A JavaScript and PHP EPUB reader web application

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Agenda

○ Introduction to Project & Quick Demo

○ Preliminary Work Summary

○ Core of the Project

○ Experiments & Results

○ Future Work / Improvement

Introduction to Project

- What is EPUB
  - EPUB format
  - What a EPUB file includes
    - Open Publication Structure(OPS directory)
    - Open Packaging Format(content.opf)
      - <metadata>: bibliography and rights info
      - <manifest>:content document, CSS, image and Navigation Control file(toc.ncx)
      - <spine>: specify the order of the pages
    - Open eBook Publication Sturcture Container Format(OCF:container.xml)
      - Telling eReader app where to find content.opf

- Existing EPUB reader
  - iBook and Google Play Books
  - Firefox's add-on EPUBReader
  - eBook reader device

- Why is a EPUB reader web application
  - Drawback of eBook reader device
  - Drawback of Firefox add-on
  - Drawback of other eBook reader applications

Introduction to Project(cont.)

- What's our proposal
  - A JavaScript and PHP EPUB reader web application
  - Supports multiple platforms/systems
  - Allow user to read EPUB book easily across multiple devices
  - Allow multiple users to read the book simultaneously
  - Provide library service & bookshelf functionality

- [Quick Demo](#)

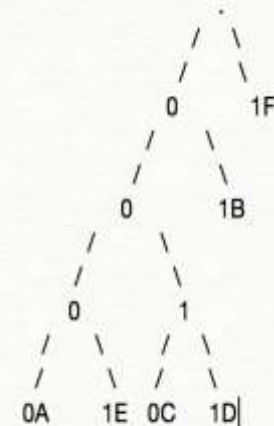# Preliminary Work Summary

- Why do a research on compression algorithm
    - EPUB file is a ZIP package includes XHTML content
    - How to decompress a ZIP file
    - How a ZIP file was compressed

- Compression/decompression algorithm
    - DEFLATE
    - SEQUITUR

- Implement SEQUITUR algorithm in JavaScript

- JSZip

Preliminary Work Summary(Cont.)

- DEFLATE algorithm
  - LZ77 algorithm (sliding window)
    - Length & Distance
    - <title>Test</title> can be compressed as <title>Test</[6;12]
  - Huffman code
    - 14 bytes string "FFDBABFCFFAFBE"
    - F: 1; B: 01; C: 0010;
    - D: 0011; A:0000; E:0001;

1100 1101 | 0000 0110 | 0101 1000 | 0101 0001|

C   D   0   6   5   8   3   1   (hex code)

Preliminary Work Summary(cont.)

- ○ SEQUITUR
  - ▪ Input string:
  "abbababbabbabbabab"
  - ▪ Final:
  {A -> ab, B -> Ab, C -> BA, S -> CCbCA}
  - ▪ Compressed as:
  RabR#0bR#1#0R#2#2b#2#0

- ○ Implement SEQUITUR in JavaScript

Letter	Aux	Production Table	Hash
a	a	{ }	{ }
b	ab	{ }	{ab}
b	abb	{ }	{ab,bb}
a	abba	{ }	{ab,bb,ba}
b	Abbab becomes AbA	{A->ab}	{Ab,bA}
a	AbAa	{A->ab}	{Ab,bA,Aa}
b	AbAab becomes AbAA	{ A->ab marked }	{Ab,bA,AA}
b	AbAAb becomes BAB	{ A->ab marked, B->Ab }	{BA,AB}
a	BABa	{ A->ab marked, B->Ab }	{BA,AB,Ba}
b	BABab becomes BABA becomes CC	{ A->ab marked, B->Ab, C->BA }	{CC}
b	CCb	{ A->ab marked, B->Ab, C->BA }	{CC,Cb}
a	CCba	{A->ab marked, B->Ab, C->BA }	{CC,Cb,ba}
b	CCbab becomes CCbA	{A->ab marked, B->Ab, C->BA }	{CC,Cb,bA}
b	CCbAb becomes CCbB	{A->ab marked, B->Ab marked, C->BA }	{CC,Cb,bB}
a	CCbBa	{A->ab marked, B->Ab marked, C->BA }	{CC,Cb,bB,Ba}
b	CCbBab becomes CCbBA becomes CCbC	{A->ab marked, B->Ab marked, C->BA marked }	{CC,Cb,bC}
a	CCbCa	{A->ab marked, B->Ab marked, C->BA marked }	{CC,Cb,bC,Ca}
b	CCbCab becomes CCbCA	{A->ab marked, B->Ab marked, C->BA marked }	{CC,Cb,bC,CA}

Preliminary Work Summary(cont.)

○ Implement SEQUITUR in JavaScript

Demo

```
<script type="text/javascript">
function compress() {
    var s = document.getElementById("submit").value;
    if (s.length < 3) {document.getElementById("demo").innerHTML = s;}
    else {
        var s1 = s[0].concat(s[1]);
        var R = new Array();
        var M = new Array();
        var last2Arr = new Array();
        last2Arr[0] = s1;
        var last2char;
        var final="";
        for (var i=2;i<s.length;i++){
            var c = s[i];
            s1 =s1.concat(c);
            last2char = s1[s1.length-2].concat(s1[s1.length-1]);
            if (last2Arr.indexOf(last2char) < 0)   {

                var index = R.indexOf(last2char);
                if (index >= 0)
                    {
                        M[index] = true; s1 = s1.replace(last2char,index);last2Arr.pop();
                        var last2char = s1[s1.length-2].concat(s1[s1.length-1]);
                        if (last2Arr.indexOf(last2char) < 0 )
                        {last2Arr.push(last2char);}
                        else {
                        R.push(last2char);
                        var index = R.indexOf(last2char);

                        var re = new RegExp(last2char,'g');
                        s1 = s1.replace(re,index);
                        last2Arr = new Array();
                        for (var j=0;j<s1.length-1;j++)
                            {
                            last2Arr.push(s1[j].concat(s1[j+1]));
                            }
                        }
                    }
                else {last2Arr.push(last2char); }
            }
            else {
                R.push(last2char);
                var index1 =  R.indexOf(last2char);

                var re = new RegExp(last2char,'g');
                s1 = s1.replace(re,index1);

                last2Arr = new Array();
                for (var j=0;j<s1.length-1;j++)
                    {
                    last2Arr.push(s1[j].concat(s1[j+1]));
                    }
            }
        }
        for (var i=0; i < R.length; i++){
            if (M[i] != true) {var re = new RegExp(i,'g'); s1 = s1.replace(re,R[i]); R[i] = i;}
        }

        for (var i=0;i<R.length;i++){
            final = final.concat("R" + R[i]);
        }
        final = final.concat("R" + s1);
        document.getElementById("demo").innerHTML = final;
```

```
function decompress(){
    var str = document.getElementById("submit_again").value;
    str = str.substr(1);
    var res = str.split("R");
    for (var j=res.length-2;j>=0;j--){
        if (res[j] != j)
        {var re = new RegExp(j,'g');
        res[res.length-1] = res[res.length-1].replace(re,res[j]);
        }
    }
    document.getElementById("origin").innerHTML = res[res.length-1];
}
```

Preliminary Work Summary(Cont.)

○ JSZip

  ○ What is JSZip

    ▪ A JavaScript Library for creating, reading and editing ZIP files
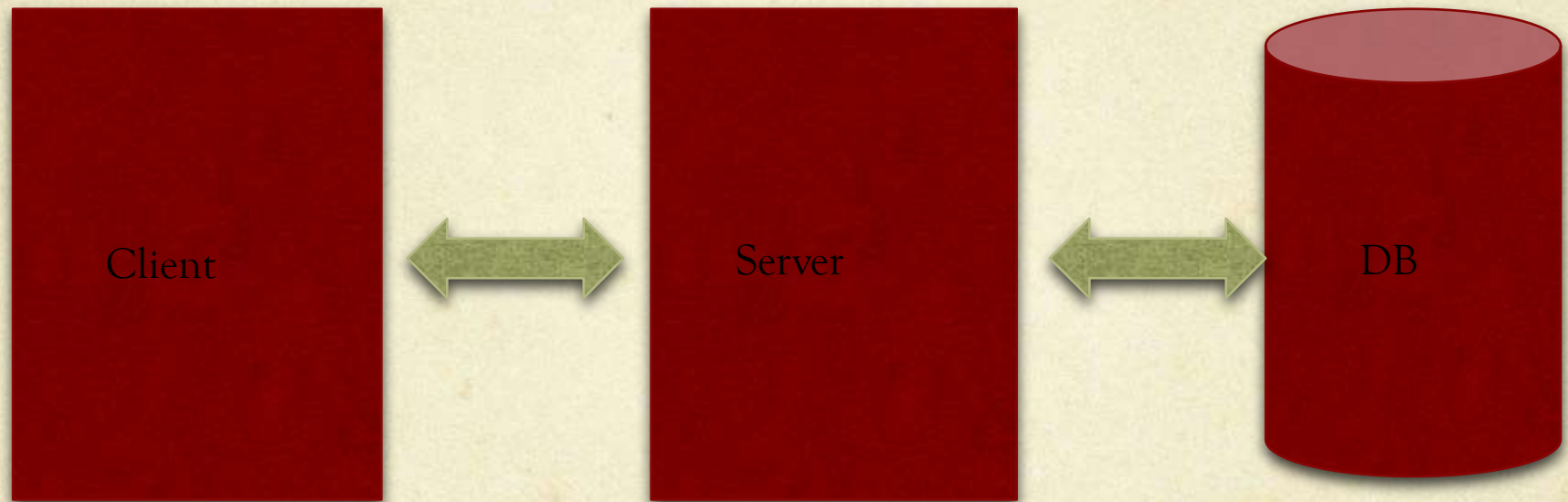
  ○ How to use it?

    ▪ Getting binary data with an AJAX request in the browser with JSZipUtils.getBinaryContent()

    ▪ Make an instance of JSZip()

    ▪ Update files with .file(filename)

    ▪ Getter method. asText()

```javascript
JSZipUtils.getBinaryContent('path/to/content.zip', function(err, data) {
  if(err) {
    throw err; // or handle err
  }

  var zip = new JSZip(data);
});
```

```javascript
var new_zip = new JSZip();
// more files !
new_zip.load(content);

// you now have every files contained in the loaded zip
new_zip.file("hello.txt").asText(); // "Hello World\n"
```

Core of the Project – Project Design

○ Database Architecture & Development Approach

Client	**Server**	**DB**

JavaScript, Html, CSS   PHP   MySQL

XAMPP: cross-platform web application solution stack, includes Apache Server, MySQL, and PHP

Core of the Project – Project Design(cont.)
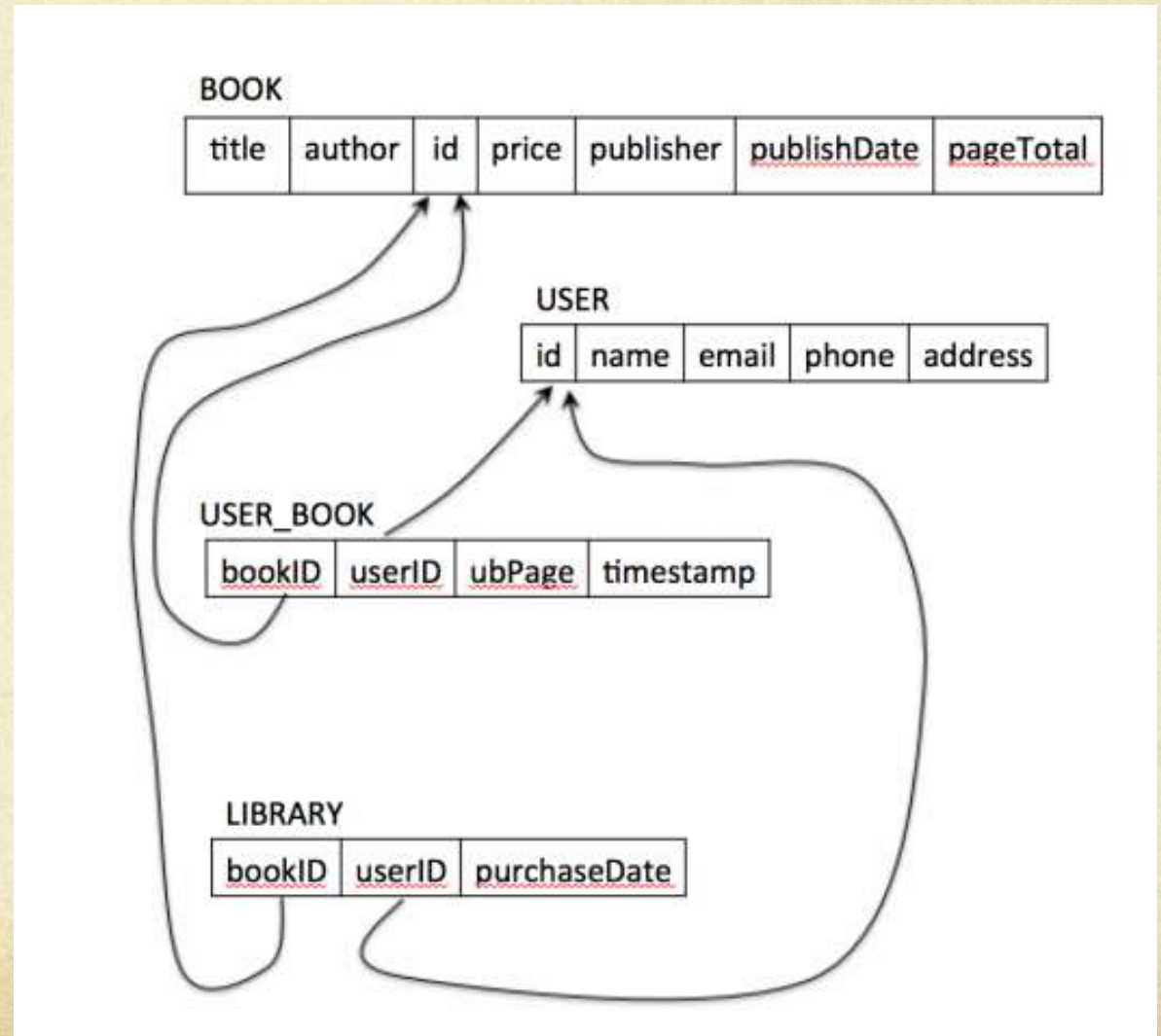
- PHP Model-View-Control pattern
  - Model - The lowest level of the pattern that is responsible for maintaining data.
  - View - This is responsible for displaying all or a portion of the data to the user.
  - Controller - Software code that controls the interactions between the Model and View.

Core of the Project – Project Design(cont.)

- What features we are going to provide in the project
  - Read EPUB book easily
    - no platform lock-in
    - no install
  - Track reading information
    - Save reading position periodically
    - Automatically bookmark
  - Bookshelf management
    - Manage reading books
  - Library service
    - Borrow book for free
    - Limitation: limited books due to copyright
    - Future work:
      - Upload book

Core of the Project – Project Design(cont.)

○ Database Schema

Core of the Project - Implementation

- Tasks list:
  - Unzip EPUB file and render content in the browser
  - Provide register and login/logout feature
  - Register users can borrow books
  - Tracking users' reading info automatically
  - Display to user the correct page
    - Display to user the exact same page as he left off last reading (login/recent book)
    - Display the correct page of each book in the bookshelf
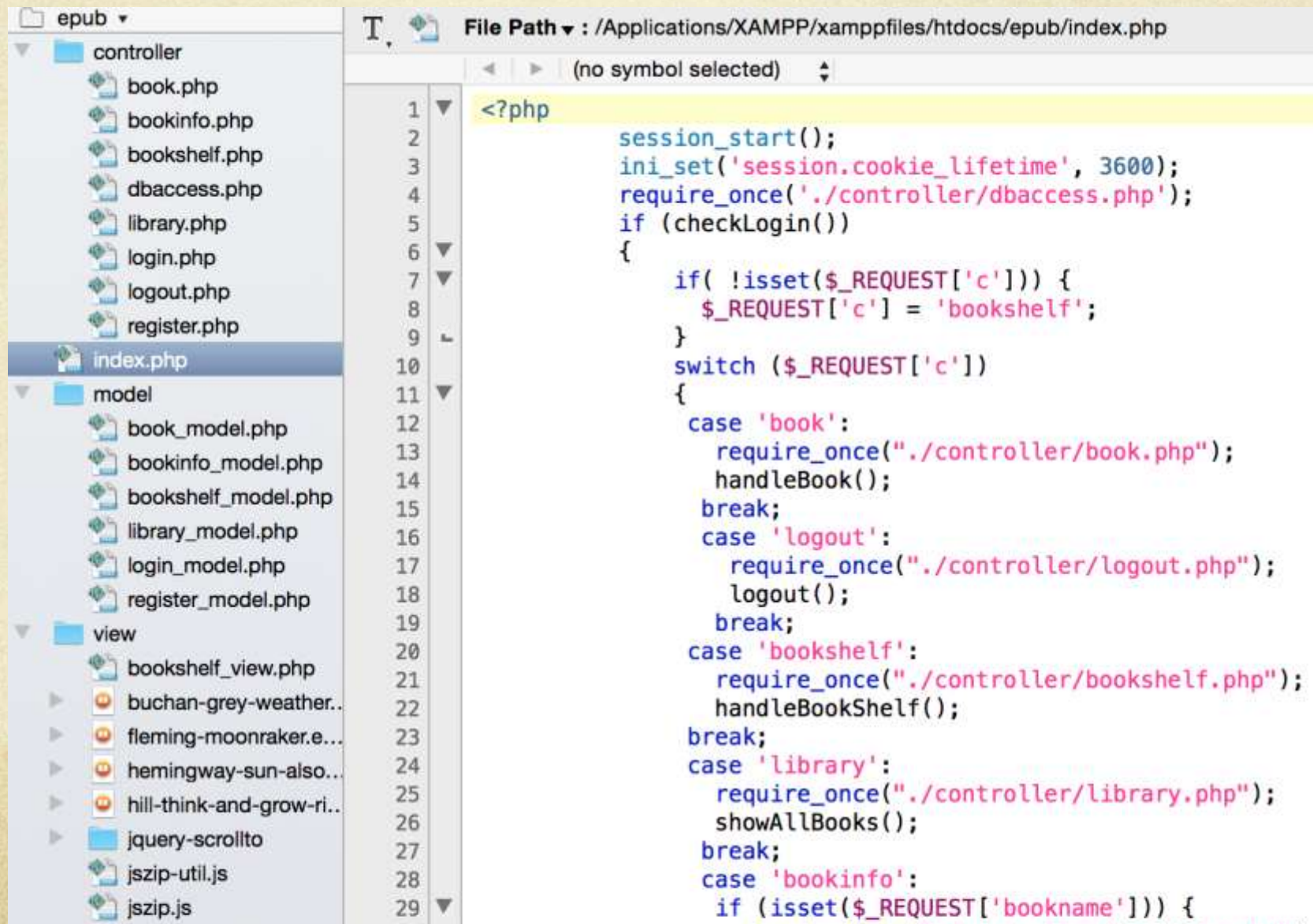
Core of the Project–Implementation(cont.)

- Task 1 - Unzip EPUB file and render content in the browser
  - Using JSZip to unzip and read EPUB book
  - Using JavaScript to parse the metadata and display the pages

```javascript
function loadFile(bookName) {
    JSZipUtils.getBinaryContent(bookName, function(err, data) {
        if(err) {
            throw err; // or handle err
        }
    var zip = new JSZip(data);
    toc = zip.file("OEBPS/toc.ncx").asText();
    myXmlObject = document.createElement('div');
    myXmlObject.innerHTML = toc;
    content = "";
    tagArray=myXmlObject.getElementsByTagName("navPoint");
    for (i=0; i< tagArray.length;i++) {
        navArray = tagArray[i].getElementsByTagName("content");
        content = content +
                    "<a href=' javascript:changePage(\""
                    + bookName +"\",\""
                    + navArray[0].attributes.getNamedItem("src").value
                    +"\",0)'>" +tagArray[i].children[0].innerHTML  + "<
    }
      elt("my-toc",0).innerHTML = content;
    });
```

Core of the Project–Implementation(cont.)

- Task 2 – provide register/login/logout feature

File Path ▾ : /Applications/XAMPP/xamppfiles/htdocs/epub/index.php

◄ ► (no symbol selected) ⬍

```php
<?php
            session_start();
            ini_set('session.cookie_lifetime', 3600);
            require_once('./controller/dbaccess.php');
            if (checkLogin())
            {
                if( !isset($_REQUEST['c'])) {
                  $_REQUEST['c'] = 'bookshelf';
                }
                switch ($_REQUEST['c'])
                {
                 case 'book':
                   require_once("./controller/book.php");
                   handleBook();
                 break;
                 case 'logout':
                   require_once("./controller/logout.php");
                   logout();
                 break;
                case 'bookshelf':
                   require_once("./controller/bookshelf.php");
                   handleBookShelf();
                 break;
                 case 'library':
                   require_once("./controller/library.php");
                   showAllBooks();
                 break;
                 case 'bookinfo':
                   if (isset($_REQUEST['bookname'])) {
```
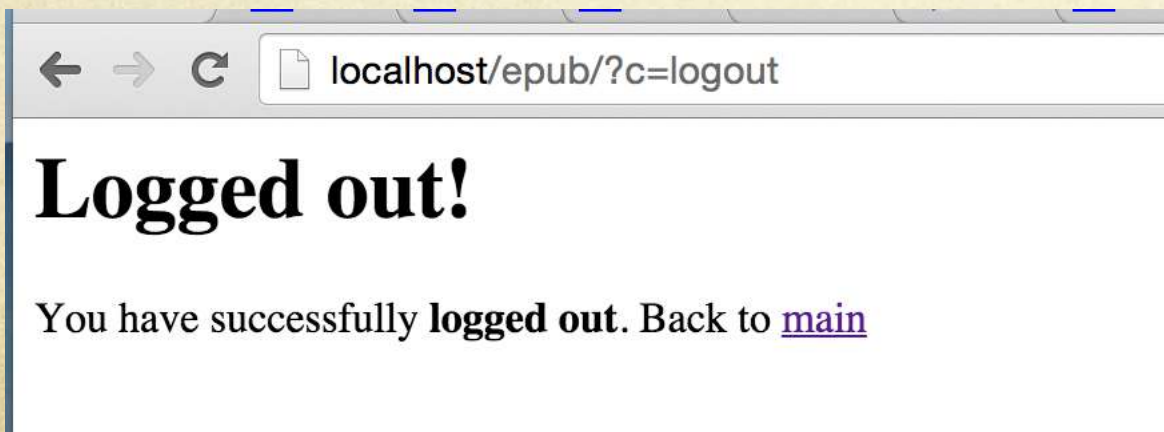
File tree (left panel):

- epub ▾
  - controller
    - book.php
    - bookinfo.php
    - bookshelf.php
    - dbaccess.php
    - library.php
    - login.php
    - logout.php
    - register.php
  - index.php
  - model
    - book_model.php
    - bookinfo_model.php
    - bookshelf_model.php
    - library_model.php
    - login_model.php
    - register_model.php
  - view
    - bookshelf_view.php
    - buchan-grey-weather..
    - fleming-moonraker.e...
    - hemingway-sun-also...
    - hill-think-and-grow-ri..
    - jquery-scrollto
    - jszip-util.js
    - jszip.js

Core of the Project–Implementation(cont.)

- Task 2 – provide register/login/logout feature

Core of the Project–Implementation(cont.)

- Task 3 - Register users can borrow books


```php
function assignBookToUser($booktitle,$username){
$link= mysql_connect('127.0.0.1','root','');
 if (!$link){
   die('Could not connect: ' . mysql_error());
 }
 if (!mysql_select_db('epub')){
   die('Could not select database:' . mysql_error());
 }
$rs = mysql_query("SELECT * FROM User_Book WHERE bookTitle = '$booktitle' AND userName = '$username'");
 if (mysql_num_rows($rs) > 0) {return false;}
 else {
   $res = mysql_query("INSERT INTO User_Book (bookTitle,userName,ubPagePosition) VALUES('{$booktitle}','{$username}',0 )");

   mysql_close($link);
   return $res;
```

Core of the Project–Implementation(cont.)

- Task 4 – Tracking users' reading info
    - Updating reading info (bookName + chapInfo + pageInfo) periodically (every 3 sec) and automatically
    - jQuery .post()
        - send JSON data to the server via an HTTP Post request.

```javascript
setInterval(function(){
  var data = {
     title : titleInfo,
    chap : new_chapInfo,
    page : window.pageYOffset
   };
  $.post("./?c=book", data);
},3000);
```

```php
$res = mysql_query("SELECT * FROM User_Book WHERE bookTitle = '$booktitle' AND userName = '$username'");
if (mysql_num_rows($res) > 0)
 {
  $rs = mysql_query("UPDATE User_Book SET ubChapter = '$chapter',ubPagePosition = $page WHERE bookTitle = '$booktitle' AND userName = '$username'");
  mysql_close($link);
  return $rs;
 }
else
 {
  $rs = mysql_query("INSERT INTO User_Book (bookTitle,userName,ubChapter,ubPagePosition) VALUES('{$booktitle}','{$username}','{$chapter}',{$page})");
  mysql_close($link);
  return $rs;
 }
```

Core of the Project–Implementation(cont.)

- Task 5 – Display to user the correct page
  - Display to user the exact same page as he left off last reading (login/recent book)
  - Display the correct page of each book in the bookshelf

- Construct pagePosition (title + chapter + pagePosition)

- Scrolls the page/document to the specified coordinates

Recent Book

```php
function getRecentBook($username){

    $res = mysql_query("SELECT bookTitle,ubChapter,ubPagePosition
                        FROM User_Book WHERE userName = '$username'
                        order by completeTime DESC limit 1");
```

Specified Book

```php
function getBook($booktitle,$username){
    $res = mysql_query("SELECT bookTitle,ubChapter,ubPagePosition FROM User_Book
                        WHERE userName = '$username' and bookTitle = '$booktitle'
```

```javascript
function elt(id,pagePosition)
{
    setTimeout(function () {
            window.scrollTo(0, pagePosition);
    },1);
        return document.getElementById(id);
}
```

Experiment & Results

- Manual function test
    - Check the application's design and functionalities

- Testing tasks
    - Whether a user can register an account
    - Whether a user can login/logout
    - After login, whether the book shows properly
    - Whether a user can borrow a book from a library and the book will shown up in his bookshelf
    - Whether the recent book feature was updated during the reading

Experiment & Results(cont.)

- Testing process (had a group of 3 people execute testing in 3 rounds)
  - Round 1: testing on Chrome, Firefox, and Safari for Mac OSX
  - Round 2: testing on Chrome, Firefox, and IE for Windows
  - Round 3: testing on iPhone, iPad, and Android Phone

Experiment & Results(cont.)

- Testing tasks-whether the book shows properly
    - a user's first time login:
        - the page is empty, and there is a link to the library page. Then, the user can borrow a book from there and begin to read;
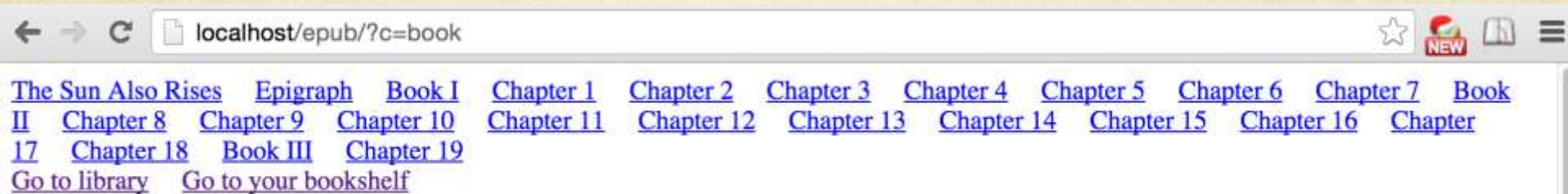
Log out
Go to library
Go to your recent book

Experiment & Results(cont.)

- Testing tasks - whether the book shows properly
  - a user with an existing reading log in this system:
    - the page should be exactly the same as where he left off last time.

Chapter 14

I do not know what time I got to bed. I remember undressing, putting on a bathrobe, and standing out on the balcony. I knew I was quite drunk, and when I came in I put on the light over the head of the bed and started to read. I was reading a book by Turgenieff. Probably I read the same two pages over several times. It was one of the stories in "A Sportsman's Sketches." I had read it before, but it seemed quite new. The country became very clear and the feeling of pressure in my head seemed to loosen. I was very drunk and I did not want to shut my eyes because the room would go round and round. If I kept on reading that feeling would pass.
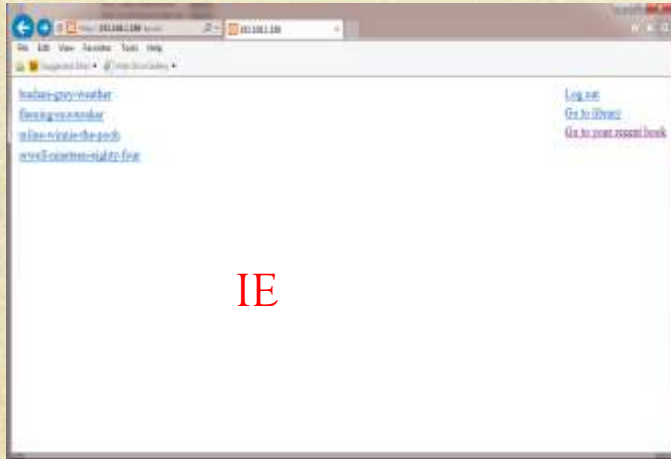
I heard Brett and Robert Cohn come up the stairs. Cohn said good night outside the door and went on up to his room. I heard Brett go into the room next door. Mike was already in bed. He had come in with me an hour before. He woke as she came in, and they talked together. I heard them laugh. I turned off the light and tried to go to sleep. It was not necessary to read any more. I could shut my eyes without getting the wheeling sensation. But I could not sleep. There is no reason why because it is dark you should look at things differently from when it is light. The hell there isn't!

I figured that all out once, and for six months I never slept with the electric light off. That was another bright idea. To hell with women, anyway. To hell with you, Brett Ashley.
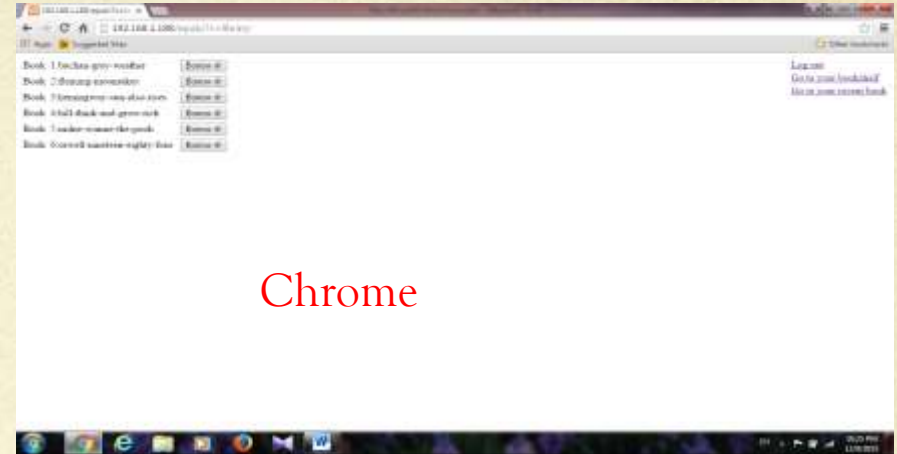
Women made such swell friends. Awfully swell. In the first place, you had to be in love with a woman to have a basis of friendship. I had been having Brett for a friend. I had not been thinking about her side of it. I had been getting something for nothing. That only delayed the presentation of the bill. The bill always came. That was one of the swell things you could count on.

Experiment & Results(cont.)

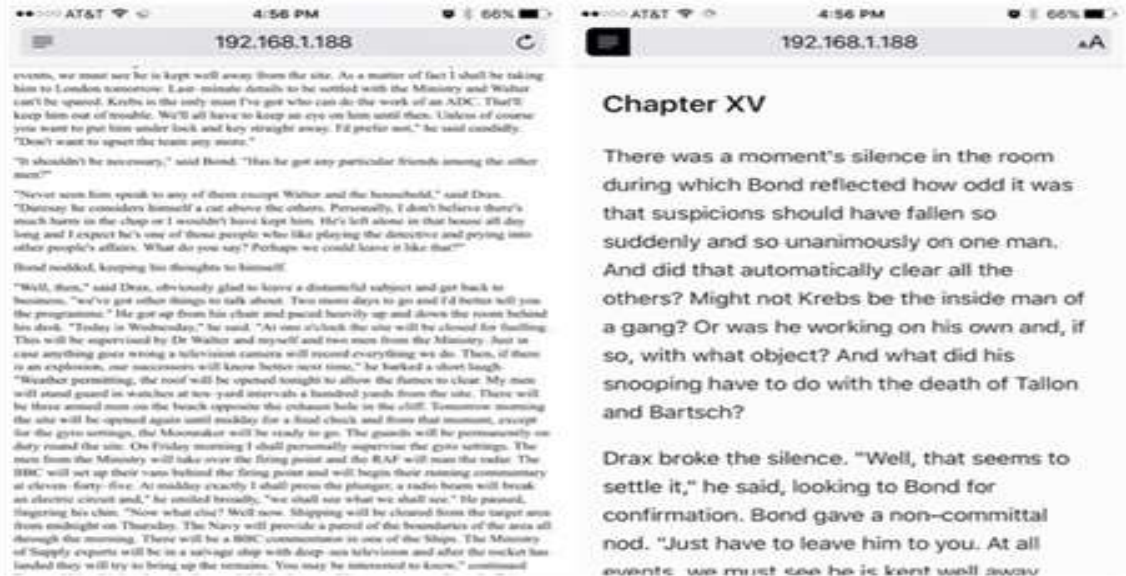○ Testing on different browsers for Windows

IE

Chrome
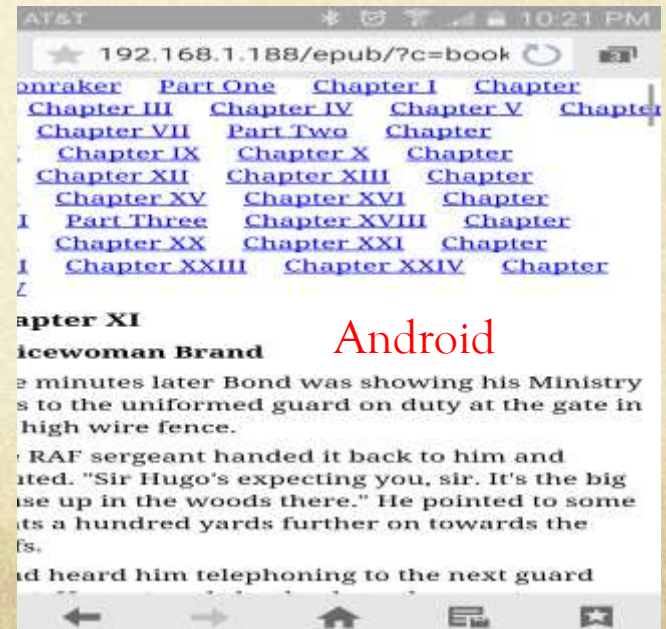

Firefox

Experiment & Results(cont.)

Testing on iPhone, iPad and Android Phone
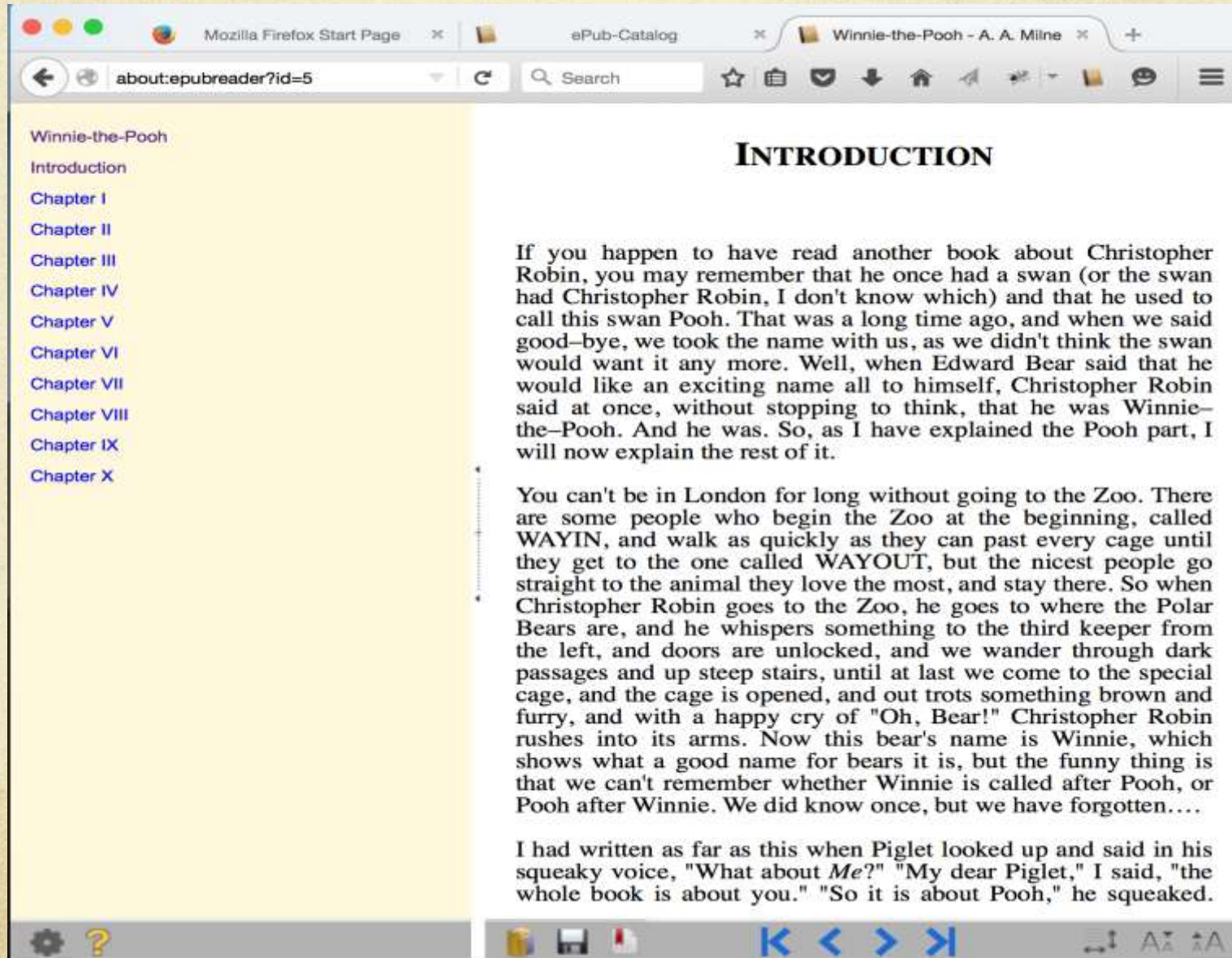

iPad

iPhone

Android

Future Work/ Improvement

- Future Work:
  - How to increase the number of the books
  - Upload book
  - File management
  - Role design

Future Work/ Improvement (cont.)

○ Improvement: UI

Questions?

Thank you ☺