcessForm.php'>
<p>Enter the first answer:
<input type='text' name='answers[]' /></p>
<p>Enter the second answer:
<input type='text' name='answers[]' /></p>
<p>Enter the third answer:
<input type='text' name='answers[]' /></p>
<input type='submit' name='submit' value='submit' />
</form>

if (is_array($_POST['answers'])) {
    $Index = 0;
    foreach ($_POST['answers'] as $Answer) {
        ++$Index;
        echo "The answer for question $Index is '$Answer'<br />\n";
    }
}
```


Answers – Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://stuc
Done

```
The answer for question 1 is 'gorilla'
The answer for question 2 is 'kitten'
The answer for question 3 is 'polar bear'
```

REFERENCE: PHP Programming with MySQL 2nd Edition

Summary

- The array_shift() function removes the first element from the beginning of an array
- The array_unshift() function adds one or more elements to the beginning of an array
- The array_pop() function removes the last element from the end of an array
- The array_push() function adds one or more elements to the end of an array
- The array_splice() function adds or removes array elements
- The unset() function removes array elements and other variables
- The array_values() function renumbers an indexed array's elements
- The array_unique() function removes duplicate elements from an array
- The in_array() function returns a Boolean value of TRUE if a given value exists in an array
- The array_search() function determines whether a given value exists in an array
- The array_key_exists() function determines whether a given index or key exists
- The array_slice() function returns a portion of an array and assigns it to another array
- The array_merge() function merges two or more arrays
- The array_diff() function returns an array of elements that exist in one array but not in any other arrays to which it is compared
- The array_intersect() function returns an array of elements that exist in all of the arrays that are compared

REFERENCE: PHP Programming with MySQL 2nd Edition