Creating A Simple Calendar in PHP

By Gareth Downes-Powell

In this tutorial, we're going to look at creating calendars in PHP. In this first part of the series we build a simple calendar for display purposes, looking at the techniques involved. In the second part we'll build a more advanced calendar that can display events for each day for example and has customised styling.

As well as being useful, calendars use a number of different programming techniques, which can be utilised in many other areas. We'll also look at the best ways to work with times and dates, and how to find the number of days in a month, or what weekday a date fall on for example.

The most important command when building calendars is the PHP **`date()`** command, so let's look at this first.

The PHP Date() Command

Overview

The PHP `date()` command is incredibly useful, due to the different data that it can return. Although we'll look at some of the functions here, for a full overview of the command its well worth checking out the command in the online PHP manual at http://www.php.net/manual/en/function.date.php

The format for the `date()` command is:

```
date($dateFormat, (optional timestamp))
```

$dateFormat contains a string containing tokens which tell the date command which information to return. **Optional timestamp** is a UNIX timestamp which represents the date that you want to work with; if it's not given then the date command will automatically work with the current date. As well as working with dates, the `date()` command can also work with times.

As an example of how the `date()` command is used, we'll look at a few examples:

```
<?php echo date(“m/d/Y”); ?>
```

This returns the current date in the format `mm/dd/yyyy` e.g. `10/12/2003`

```
<?php echo date(“l, jS F Y”); ?>
```

This returns the date in the format `Sunday, 12`th `October 2003` for example

```
<?php echo date(“G:i”); ?>
```

This returns the time in the format `19:06` for example

```
<?php echo date(“h:i a”); ?>
```

This returns the time in the format `7:06 am`

You can see that the date( ) command is extremely versatile, and allows you to create times and dates in many different formats. It can also return other useful information such as the number of days in the current month, the current day of the week, whether it's a leap year etc. All of these come in extremely useful when creating a calendar, and saves a lot of manual coding.

Now let's look at some of the tokens that we are going to be using.

Useful tokens

Because there are over 30 tokens available, we won't look at them all here. Instead, we'll look at a selection of the most useful tokens, and the ones were going to use to build our calendar. To see a complete list of all the tokens (which is well worth printing out for reference), see the online PHP manual at:
http://www.php.net/manual/en/function.date.php

Token	*Description*	*Example of Output*
d	Day of the month, 2 digits with leading zeros	01 - 31
D	3 Letters representing the day	Mon – Sun
F	Month Name	January – December
h	Hour with leading zeros	01 – 12
H	Hour in 24 Hour Format	00 – 23
i	Minutes	00 – 59
j	Day	1 – 31
l	Day of the week	Sunday – Saturday
L	Whether it's a Leap Year	0 = no, 1 = yes
m	Month Number	1 – 12
M	Month Name	Jan – Dec
t	Number of days in month	28 - 31
w	Number representing day of week	0 = Sunday – 6 = Saturday
W	ISO-8601 Week Number (weeks start on Monday)	E.g. 34
y	Year (2 digits)	99 or 03
Y	Year (4 digits)	1999 or 2003
z	Number representing Day of the Year	0 - 366

Table 1 – Useful date tokens

Note that the case of the tokens is important, and a lowercase letter and the same uppercase letter can represent two different formats. You can also have several different tokens in the same string.

If you include any characters in the token string that aren't actually tokens, these tokens will be left unchanged so you can use them for adding your own formatting to the output. For example, if you wanted the current date in the MySQL date format (yyyy-mm-dd) then you could use:

```
<?php echo date("Y-m-d"); ?>
```

This would output `2003-12-10` for example, and you can see that the hyphens (-) have been left unchanged and are included in the output. Any non token characters can be used e.g.

```
<?php echo date("m/d/Y"); ?>
```

would output `10/12/2003` for example.

Now that we've looked at how the `date()` command is used, and at the tokens we have available we can move on and start looking at building a calendar.

Building the Calendar

In this section were going to start building the calendar that will display a single month, which we will expand upon in the second part of this tutorial. Create a new PHP page in Dreamweaver MX, and save it as `single_month`.php.

Displaying the current month

There are two steps to creating the calendar, creating the HTML and then making it dynamic. It always helps to create a mock up in plain HTML of how you want the end result to look, and then you can create your dynamic PHP that creates the actual HTML. Using this method means its much more likely that your code creates valid HTML, as there's less chance of forgetting closing tags etc.

Creating the HTML

To create the calendar we'll use two tables. The first table is the outer frame and has 2 rows and 1 column, in the example below the table is 280 pixels wide. In the bottom row, there is another table with 6 rows and 7 columns, each column being 40 pixels wide (40 x 7 = 280 pixels)

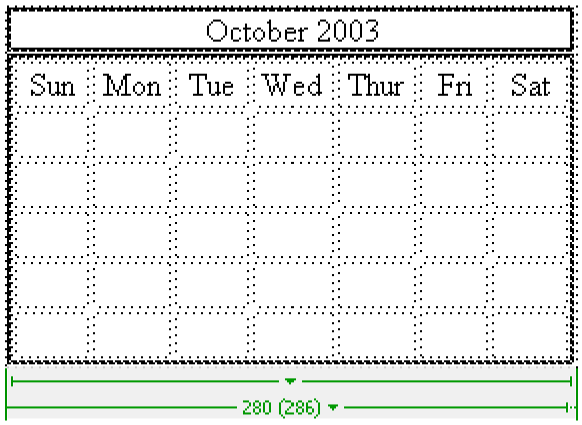


Figure 1 – Example HTML layout

Now that we have the HTML structure created, we can use PHP to automatically generate the HTML code needed, and to fill in the date dynamically.

Creating the PHP

The first step to creating the PHP is to create the basic table layout. To do this, an easy way is to copy and paste from your HTML calendar code, and convert it to be outputted through PHP. Because of the amount of code that will be dynamic in this example, it's easier to generate the whole calendar using PHP, rather than inserting PHP into the HTML.

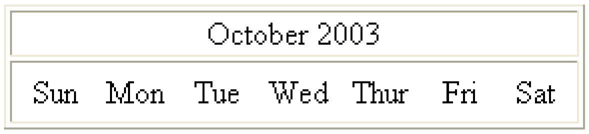
At the moment, we just need the basic layout, so we can leave out the rows that will contain dates as we'll add them next. The code below is shown as an example:

```
<?php
echo “<table width=‘280’ border=‘1’>\n”;
  echo “<tr>\n”;
    echo “<td align=‘center’>October 2003</td>\n”;
  echo “</tr>\n”;
  echo “<tr>\n”;
    echo “<td>\n”;
      echo “<table width=‘280’  border=‘0’ cellspacing=‘2’ cellpadding=‘2’>\n”;
        echo “<tr align=‘center’>\n”;
          echo “<td width=‘40’>Sun</td>\n”;
          echo “<td width=‘40’>Mon</td>\n”;
          echo “<td width=‘40’>Tue</td>\n”;
          echo “<td width=‘40’>Wed</td>\n”;
          echo “<td width=‘40’>Thur</td>\n”;
          echo “<td width=‘40’>Fri</td>\n”;
          echo “<td width=‘40’>Sat</td>\n”;
        echo “</tr>\n”;
      echo “</table>\n”;
    echo “</td>\n”;
  echo “</tr>\n”;
echo “</table>\n”;
?>
```

Code Block 1 – Creating the basic framework using PHP

When you're creating a table like this using PHP, it makes it much easier to see what's going on if you tabulate the code as shown above to preserve the structure. This makes it much easier to spot if you have missed a closing HTML tag e.g. `</tr>` and makes debugging much easier.

When this code is viewed in a browser, the following output is displayed.



October 2003						
Sun	Mon	Tue	Wed	Thur	Fri	Sat

Figure 2 – Basic Layout

Not very exciting at the moment but we have our basic layout in place. We can now expand on this to add the dates that need to be displayed.

The first job we have is to work out which day of the week the first day of the month falls on. We can do this with the following block of PHP, which is placed before our previous code.

```
$month = date(“n”);
$year = date(“Y”);
$firstDay = mktime(0,1,0,$month,1,$year);
$daysInMonth = date(“t”,$firstDay);
$firstDay = date(“w”,$firstDay);
```

Code Block 2 – Calculating the first day of the month and the number of days in the month

First, we use the token “n” which places the current month number in $month, and the token “Y” which represents the year using 4 figures and places it in $year. Next, we need to create a timestamp which corresponds to the first day of the month e.g. $month/1/$year. To do this we use the PHP **mktime()** command which has the following format:

```
$timeStamp = mktime(hour,minute,second,month,day,year);
```

So, to create a timestamp representing $month/1/$year we use **mktime(0,1,0,$month,1,$year)** which represents 00:01:00 on $month/1/$year. Now that we have a timestamp, we can use it with the date() parameter to see which day of the week it falls upon, which is placed in **$firstDay**.

Now that we know what day of the week the first of the month falls on, we can put the first in the correct cell of the table.

Finally, we use the date() command again, with the token “t” to find out the number of days in the month. Now we know these two important bits of information we can complete the table containing the dates.

We’ll now add the code to create the rest of the table and fill in the dates. To keep things clear, the code for the whole page is shown below. We’ll then look at the code parts in sections.

```
<?php
$month = date(“n”);
$year = date(“Y”);
$firstDay = mktime(0,1,0,$month,1,$year);
$daysInMonth = date(“t”,$firstDay);
$firstDay = date(“w”,$firstDay);

echo “<table width=‘280’  border=‘1’>\n”;
  echo “<tr>\n”;
    echo “<td align=‘center’>“ . date(“F Y”) . “</td>\n”;
  echo “</tr>\n”;
  echo “<tr>\n”;
    echo “<td>\n”;
      echo “<table width=‘280’  border=‘0’ cellspacing=‘2’ cellpadding=‘2’>\n”;
        echo “<tr align=‘center’>\n”;
          echo “<td width=‘40’>Sun</td>\n”;
          echo “<td width=‘40’>Mon</td>\n”;
          echo “<td width=‘40’>Tue</td>\n”;
          echo “<td width=‘40’>Wed</td>\n”;
          echo “<td width=‘40’>Thu</td>\n”;
          echo “<td width=‘40’>Fri</td>\n”;
          echo “<td width=‘40’>Sat</td>\n”;
        echo “</tr>\n”;
        # Calculate number of rows
        $totalCells = $firstDay + $daysInMonth;
        if($totalCells < 36){
          $rowNumber = 5;
        } else {
          $rowNumber = 6;
        }
        $dayNumber = 1;
        # Create Rows
        for($currentRow=1; $currentRow <= $rowNumber; $currentRow++){
          if($currentRow == 1){
            # Create First Row
            echo “<tr align=‘center’>\n”;
            for($currentCell  = 0; $currentCell<7; $currentCell++){
              if($currentCell == $firstDay){
                # First Day of the Month
                  echo “<td width=‘40’>“ . $dayNumber . “</td>\n”;
                  $dayNumber++;
              } else {
                if($dayNumber > 1){
                  # First Day Passed so output Date
                  echo “<td width=‘40’>“ . $dayNumber . “</td>\n”;
                  $dayNumber++;
                } else {
                  # First Day Not Reached so display blank cell
                  echo “<td width=‘40’>&nbsp;</td>\n”;
                }
              }
            }
            echo “</tr>\n”;
          } else {
            # Create Remaining Rows
            echo “<tr align=‘center’>\n”;
            for($currentCell = 0; $currentCell < 7; $currentCell++){
              if($dayNumber > $daysInMonth){
                # Days in month exceeded so display blank cell
                  echo “<td width=‘40’>&nbsp;</td>\n”;
              } else {
                  echo “<td width=‘40’>“ . $dayNumber . “</td>\n”;
                  $dayNumber++;
              }
            }
            echo “</tr>\n”;
          }
        }
      echo “</table>\n”;
    echo “</td>\n”;
  echo “</tr>\n”;
echo “</table>\n”;
?>
```

Code Block 3 - Complete Code for displaying a Calendar Month

At the moment, we have the basic table constructed, and a row containing the days of the week. We need to now fill in the rest of the rows with the appropriate dates. The first job is to work out the number of rows that our table will need, which uses the code block shown below:

```
        # Calculate number of rows
        $totalCells = $firstDay + $daysInMonth;
        if($totalCells < 36){
          $rowNumber = 5;
        } else {
          $rowNumber = 6;
        }
        $dayNumber = 1;
```

Code to calculate the number of rows needed to display the calendar dates

The number of rows needed depends on two things. First, is the day of the month (if the first day of the month falls on a Saturday, there can be only one date in the first row), and second the number of days in the current month. Either way we will need either 5 or 6 rows, we just need to work out which.

To do this we first add the weekday number (0-6) to the number of days in the month. If the result is less than 36 we can fit the dates into 5 rows (7 * 5 = 35), otherwise we will require 6 rows to show the data. The variable $rowNumber is set to the appropriate number of rows.

Finally, we create a new variable **`$dayNumber`** which will hold the current date that we're working on.

Next we have part of the structure shown below:

```
        for($currentRow=1; $currentRow <= $rowNumber; $currentRow++){
          if($currentRow == 1){
            # Code removed for clarity
          } else {
            # Code removed for clarity
          }
        }
```
Basic structure of the code to generate the calendar roads

This has the code removed from the inner section for clarity. What we are doing is setting up a for loop which will run once for each row of the table that we are creating. Inside that we check if we are working on the first row of the date section or one of the other rows.

First we'll look at the section of code that creates the first row, this block is shown below:

```
          if($currentRow == 1){
            # Create First Row
            echo “<tr align=‘center’>\n”;
            for($currentCell = 0; $currentCell<7; $currentCell++){
              if($currentCell == $firstDay){
                # First Day of the Month
                  echo “<td width=‘40’>“ . $dayNumber . “</td>\n”;
                  $dayNumber++;
              } else {
                if($dayNumber > 1){
                  # First Day Passed so output Date
                  echo “<td width=‘40’>“ . $dayNumber . “</td>\n”;
                  $dayNumber++;
                } else {
                  # First Day Not Reached so display blank cell
                  echo “<td width=‘40’>&nbsp;</td>\n”;
                }
              }
            }
            echo “</tr>\n”;
          } else {
```
Code block to generate the first date row

We have to create different code to create the first row so that we can take into account which day of the week that the month started on.

First we output the HTML `<tr>` tag for the first row of the table.

We then have a for loop which will run 7 times, once for each column in the row. We then work through each cell, checking whether the current cell is equal to the position of the first day of the month. If it is, then we output 1 and increment `$dayNumber` by 1 so that it contains the next date.

If the position of the current cell does not equal the **`$currentCell`** value we can have one of two situations. The first is that we haven't reached the first day of the month position yet, in which case `$dayNumber` will still be 1, and we output a blank cell. If we have gone past the first day of the month position then we can simply output a cell containing the current day number.

We then output a closing HTML `</tr>` tag to close the first row.

Finally, we can output the rest of the rows in the table which we do with the rest of the code, repeated below:

```
          } else {
            # Create Remaining Rows
            echo "<tr align='center'>\n";
            for($currentCell = 0; $currentCell < 7; $currentCell++){
              if($dayNumber > $daysInMonth){
                # Days in month exceeded so display blank cell
                  echo "<td width='40'>&nbsp;</td>\n";
              } else {
                  echo "<td width='40'>" . $dayNumber . "</td>\n";
                  $dayNumber++;
              }
            }
            echo "</tr>\n";
          }
        }
```
Code to display the other date rows

This section of code is simpler. We just have to keep outputting the date until we have reached the figure indicating the number of days in the month, and then we just output blank cells until the table is completed.

As before, we first output an opening HTML `<tr>` tag. We then have a for loop which runs 7 times, once for each column in the row.

If we have exceeded the number of days in the month, which is stored in **`$daysInMonth`** then we output a blank cell. If the day number hasn't exceeded the number of days in the month then we output the day number, and then increment the day number by 1.

Finally, we close the row with an HTML `</tr>` tag to make sure the HTML is valid.
Formatting Tip

You may have noticed that throughout this tutorial many HTML tags have had the character "\n" at the end, as shown in the example code below.

```
          echo “<td width=‘40’>Sun</td>\n”;
          echo “<td width=‘40’>Mon</td>\n”;
          echo “<td width=‘40’>Tue</td>\n”;
          echo “<td width=‘40’>Wed</td>\n”;
          echo “<td width=‘40’>Thu</td>\n”;
          echo “<td width=‘40’>Fri</td>\n”;
          echo “<td width=‘40’>Sat</td>\n”;
```

When you use PHP to output HTML, if you view the source in a browser, the original formatting is lost (and we're only talking about viewing the source here rather than the actual web display). Without the new line character (\n) the output above would look like that below:

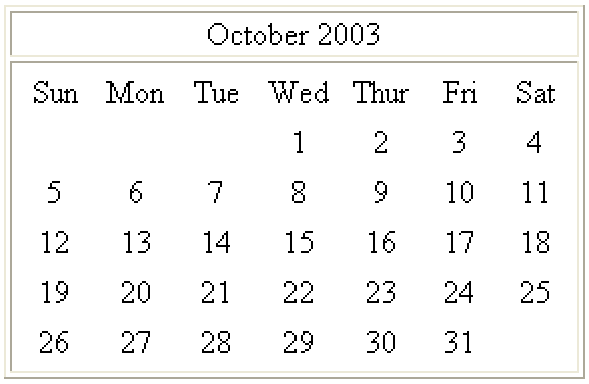
```
<td width=‘40’>Sun</td><td width=‘40’>Mon</td><td width=‘40’>Tue</td><td
width=‘40’>Wed</td><td width=‘40’>Thu</td><td width=‘40’>Fri</td><td
width=‘40’>Sat</td>
```

This makes it difficult to spot errors in the HTML generated whilst you're debugging. By appending the new line character to the end of the line, the formatting stays as intended in the browser's view source mode, and is much easier to debug, and also looks more professional.

```
<td width=‘40’>Sun</td>
<td width=‘40’>Mon</td>
<td width=‘40’>Tue</td>
<td width=‘40’>Wed</td>
<td width=‘40’>Thu</td>
<td width=‘40’>Fri</td>
<td width=‘40’>Sat</td>
```

The Calendar Output

When the code in Code Block 3 (full code) is run, you should see something similar to the screenshot below.



October 2003

Sun	Mon	Tue	Wed	Thur	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Figure 3 – Example output

In the example above you can see that the first day of the month is shown under the correct day, and that the month is shown with the correct number of days.

In the next part of this tutorial, we will look at styling the calendar using CSS, and making more advanced calendars that can interact with a database.

Summary

In this article, we've looked at how to use the PHP `date()` command to retrieve useful information about the current date of a provided timestamp. We also looked at using the PHP `mktime()` command, to turn any date and / or time into a UNIX timestamp for use with the `date()` command.

Next we created the HTML structure for the calendar, which we then made dynamic using PHP to layout the calendar in the correct order. We also looked at formatting the HTML output so that it shows neatly in the browsers view source display,