EARTHQUAKE

Seismic Activity Website Code Sample

BACKGROUND

I designed and coded a website that tracks seismic activity in real-time worldwide. The user can see seismic activity that occurred within the last hour, day, week, and month. The website uses a combination of HTML, PHP, CSS/CSS3, JavaScript/jQuery, and MySQL.

DYNAMIC CONTENT

The main challenge while making this website involved creating animated circles to mark where seismic activity occurred and making sure that they showed up on the map in the right location. This process involved converting the latitude and longitude coordinates that accompanied each seismic occurrence into x and y coordinates that could be plotted on the website's map. Below is a sample that shows the key parts to this process.

PHP

A foreach statement is used to loop through the seismic activity data and plot each occurrence on the map.

```
/* Plot Earthquake On The Map */

<?php                    2
        foreach($phpObj->features as $result){
                $mag = $result->properties->mag;
                $long = $result->geometry->coordinates[0];
                $lat = $result->geometry->coordinates[1];

                echo “                                                    1                    1
                        <div class='spot_container' style='margin-left: “.latToX($lat).”px; margin-top: “.lonToY($long).”px;'>
                        <div class='spot_animated' style=' “.$animation_delay.”;'>
                        </div>  3
                        </div>”;
        }
?>
```

1 The function below converts the latitude and longitude coordinates to web-friendly X,Y coordinates. Calculations take into account the Mercator map projection that is used on the website.

```
/* Lat/Long to X/Y */
        function latToX($lat){
           return (($lat/360)+0.5)*904;
        }
```

```
function lonToY($long){
    return ((abs((asinh(tan(deg2rad($long)))/M_PI/2)-0.5)))*786;
}
```

2 Real-time earthquake data (geoJSON) is gathered from usgs.gov/. The information can be sorted based on the interval that is selected (month, week, day, hour). The JSON is decoded and PHP is used to navigate through the data to get the magnitude, and latitude and longitude coordinates.

```
/* Sort by interval */

        if ($_REQUEST['sort']=="month") {

                $json_url = file_get_contents('http://earthquake.usgs.gov/earthquakes/feed/geojson/2.5/month');

        } elseif ($_REQUEST['sort']=="week") {

                $json_url = file_get_contents('http://earthquake.usgs.gov/earthquakes/feed/geojson/1.0/week');

        } elseif ($_REQUEST['sort']=="day") {

                $json_url = file_get_contents('http://earthquake.usgs.gov/earthquakes/feed/geojson/all/day');

        } else {

                $json_url = file_get_contents('http://earthquake.usgs.gov/earthquakes/feed/geojson/all/hour');

        }

/* JSON decode */

        $phpObj = json_decode($json_url);
```

CSS

3 CSS3 animations and keyframes were used to create the animated circles that pinpoint the seismic activity. Creating circles that grew and shrank was a surprisingly complicated process for such a simple effect.

```
/* Spot Animation */
.spot_animated {
                animation:mycircle 3s infinite;
                -moz-animation:mycircle 3s infinite; /* Firefox */
                -webkit-animation:mycircle 3s infinite; /* Safari and Chrome */
                -o-animation:mycircle 3s infinite; /* Opera */
                border: 0px;
                }

                @keyframes mycircle
                {
                0%   {background: <?php echo $bgcolor1 ?>;}
                50%  {background: <?php echo $bgcolor2 ?>; height:0px; width:0px; margin: 9px;}
                }
```

```
@-moz-keyframes mycircle /* Firefox */
{
0%   {background: <?php echo $bgcolor1 ?>;}
50%  {background: <?php echo $bgcolor2 ?>; height:0px; width:0px; margin: 9px;}
}

@-webkit-keyframes mycircle /* Safari and Chrome */
{
0%   {background: <?php echo $bgcolor1 ?>;}
50%  {background: <?php echo $bgcolor2 ?>; height:0px; width:0px; margin: 9px;}
}

@-o-keyframes mycircle /* Opera */
{
0%   {background: <?php $bgcolor1 ?>;}
50%  {background: <?php echo $bgcolor2 ?>; height:0px; width:0px; margin: 9px;}
}
```