PHP Sample Application

Simple graphics and database

Sample PHP Application

- PHP is commonly used to:
  - Draw graphics on the fly
  - Access a database
- Let's put these together to make an application that:
  - Lets a user make a query on a web form
  - Looks up some data from an Access database (similar if using SQL database)
  - Displays a graph of the data from the database

Simple Graphics

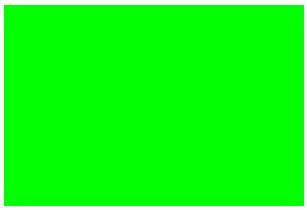
- First, let's see how to draw some simple graphics
- PHP 5 includes the "GD" graphics library, created by Boutell.com
- PHP 4 requires an extension be added to access this library
- PNG format used
  - Similar but superior to GIF
  - GIF patented by Unisys, expired 2003

Base image functions

- image imagecreate(width,height)
  - Creates and returns an image of specified height
- color imagecolorallocate(image, R,G,B)
  - Creates a color for image with the given Red, Green, and Blue colors
- boolean imagefill(image, x, y, color)
  - Flood fills at the given point with the given color
- header("Content-type: image/png");
  - Displays the MIME header for a PNG image
- imagepng(image)
  - Displays the data for the PNG image

Example: Green image

```
<?
  $image = imagecreate(300,200);
  $colorGreen = imagecolorallocate($image, 0, 255, 0);
  imagefill($image, 0, 0, $colorGreen);
  header("Content-type: image/png");
  imagepng($image);
?>
```



More image functions

- imagestring (image, int font, int x, int y, string s, int col)
  - Draws the string s in the image at coordinates x, y in color col. If font is 1, 2, 3, 4 or 5, a built-in font is used.
- imagefilledrectangle(image, x1,y1, x2,y2,color)
  - Draws a filled rectangle at upper left corner x1,y1 bottom right corner x2,y2
- imagefilledellipse(image, x1,y1, width,height,color)
  - Draws a filled ellipse in the bounding rectangle specified by x1,y1,x2,y2
- imagerectangle(image,x1,y1,x2,y2,color)
  - Rectangle with no fill
- imageellipse(image, x1,y1, width,height,color)
  - Ellipse with no fill

Image example

```
<?
  $image = imagecreate(300,200);
  $colorWhite = imagecolorallocate($image, 255, 255, 255);
  imagefill($image, 0, 0, $colorWhite);

  imagefilledrectangle($image, 50,50, 100, 75,
                       imagecolorallocate($image,255,0,0));
  imageellipse($image, 150, 50, 100, 50,
                       imagecolorallocate($image,0,0,255));
  imagestring($image, 0, 10, 10, "Hello!",
                       imagecolorallocate($image,0,0,0));

  header("Content-type: image/png");
  imagepng($image);
?>
```

ImagePolygon and ImageLine

```
<?
  $image = imagecreate(300,200);
  $colorWhite = imagecolorallocate($image, 255, 255, 255);
  imagefill($image, 0, 0, $colorWhite);

  $colorBlack = imagecolorallocate($image, 0, 0, 0);

  imageLine($image, 50, 0, 200, 150, $colorBlack);

  $pointsTriangle = array(50, 10, 10, 90, 90, 90);
  imagePolygon($image, $pointsTriangle, count($pointsTriangle)/2, $colorBlack);

  header("Content-type: image/png");
  imagepng($image);
?>
```

How could you display this image multiple times in a web page?

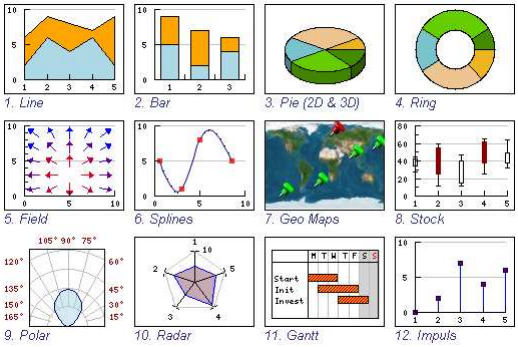
Many more image functions

- Read jpg, gif, etc.
- Rotate, blending
- Resize
- Draw arcs
- Gamma correct
- Tiling
- …
- PHP Reference or textbook is a great way to learn about these functions, with code samples

Drawing Graphs

- What if you wanted to draw charts and graphs?
  - Pie chart, bar chart, line chart, scatter plot, etc.
  - You could do it using the graphics primitives we have covered
- Fortunately, someone has already done this for you
  - JPGraph Library
  - http://www.aditus.nu/jpgraph/

JPGraph Samples



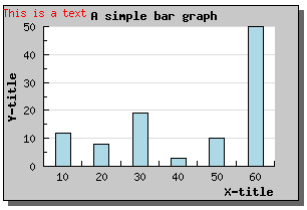
See test suite with code samples….

Let's look at a simple bar chart

```
<?php
include ("jpgraph2/jpgraph.php");
include ("jpgraph2/jpgraph_bar.php");

$datay=array(12,8,19,3,10,50);
$datax=array(10,20,30,40,50,60);

// Create the graph. These two calls are always required
$graph = new Graph(300,200,"auto");
$graph->SetScale("textlin");            // Natural nums

// Add a drop shadow
$graph->SetShadow();

// Adjust the margin a bit to make more room for titles
$graph->img->SetMargin(40,30,20,40);

// Create a bar plot
$bplot = new BarPlot($datay);
$graph->Add($bplot);
```

Simple Bar chart, cont.

```
// Add data to X coordinate
// $graph->xaxis->SetTickLabels($datax);

// Create and add a new text
$txt=new Text("This is a text");
$txt->SetPos(0,0);
$txt->SetColor("red");
$graph->AddText($txt);

// Setup the titles
$graph->title->Set("A simple bar graph");
$graph->xaxis->title->Set("X-title");
$graph->yaxis->title->Set("Y-title");

$graph->title->SetFont(FF_FONT1,FS_BOLD);
$graph->yaxis->title->SetFont(FF_FONT1,FS_BOLD);
$graph->xaxis->title->SetFont(FF_FONT1,FS_BOLD);

// Display the graph
$graph->Stroke();
?>
```



Database Access

- Changing directions, reading from a database and displaying data in a graph
  - In our example, let's read from a MySQL "Test" database with name popularity over the decades
    - name
    - yr1900
    - yr1910
    - …
    - yr2000
  - PHP app: let the user enter a name then graph the popularity

Database Schema

```
+--------+-------------+------+-----+---------+-------+
| Field  | Type        | Null | Key | Default | Extra |
+--------+-------------+------+-----+---------+-------+
| name   | varchar(50) | NO   | PRI | NULL    |       |
| yr1900 | int(11)     | YES  |     | NULL    |       |
| yr1910 | int(11)     | YES  |     | NULL    |       |
| yr1920 | int(11)     | YES  |     | NULL    |       |
| yr1930 | int(11)     | YES  |     | NULL    |       |
| yr1940 | int(11)     | YES  |     | NULL    |       |
| yr1950 | int(11)     | YES  |     | NULL    |       |
| yr1960 | int(11)     | YES  |     | NULL    |       |
| yr1970 | int(11)     | YES  |     | NULL    |       |
| yr1980 | int(11)     | YES  |     | NULL    |       |
| yr1990 | int(11)     | YES  |     | NULL    |       |
| yr2000 | int(11)     | YES  |     | NULL    |       |
+--------+-------------+------+-----+---------+-------+
```

```
mysql> select name, yr1960, yr1970, yr1980, yr1990, yr2000 from names where name
='kyler';
+-------+--------+--------+--------+--------+--------+
| name  | yr1960 | yr1970 | yr1980 | yr1990 | yr2000 |
+-------+--------+--------+--------+--------+--------+
| kyler |   1001 |   1001 |    978 |    378 |    281 |
+-------+--------+--------+--------+--------+--------+
```

Building our App

- First, make a form that asks for a username and then retrieves and prints all the yearly data that matches the name in the table

```
<?php
        header("Content-Type: text/html");
        print("<HTML><HEAD><TITLE>Name Popularity Surfer</TITLE>");
        print("</HEAD>");
        print("<BODY>");

        if($_SERVER['REQUEST_METHOD'] != "POST")
        {
                print("<FORM method=post action='names.php'>");
                print("Enter name.<p>");
                print("<INPUT type=text name='name'>");
                print("<INPUT type=submit>");
                print("</FORM>");
        }
```

```
else
     {
            $name = $_REQUEST['name'];
            // Database parameters
            $db_location = "localhost";
            $db_user_name = "test";
            $db_password = "test";
            $database_name = "test";
            // Connect to the DB
            $dbcnx = mysql_connect($db_location,$db_user_name,$db_password);
            mysql_select_db($database_name);

            $sql="SELECT * FROM names where name='" . $name . "';";
            $rs=mysql_query($sql);
```

```
        if ($row = mysql_fetch_assoc($rs))
        {
                $arr = array();
                $arr[] = $row['yr1900'];
                for ($i = 10; $i < 100; $i+=10)
                        $arr[] = $row['yr19' . $i];
                $arr[] = $row['yr2000'];
                print_r($arr);
                print("<br>");
        }
        if (!isset($arr))
                print("$name not found in the database.");
    }
    print("</BODY>");
?>
```

Drawing Graph

- Now let's hook this up with jpgraph to draw a graph of the popularity over time
- You could run this yourself if you copy/install the jpgraph folder to your own HTML folder
  - Can access database from any account using the supplied username/password

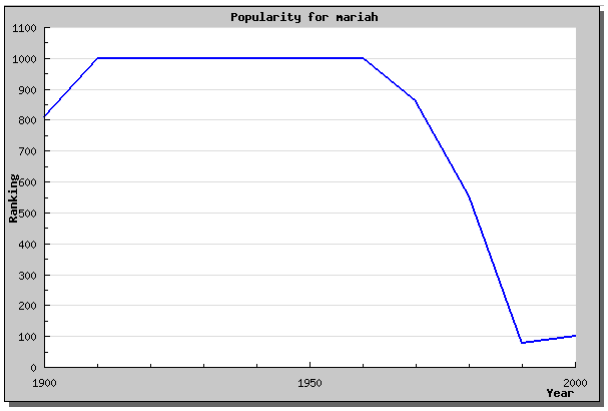
Tie-In Graphics

```
<?php
	include("jpgraph.php");
	include("jpgraph_line.php");

	if($_SERVER['REQUEST_METHOD'] != "POST")
	{
		print("<FORM method=post action='names.php'>");
		print("Enter name.<p>");
		print("<INPUT type=text name='name'>");
		print("<INPUT type=submit>");
		print("</FORM>");
	}
	else
	{
		$name = $_REQUEST['name'];
		// Database parameters
		$db_location = "localhost";
		$db_user_name = "test";
		$db_password = "test";
		$database_name = "test";
		// Connect to the DB
		$dbcnx = mysql_connect($db_location,$db_user_name,$db_password);
		mysql_select_db($database_name);
```

Tie-In Graphics

```
$sql="SELECT * FROM names where name='" . $name . "';";
$rs=mysql_query($sql);
if ($row = mysql_fetch_assoc($rs))
{
	$ydata = array();
	$xdata = array();
	$ydata[] = $row['yr1900'];
	$xdata[] = 1900;
	for ($i = 10; $i < 100; $i+=10)
	{
		$ydata[] = $row['yr19' . $i];
		$xdata[] = 1900 + $i;
	}
	$ydata[] = $row['yr2000'];
	$xdata[] = 2000;

	// Create the graph. These two calls are always required
	$graph = new Graph(600,400,"auto");
	$graph->SetScale("linlin");

	// Add a drop shadow
	$graph->SetShadow();
	// Adjust the margin a bit to make more room for titles
	$graph->img->SetMargin(40,30,20,40);

	 // Create a line plot
	$lplot = new LinePlot($ydata,$xdata);
	$lplot->SetColor("blue");
	$lplot->SetWeight(2);
	$graph->Add($lplot);

	// Add data to X coordinate
	$graph->xaxis->SetTickLabels($xdata);

	// Setup the titles
	$graph->title->Set("Popularity for " . $name);
	$graph->xaxis->title->Set("Year");
	$graph->yaxis->title->Set("Ranking");

	$graph->title->SetFont(FF_FONT1,FS_BOLD);
	$graph->yaxis->title->SetFont(FF_FONT1,FS_BOLD);
	$graph->xaxis->title->SetFont(FF_FONT1,FS_BOLD);

	// Display the graph
	$graph->Stroke();
}
if (!isset($arr))
{
	header("Content-Type: text/html");
	print("<HTML><HEAD><TITLE>Name Surfer</TITLE>");
	print("</HEAD>");
	print("<BODY>");
	print("$name not found in the database.");
	print("</BODY></HTML>");
}
}
?>
```

Output



Summary

- We discussed how to integrate business graphics with a simple database web application
- Should have error checking for no user found, SQL injection, etc.
- Similar process for updating and modifying the database
- Very easy to make simple graphics
- Libraries for more complex graphs
- Overall it is fairly easy to create sophisticated web applications
  - Other environments like .NET encapsulate much of the primitive HTML information, e.g. datagrid