Homework: JSON Exercise

1. Objectives

- Become familiar with the navigating JavaScript JSON objects;
- Use of JSON.parse parser and synchronous XMLHttpRequest;
- Transform the content of a JSON document into an HTML page.

2. Description

You are required to write an HTML/JavaScript program, which takes the URL of a JSON document containing top grossing films information, parses the JSON file, and extracts the list of top grossing films, displaying them in a table. The JavaScript program will be embedded in an HTML file so that it can be executed within a browser.

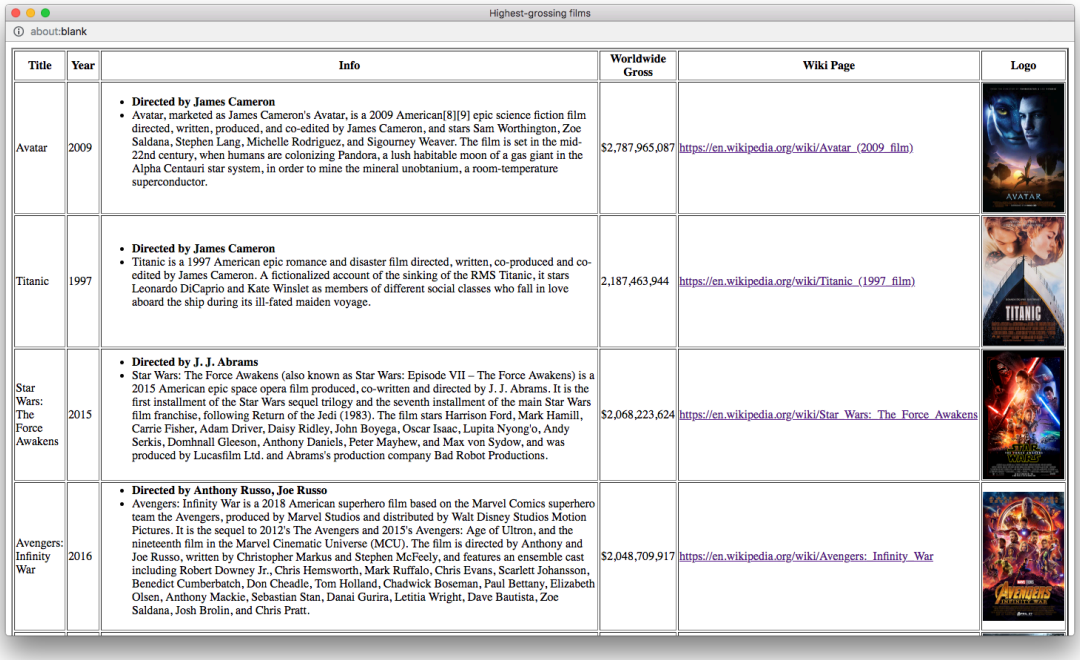
- Your program should display a text box to enter the JSON file name as shown below in Figure 1. On clicking the "Submit Query" button, your program should display the table as shown below, Figure 2. If the text box is left empty and Submit Query is clicked, an appropriate error message must be shown.

Figure 1: Initial Page

- Once the JSON file is downloaded, a JavaScript function within the HTML file parses the JSON document that was passed as an input in the edit box.
- After parsing the JSON document, a popup window or tab should display a table consisting of the data for all container shipping companies that are contained in the JSON file. For example, given the following JSON document:

http://csci571.com/hw/hw4/filmslist.json

the table below should be displayed:



Title	Year	Info	Worldwide Gross	Wiki Page	Logo
Avatar	2009	• **Directed by James Cameron** • Avatar, marketed as James Cameron's Avatar, is a 2009 American[8][9] epic science fiction film directed, written, produced, and co-edited by James Cameron, and stars Sam Worthington, Zoe Saldana, Stephen Lang, Michelle Rodriguez, and Sigourney Weaver. The film is set in the mid-22nd century, when humans are colonizing Pandora, a lush habitable moon of a gas giant in the Alpha Centauri star system, in order to mine the mineral unobtanium, a room-temperature superconductor.	$2,787,965,087	https://en.wikipedia.org/wiki/Avatar_(2009_film)	
Titanic	1997	• **Directed by James Cameron** • Titanic is a 1997 American epic romance and disaster film directed, written, co-produced and co-edited by James Cameron. A fictionalized account of the sinking of the RMS Titanic, it stars Leonardo DiCaprio and Kate Winslet as members of different social classes who fall in love aboard the ship during its ill-fated maiden voyage.	2,187,463,944	https://en.wikipedia.org/wiki/Titanic_(1997_film)	
Star Wars: The Force Awakens	2015	• **Directed by J. J. Abrams** • Star Wars: The Force Awakens (also known as Star Wars: Episode VII – The Force Awakens) is a 2015 American epic space opera film produced, co-written and directed by J. J. Abrams. It is the first installment of the Star Wars sequel trilogy and the seventh installment of the main Star Wars film franchise, following Return of the Jedi (1983). The film stars Harrison Ford, Mark Hamill, Carrie Fisher, Adam Driver, Daisy Ridley, John Boyega, Oscar Isaac, Lupita Nyong'o, Andy Serkis, Domhnall Gleeson, Anthony Daniels, Peter Mayhew, and Max von Sydow, and was produced by Lucasfilm Ltd. and Abrams's production company Bad Robot Productions.	$2,068,223,624	https://en.wikipedia.org/wiki/Star_Wars:_The_Force_Awakens	
Avengers: Infinity War	2016	• **Directed by Anthony Russo, Joe Russo** • Avengers: Infinity War is a 2018 American superhero film based on the Marvel Comics superhero team the Avengers, produced by Marvel Studios and distributed by Walt Disney Studios Motion Pictures. It is the sequel to 2012's The Avengers and 2015's Avengers: Age of Ultron, and the nineteenth film in the Marvel Cinematic Universe (MCU). The film is directed by Anthony and Joe Russo, written by Christopher Markus and Stephen McFeely, and features an ensemble cast including Robert Downey Jr., Chris Hemsworth, Mark Ruffalo, Chris Evans, Scarlett Johansson, Benedict Cumberbatch, Don Cheadle, Tom Holland, Chadwick Boseman, Paul Bettany, Elizabeth Olsen, Anthony Mackie, Sebastian Stan, Danai Gurira, Letitia Wright, Dave Bautista, Zoe Saldana, Josh Brolin, and Chris Pratt.	$2,048,709,917	https://en.wikipedia.org/wiki/Avengers:_Infinity_War	

Figure 2: Table containing films from filmslist.json

Here is a version of the ***filmslist.json*** file containing the data that is displayed above:


```
{
 "Mainline": {
  "Table": {
   "Header": {
    "Data": [
     "Title",
     "Year",
     "Info",
     "Worldwide Gross",
     "Wiki Page",
     "Logo"
    ]
   },
   "Row": [

    {
     "Title": "Avatar",
     "Year": "2009",
     "Hubs": {
```

```
        "Hub": [
          "Directed by James Cameron",
          "Avatar, marketed as James Cameron's Avatar, is a 2009 American[8][9] epic science fiction film directed, written, produced, and co-edited by James Cameron, and stars Sam Worthington, Zoe Saldana, Stephen Lang, Michelle Rodriguez, and Sigourney Weaver. The film is set in the mid-22nd century, when humans are colonizing Pandora, a lush habitable moon of a gas giant in the Alpha Centauri star system, in order to mine the mineral unobtanium, a room-temperature superconductor."
        ]
      },
      "Gross": "$2,787,965,087",
      "HomePage": "https://en.wikipedia.org/wiki/Avatar_(2009_film)",
      "Logo": "http://csci571.com/hw/hw4/avatar.jpg"
    },

    {
      "Title": "Titanic",
      "Year": "1997",
      "Hubs": {
        "Hub": [
          "Directed by James Cameron",
          "Titanic is a 1997 American epic romance and disaster film directed, written, co-produced and co-edited by James Cameron. A fictionalized account of the sinking of the RMS Titanic, it stars Leonardo DiCaprio and Kate Winslet as members of different social classes who fall in love aboard the ship during its ill-fated maiden voyage."
        ]
      },
      "Gross": "2,187,463,944",
      "HomePage": "https://en.wikipedia.org/wiki/Titanic_(1997_film)",
      "Logo": "http://csci571.com/hw/hw4/titanic.jpg"
    },


[.....]

    ]
  }
 }
}
```


3. Error Handling

An error condition that should be checked for a JSON file containing NO films. An example of a JSON files which does not contain films entries:


```
{
  "Mainline": {
 "Table": {
 "Header": {
  "Data": [
```

```
      "Title",
      "Year",
      "Info",
      "Worldwide Gross",
      "Wiki Page",
      "Logo"
    ]
       }
      }
     }
    }
```

In addition, your program should handle the case when the JSON file does not exist. A proper message should be displayed.

The "structure" of the input JSON files will not change. We will not test the case where one of the keys is missed. In other words, every *Row* always contains the keys: *Title*, *year*, *Hubs*, *Gross*, *HomePage*, and *Logo*. The *Hubs* tag contains an array with key *Hub*. Note that The *Hub* array may contain ZERO or more values.

If the value of a tag is empty, you should display a blank cell.

You are required to handle the case where the Header data values are different. Please note that the Data tag values might differ but the JSON structure remains the same. For example, the Header can be like this:

```
"Header": {
      "Data": [
        "Title of Movie",
        "Year of Release",
        "Notes",
        "Worldwide Gross",
        "Wikipedia Page",
        "Logo"
      ]
    },
```

No other error conditions need be checked. In all cases if an error is found your program should show an alert box indicating the error was detected.

4. Hints

- *Step 1: Writing Your HTML/JavaScript program - Using the DOM Parser*

Here's how you could use the Microsoft DOM API and the Mozilla DOM API (used in Firefox) to load and parse a JSON document into a DOM tree, and then use the DOM API to extract information from that document.

```
<script type="text/javascript">
var jsonDoc;
function loadJSON (url) {
    var xmlhttp=new XMLHttpRequest();
    xmlhttp.open("GET",url,false); //open, send, responseText are
    xmlhttp.send();              //properties of XMLHTTPRequest

    jsonDoc=xmlhttp.responseText;
    return jsonDoc;
 }
// ..... processing the document goes here
</script>
```

Now you can parse the JSON file with JSON.parse and generate the HTML table on the fly by navigating through the JSON object. You can assume that every JSON file will have identical Object, Array and key names.

Your task is to write a program that transforms this type of JSON file into the table as shown above.

- *Step 2: Display the Resulting HTML Document*

  You should use the DOM document.write method to output the required HTML.

- *Step 3: Use JavaScript control syntax*

  The only program control statements that you will need to use for this exercise are the "if" and the "for" statements. The syntax of both statements is practically identical to the syntax of the corresponding statement in the C, C++ and Java languages, as in:

```
if (container_keys[j]=="Image") {
      // do stuff
}
for (j=0; j<container_keys.length; j++) {
```

```
        // do more stuff
    }
```

Please make a note of the following issue:

Cross-Site Scripting (XSS):

JavaScript cannot call the resources from another domain. This is called cross side scripting which is not allowed in browsers. Therefore, you must put your JSON files and your script in the same domain. Please make sure, when you are testing your implementation, to place both the HTML file and the JSON file on your local machine IN THE SAME FOLDER. A sample file can be copied from here:

http://csci571.com/hw/hw4/filmslist.json

Window.open() method must be used to pop up a new window which would display the final widget.

Image files can be either local or remote, as these files do not exhibit the cross-site scripting issue.

Scrollable Window:
The popup window should be scrollable so the user can read all records listed in the window.

6. Image Test Files

These image files are provided for testing purpose.

http://csci571.com/hw/hw4/avatar.jpg
http://csci571.com/hw/hw4/titanic.jpg
http://csci571.com/hw/hw4/starwars.jpg
http://csci571.com/hw/hw4/infinitywar.jpg
http://csci571.com/hw/hw4/jurassicworld.jpg
http://csci571.com/hw/hw4/theavengers.jpg
http://csci571.com/hw/hw4/furious7.jpg

7. Material You Need to Submit

On your course homework page, your link for this homework should go to a page that looks like the one displayed in the Figure on page 1. **This page**

should include your entire JavaScript/HTML/CSS program in a single file. Also, you should upload your source code electronically to the csci571 GitHub Classroom account so that it can be compared to all other students' code via the MOSS code comparison tool. If your submission is composed of multiple files, 3 points will be deducted.