Homework 6: Server-side Scripting

1. Objectives

- Get experience with PHP programming language.
- Get experience with Zillow Web Service API.
- Get experience using an XML parser in PHP.

2. Description

In this exercise, you are asked to create a webpage that allows users to search for real estate listings using the Zillow API (www.zillow.com) and the results will be displayed in a tabular format.

A user will first open a page as shown below in Figure 1, where he/she can enter a property address in the format (Street address, city, state) for listing its information in Zillow if available. The state text-field should be a drop-down list of all US states abbreviated in two letters (e.g., CA or IN). An example is shown in Figure 1.

Figure 1: Initial Screen to Enter Property Address

The user should enter values for street address, city and state before clicking on the Search button. Once the user clicks on Search, a JavaScript program will check that the data is valid. If the user did not enter one of the data items, then an alert message should be shown with an appropriate message prompting the user to provide complete information. An example of the alert message is shown in Figure 2, and an example of valid input is shown in Figure 3.

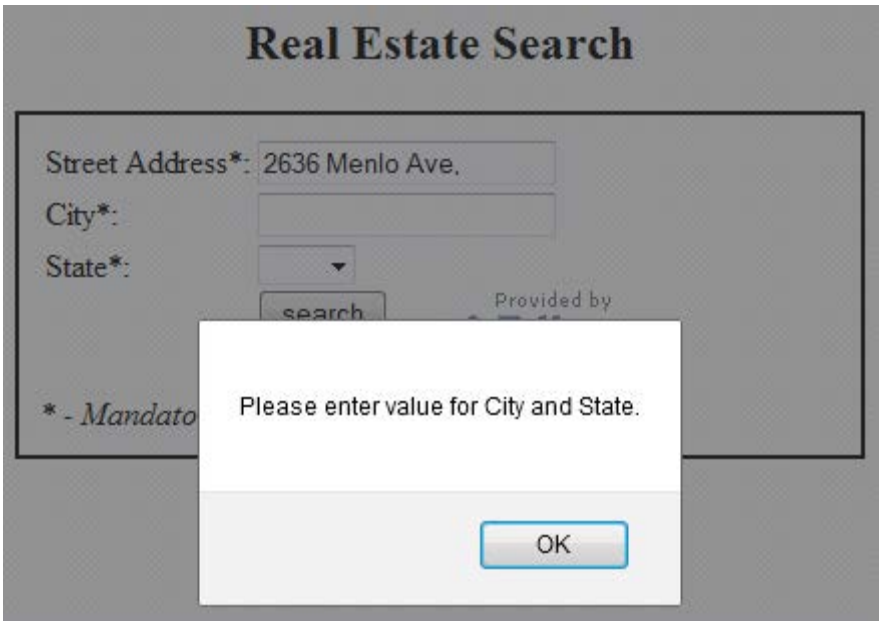

Figure 2: Error when providing incomplete address

Figure 3: An Example of Valid Input

Once the user has provided valid data, your script will make a request to your web server providing it with the form data that was entered. You can use either GET or POST to transfer the form data to the web server. A PHP script will grab the data and send it to the Zillow Web Service.

To obtain the real estate information from Zillow, your PHP script will construct a URL to query the Zillow Web service using the property address that was provided. For example, suppose we want to search for the real estate information for the address *2636 Menlo Ave, Los Angeles, CA*. The following URL retrieves its information from the Zillow portal.

http://www.zillow.com/webservice/GetDeepSearchResults.htm?zws-id=*yourZillowID*&address=2636+Menlo+Avenue&citystatezip=los+angeles%2C+CA&rentzestimate=true.

The Zillow web service URL retrieves an XML response and your PHP script should parse the returned XML file and extract the necessary information to display data in a tabular format below the search form. A sample output is shown in Figure 4. How to interpret the returned XML is explained in section 3.

Real Estate Search

Street Address*: 2636 Menlo Ave
City*: Los Angeles
State*: CA
search
Provided by Zillow

* - *Mandatory fields.*

Search Results

See more details for **2636 Menlo Ave, Los Angeles, CA-90007** on Zillow

Property Type:	Duplex	Last Sold Price:	$115000
Year Built:	1924	Last Sold Date:	29-Jul-1996
Lot Size:	5242 sq. ft.	Zestimate ® Property Estimate as of 21-Sep-2014	$489,341.00
Finished Area:	1728 sq. ft.	30 Days Overall Change ↓:	$2,936.00
Bathrooms:	2.0	All Time Property Range:	$440,407.00 - $543,169.00
Bedrooms:	2	Rent Zestimate ® Valuation as of 22-Sep-2014:	$1,899.00
Tax Assessment Year:	2013	30 Days Rent Change ↑:	$47.00
Tax Assessment:	$152,082.00	All Time Rent Range:	$1,348.00 - $2,583.00

What's a Zestimate?

Figure 4: Search Result

If the property address is incorrect or the Zillow portal does not have information for the property address, your page should show the message "*No exact match found -- Verify that the given address is correct*". For example when entering the address "1149 W 36th St, Los Angeles, CA" a sample output is shown in Figure 5.

Figure 5: Example Output for a Property Address for Which Zillow Has No Information

3 RETURNED XML FILES

The returned XML from Zillow contains a set of information. Figure 6 shows an example of a returned XML file from Zillow. We will guide you how to extract specific information to fill up the necessary data in the result data. The headline of top part shows the property address. Table 1 shows the mapping between the returned Zillow XML File and the result table. You should note that the value of "30 Days Overall Change" displayed in the result table is mapped to the "valueChange" XML entry. The value is either positive or negative. If it is positive the page should display an UP green arrow, otherwise it should display a red DOWN arrow. Similarly, you map the value of "30 Days Rent Change" in the result table with the entry "" which is either positive or negative. The arrow images are available at

- *http://cs-server.usc.edu:45678/hw/hw6/down_r.gif*
- *http://cs-server.usc.edu:45678/hw/hw6/up_g.gif*

All numbers should display the thousand operator (1500 → 1,500). All monetary numeric values which may or may not have decimal points should display only two decimal points (1500.562 → 1,500.56).

This XML file does not appear to have any style information associated with it. The document tree is shown below.


```
▼<SearchResults:searchresults xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:SearchResults="http://www.
 xsi:schemaLocation="http://www.zillow.com/static/xsd/SearchResults.xsd http://www.zillowstatic.com/vstatic/6eb1265/
  ▼<request>
     <address>2636 Menlo Ave</address>
     <citystatezip>los angeles, CA</citystatezip>
   </request>
  ▼<message>
     <text>Request successfully processed</text>
     <code>0</code>
   </message>
  ▼<response>
   ▼<results>
    ▼<result>
       <zpid>20593083</zpid>
      ▼<links>
       ▼<homedetails>
          http://www.zillow.com/homedetails/2636-Menlo-Ave-Los-Angeles-CA-90007/20593083_zpid/
        </homedetails>
       ▼<graphsanddata>
          http://www.zillow.com/homedetails/2636-Menlo-Ave-Los-Angeles-CA-90007/20593083_zpid/#charts-and-data
        </graphsanddata>
        <mapthishome>http://www.zillow.com/homes/20593083_zpid/</mapthishome>
        <comparables>http://www.zillow.com/homes/comps/20593083_zpid/</comparables>
      </links>
      ▼<address>
        <street>2636 Menlo Ave</street>
        <zipcode>90007</zipcode>
        <city>Los Angeles</city>
        <state>CA</state>
        <latitude>34.03163</latitude>
        <longitude>-118.289972</longitude>
      </address>
      <FIPScounty>6037</FIPScounty>
      <useCode>Duplex</useCode>
      <taxAssessmentYear>2013</taxAssessmentYear>
      <taxAssessment>152082.0</taxAssessment>
      <yearBuilt>1924</yearBuilt>
      <lotSizeSqFt>5242</lotSizeSqFt>
      <finishedSqFt>1728</finishedSqFt>
      <bathrooms>2.0</bathrooms>
      <bedrooms>2</bedrooms>
      <lastSoldDate>07/29/1996</lastSoldDate>
      <lastSoldPrice currency="USD">115000</lastSoldPrice>
     ▼<zestimate>
        <amount currency="USD">480706</amount>
        <last-updated>09/18/2014</last-updated>
        <oneWeekChange deprecated="true"/>
        <valueChange duration="30" currency="USD">-13313</valueChange>
       ▼<valuationRange>
          <low currency="USD">447057</low>
          <high currency="USD">557619</high>
        </valuationRange>
        <percentile>0</percentile>
      </zestimate>
     ▼<localRealEstate>
      ▼<region id="268581" type="neighborhood" name="West Adams">
         <zindexValue>502,900</zindexValue>
        ▼<links>
         ▼<overview>
            http://www.zillow.com/local-info/CA-Los-Angeles/West-Adams/r_268581/
          </overview>
         ▼<forSaleByOwner>
            http://www.zillow.com/west-adams-los-angeles-ca/fsbo/
          </forSaleByOwner>
          <forSale>http://www.zillow.com/west-adams-los-angeles-ca/</forSale>
        </links>
      </region>
    </localRealEstate>
   </result>
```


Figure 6: Example of a returned XML file from Zillow Web Service

Result Table	Tags in Zillow's XML
result header	street, city, state, zipcode Hyper Link: response->results->result->links->homeDetails
Property Type	useCode
Year Built	yearBuilt
Lot Size	lotSizeSqFt
Finished Area	finishedSqFt
Bathrooms	bathrooms
Bedrooms	bedrooms
Tax Assessment Year	taxAssessmentYear
Tax Assessment	taxAssessment
Last Sold Price	lastSoldPrice
Last Sold Date	lastSoldDate
Zestimate ® Property Estimate as of DATE	amount - last-updated DATE = zestimate->lastUpdated
30 Days Overall Change	valueChange
All Time Property Range	valuationRange->low - valuationRange->high
Rent Zestimate ® Rent Valuation as of DATE	rentzestimate->amount DATE = rentzestimate->lastUpdated
30 Days Rent Change	rentzestimate->valueChange
All Time Rent Range	rentzestimate->valuationrange->low- rentzestimate->valuationrange->high

Table 1: Mapping between Zillow XML File and Result Table

The result header is composed of Street Address, City and State. This information can be extracted from the XML entries: <street>, <zipcode>, <city>, and <state> under the <address> element in the returned XML. When clicking on the result header, a link in Zillow portal is opened to show more details about the property. This link can be obtained as the value of the <homeDetails> XML element.

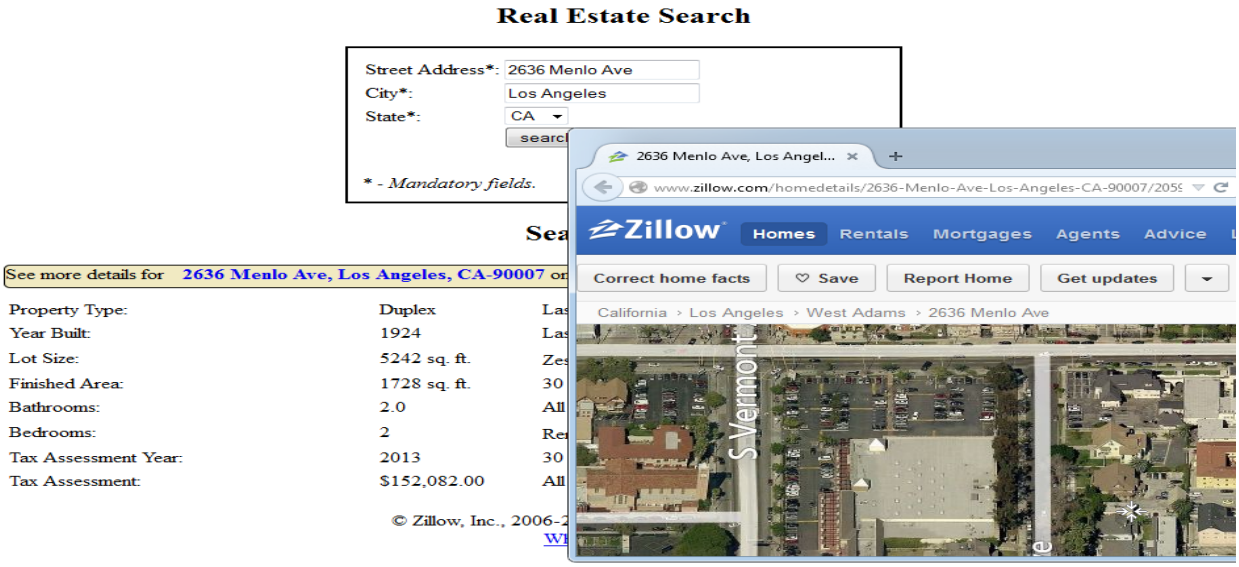

Figure 6: The Result of Clicking on the Link in the Result Header

4. Hints

4.1. Parsing XML files in PHP

You are free to choose any XML parsing library but we recommend *SimpleXML* API. The SimpleXML library is a simple way of getting an XML element's name, attributes, and text. As of PHP 5, the SimpleXML functions are part of the PHP core. No installation is required to use these functions. The following two tables show a set of functions which you may use. For more detailed information, please read:

- http://www.w3schools.com/php/php_xml_simplexml.asp
- http://php.net/manual/en/book.simplexml.php
- http://www.w3schools.com/php/php_ref_simplexml.asp

PHP 5 SimpleXML Functions

Function	Description
__construct()	Creates a new SimpleXMLElement object
addAttribute()	Adds an attribute to the SimpleXML element
addChild()	Adds a child element the SimpleXML element
asXML()	Formats the SimpleXML object's data in XML (version 1.0)
attributes()	Returns attributes and values within an XML tag
children()	Finds the children of a specified node
count()	Counts the children of a specified node
getDocNamespaces()	Returns the namespaces DECLARED in document
getName()	Returns the name of the XML tag referenced by the SimpleXML element
getNamespaces()	Returns the namespaces USED in document
registerXPathNamespace()	Creates a namespace context for the next XPath query
saveXML()	Alias of asXML()
simplexml_import_dom()	Returns a SimpleXMLElement object from a DOM node
simplexml_load_file()	Converts an XML file into a SimpleXMLElement object

simplexml_load_string()	Converts an XML string into a SimpleXMLElement object
xpath()	Runs an XPath query on XML data

PHP 5 SimpleXML Iteration Functions

Function	Description
current()	Returns the current element
getChildren()	Returns the child elements of the current element
hasChildren()	Cheks whether the current element has children
key()	Return the current key
next()	Moves to the next element
rewind()	Rewind to the first element
valid()	Check whether the current element is valid

4.2 Steps to get Zillow Web Services Identification (ZWSID).

Go to https://www.zillow.com/user/Register.htm and create a new account. You should provide your USC email and leave "I am an industry professional" **UNCHECKED**.

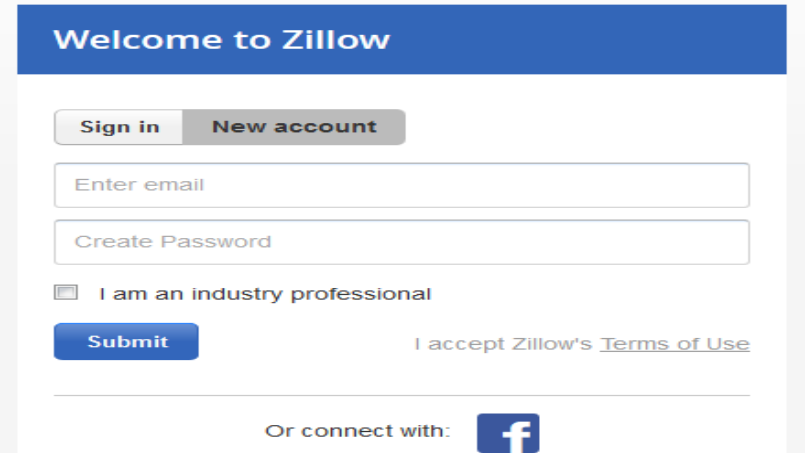

Figure 7: Zillow – create account

After creating your account, go to http://www.zillow.com/webservice/Registration.htm and fill in the details as below. Enter your first and last name, use "http://www-scf.usc.edu/~<user_name>

as the Example URL. Check all 4 APIs: Home Valuations, Property Details, Posting and Mortgage. Check the Terms of Use checkbox, click Submit.

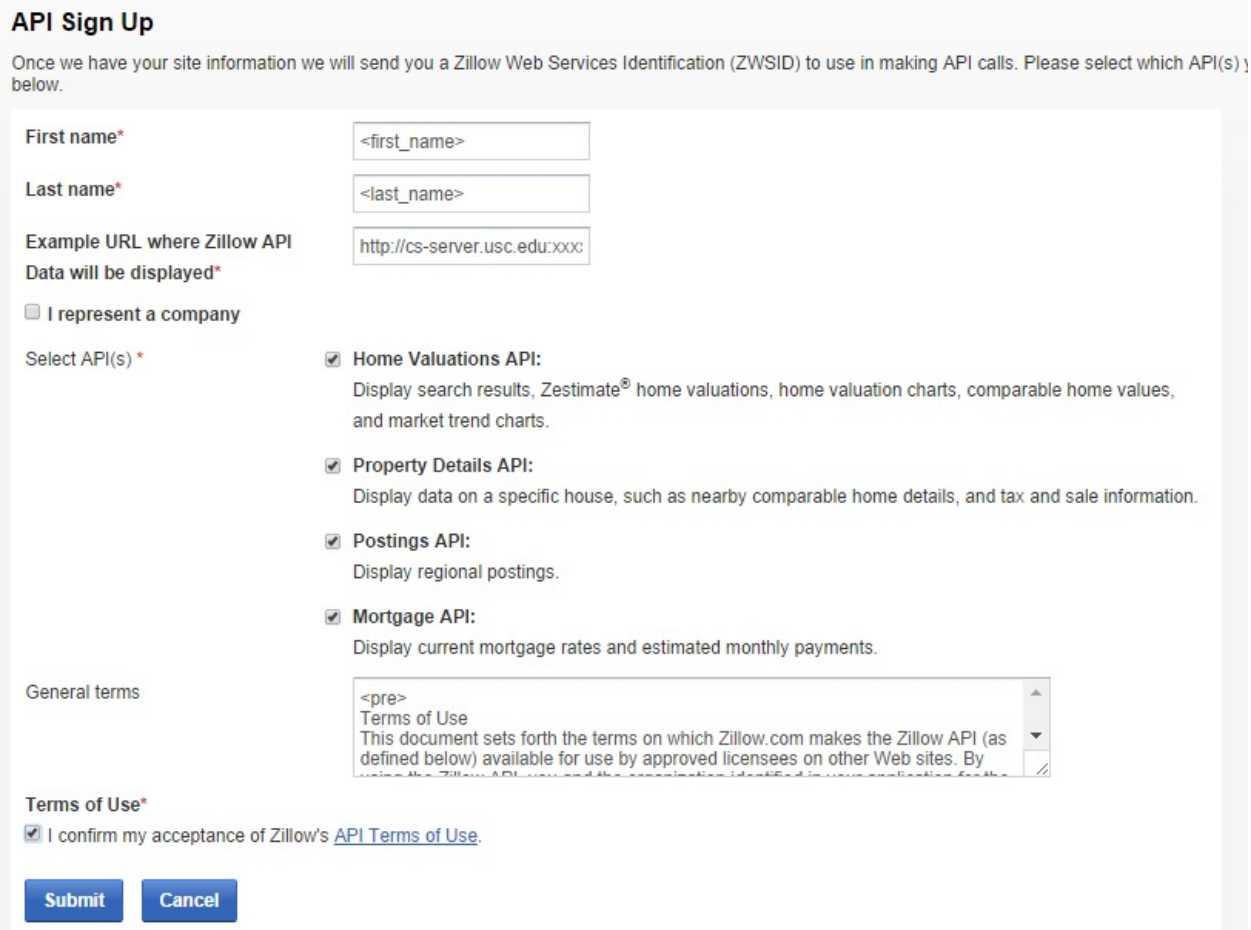

Figure 8: Zillow - Registration Form

- After this you will get your Zillow Web Services Identification (ZWSID) in the email. You will use this ZWSID to make calls to the Zillow APIs.

Figure 9: Zillow - Successful Registration

4.3 Zillow Branding Requirements

To use Zillow API, you have to include Zillow branding requirements in your page based on the instructions in http://www.zillow.com/howto/api/BrandingRequirements.htm.

1. Add Zillow Logo

In your page add the following fragment of code:
<img
src="http://www.zillow.com/widgets/GetVersionedResource.htm?path=/static/logos/Zillowlogo_150x40_rounded.gif" width="150" height="40" alt="Zillow Real Estate Search" />

2. Zillow Disclaimer

Below the result table you must mention Zillow disclaimer.

© Zillow, Inc., 2006-2014. Use is subject to Terms of Use
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3. Link to Zillow website

The result table header mentions the full address of the property. Because it also contains a link to the Zillow portal, you have to surround the address with the phrase:

See more details for [address] on Zillow

4. "Zestimate®" Label

In the result table beside “Property Estimate” add the label.

5. "Rent Zestimate®" Label

In the result table beside “Valuation as of ” add the label.

4.4 List of US States and Their Two-Letter Abbreviations

Two-Letter Abbreviation	State
AL	Alabama
AK	Alaska
AZ	Arizona
AR	Arkansas
CA	California
CO	Colorado
CT	Connecticut
DE	Delaware
DC	District Of Columbia
FL	Florida
GA	Georgia
HI	Hawaii
ID	Idaho

IL	Illinois
IN	Indiana
IA	Iowa
KS	Kansas
KY	Kentucky
LA	Louisiana
ME	Maine
MD	Maryland
MA	Massachusetts
MI	Michigan
MN	Minnesota
MS	Mississippi
MO	Missouri
MT	Montana
NE	Nebraska
NV	Nevada
NH	New Hampshire
NJ	New Jersey
NM	New Mexico
NY	New York
NC	North Carolina
ND	North Dakota
OH	Ohio
OK	Oklahoma
OR	Oregon
PA	Pennsylvania
RI	Rhode Island
SC	South Carolina
SD	South Dakota
TN	Tennessee
TX	Texas
UT	Utah
VT	Vermont
VA	Virginia
WA	Washington
WV	West Virginia
WI	Wisconsin
WY	Wyoming

5. Files to Submit

On your course homework page, you should update HW6 link to refer your new initial web page. Also, Submit your files (likely only a .php file) electronically to the csci571 account so that they can be graded and compared to all other students' code via the MOSS code comparison tool.

**IMPORTANT:

All discussion and explanation in Piazza related to this homework are part of the homework description. So please review all Piazza threads before finishing the assignment.