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Online and Offline eBook Management System using W-CMS

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Online and Offline eBook Management System using W-CMS

(Access Control Policy Enforcement for eBooks)

A Project Report

Presented to

The Faculty of the Department of Computer Science

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Computer Science

by

Rohan Vibhandik

May 2011

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- Rohan Vibhandik

ABSTRACT

In this internet and smart-phone era paper books are almost obsolete. Many developers have come up with the eBooks which can be read online on computer or on a smart-phone. Users can now access them offline any time without carrying a bulky pBook (Paper Book). The stable eBook application should restrict and control the use of contents to protect the copyrights. Encryption and enforcement of digital policies are generally managed by Digital Rights Management (DRM). The stable system for online as well as offline readers safeguard the intellectual properties for authors, publishers by providing a protection to their digital content, secure eBook distribution, authentication, authorization, market involvement, and monetary transactions [1, 2, 3].

Content Piracy has always been a prime issue in managing a *Library System*. To safeguard against piracy, publishers need to control and track whether the user is authorized or not and up to how much extent the privileges should be provided [4]. Publishers, authors are concerned about the revenue lost over unauthorized, unpaid access to their valuable contents and efforts as well. This is an old issue with pBooks that has now come in the forefront with the introduction of online and offline eBook applications. A solution needs to be proposed to provide a good user experience and content security, and integrity for publishers.

In this project, we will explore how the user restrictions and access controls can be enforced using a Content Management System (CMS). Drupal [17], Joomla [18], and WordPress [19] are few of the powerful CMSs where a developer has to integrate various modules with core modules and configure them as per the need of an organization. We will focus on effective use of Drupal for importing an eBook (e.g. .doc, .docx etc. formats) to Drupal for managing user and administrative policies to develop an eLibrary System for University environment.

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1. Introduction

"An automated library system that is capable of managing the operations of more than one basic library functions" – UNESCO [9]. This defines the Library Management System. Library management functions include authorization and authentication for users, privilege assignments, and access controls. Earlier library system was all about keeping hard copies or paper copies of all the books and maintaining the user records manually for transactions with personal interaction. Nowadays in an internet era, traditional library system has been replaced by the soft copies of books i.e. eBooks. But the content piracy is still the primary concern for the publishers and authors. Laws describing "copyrights" were enforced to protect the authorization for owners and authors. Similarly for digital contents, Digital Rights Management (DRM) and Access Control Policies are now being implemented along with copyrights. An eLibrary system with well configured ACL and DRM policies, provide better control over distribution of eBooks. To avoid any data breach attempts and to be sure about data compliance, effective library management system is a need of hour.

Proposed eBook Management System (eBMS) focuses on such issues related to content piracy. eBMS makes use of Open-source Web-based Content Management System to achieve desired privilege enforcement on various roles of the user. It is best implemented for the University scenario, where instructor can post their class notes online in web-based form and student can remotely access them using their membership, where the contents are categorized by the different classes. It effectively converts a .doc/.docx file to equivalent html tags and then imports it as Web-version for that eBook. It gives an edge over other library system due to its node structure. Access control policies can be enforced on fine levels i.e. words or pages or nodes. It takes care of automatic role expiration for members and download limits depending on the purchase made by the user.

The library contents are dynamic in nature. E.g. course contents are updated per semester. It means there can be certain periodical updates, addition of information, modification, deletion as well as retrieval of stored data. When it comes to storing images, HTML documents or media files; a Web based software system is required to have a dynamic access and control. Proposed eBMS could be the appropriate choice of instructors to manage all these web-based collections.

2. Open-source Web-based Content Management System (Open WCMS)

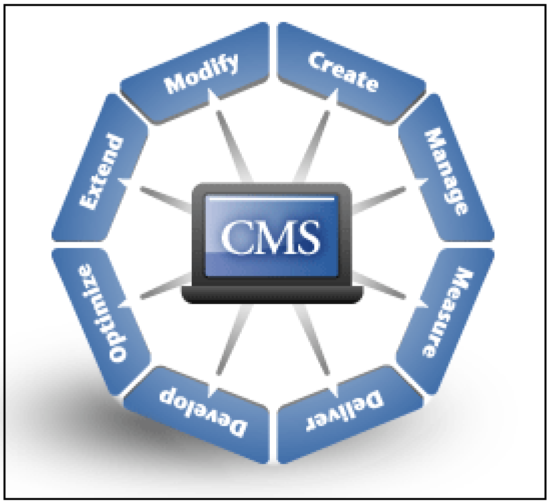


Figure 1: Web-based CMS

Firstly, we shall discuss what the Content Management System (CMS) is all about! A CMS is a collection of manual or automated procedures to manage the work flow in a collaborative environment [10]. CMS for library management is very effective in collaborative environment where collaborators are library account holders, guest visitors, admins, publishers, and authors with specific pre-defined roles and permissions.

Open WCMS is the combination of Open Source software applications and Web based CMS. As shown in Figure 1 [11], WCMS provides a ready platform for developer to construct upon the foundation such as inbuilt themes, scripts, modules, and database connectivity. Because of this provision it is also very easy to develop and maintain the website for a novice web-developer having very basic knowledge of programming and scripting languages.

Predefined modules in WCMS provide easy integration with the system. The modules like Nagios [12] and Pantheon [13] provide better control and performance measures for the hosted websites. Drupal, Joomla, WordPress, dotCMS, eZ Publish, etc. are few of the well-known and widely used stable Open-source Web-based Content Management Systems [14].

2.1 Available WCMS

There are many SaaS (Software as a Service; generally paid services) and Free or Open Source CMS available. Each of them has particular functionality depending on the base technologies used to develop; such as AJAX framework, PHP Engine, MySQL/ SQLite/ PostgreSQL, Perl, etc. Drupal [17], Joomla [18], and WordPress [19] are the most efficient and widely used PHP and MySQL based Open Source CMS available. All of them provide Content Management Framework (CMF) [20].

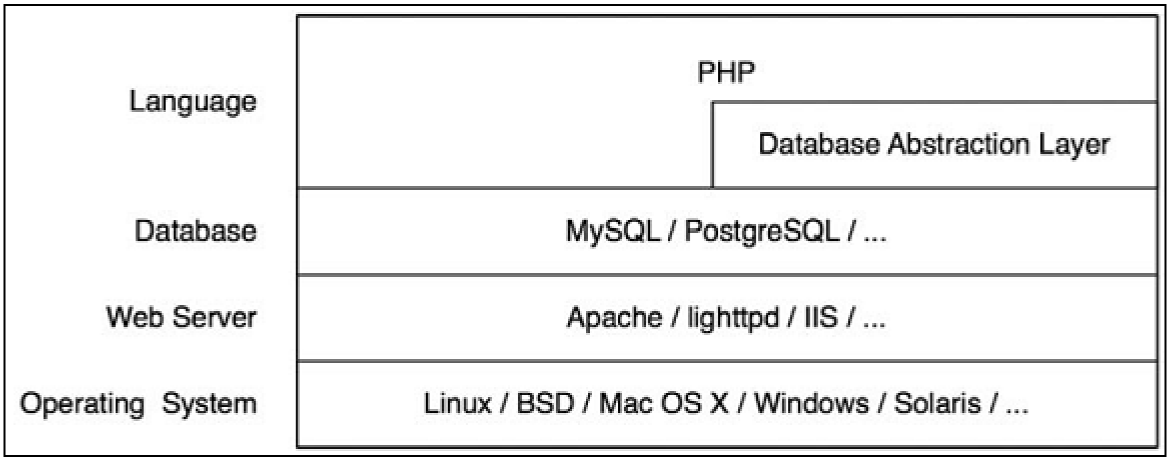

Language
PHP
Database Abstraction Layer
Database
MySQL / PostgreSQL / ...
Web Server
Apache / lighttpd / IIS / ...
Operating System
Linux / BSD / Mac OS X / Windows / Solaris / ...

Figure 2: Content Management Framework

Basic or core framework for CMS, e.g. Drupal, is shown in Figure 2 [21]. Let's get introduced to each of them briefly. This knowledge will help to select appropriate framework for proposed library management system.

2.2.1 Drupal

Drupal provides collaborative modules which can be integrated with core modules to achieve desired functionalities. *Core modules* are those modules which are provided by default package and on clean installation of Drupal framework on a server. Figure 3 [21] shows the cleanly installed configuration of core Drupal modules. Drupal provides several built-in modules and customized third party modules developed by many contributors, code committers across the globe. Drupal Module Index [22] lists all the available modules with their version information, compatibility, and functionality. Till date there are overall 7972 third party modules available considering all Drupal versions: 4.x, 5.x, 6.x, and 7.x. User may choose the appropriate one, integrate that with core modules, and enable them to use its functionality depending on the Drupal version he is using. The great advantage to the developer is that, he may disable or enable any module any time without affecting the functionality of other modules and also rendering of the already hosted web contents! It provides a thick edge of modularity in developing with Drupal compared to other CMF and CMS available. Stanford University website, White House govt. website are the popular examples of stable and secure Drupal development.

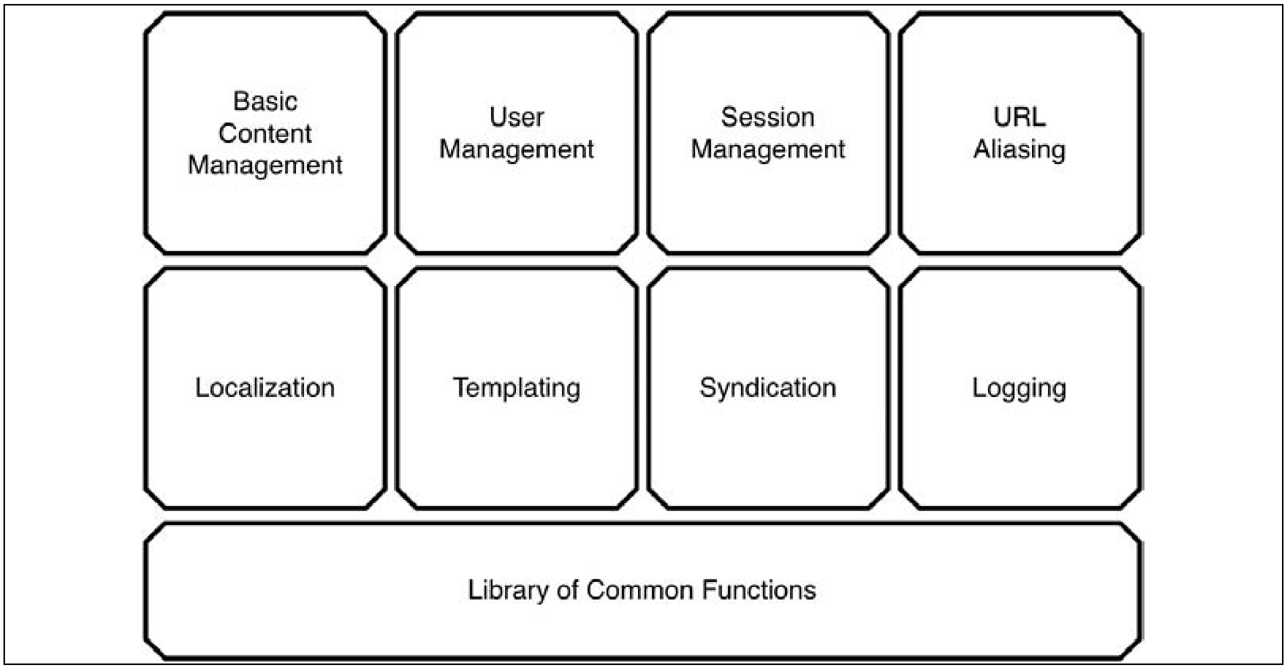


Figure 3: Drupal Core Overview

2.2.2 Joomla!

Joomla enables developer to quickly build online applications such as corporate intranets and extranets, web-portals. It is highly extensible because the Joomla release provides various open source *Extensions* which are integrated to achieve desired functionality. The clients can be empowered to use the developed application with minimal learning curve. It also releases the dependency on the developer and support. MTV Networks Quizilla, Harvard University, Citibank are well-known examples of Joomla development.

2.2.3 WordPress

WordPress is mostly used for creating blogs as it provides web software. This web software framework is also open source and free distribution. Similar to Drupal and Joomla, WordPress also provides extensible modules, called as *Plug-ins* and *Themes*, to achieve extended functionality. All these plug-ins are developed by volunteers and also updated by many code committers around the world. WordPress is widely used for developing blogs, discussion forums, and event calendars.

3. Available e-Library or eBook Management Systems

Before proceeding we will discuss the features of available library management systems or softwares. E.g. WatchDox [15] provides secure media files transfer over the internet. It provides certain user restriction as only viewing or printing or downloading for the documents. It tracks the document usage by the "Authenticated Recipient/User" subscribed with WatchDox. Similarly NetLibrary and LIBRIe also provide the user access control policies to restrict the contents from unauthorized use or distribution.

3.1 Calibre

Calibre is An Open Source Library Management freeware software [16]. For the analysis of available applications, the Calibre main user interface, its working, online book uploads for Server is tested. It doesn't provide feature to enforce any user restriction but allows tagging, organizing, and sorting the books in personalized library. It can convert book to specified format namely Android, Apple, Sony, Amazon (but only one at one installation) and then import it to the reading device through “Send to Device” feature. For Calibre, eBooks Database Files Storage in a Local system is at:

For Windows Vista/7 OS →

`C:\Users\<User Computer Name>\Calibre Library\`

Calibre server connection for Localhost library → **`http://127.0.0.1:8080/`**

It stores the files in *metadata.opf and metadata.db* files. These files can be opened in any XML editor as they are parsed in XML.

3.2 Calibre2Web v0.98.zip and Calibre2opds

These two are personalized version of Calibre [16] for independent/ individual users. These are tested to check that how Calibre libraries and database can be modified with Python to have desired output.

Thus detailed analysis of above mentioned systems helped me to define the features to be included in proposed Online and Offline eBook Management System. It has provided an approach towards the secure transfer or viewing of files offline as well as helped me to get implementation approach for access control enforcement for proposed eBook management system using Open WCMS.

4. Proposed System

Proposed Online/Offline eBook management system is an integration of the selected researches and available systems. It has its own standards to enforce the offline and online eBook management access control policies. Proposed system for online eBooks provides a protection against unauthenticated viewing, printing, and time-bound usage, etc. In hardware locking, many times if the system crashes, user may lose his data and access rights even being authorized.

The solution is to maintain secure servers and save the contents in single encrypted database. It facilitates user to retrieve the account settings in order to save the loss of money and eBooks reading registration information. The proposed system has used the available data, measures, and foundation provided by open source CMS to test the implementation.

The main purpose of the proposed system is to ease publishers, professors, authors or students to publish their documents, research reports, and lecture notes online. For this, the system uses the Filtered HTML file converted from any PDF or Doc file. It maps the original Word Document tags to the equivalent HTML tags and creates the Book Page hierarchy. Refer to the following Figure 4:

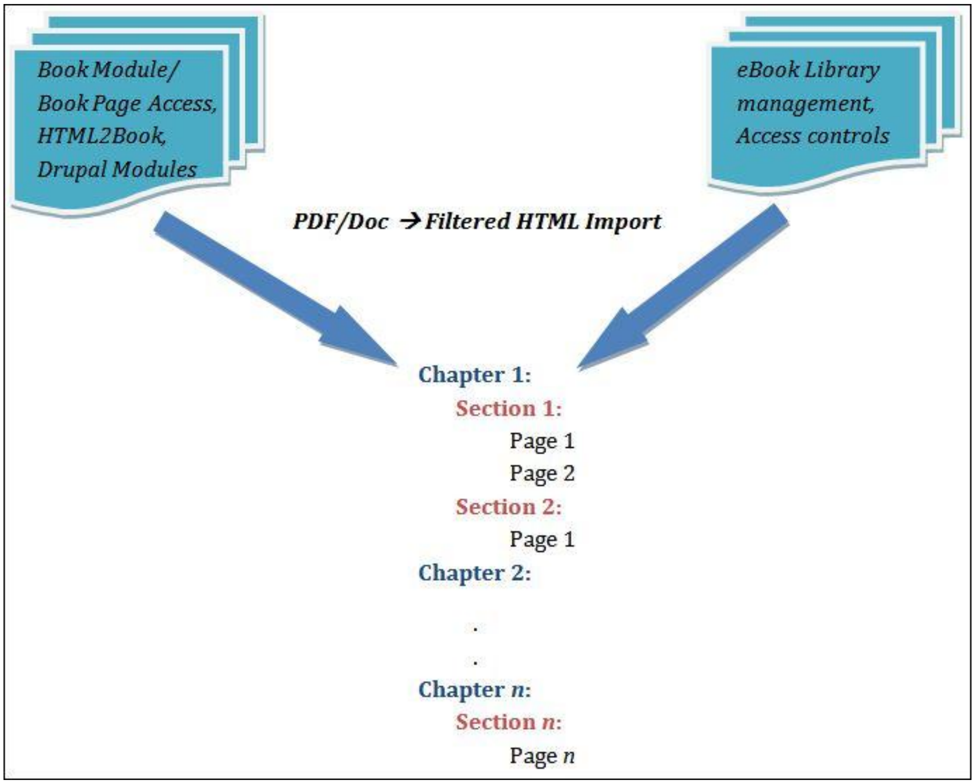


Figure 4: Proposed eLibrary management system using WCMS

5. Integration Details and Requirements for eBook Management

The initial phase of Master's Project was a detailed literature study of the available WCMS to shortlist the appropriate implementation, integration, and management strategies and techniques. Considering the functionality required by the proposed eLibrary i.e. eBook management system, we have selected to use the Drupal v6.20 along with Drupal UberCart distribution to add e-commerce features. MySQL database is used to maintain the repositories for the books, pages, and the contents. WAMP 2.0 server is used to install and run Drupal framework. This report will discuss the approach taken towards second phase of the project and will focus on management of eBooks using WCMS. For basic software implementation details, appendix can be referred.

5.1 WAMP Server and MySQL Database

WampServer [23] is a Windows web development environment. It facilitates the developer to design and develop web services and applications with Apache, PHP and the MySQL database. The databases can be easily managed with phpMyAdmin interface. It allows tuning the server without even touching the pre-configured files. It allows reproducing the production server. For the project, WampServer 2.0i will be used which includes the recent releases for MySQL v5.1.36 and PHP v5.3.0.

5.2 Drupal Modules, Plug-ins and Libraries

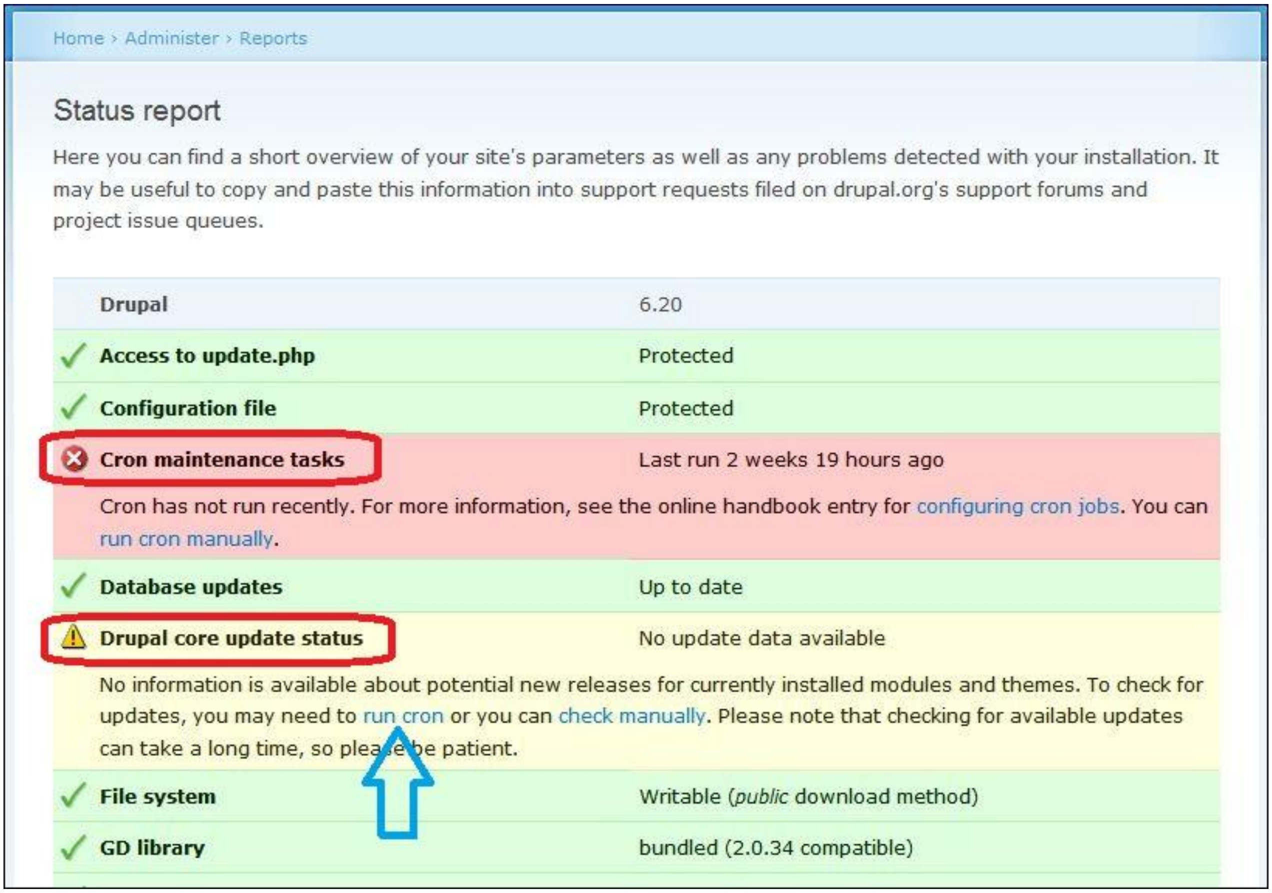
As we have discussed earlier, Drupal is a freeware CMS and ships with various installation packages such as Core Drupal, UberDrupal (or UberCart). Ubercart [24] is an open source e-commerce shopping cart interface which is set up on core Drupal modules. It integrates online store facilities with Drupal. This provides the appropriate combination to build a web or web application around a product, sell access to the *premium contents*, and offers subscription facility or payment gateways for file downloads. This functionality will facilitate the online library management system implementation. Access control policies are possible to enforce by installing suitable modules with Drupal core modules, UberCart, and libraries. jQuery and jQuery-cycle plug-ins are generally used with *views*, *Drupal themes* to design a GUI. In Section 7, we will discuss the required core Drupal modules, third-party modules and steps involved in their installation, integration with each other and configuration to achieve the eBook management system for different set of users.

6. Online access and management for eBook management system:

After configuring the WAMP Server, Database set-up, and Drupal installation, next step is to integrate, configure and manage the eLibrary. The details about installation can be referred in an appendix.

As shown in Figure 5, the inbuilt procedures such as *Cron* and *update.php* allow Drupal to find the updates and install them in the background without affecting the functionality of the web application or services already running. Drupal generates the status report and notifies site admin periodically. It can be accessed at (with admin privileges only):

```
URL: http://ebookcms.cs-sjsu.org/?q=admin/reports/status
```



Home › Administer › Reports

Status report

Here you can find a short overview of your site's parameters as well as any problems detected with your installation. It may be useful to copy and paste this information into support requests filed on drupal.org's support forums and project issue queues.

Drupal	6.20
✓ Access to update.php	Protected
✓ Configuration file	Protected
☒ Cron maintenance tasks	Last run 2 weeks 19 hours ago
Cron has not run recently. For more information, see the online handbook entry for configuring cron jobs. You can run cron manually.	
✓ Database updates	Up to date
⚠ Drupal core update status	No update data available
No information is available about potential new releases for currently installed modules and themes. To check for updates, you may need to run cron or you can check manually. Please note that checking for available updates can take a long time, so please be patient.	
✓ File system	Writable (*public* download method)
✓ GD library	bundled (2.0.34 compatible)

Figure 5: Upgrading Drupal Installation using CRON procedure

6.3.1 Integrating eBook Manager with Drupal: Setting up the Root or Repository for eBook Management

After following the step mentioned in Section 6.1, *Drupal 6.x.zip archive* is to be extracted at:

```
C:/wamp/www/drupal-6.20
```

For simplicity the **`<Drupal Core folder 1>`** i.e. **`drupal-6.20`** can be renamed as per developer's convenience and choice. It is a good practice to use an elaborative name for Drupal installation. It serves the purpose of easily finding the configuration files, resources, libraries for particular Drupal installation when, over the period of time, developer having many Drupal versions hosted under same *www* directory. Also it helps the newly appointed developer to take charge and locate the repositories.

Example 1:

```
C:/wamp/www/eBookManager(vD6.2)
```

The above example clearly states that the current Drupal repository is for eBook Management project and it is using Drupal core version 6.20.

6.3.2 Accessing eBook Manager on localhost

After following steps up to 6.3.1, Drupal website is ready to access. On localhost, normally on port no: 8080; the URL shown in example 2, is to be used to open the home page of the website. The Drupal CMF parses the **`eBookManager(vD6.2)`** directory in URI field. Then Drupal CMS locates and executes *index.php* file and home page of cleanly installed Drupal is rendered. Now it is ready to be configured further with the help of other modules and their integration with core modules.

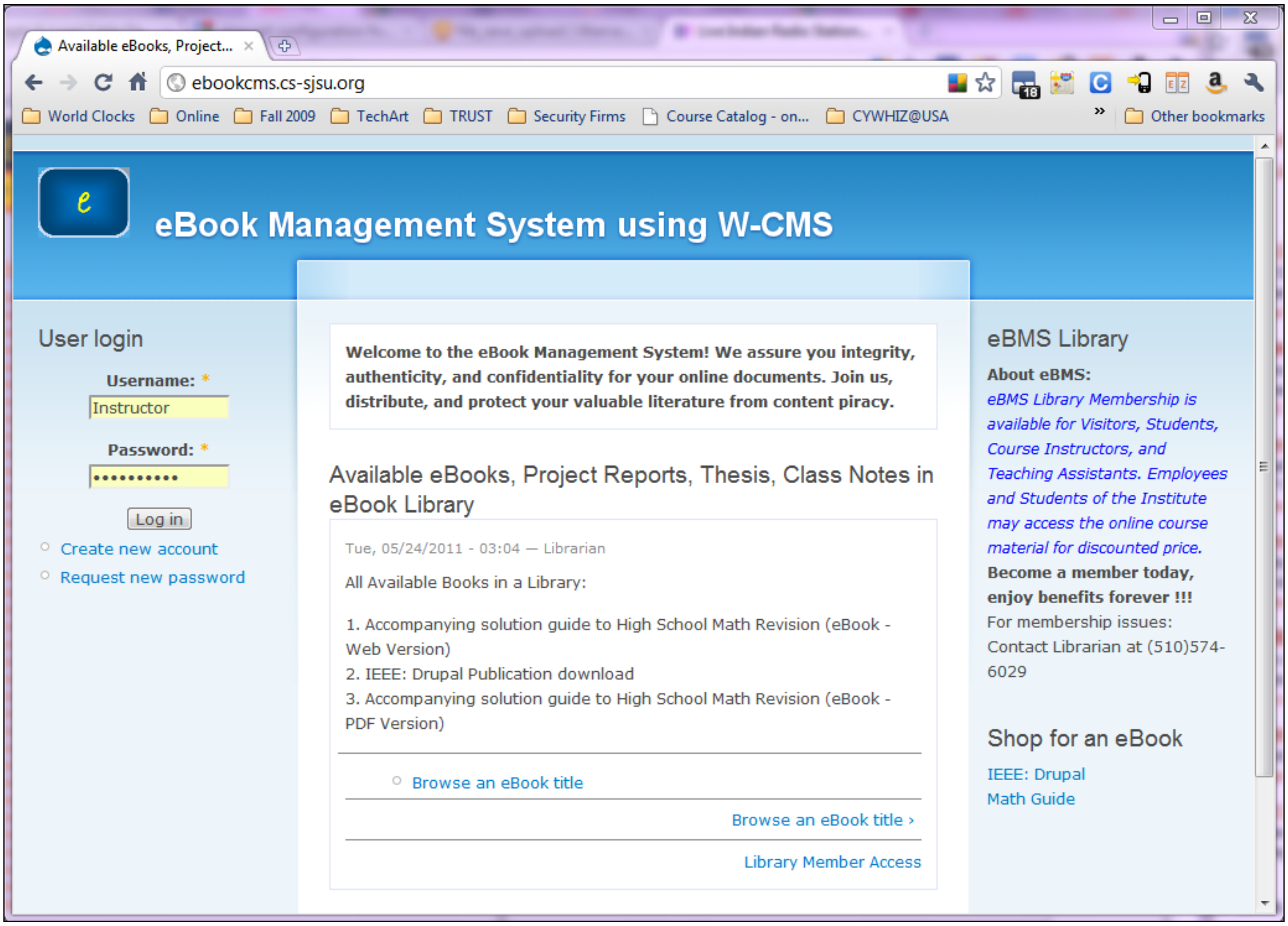
Example 2:

```
http://localhost/eBookManager(vD6.2)/
```

6.3.3 Accessing eBook Management System online

Step mentioned in Section 6.2.2 is used to play around and test the website when in development phase. After completing necessary configurations and integrating modules, when the website is ready to make it publicly accessible, it is to be hosted with domain name. Web hosting servers are to be configured and the Drupal installation folder created in Section 6.3.1 is to be imported to the allocated web space using any FTP connection.

The proposed eBook management system is reproduced under **`http://ebookcms.cs-sjsu.org/`**, which is shown in the following Figure 6.



eBook Management System using W-CMS

User login

Username: *

Instructor

Password: *

••••••••••

- Create new account
- Request new password

Welcome to the eBook Management System! We assure you integrity, authenticity, and confidentiality for your online documents. Join us, distribute, and protect your valuable literature from content piracy.

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Figure 6: Home Page of Public eBMS website

7. Drupal 6.x Modules and Libraries: Integration with eBook Manager Application

The procedure followed till Section 6, creates an online presence of eBook Management System. Now the next step is to configure the core or in built modules and to integrate the third party modules. We have discussed the clean installation of Drupal in Figure 3 under Section 2.2.1. It forms a foundation to build the infrastructure on the top of it for the proposed eBook Management System. The process of adding customized or third party modules to Drupal is shown in Figure 7 [21] below.

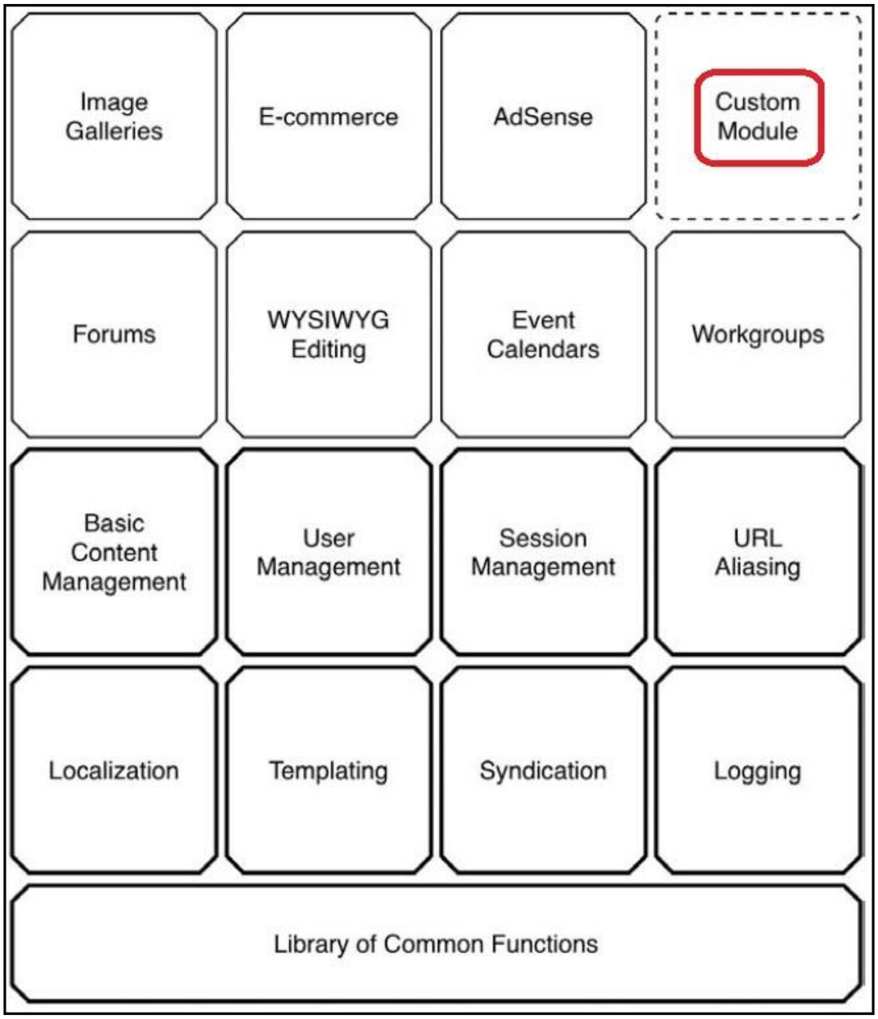


Figure 7: Integrating Custom Modules to Drupal Core

7.1 Default Directory Structure for eBook Management System

Following Table no. 1 explains the directory structure for Drupal core modules. It shows the procedures or initiating files residing under each directory. Each time when any event is triggered, concerned library file is executed by php-engine.

Directory/ Repository	**Libraries**
includes	cron.php
misc	index.php
modules	install.php
profiles	robots.txt
sites	update.php
scripts	xmlrpc.php
themes	page.tpl.php & template.php
custom directory	*customized themes, modules*

Table 1: Directory Structure Layout

Update.php checks for available updates to modules. Any modification, customization of libraries and modules are taken care by *update.php* and stored under *sites* directory.

7.2 Configuring Modules

Now we will discuss the Drupal modules for their features, applications to implement Access Policies and DRM. After repositioning these downloaded module directories to project resource folder i.e. **`eBookManager(vD6.2)`** and enabling them as per explained in Section 7.2; it allows to configure the featured settings through the settings page. The modules can be configured through:

`Administer → Content Management,`

`Administer → Site Configuration, and`

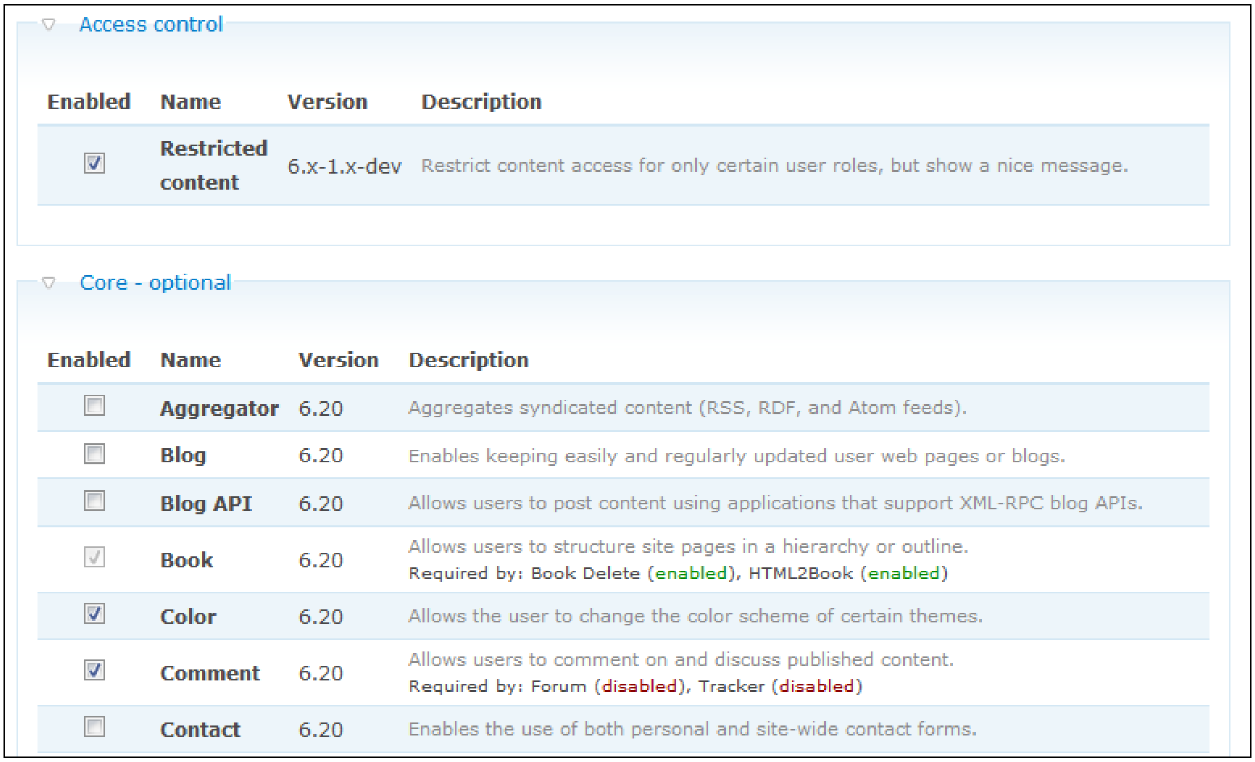
`Administer → Side Building.`

The paths to other administrative categories can be referred in Table 2.

Category	Path
Content Management	admin/content
Site Building	admin/build
Site Configuration	admin/settings
User Management	admin/user
Reports	admin/reports

Table 2: Administrative categories

`URL: http://ebookcms.cs-sjsu.org/?q=admin/`



▽ Access control

Enabled	Name	Version	Description
☑	Restricted content	6.x-1.x-dev	Restrict content access for only certain user roles, but show a nice message.

▽ Core - optional

Enabled	Name	Version	Description
□	Aggregator	6.20	Aggregates syndicated content (RSS, RDF, and Atom feeds).
□	Blog	6.20	Enables keeping easily and regularly updated user web pages or blogs.
□	Blog API	6.20	Allows users to post content using applications that support XML-RPC blog APIs.
☑	Book	6.20	Allows users to structure site pages in a hierarchy or outline. Required by: Book Delete (enabled), HTML2Book (enabled)
☑	Color	6.20	Allows the user to change the color scheme of certain themes.
☑	Comment	6.20	Allows users to comment on and discuss published content. Required by: Forum (disabled), Tracker (disabled)
□	Contact	6.20	Enables the use of both personal and site-wide contact forms.

Figure 8: Configuration of Modules

For implementing the eBook Library features, enforcing the taxonomies, and setting access controls various modules are integrated and their features are cond. We will discuss each module in detail in Section 8.

8 Module Integration and Configuration for eBook Management System

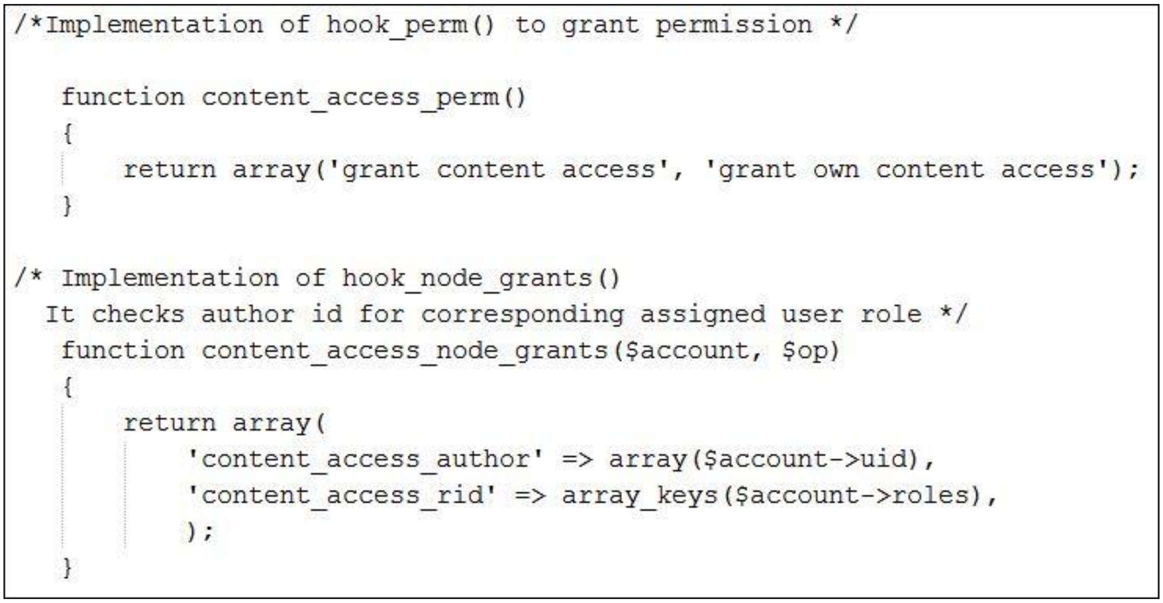
Integration of selective third-party modules with the core modules has provided the extended features for eBook Management System.

8.1 Configuring Core Modules

8.1.1 Content Access

Content Access [25] is the core Drupal module, which when enabled provides a panel to configure the permissions for users created with their privilege level hierarchy. Administrator or Authenticated user is generally considered at LEVEL = 0 i.e. highest privilege level. Also it allows editing the permissions for authenticated users. For current eBook Management system, each authenticated user cannot be an administrator. Because a registered student or professor is an authenticated user but may not be an administrator having LEVEL = 0 privileges. In this case, the View, Edit, and Write accessibilities can be set separately. It allows specifying the custom view, editing and deleting permissions for each content type.

Figure 9 shows the control panel for assigning the permissions. This control panel is the outcome of how a developer configures the function in *content_access* module. Advantage of using Open Source Drupal CMS is that, developer may modify the original code as per his requirements. Thus it offers scalability, extensibility along with modularity. Referring to following code snippets 1 and 2 where permissions can be assigned by setting, modifying default roles to the desired one can be observed.

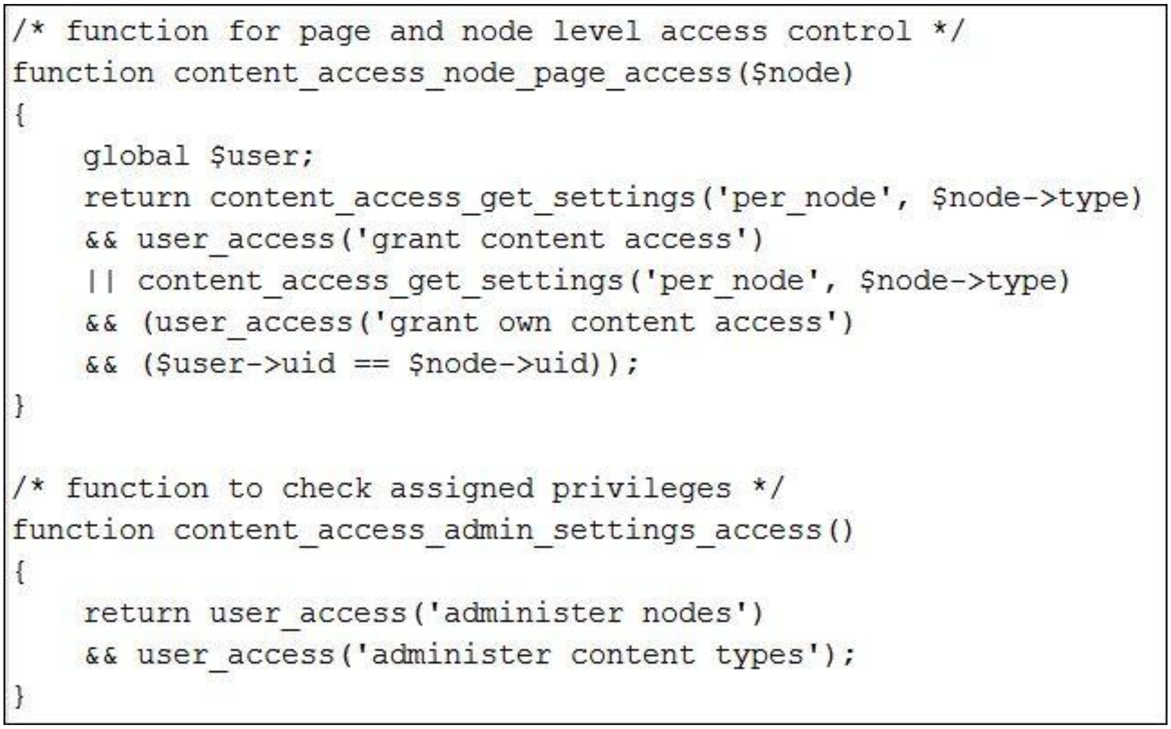


```
/*Implementation of hook_perm() to grant permission */

   function content_access_perm()
   {
       return array('grant content access', 'grant own content access');
   }

/* Implementation of hook_node_grants()
  It checks author id for corresponding assigned user role */
   function content_access_node_grants($account, $op)
   {
       return array(
           'content_access_author' => array($account->uid),
           'content_access_rid' => array_keys($account->roles),
           );
   }
```

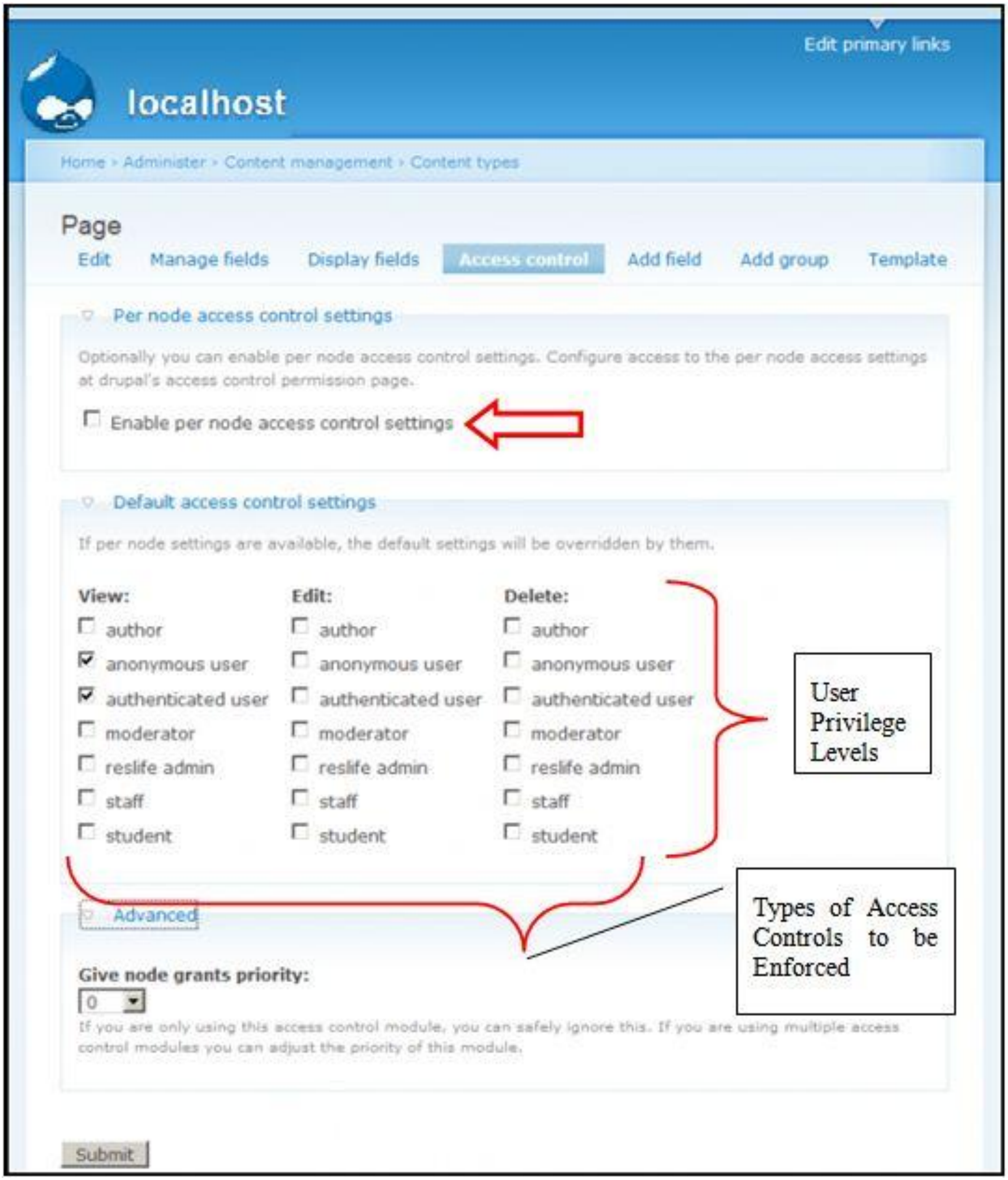
Code Snippet 1: Content Access Grant by User Roles



```
/* function for page and node level access control */
function content_access_node_page_access($node)
{
    global $user;
    return content_access_get_settings('per_node', $node->type)
    && user_access('grant content access')
    || content_access_get_settings('per_node', $node->type)
    && (user_access('grant own content access')
    && ($user->uid == $node->uid));
}

/* function to check assigned privileges */
function content_access_admin_settings_access()
{
    return user_access('administer nodes')
    && user_access('administer content types');
}
```

Code Snippet 2: Page and Node Level Access Control



Page

Per node access control settings

Optionally you can enable per node access control settings. Configure access to the per node access settings at drupal's access control permission page.

□ Enable per node access control settings

Default access control settings

If per node settings are available, the default settings will be overridden by them.

View:	Edit:	Delete:
□ author	□ author	□ author
☑ anonymous user	□ anonymous user	□ anonymous user
☑ authenticated user	□ authenticated user	□ authenticated user
□ moderator	□ moderator	□ moderator
□ reslife admin	□ reslife admin	□ reslife admin
□ staff	□ staff	□ staff
□ student	□ student	□ student

User Privilege Levels

Types of Access Controls to be Enforced

Advanced

Give node grants priority: 0

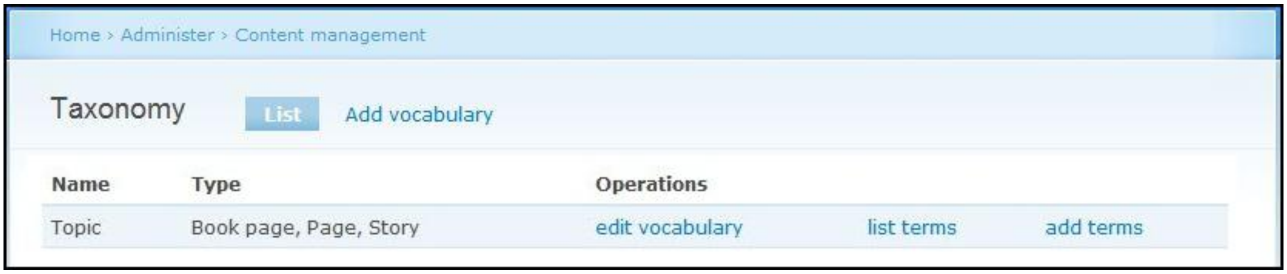
If you are only using this access control module, you can safely ignore this. If you are using multiple access control modules you can adjust the priority of this module.

Figure 9: Configuring Content Access depending on User Privileges

8.1.2 Taxonomy

In layman's language, Taxonomy means classification or categorization of a data. Taxonomy [26] is a core module of a Drupal distribution. It allows organizing and departmentalizing of the contents. The contents can be *tags*, *metadata* or *categories*. It associates itself with integrated custom modules. Developer or site administrator for eBook System has to define the categories or tags for particular content types. E.g. Fiction Books, Non-fiction Books, History Books, Student Thesis Report booklets can be various distinct categories under BOOKS, as a single *vocabulary* term. Also under THEME_VIEW vocabulary, there can be many themes stored. When admin calls any function for particular vocabulary or even any tag under particular vocabulary; that particular data can be accessed or operated.

URL: http://ebookcms.cs-sjsu.org/?q=admin/content/taxonomy



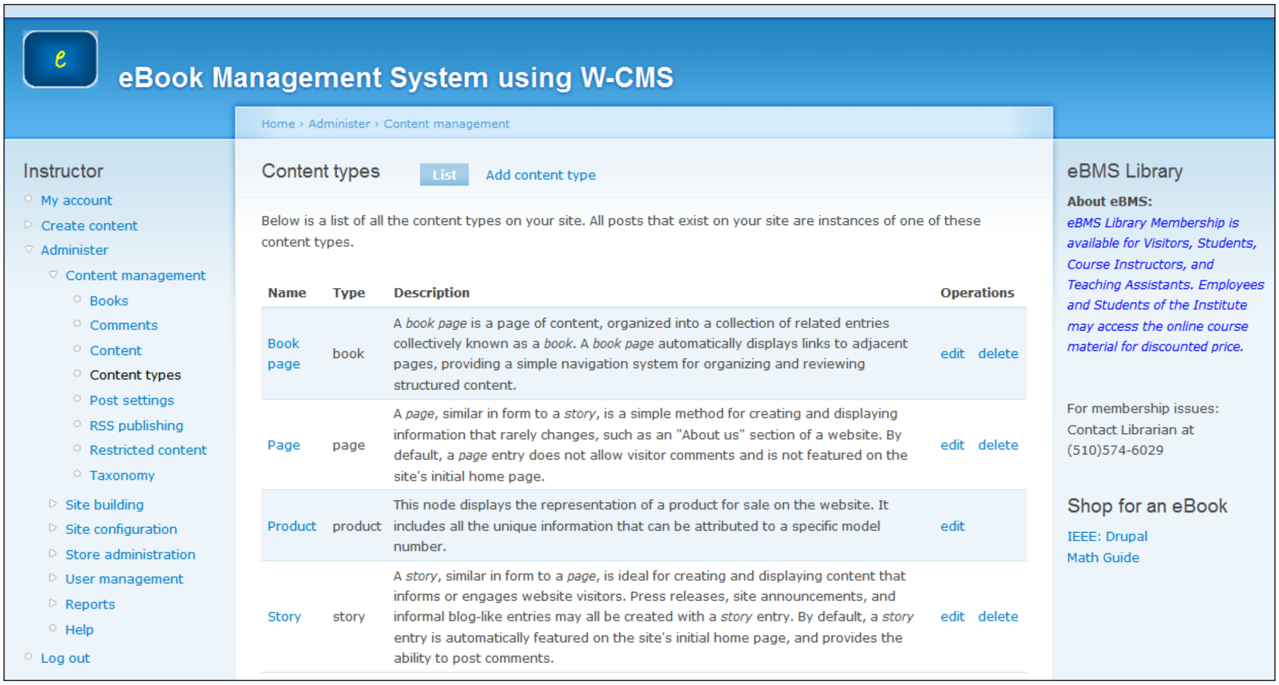
Name	Type	Operations		
Topic	Book page, Page, Story	edit vocabulary	list terms	add terms

Figure 10: Defining Taxonomy for eBook Management System

Figure 10 shows the customization of a Taxonomy module where the books has a *Vocabulary* name as *Topic* and *content types* or *categories* present under Topic are *Book page*, *Page*, and *Story*. It allows author or administrator to simply add any new book and assign a category by just single click. The whole book contents are automatically categorized under selected tags. Further it allows a lower level access control i.e. hide particular page from several pages of book, show only 1 story etc. We will discuss the configuration of access controls in further sections. Third-party or custom modules need to be integrated with the Taxonomy.

8.1.3 CCK (Content Construction Kit)

The Content Construction Kit [28] is of prime important Drupal core modules. It is highly scalable, as all other custom or third-party modules need to be associated with it. Integration of custom modules with CCK permits to generate custom fields to the nodes. CCK module makes the CMS very powerful by extending its functionality with many different contributed modules.



Below is a list of all the content types on your site. All posts that exist on your site are instances of one of these content types.

Name	Type	Description	Operations	
Book page	book	A *book page* is a page of content, organized into a collection of related entries collectively known as a *book*. A *book page* automatically displays links to adjacent pages, providing a simple navigation system for organizing and reviewing structured content.	edit	delete
Page	page	A *page*, similar in form to a *story*, is a simple method for creating and displaying information that rarely changes, such as an "About us" section of a website. By default, a *page* entry does not allow visitor comments and is not featured on the site's initial home page.	edit	delete
Product	product	This node displays the representation of a product for sale on the website. It includes all the unique information that can be attributed to a specific model number.	edit	
Story	story	A *story*, similar in form to a *page*, is ideal for creating and displaying content that informs or engages website visitors. Press releases, site announcements, and informal blog-like entries may all be created with a *story* entry. By default, a *story* entry is automatically featured on the site's initial home page, and provides the ability to post comments.	edit	delete

eBMS Library

About eBMS:

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For membership issues:
Contact Librarian at
(510)574-6029

Figure 11: Content Types specification in CCK Field

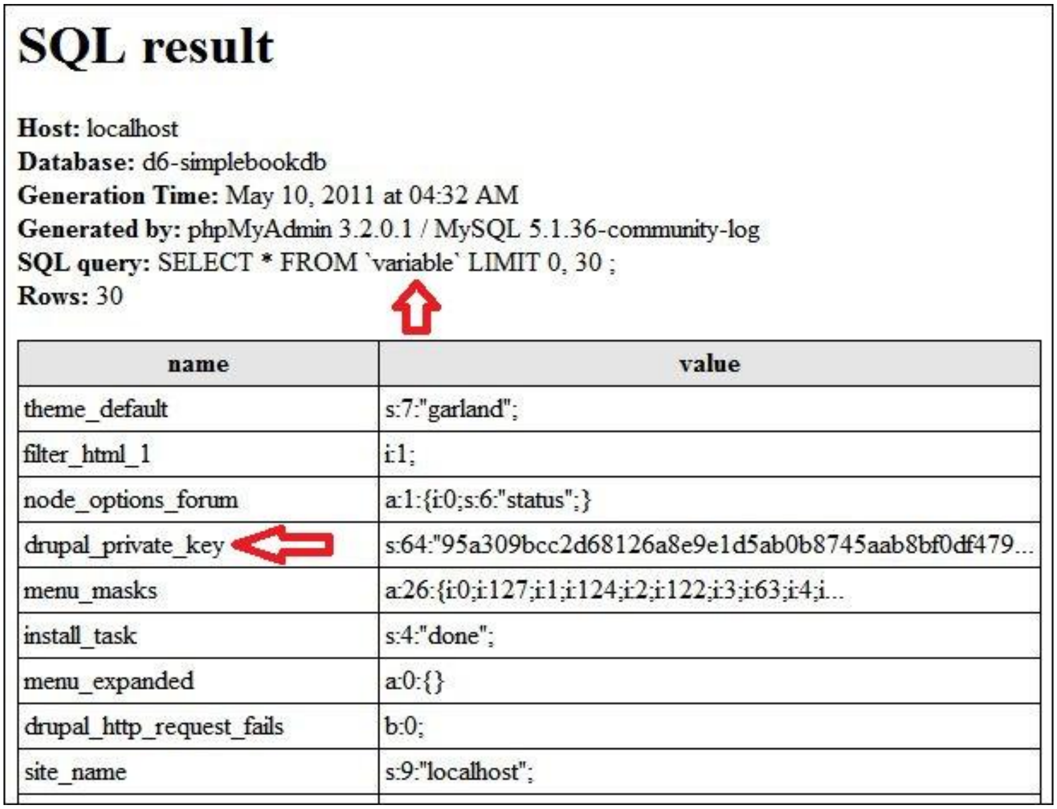
Figure 11 shows the integration of third-party and customized modules such as Book Page, Page, Story, and us_simplebook1 to CCK fields. This will serve the purpose of creating contents for eBooks management system and constructing nodes for each metadata added to it.

8.1.5 TOKEN Validation

Token module provides validation of the forms created on Drupal. For every form created, the CMS assigns a unique Token ID to it. This Token is sent out with the form and is supposed to be submitted along with other associated form values. The validation fails if the sent *token_id* does not match with the initially assigned *token_id* for that form. Unless the token_id is verified and validated, other operation cannot be performed. It adds the validation security to the eBook Management System. The spammers, attackers trying phishing attacks are prohibited by Token Validation feature. Refer to the Figure 12:

Database table name where the key is stored → variable

Field Name → drupal_private_key



SQL result

Host: localhost
Database: d6-simplebookdb
Generation Time: May 10, 2011 at 04:32 AM
Generated by: phpMyAdmin 3.2.0.1 / MySQL 5.1.36-community-log
SQL query: SELECT * FROM `variable` LIMIT 0, 30 ;
Rows: 30

name	value
theme_default	s:7:"garland";
filter_html_1	i:1;
node_options_forum	a:1:{i:0;s:6:"status";}
drupal_private_key	s:64:"95a309bcc2d68126a8e9e1d5ab0b8745aab8bf0df479...
menu_masks	a:26:{i:0;i:127;i:1;i:124;i:2;i:122;i:3;i:63;i:4;i...
install_task	s:4:"done";
menu_expanded	a:0:{}
drupal_http_request_fails	b:0;
site_name	s:9:"localhost";

Figure 12: Token Validation with drupal_private_key

Every Drupal installation assigns a unique private key i.e. *drupal_private_key*. This key is pseudo-randomly generated. It means for another Drupal installation under same server has another distinct key. All forms are uniquely tokenized when created. These Tokens containing the private key are sent out in the form in the hidden field and crosschecked when form is submitted.

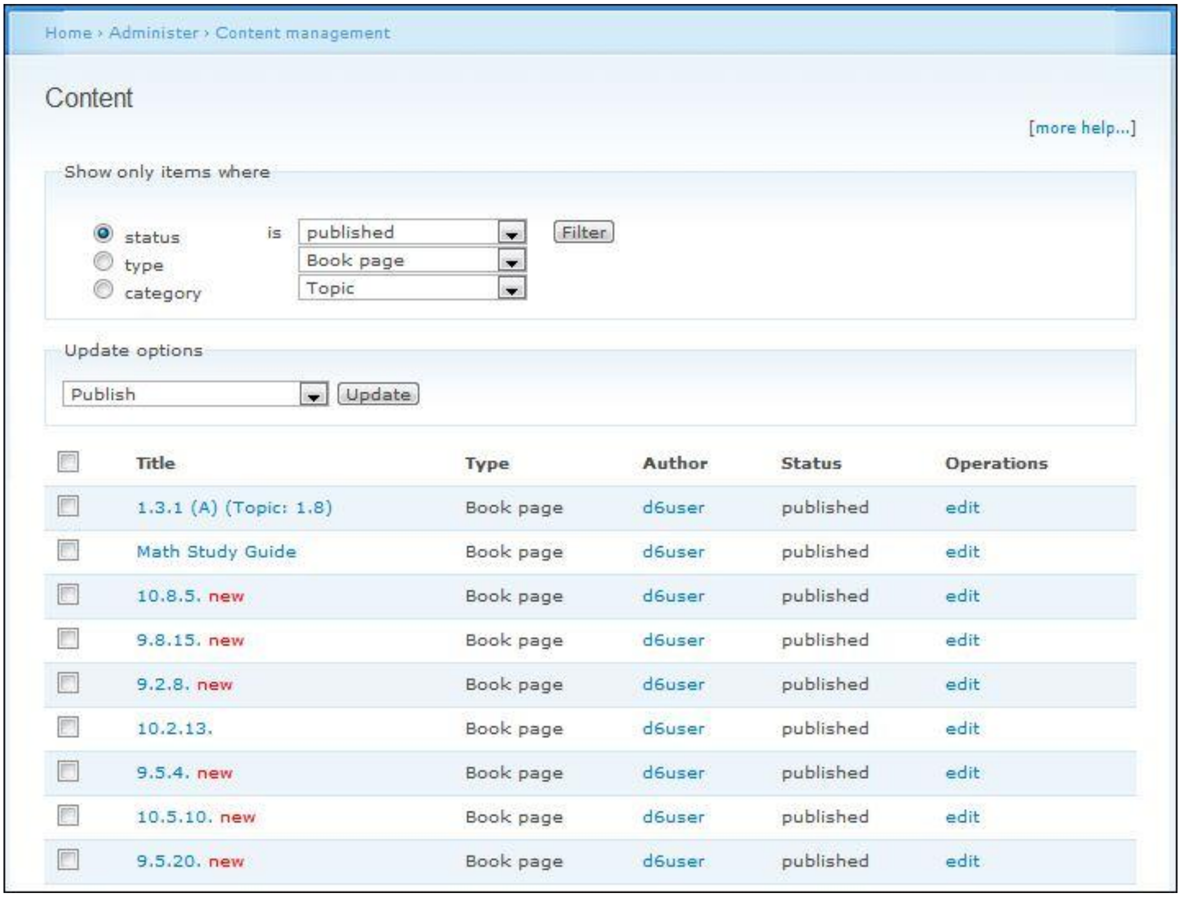
Thus when any spammer tries to submit a form, his private key does not match with the victim web-site using Tokens. Also website defacing or phishing attacks are prevented by the same means. www.whitehouse.gov and www.stanford.edu are well-known examples of active and secured websites using this feature.

8.1.6 Node

A chunk of content created using *create content* is known as a *Node*. Nodes can be given a title so that they can be identified later on. Figure 13 shows the nodes created on the eBook Management website, where book pages can be clearly identified by their names. E.g. Math Study Guide (book name), 10.8.5 (section name), etc.

Each node when created, is assigned with a unique Node ID i.e. **`$nid.`** Titles help user to search, locate, view contents where Node IDs help Drupal system to identify, locate the node when revoked.

URL: http://ebookcms.cs-sjsu.org/?q=admin/content/node



Home › Administer › Content management

Content

[more help...]

Show only items where

● status ○ type ○ category — is — published ▾ / Book page ▾ / Topic ▾ — Filter

Update options

Publish ▾ — Update

□	Title	Type	Author	Status	Operations
□	1.3.1 (A) (Topic: 1.8)	Book page	d6user	published	edit
□	Math Study Guide	Book page	d6user	published	edit
□	10.8.5. new	Book page	d6user	published	edit
□	9.8.15. new	Book page	d6user	published	edit
□	9.2.8. new	Book page	d6user	published	edit
□	10.2.13.	Book page	d6user	published	edit
□	9.5.4. new	Book page	d6user	published	edit
□	10.5.10. new	Book page	d6user	published	edit
□	9.5.20. new	Book page	d6user	published	edit

Figure 13: Node View for Content Created

Every node has unique ID, user defined Title and custom Body, where html contents are rendered for web view. Figure 14 shows the node structure [21]:

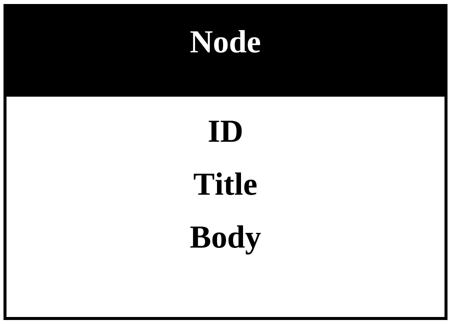
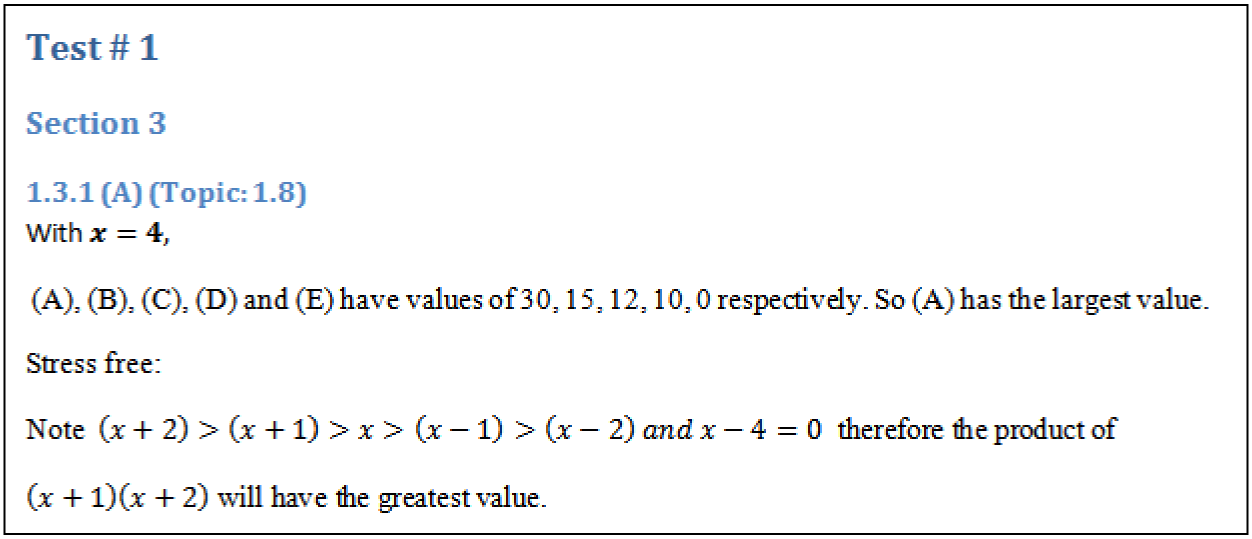


Figure 14: Node Structure

8.2 Creating and Importing an eBook to eBook Library

eBook Management System facilitates users especially publishers, professors to upload there lecture notes, books to the system. Then by configuring access control per role, per student user, the books can be accessed online. The following sections will discuss to create a new book or to import available PDF or Doc book to the system. Figure 15 shows the original *Math_Study_Guide.doc* file that we need to import to the eBook Management System.



Test # 1

Section 3

1.3.1 (A) (Topic: 1.8)

With $\boldsymbol{x} = \mathbf{4}$,

(A), (B), (C), (D) and (E) have values of 30, 15, 12, 10, 0 respectively. So (A) has the largest value.

Stress free:

Note $(x+2) > (x+1) > x > (x-1) > (x-2)\ and\ x-4=0$ therefore the product of

$(x+1)(x+2)$ will have the greatest value.

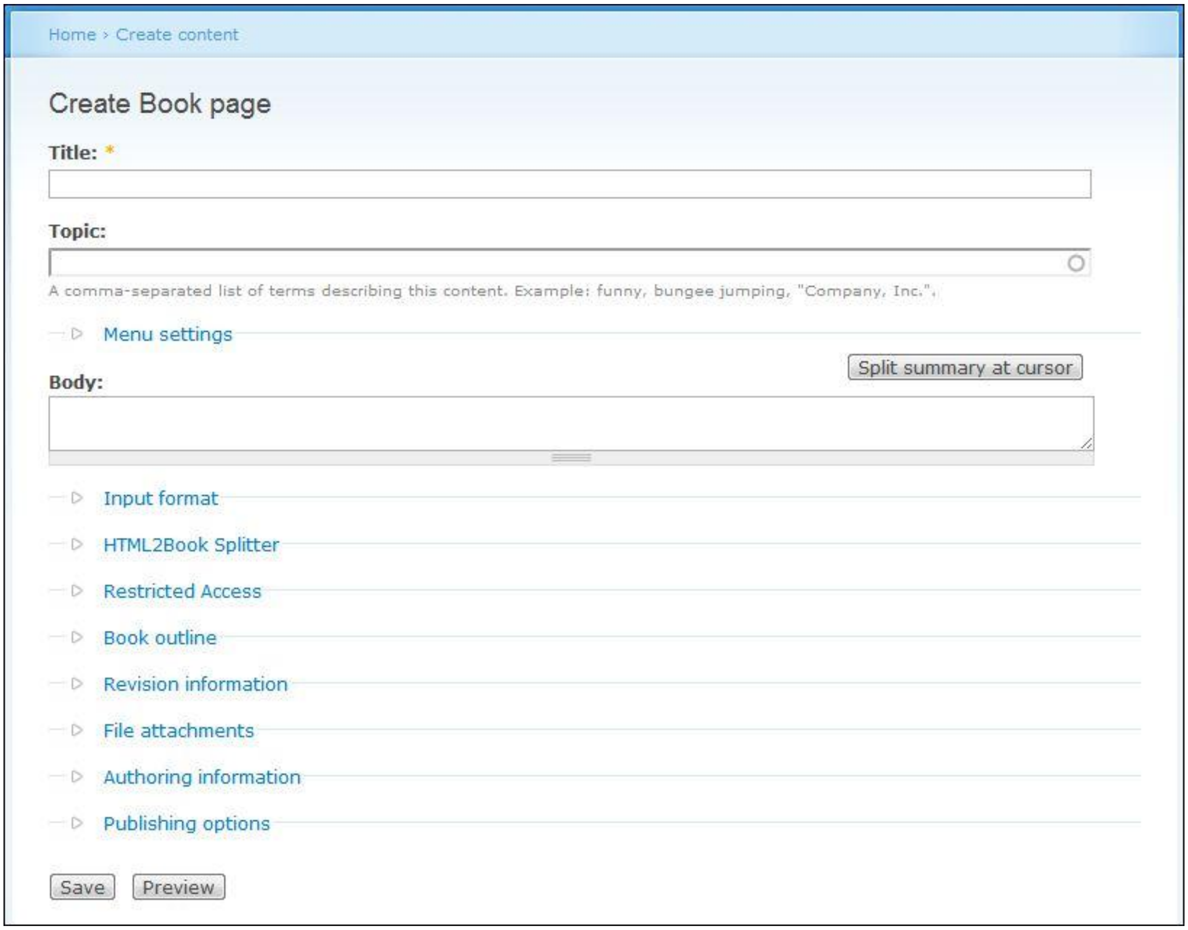
Figure 15: Original .doc Book

8.2.1 Book Access and Book Page Access

Initially both of these modules were third-party modules. For any website development it is primary task to start with a webpage creation. So in recent versions of Drupal, these modules are included with core package. Book Access [29] is primary module and it is extended by Book Page Access [30] to have fine control oven every single page of the book. Here *Book Page view* is not a flip book like hard copy of a book, but it is web-view of a book with the book pages, index, chapters, sections, etc. hierarchy maintained. It allows access by *per-book basis, role-*

based view, *edit* and *delete* permissions for each of the individual book and its pages created. If the permissions are assigned to the Book, all the child nodes under that book will be automatically assigned with the same permissions.

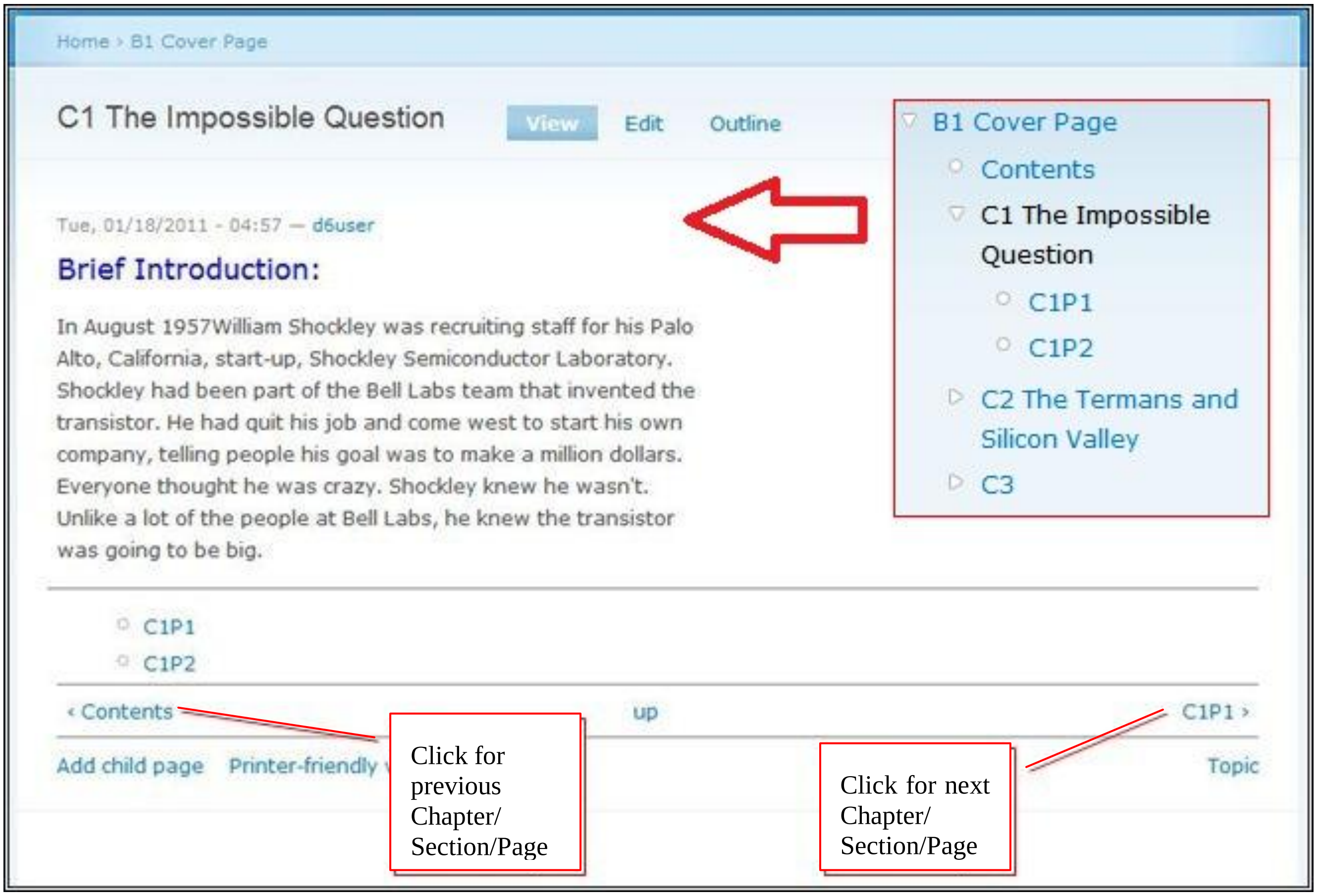
What if the author wants to hide few in-between pages from user? E.g. if you are browsing a book at Amazon store or at Google Books, the publishers allow few pages to view. Other pages are hidden from user until user purchases the book. To deploy this feature Book Page Access module is required. It allows per node permission for single book page. The permissions set for Book Page Access have higher priority than the permissions set for Book Access. It allows lower level access control.



A comma-separated list of terms describing this content. Example: funny, bungee jumping, "Company, Inc.".

Figure 16: Creating Book Pages

Figure 16 shows the control panel to create a book and pages using these modules. eBook management system uses this basic panel to generate any notification page or advertisement page, or contents which are smaller in size such as a Note, etc. Figure 17 shows the eBook created with this module. It creates the page hierarchy as **Book → Contents → Chapter 1 →Chapter 1 Page 1, Chapter 1 Page 2 → Chapter 2** and so on.



Home › B1 Cover Page

C1 The Impossible Question

Tue, 01/18/2011 - 04:57 — d6user

Brief Introduction:

In August 1957William Shockley was recruiting staff for his Palo Alto, California, start-up, Shockley Semiconductor Laboratory. Shockley had been part of the Bell Labs team that invented the transistor. He had quit his job and come west to start his own company, telling people his goal was to make a million dollars. Everyone thought he was crazy. Shockley knew he wasn't. Unlike a lot of the people at Bell Labs, he knew the transistor was going to be big.

View
Edit
Outline
B1 Cover Page
Contents
C1 The Impossible Question
C1P1
C1P2
C2 The Termans and Silicon Valley
C3
C1P1
C1P2
‹ Contents
up
C1P1 ›
Add child page
Printer-friendly v
Topic
Click for previous Chapter/ Section/Page
Click for next Chapter/ Section/Page

Figure 17: Book Sections Hierarchy created using Book Page

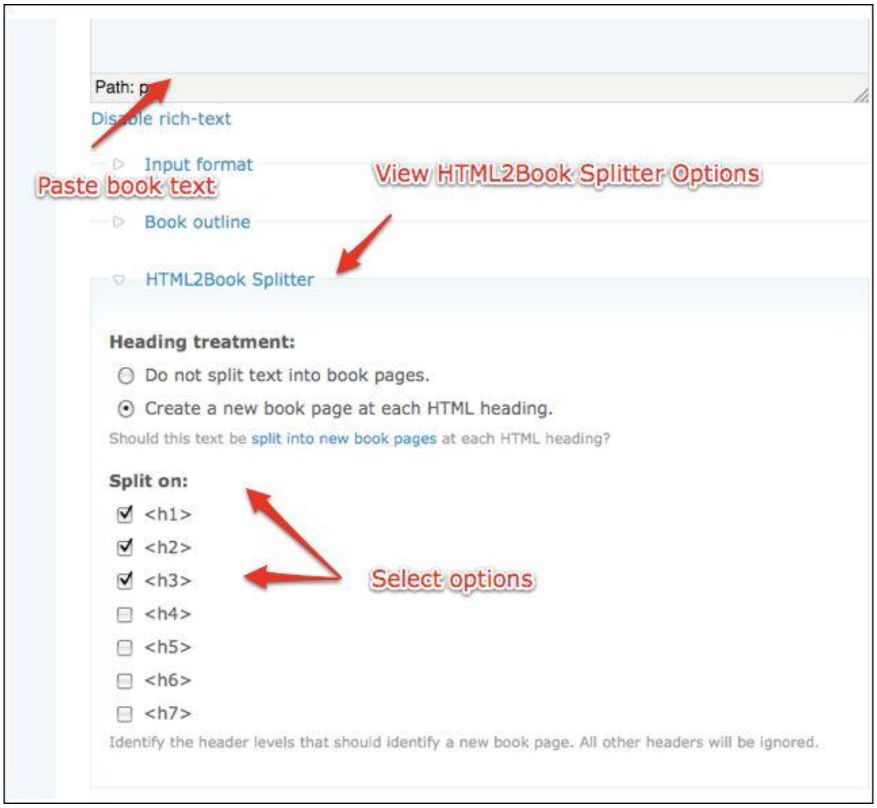
For large size book import to the eBook Management System, we made use of another customized modules with Book Access module as a foundation to automate the process of importing and publishing a large size e-book. We shall discuss them in Section 8.2.3.

8.2.3 HTML2Book Splitter

We have seen page by page uploading of a book to eBook Management System in Section 8.2.3. For importing large size Doc or PDF book, HTML2Book [31] module is the appropriate one. Installation steps for HTML2Book Splitter module:

1. Download module HTML2Book (http://drupal.org/project/HTML2Book)
2. Unzip it and copy to module subfolder.
3. Go to Administer/site building/modules and enable HTML2Book module.
4. Set access permission for this module from Home → Administer → User Management → Permissions → Select user to be assigned and save the configuration.

Figure 18 shows the input panel for HTML2Book.



Paste book text

View HTML2Book Splitter Options

Heading treatment:

○ Do not split text into book pages.

● Create a new book page at each HTML heading.

Should this text be split into new book pages at each HTML heading?

Split on:

☑ <h1>
☑ <h2>
☑ <h3>
□ <h4>
□ <h5>
□ <h6>
□ <h7>

Identify the header levels that should identify a new book page. All other headers will be ignored.

Select options

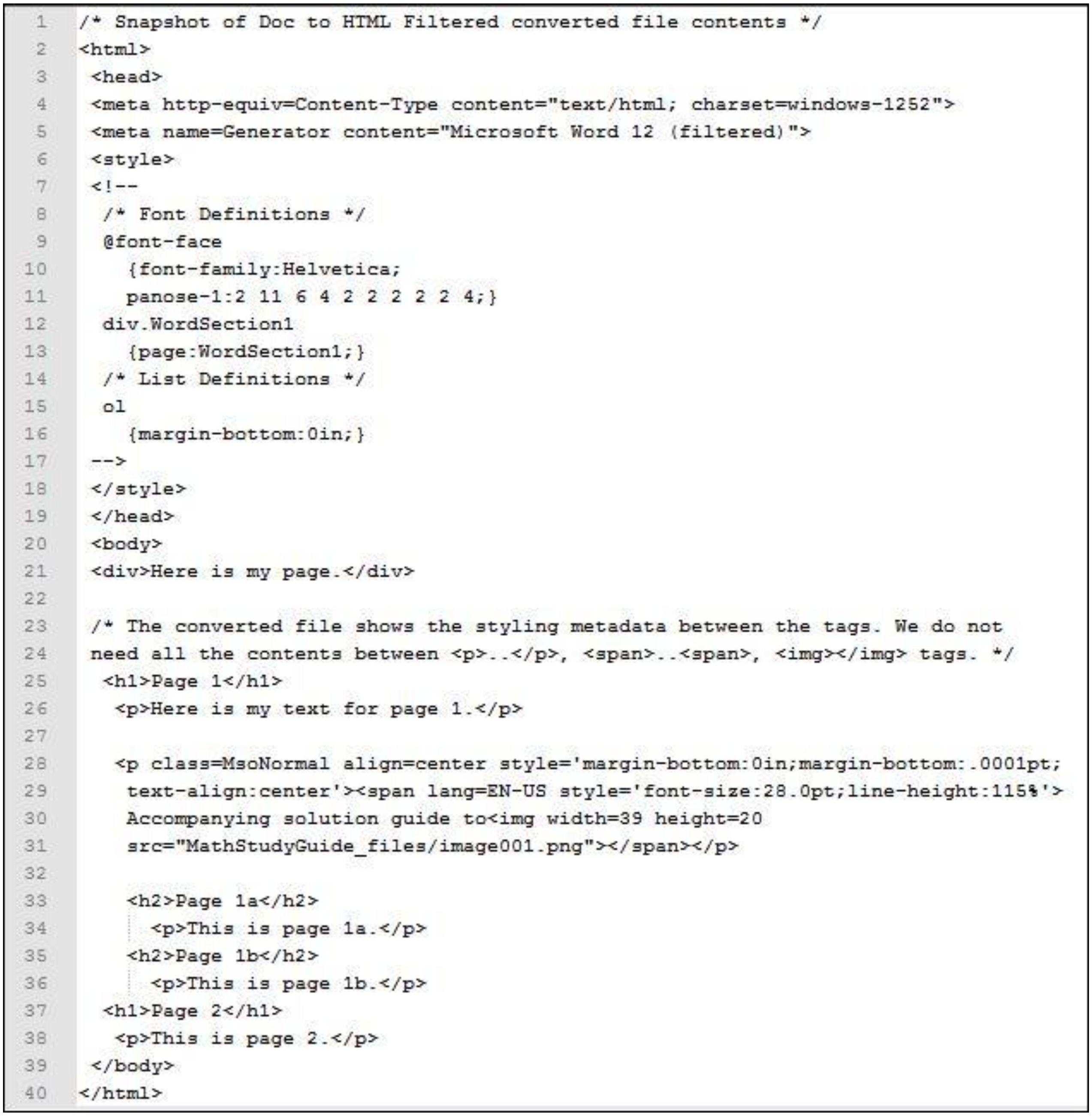
Figure 18: Input Panel for Importing Large Book Contents in Single Pass

This module automatically creates nodes for each book page and maintains the hierarchy for the book structure. It identifies the header and sub-header tags i.e. <h1>, <h2>, etc. from the *Filtered HTMLDocument file.* The document file (file with .doc/.docx extension) has to be converted to the Filtered HTML format (.html/.htm). Before using this module publisher has to perform some pre-processing on the eBook in DOC/ PDF format to make it compatible with this module.

This module does not provide the single pass solution to import a book. To solve this problem, we propose following pre-processing steps to be applied on the eBook before importing. We shall discuss those steps to import an eBook to eBook Management System in the following sub-sections:

8.2.3.1 Original .Doc/ .PDF file conversion to Filtered HTML file

Open original .doc file (if it is .pdf file, first convert it to .doc by using any *pdf to doc converters*) and save it as *Web Page, Filtered (*.htm, *.html).* Then open that HTML code in any HTML Editor, e.g. HTML-Kit [32]. For importing to the system, we can remove all style tags, span tags, html tags, header tags, title tags with the contents inside it. We just need to clean <body>…</body> tags with the actual page contents. The proposed eBook management system takes care of the styling of contents while creating a web-page. The sample code, when doc file is converted to filtered html will look like as shown in code snippet 3 below.



```
/* Snapshot of Doc to HTML Filtered converted file contents */
<html>
 <head>
 <meta http-equiv=Content-Type content="text/html; charset=windows-1252">
 <meta name=Generator content="Microsoft Word 12 (filtered)">
 <style>
 <!--
  /* Font Definitions */
  @font-face
    {font-family:Helvetica;
    panose-1:2 11 6 4 2 2 2 2 2 4;}
  div.WordSection1
    {page:WordSection1;}
  /* List Definitions */
  ol
    {margin-bottom:0in;}
 -->
 </style>
 </head>
 <body>
 <div>Here is my page.</div>

 /* The converted file shows the styling metadata between the tags. We do not
 need all the contents between <p>..</p>, <span>..<span>, <img></img> tags. */
  <h1>Page 1</h1>
   <p>Here is my text for page 1.</p>

   <p class=MsoNormal align=center style='margin-bottom:0in;margin-bottom:.0001pt;
    text-align:center'><span lang=EN-US style='font-size:28.0pt;line-height:115%'>
    Accompanying solution guide to<img width=39 height=20
    src="MathStudyGuide_files/image001.png"></span></p>

    <h2>Page 1a</h2>
      <p>This is page 1a.</p>
    <h2>Page 1b</h2>
      <p>This is page 1b.</p>
  <h1>Page 2</h1>
   <p>This is page 2.</p>
 </body>
</html>
```

Code Snippet 3: Doc to Web Filtered HTML Conversion

8.2.3.2 HTML Tidy and Office HTML Filter

HTML Tidy [33] and Office HTML Filter [34] modules integrated with HTML2Book eases to remove unwanted tags in the above code snippet 3. The filters can be configured for

<style>, <script> etc tags to remove them from the filtered file. HTML Tidy also takes care of any broken tags in the code we might have missed while conversion.

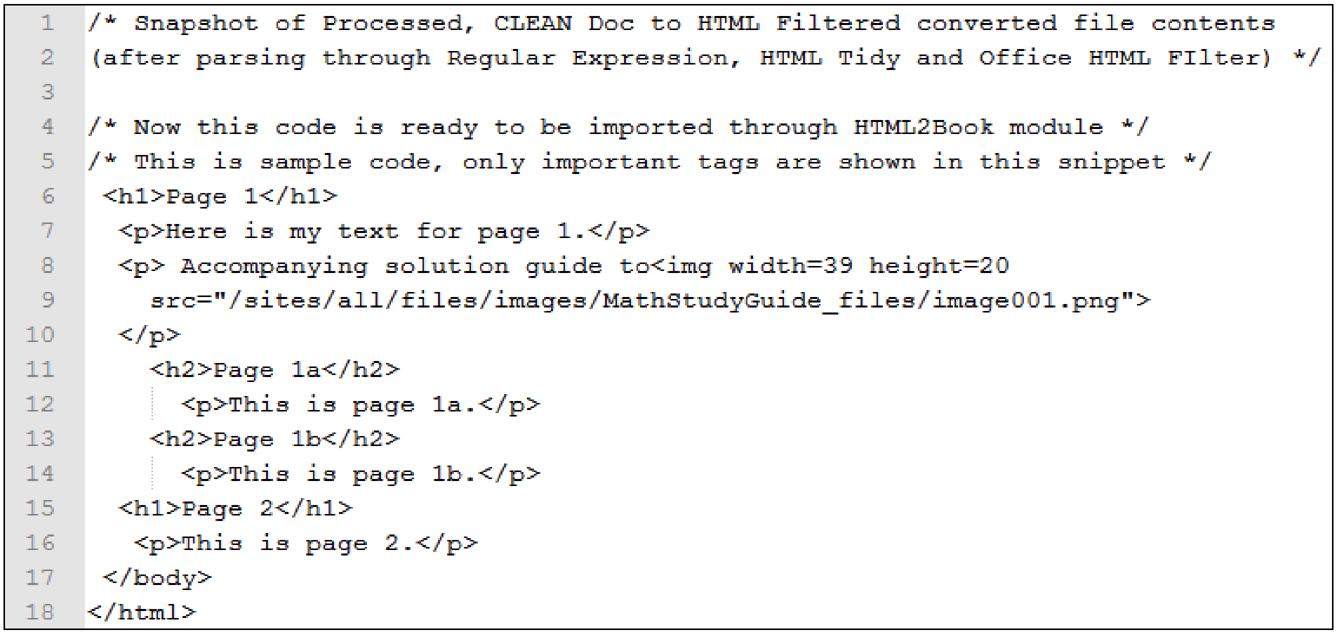
Still the filtering process is not sufficient to feed the input code to HTML2Book. In order to retain all the contents as of original Document file, we may not delete the whole tags. For the tags like <span> or <img> or <p>, we need to retain the contents in the tags. HTML2Book module does not provide the provision to filter the contents selectively.

To solve this problem we propose the use of Regular Expression to parse the contents in order to filter as per required. Alternatively we may use HTML-Shrinker software to get rid of untidy HTML tags and extra attributed in tags. In next Section 8.2.3.3 we shall discuss the use of regular expressions.

8.2.3.3 Use of Regular Expressions or HTML-Shrinker to clean the filtered HTML code

Regular Expressions [35] are used for pattern matching. RE can be used with PHP code to parse the contents of the eBook to be imported. For security concerns admin may block the use of PHP Filters. (We shall discuss about PHP Scripting security in Section 10.1.2). In this case, HTML-Shrinker free software can be used to obtain a filtered eBook HTML contents in single line to avoid errors in rendering broken tags.

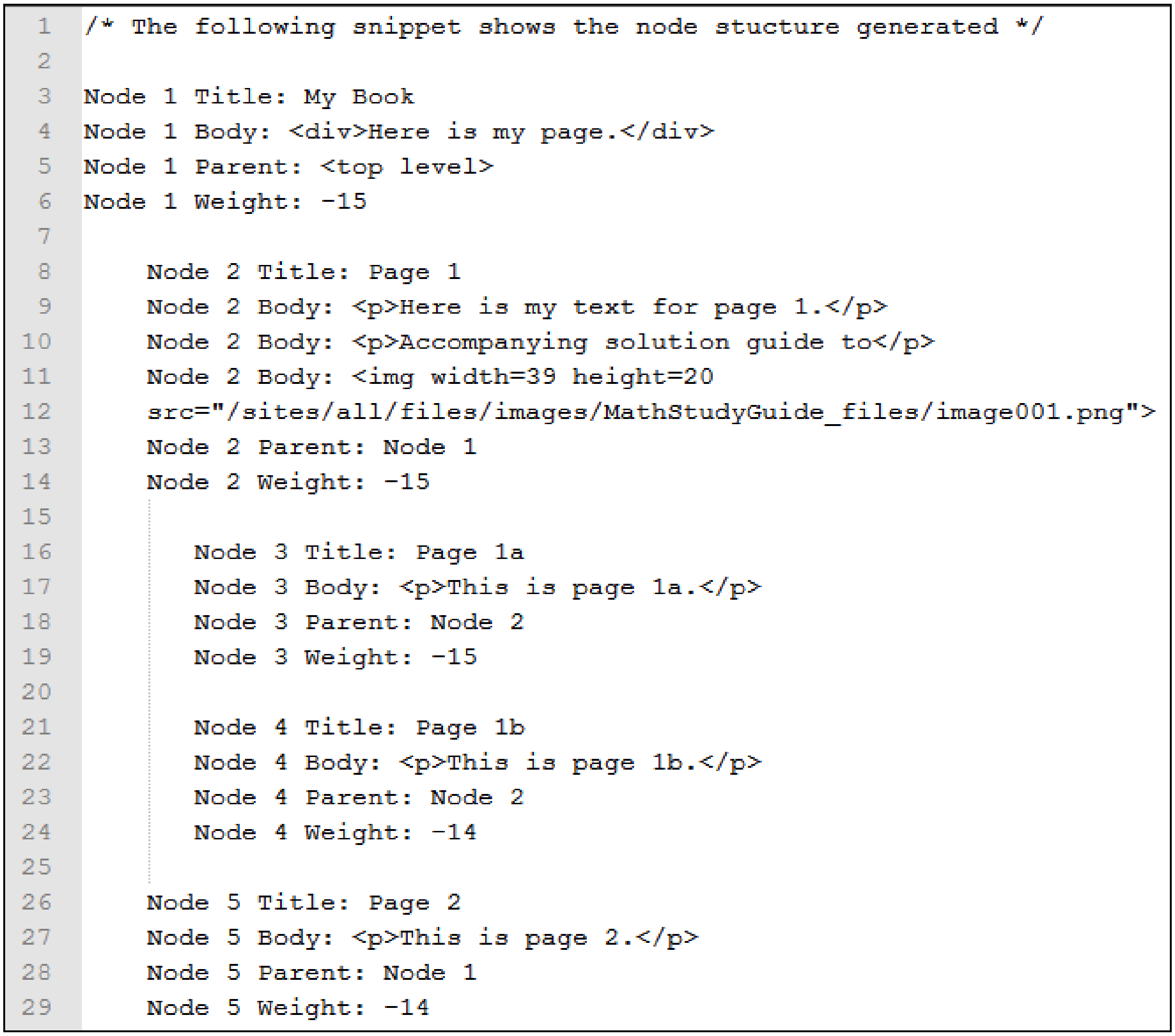
After following all the steps discussed until Section 8.2.3.3, the output of the parsed Web-Filtered HTML file (as shown in code snippet 3) should look like the sample code shown in following code snippet 5:



```
/* Snapshot of Processed, CLEAN Doc to HTML Filtered converted file contents
(after parsing through Regular Expression, HTML Tidy and Office HTML FIlter) */

/* Now this code is ready to be imported through HTML2Book module */
/* This is sample code, only important tags are shown in this snippet */
 <h1>Page 1</h1>
  <p>Here is my text for page 1.</p>
  <p> Accompanying solution guide to<img width=39 height=20
    src="/sites/all/files/images/MathStudyGuide_files/image001.png">
  </p>
    <h2>Page 1a</h2>
      <p>This is page 1a.</p>
    <h2>Page 1b</h2>
      <p>This is page 1b.</p>
  <h1>Page 2</h1>
   <p>This is page 2.</p>
 </body>
</html>
```

Code Snippet 4: Clean Web-filtered HTML file

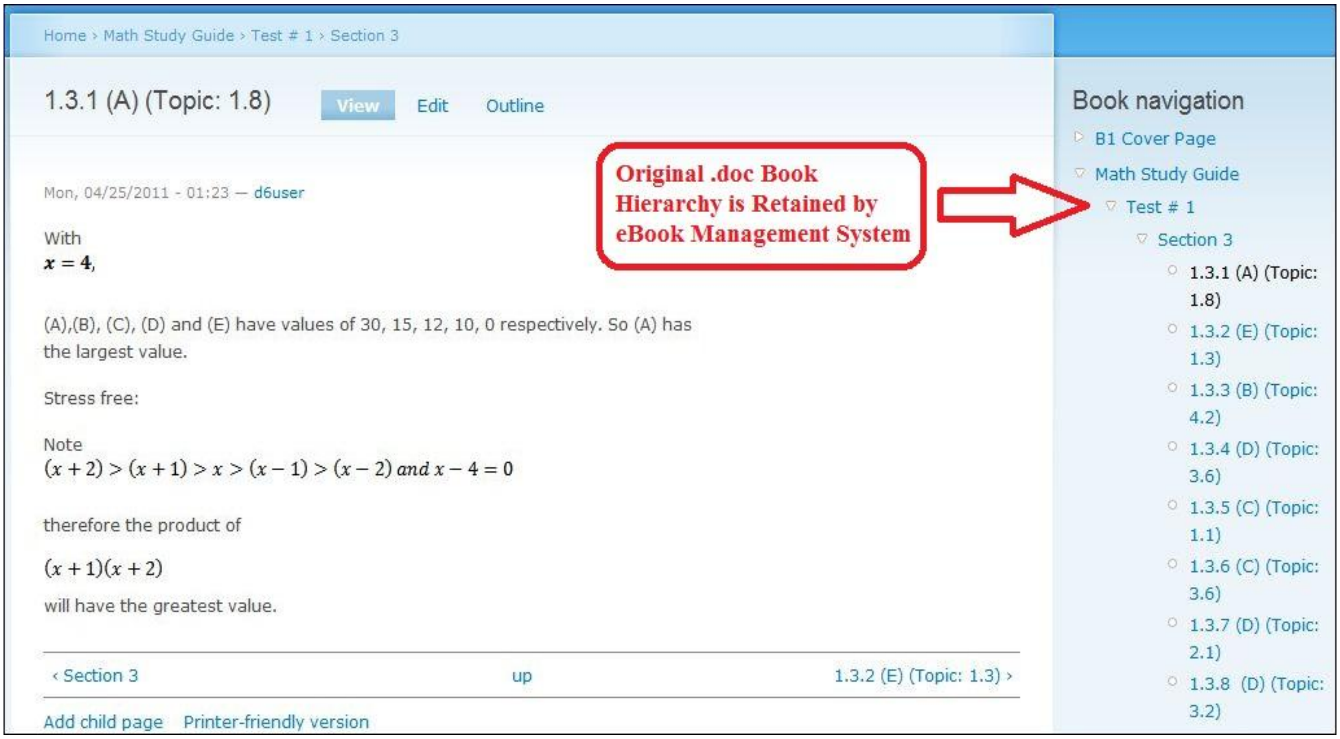
Figure 19 shows the node structure generated when we use the clean code shown in code snippet 5. We have already discussed the node structure in Section 8.1.6 and Figure 14.



```
/* The following snippet shows the node stucture generated */

Node 1 Title: My Book
Node 1 Body: <div>Here is my page.</div>
Node 1 Parent: <top level>
Node 1 Weight: -15

    Node 2 Title: Page 1
    Node 2 Body: <p>Here is my text for page 1.</p>
    Node 2 Body: <p>Accompanying solution guide to</p>
    Node 2 Body: <img width=39 height=20
    src="/sites/all/files/images/MathStudyGuide_files/image001.png">
    Node 2 Parent: Node 1
    Node 2 Weight: -15

       Node 3 Title: Page 1a
       Node 3 Body: <p>This is page 1a.</p>
       Node 3 Parent: Node 2
       Node 3 Weight: -15

       Node 4 Title: Page 1b
       Node 4 Body: <p>This is page 1b.</p>
       Node 4 Parent: Node 2
       Node 4 Weight: -14

    Node 5 Title: Page 2
    Node 5 Body: <p>This is page 2.</p>
    Node 5 Parent: Node 1
    Node 5 Weight: -14
```

Figure 19: HTML2Book Generated Node Structure for Filtered HTML Contents

This is a Drupal CMS understandable structure that outputs the rendered web-page as online eBook. The output of eBook Management System after importing to Drupal should look like Figure 20.



1.3.1 (A) (Topic: 1.8)

Mon, 04/25/2011 - 01:23 — d6user

With
$\boldsymbol{x = 4}$,

(A),(B), (C), (D) and (E) have values of 30, 15, 12, 10, 0 respectively. So (A) has the largest value.

Stress free:

Note
$(x+2) > (x+1) > x > (x-1) > (x-2)\ and\ x-4=0$

therefore the product of

$(x+1)(x+2)$

will have the greatest value.

Original .doc Book Hierarchy is Retained by eBook Management System

Figure 20: Final Web-view of .doc to .html Book Page

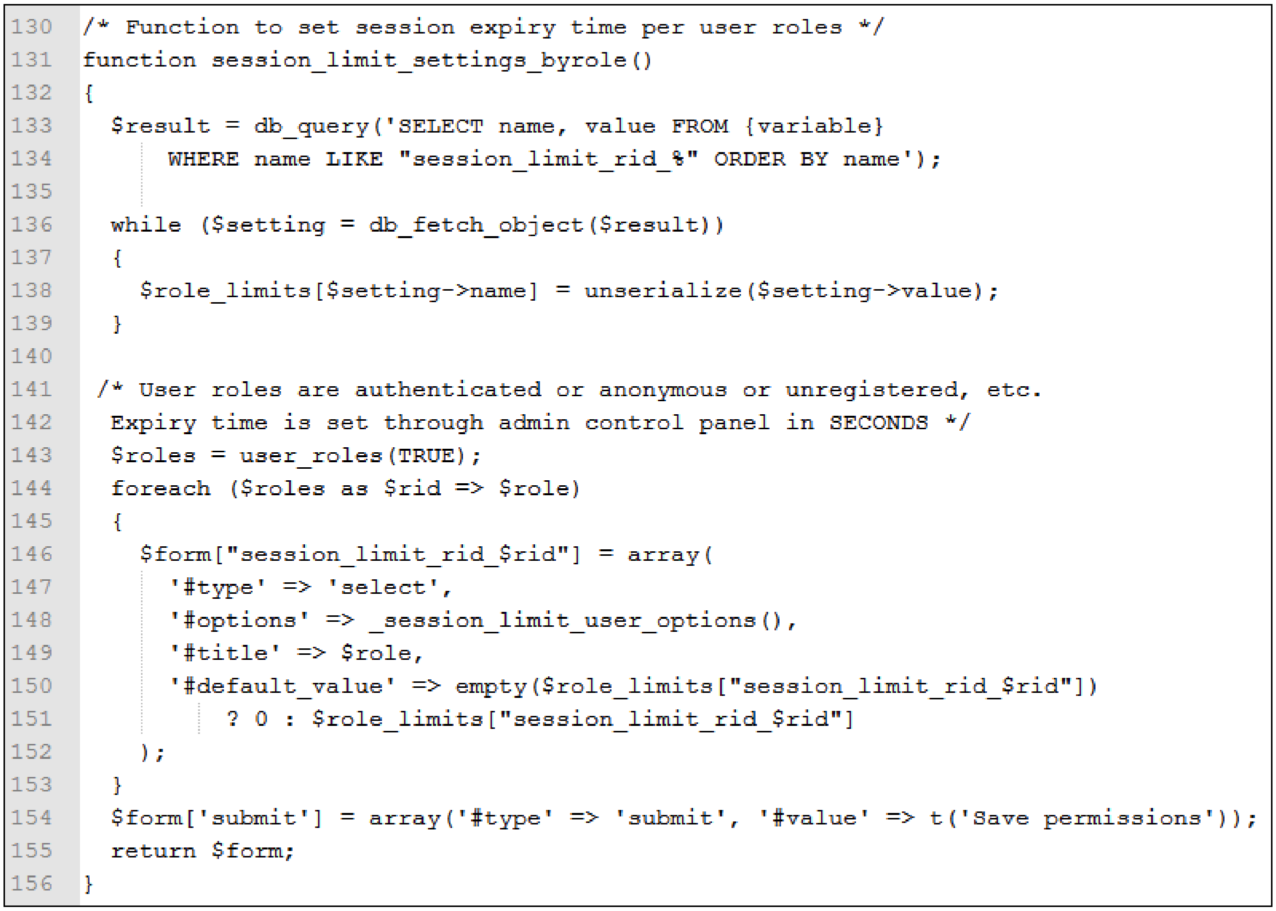
Now if we compare the original Math_Study_Guide.doc file shown in Figure 16 with the final web-view shown in Figure 20, the quality, power and efficiency of eBook Management using WCMS can be visualized. The first goal of the eBook Management System is accomplished!

8.3 Enforcing Access Control Policies

Now the next important milestone is to enforce access control policies to the generated eBook. That is the second goal of the proposed writing project. We shall discuss the steps through Section 8.3.

8.3.1 Session Limit

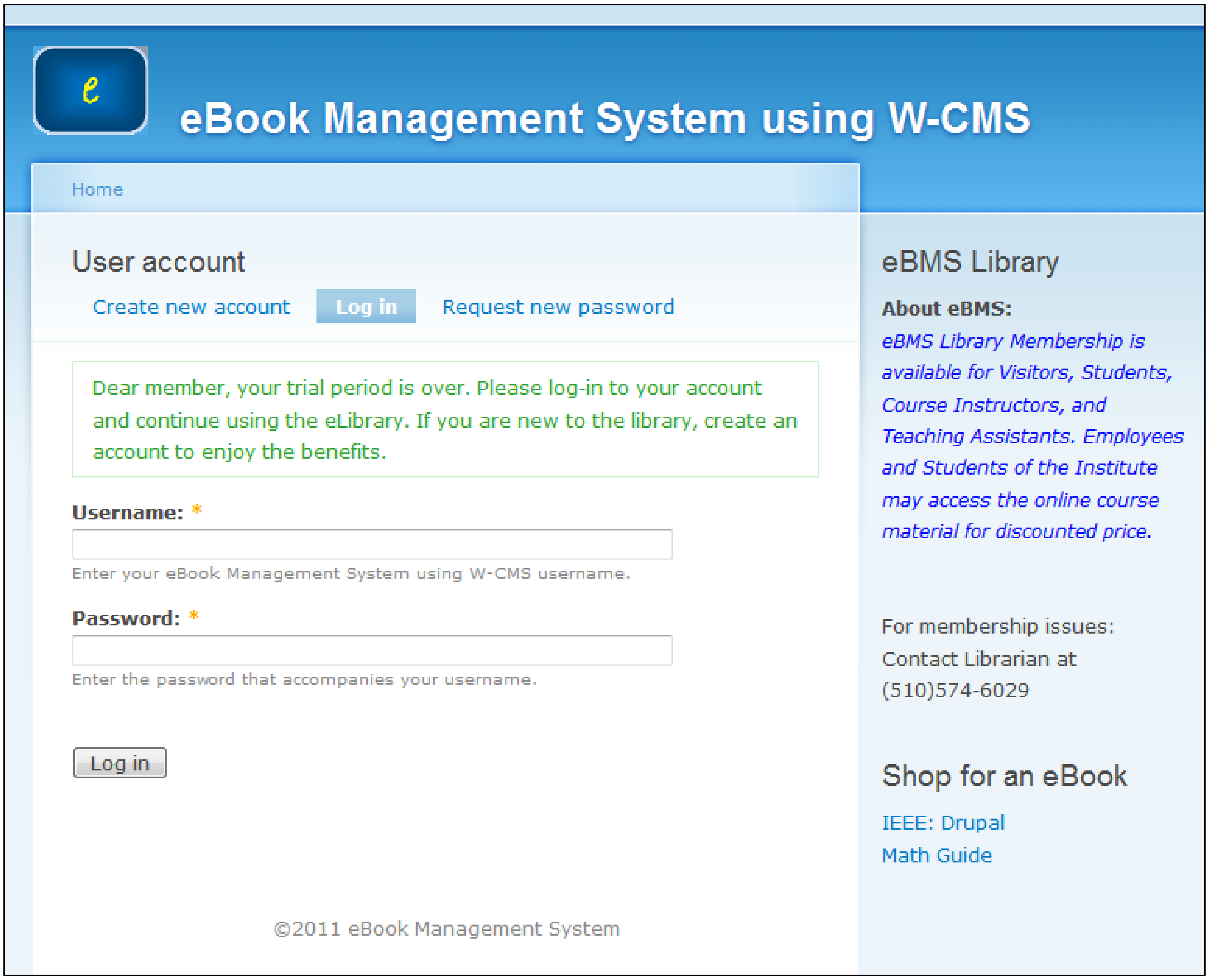
Session Limit [36] allows administrators to limit the session time per user per role. For authenticated user, while logged in, the session time limit is FALSE as shown in code snippet 6. So the session never expires. For unauthenticated user, time limit in seconds can be set. After that time has lapsed, the web-page is automatically redirected to defined URL.



```
/* Function to set session expiry time per user roles */
function session_limit_settings_byrole()
{
  $result = db_query('SELECT name, value FROM {variable}
      WHERE name LIKE "session_limit_rid_%" ORDER BY name');

  while ($setting = db_fetch_object($result))
  {
    $role_limits[$setting->name] = unserialize($setting->value);
  }

 /* User roles are authenticated or anonymous or unregistered, etc.
  Expiry time is set through admin control panel in SECONDS */
  $roles = user_roles(TRUE);
  foreach ($roles as $rid => $role)
  {
    $form["session_limit_rid_$rid"] = array(
      '#type' => 'select',
      '#options' => _session_limit_user_options(),
      '#title' => $role,
      '#default_value' => empty($role_limits["session_limit_rid_$rid"])
          ? 0 : $role_limits["session_limit_rid_$rid"]
    );
  }
  $form['submit'] = array('#type' => 'submit', '#value' => t('Save permissions'));
  return $form;
}
```

Code Snippet 5: Function for Session Limit per User Role

For eBook Management System, for a demo purpose, the session time limit is set to 60 seconds only and the web page is set to be redirected at log-in page: `http://ebookcms.cs-sjsu.org/?q=user/register`. Also the *notification* is set to be displayed as *"Dear member, your trial period is over. Please log-in to your account and continue using the eLibrary. If you are new to the library, create an account to enjoy the benefits."* It is shown in Figure 21.



eBook Management System using W-CMS

Home

User account

Create new account | Log in | Request new password

Dear member, your trial period is over. Please log-in to your account and continue using the eLibrary. If you are new to the library, create an account to enjoy the benefits.

Username: *

Enter your eBook Management System using W-CMS username.

Password: *

Enter the password that accompanies your username.

Log in

©2011 eBook Management System

eBMS Library

About eBMS:

eBMS Library Membership is available for Visitors, Students, Course Instructors, and Teaching Assistants. Employees and Students of the Institute may access the online course material for discounted price.

For membership issues:
Contact Librarian at
(510)574-6029

Shop for an eBook

IEEE: Drupal
Math Guide

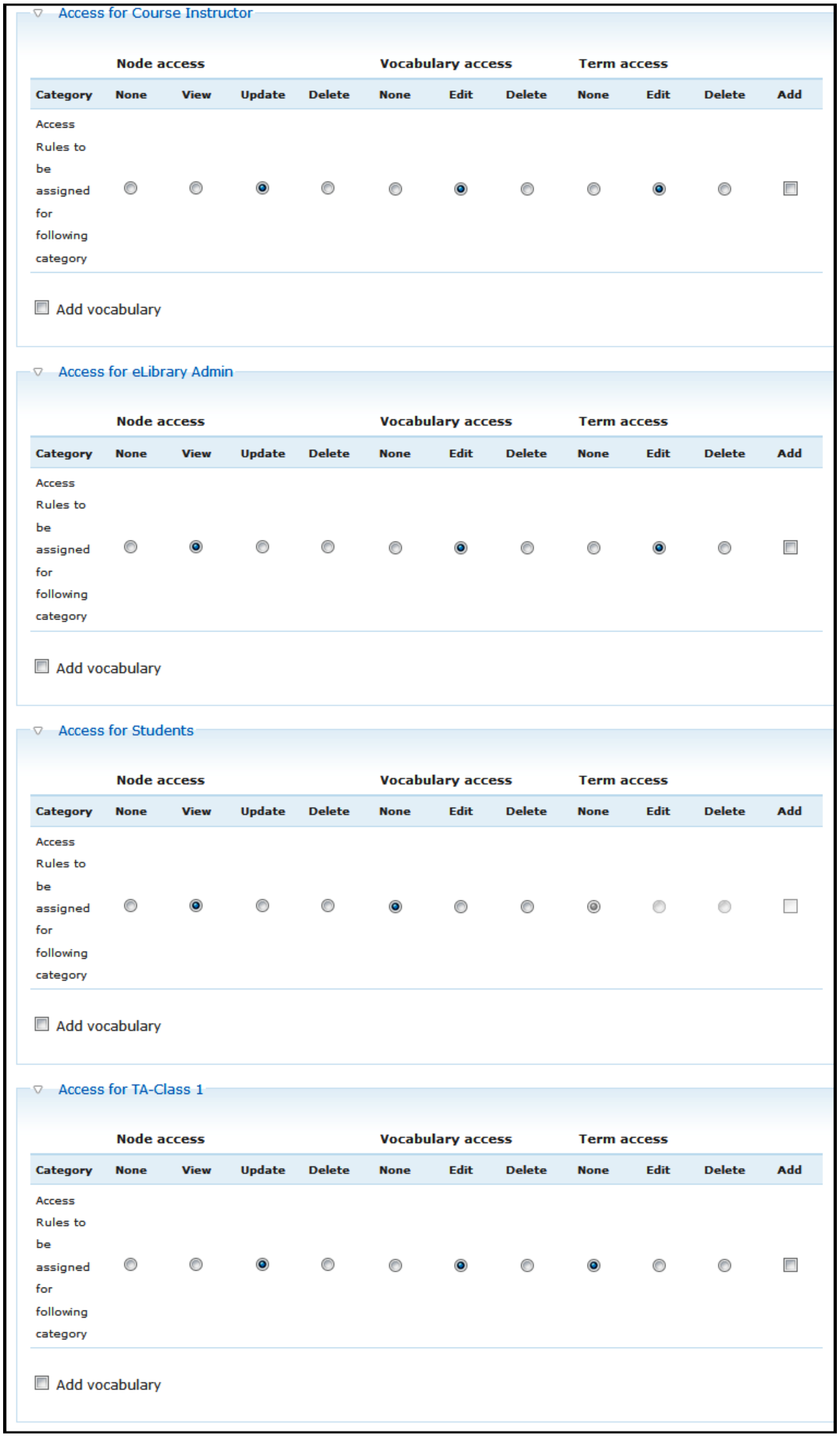
Figure 21: Session Expire-Time Out for Unauthenticated User

This serves the purpose of e-commerce feature integration to eBook Management System where user is allowed to take a trial for or view specific products for limited time period. The contents are made available until trial period expires.

8.3.2 Limited Views and Vocabulary Access Control

Limited Views [37] and Vocabulary Access Control [38] are the modules that need to be integrated with CCK module discussed in Section 8.1.3. Limited Views (*limited_content_views*) allows administrator to set the node (i.e. web-page) view permissions allowing unregistered user to access certain contents only, or certain contents for specific time period only.

Vocabulary is the *tag* defined and assigned to specific node. Referring to Figure 22, the configuration panel for user defined vocabulary permissions looks like:



▽ Access for Course Instructor

	Node access				Vocabulary access			Term access			
Category	None	View	Update	Delete	None	Edit	Delete	None	Edit	Delete	Add
Access Rules to be assigned for following category	○	○	●	○	○	●	○	○	●	○	□

□ Add vocabulary

▽ Access for eLibrary Admin

	Node access				Vocabulary access			Term access			
Category	None	View	Update	Delete	None	Edit	Delete	None	Edit	Delete	Add
Access Rules to be assigned for following category	○	●	○	○	○	●	○	○	●	○	□

□ Add vocabulary

▽ Access for Students

	Node access				Vocabulary access			Term access			
Category	None	View	Update	Delete	None	Edit	Delete	None	Edit	Delete	Add
Access Rules to be assigned for following category	○	●	○	○	●	○	○	●	○	○	□

□ Add vocabulary

▽ Access for TA-Class 1

	Node access				Vocabulary access			Term access			
Category	None	View	Update	Delete	None	Edit	Delete	None	Edit	Delete	Add
Access Rules to be assigned for following category	○	○	●	○	○	●	○	●	○	○	□

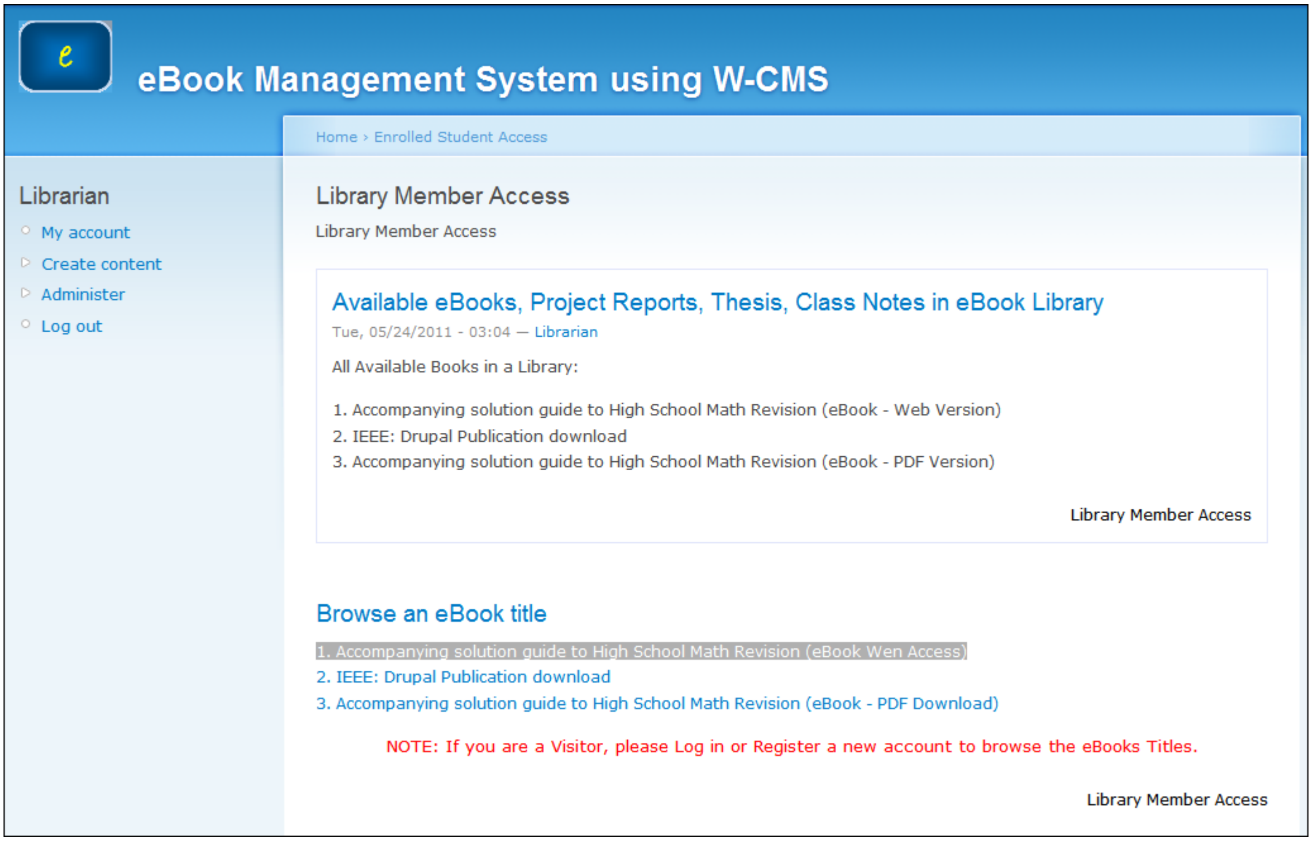
□ Add vocabulary

Figure 22: Configuration of Custom Vocabulary Permissions

]

For the proposed eBook Management System, *Access rules to be assigned for the following category* is the *vocabulary tag* defined and assigned to the eBMS homepage displaying *Available eBooks, Project Reports, Thesis, Class Notes in eBook Library*. This enforces following access controls to the nodes or web-pages:

Case 1: If user is logged-in or user is an authenticated user (Student, Instructor, TA, and Librarian) accesses the website then he can access to the contents and hyperlinks for “available books in eLibrary”. This allows browsing an eBook for authenticated users. Refer to Figure 23.


e
eBook Management System using W-CMS
Home › Enrolled Student Access
Librarian
My account
Create content
Administer
Log out

Library Member Access

Library Member Access

Available eBooks, Project Reports, Thesis, Class Notes in eBook Library

Tue, 05/24/2011 - 03:04 — Librarian

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1. Accompanying solution guide to High School Math Revision (eBook - Web Version)
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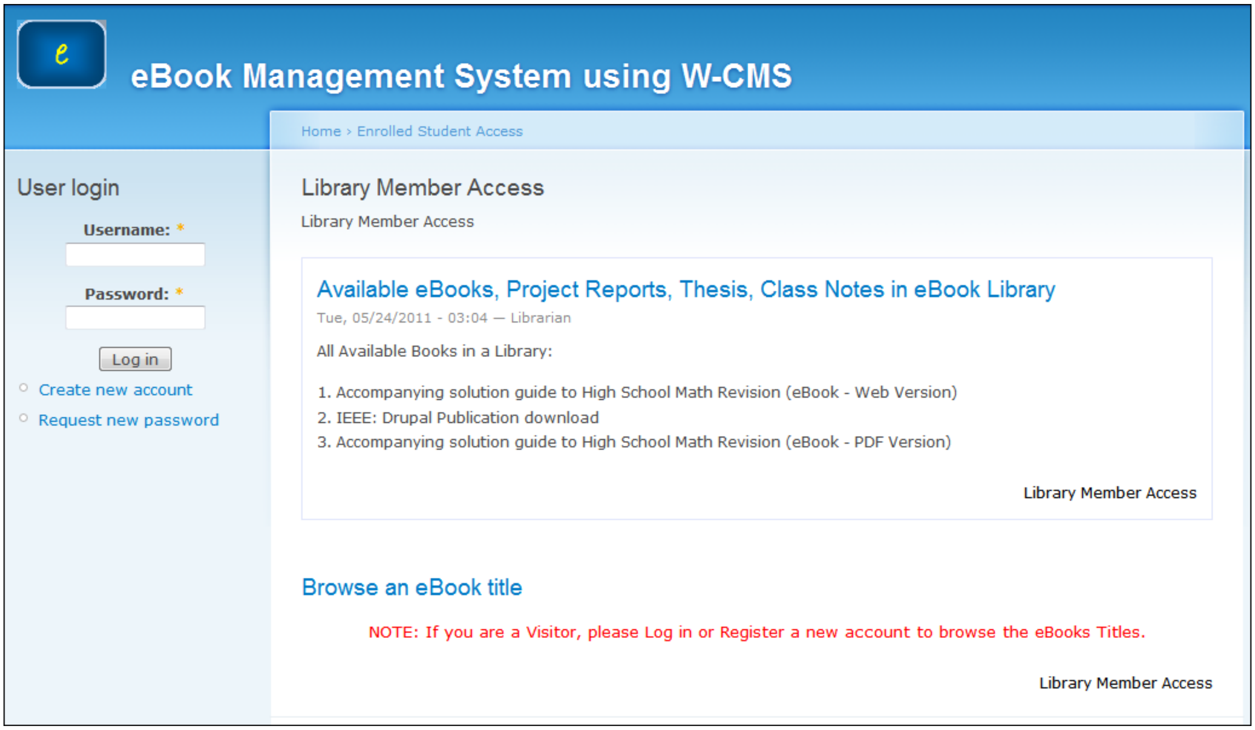
NOTE: If you are a Visitor, please Log in or Register a new account to browse the eBooks Titles.

Library Member Access

Figure 23: View NOT Limited for Registered User

If user is not logged-in or user is an unauthenticated user (Anonymous, Guest or Visitor) accesses the website then he can only access visit publically available contents. He can see the titles for available books but he cannot browse the eBooks. Refer to the following Figure 24.



Library Member Access

Library Member Access

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Library Member Access

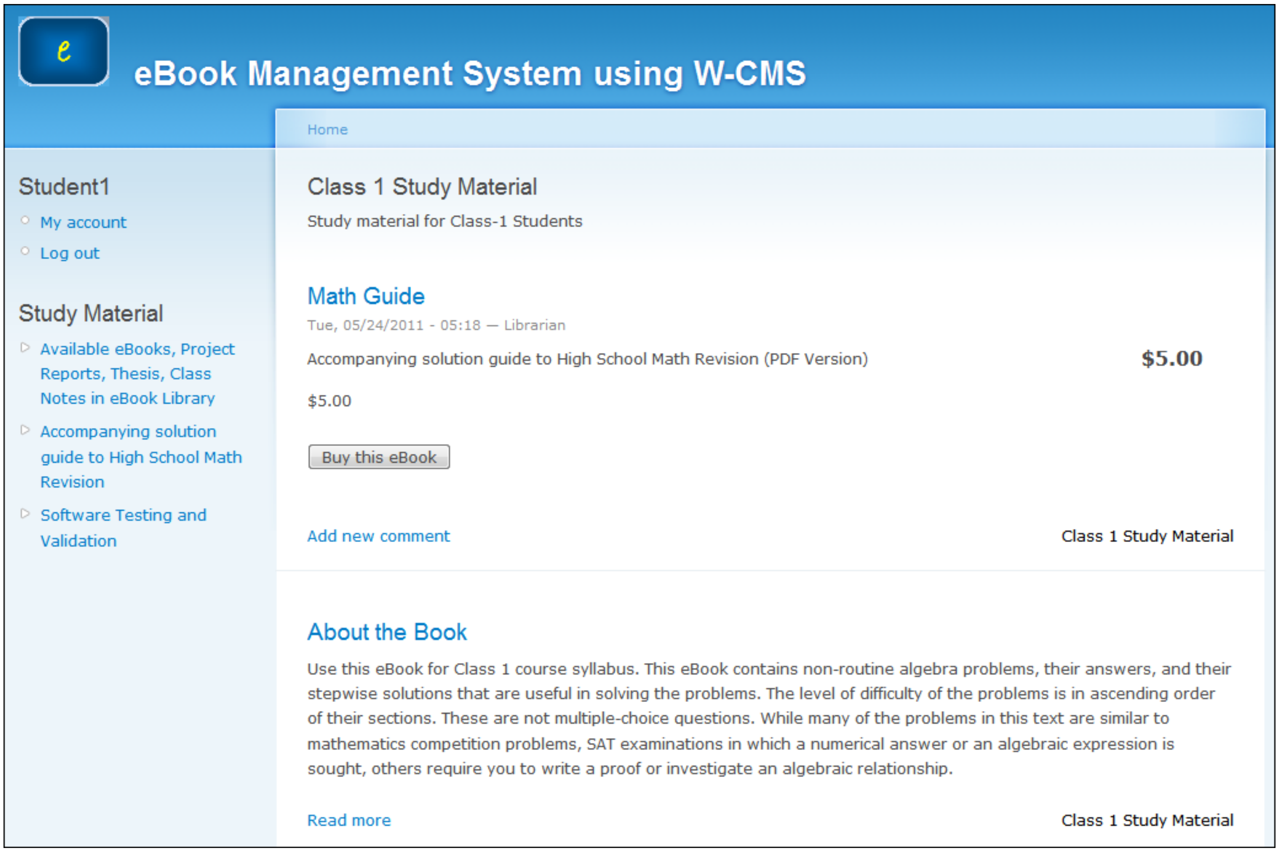
Browse an eBook title

NOTE: If you are a Visitor, please Log in or Register a new account to browse the eBooks Titles.

Library Member Access

Figure 24: View Restricted for Unregistered User

Case 2: Any node assigned to the vocabulary, is set to show a small teaser of the book or a webpage when user is logged in. To view complete eBook, user needs to buy credits. I.e. he needs to buy an eBook or buy sufficient library credits to access. It is important to show small teaser of the product to the buyers, so they can try the product. At the same time, the product is not exposed to customer for free of cost. Referring to Figure 25, user can view the small teaser or brief introduction of an eBook by clicking to *Class1 study material*. Here *Class1 study material* is an eBMS defined vocabulary which on clicked provides the teaser to the user before buying an eBook.



Student1

- My account
- Log out

Study Material

- Available eBooks, Project Reports, Thesis, Class Notes in eBook Library
- Accompanying solution guide to High School Math Revision
- Software Testing and Validation

Class 1 Study Material

Study material for Class-1 Students

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About the Book

Use this eBook for Class 1 course syllabus. This eBook contains non-routine algebra problems, their answers, and their stepwise solutions that are useful in solving the problems. The level of difficulty of the problems is in ascending order of their sections. These are not multiple-choice questions. While many of the problems in this text are similar to mathematics competition problems, SAT examinations in which a numerical answer or an algebraic expression is sought, others require you to write a proof or investigate an algebraic relationship.

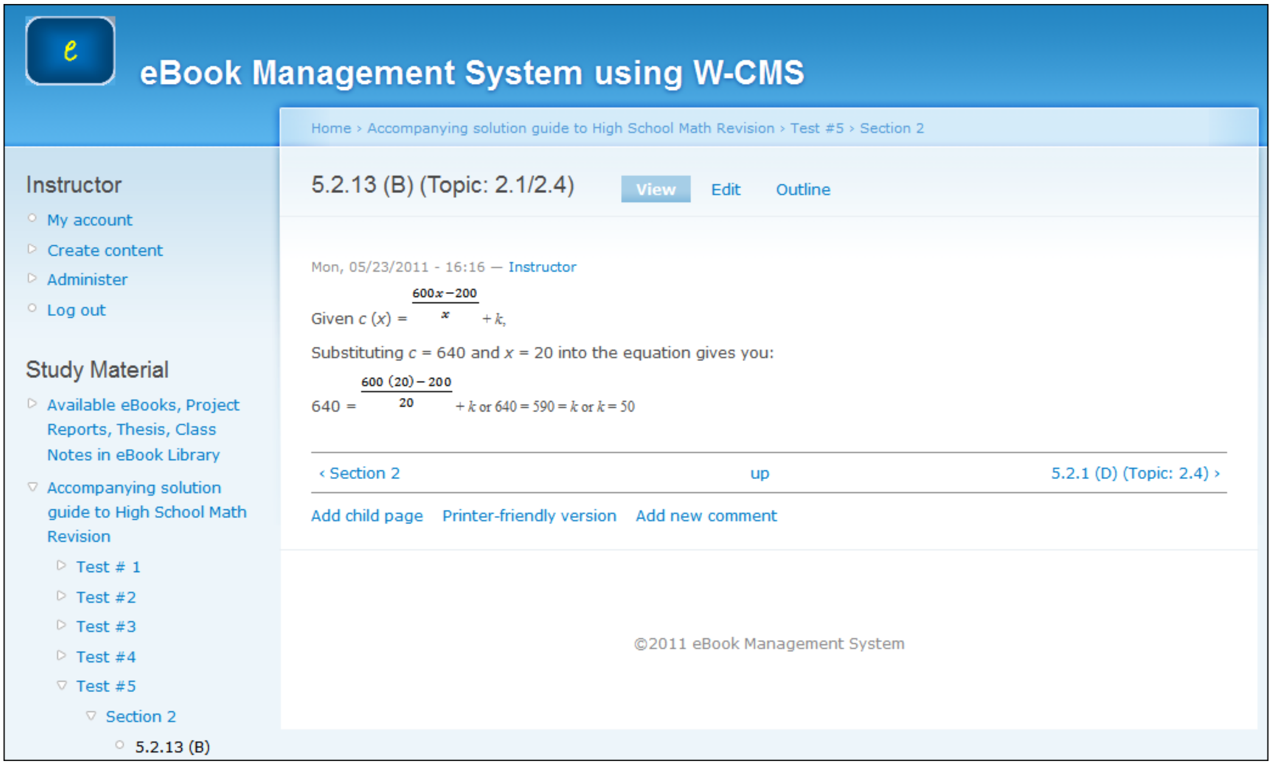
Read more Class 1 Study Material

Figure 25: Snippet Only View controlled by Vocabulary Permissions

8.3.3 Restricted Content and Restricted Text

Till now we have discussed the configuration of all node level modules that control access for whole web-page or a book or whole set of data. Going further, we have implemented access restriction for selected data chunk (words, sentences or paragraph level) for particular eBook. The Restricted Content and Restricted Text [39] modules allow admin to block certain chunk of data per user per role base. So unauthenticated user or authenticated user having no credits available may not view complete contents on that web-page. This module allows setting a *notification* so that user will be alerted to take certain actions as *log-in or register or buy credits.*

Refer to Figure 26 to view the demo on eBook Management Website where whole equation and the answer is visible to the registered (logged-in) user.


eBook Management System using W-CMS
Home › Accompanying solution guide to High School Math Revision › Test #5 › Section 2
Instructor
My account
Create content
Administer
Log out
Study Material
Available eBooks, Project Reports, Thesis, Class Notes in eBook Library
Accompanying solution guide to High School Math Revision
Test # 1
Test #2
Test #3
Test #4
Test #5
Section 2
5.2.13 (B)
View
Edit
Outline
‹ Section 2
up
5.2.1 (D) (Topic: 2.4) ›
Add child page
Printer-friendly version
Add new comment
©2011 eBook Management System

5.2.13 (B) (Topic: 2.1/2.4)

Mon, 05/23/2011 - 16:16 — Instructor

Given $c\ (x) = \frac{600x-200}{x} + k,$

Substituting c = 640 and x = 20 into the equation gives you:

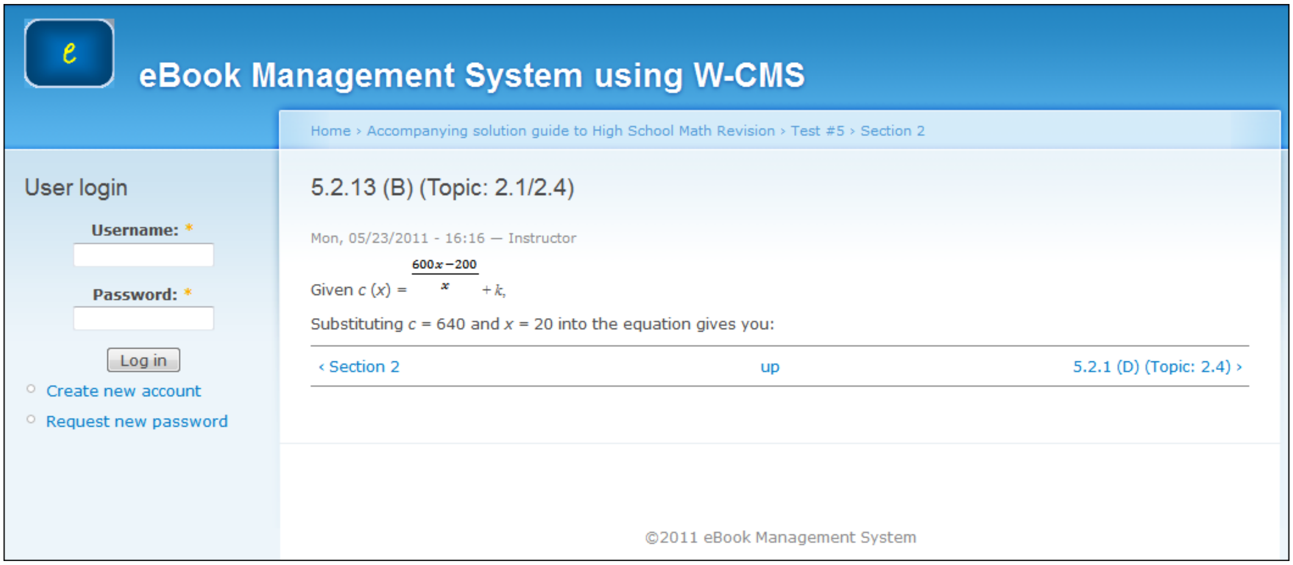
$640 = \frac{600\ (20)-200}{20} + k$ or $640 = 590 = k$ or $k = 50$

Figure 26: No Restriction for Registered User

To enforce this restriction we have used following tag along with HTML tags. The contents defined in between `[restrict].....  [/restrict]` tags will be invisible when user logs out or does not register to eBook library services. To refine the restriction per user or per role; proposed system has added following tags:

- **`[restrict:roles = Student]`**
- **`[restrict:roles = Book 1,Section 2]`**
- **`[restrict:roles = Author_Group, Professor_Group]`**

Refer to Figure 27 to view the demo of restricted text enforcement. Here the visitor can only view the question in that equation but not the answer. Admin i.e. instructor can have various combinations of restricted text tags along with the user roles.


e
eBook Management System using W-CMS
Home › Accompanying solution guide to High School Math Revision › Test #5 › Section 2
User login
Username: *
Password: *
Log in
Create new account
Request new password
‹ Section 2
up
5.2.1 (D) (Topic: 2.4) ›
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5.2.13 (B) (Topic: 2.1/2.4)

Mon, 05/23/2011 - 16:16 — Instructor

Given $c\,(x) = \frac{600x - 200}{x} + k,$

Substituting c = 640 and x = 20 into the equation gives you:

Figure 27: Content Restricted for Unregistered User

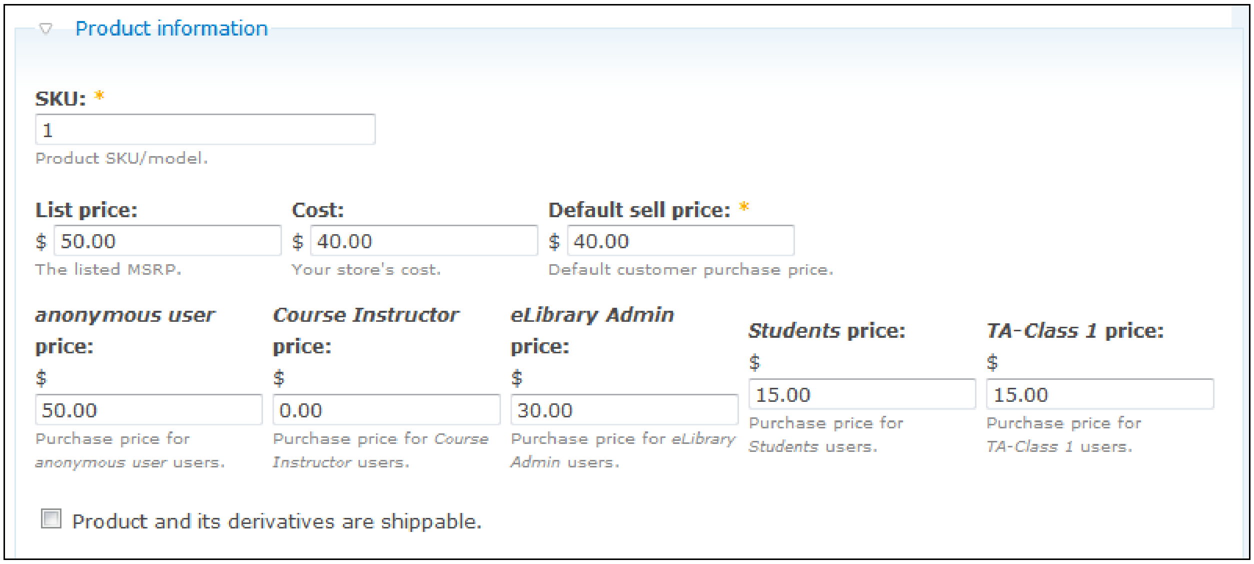
This module is very much useful in conducting an online examinations where only questions are displayed and students through *add a comment* feature can post their answers.

8.3.4 UberCart Drupal Integration

The discussion till now has explained the powerful usage of modularity implemented by eBook Management System. Now to make it perfect e-commerce platform, the cart features, payment gateways, secure transactions, etc features need to be added to the system.

Ubercart [40] is a powerful open source online store facilitator which can be integrated with Core Drupal installation. It is an extension to Core Drupal rather than a module. Ubercart has its separate modules which can be integrated with Core Drupal after installing Ubercart.

The integration of Ubercart with Core eBook management System provides the features to add price and transaction details for the products in the store, here eBooks in the library. This module works with previously integrated core Drupal modules. It shows extended features in control panel and input panel. Refer to Figure 28.



▽ Product information

SKU: *
1
Product SKU/model.

List price:
$ 50.00
The listed MSRP.

Cost:
$ 40.00
Your store's cost.

Default sell price: *
$ 40.00
Default customer purchase price.

anonymous user price:
$ 50.00
Purchase price for *anonymous user* users.

Course Instructor price:
$ 0.00
Purchase price for *Course Instructor* users.

eLibrary Admin price:
$ 30.00
Purchase price for *eLibrary Admin* users.

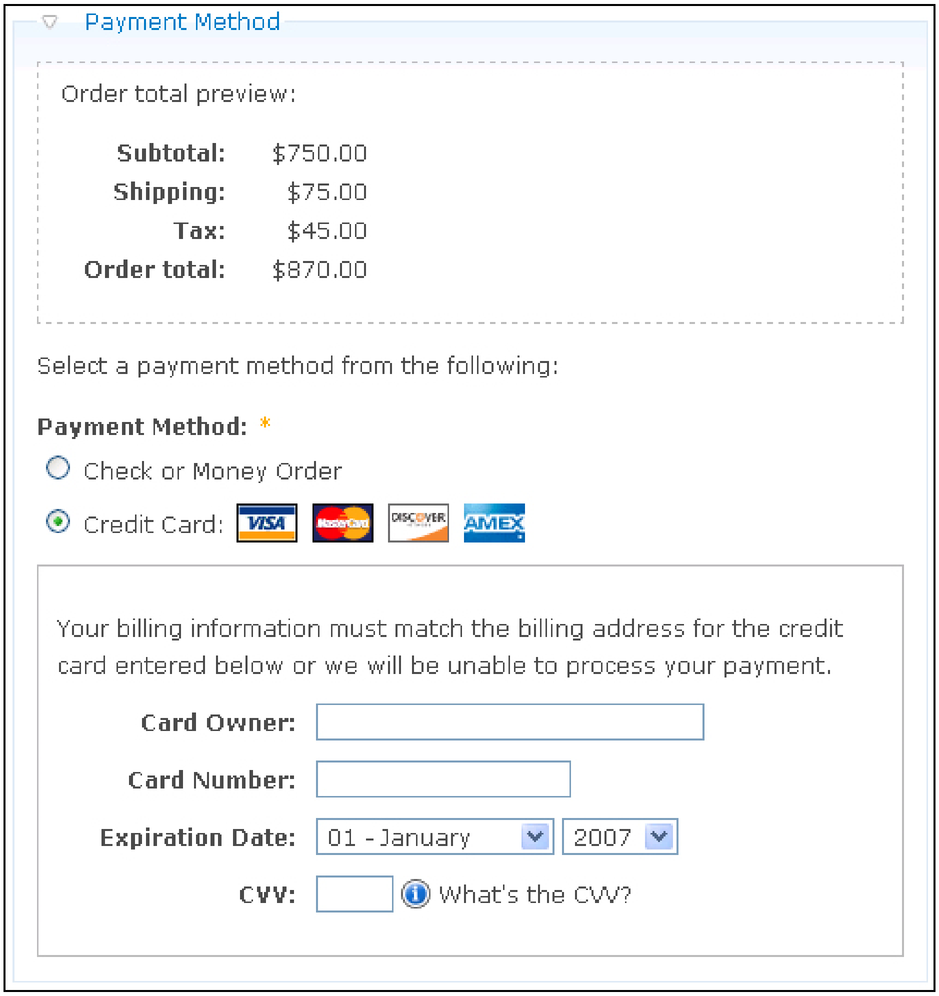
Students price:
$ 15.00
Purchase price for *Students* users.

TA-Class 1 price:
$ 15.00
Purchase price for *TA-Class 1* users.

☐ Product and its derivatives are shippable.

Figure 28: Ubercart Extending Core Book Acces Module-Product Informnation

We may add the online store facilities such as shopping cart and payment gateways to the proposed eBook Management System by customizing Ubercart add-ons such as *product, cart, PayPal gateway, credit card transaction, and order etc.* refer to Figure 29 showing the integration of above features.



Payment Method

Order total preview:

Subtotal:	$750.00
Shipping:	$75.00
Tax:	$45.00
Order total:	$870.00

Select a payment method from the following:

Payment Method: *

○ Check or Money Order

● Credit Card:

Your billing information must match the billing address for the credit card entered below or we will be unable to process your payment.

Card Owner:

Card Number:

Expiration Date: 01 - January 2007

CVV: What's the CVV?

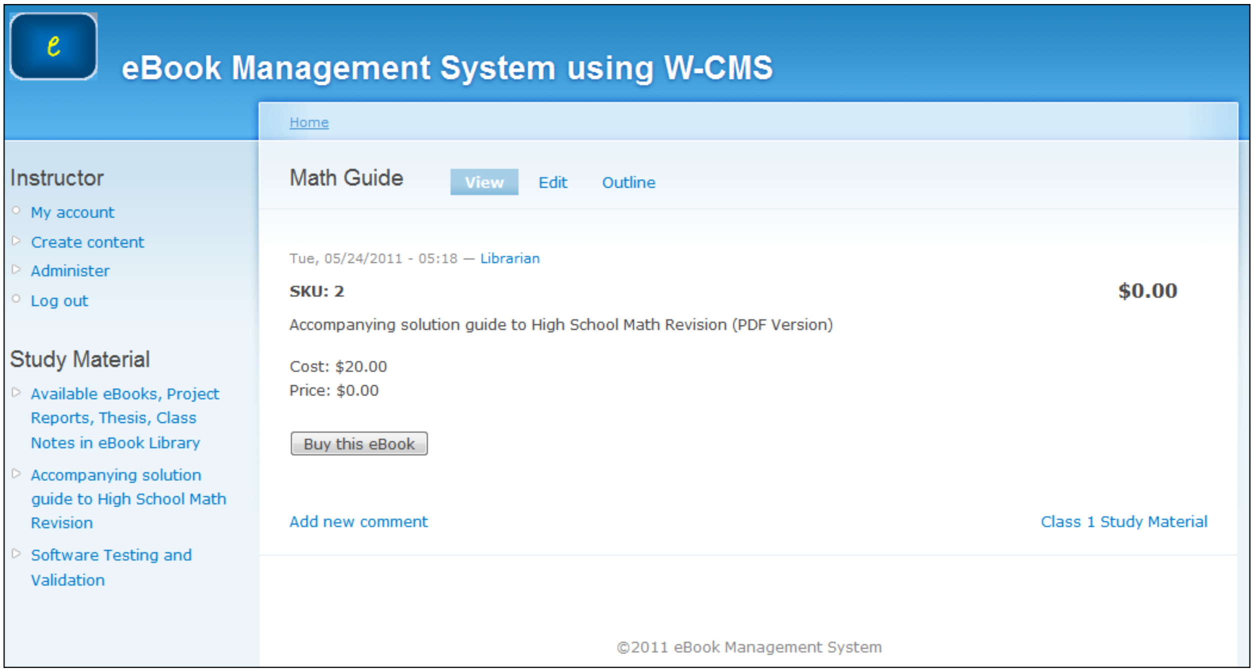
Figure 29: Ubercart Secured Payment Gateway

8.3.5 uc_price_per_role and uc price per user

In Section 8.3.4 we discussed the integration of Ubercart features to eBook management System. After integrating Core Drupal modules to create or import HTML Book, we added permissions, access controls to eBooks. Similarly using Ubercart *Price Per Role* [41] and *Price Per User* [42] the proposed system enforces the payment options, library discount or membership pricing features.

Let’s say, for Black Friday deals, proposed system has decided to make certain eBook available for $1.00 at discounted price only for members. But at the same time same eBook is available for $100.00 for non-members. Similarly for University scenario, the instructor may be offered an eBook for free of cost, but for student the same book is available for some discounted price. In both of the cases the original price is fixed to USD 20. But different users are availed discounts depending on their roles.

Price per role and price per user allows configuring the different prices for users having same roles or specific users at individual level. It means, it enables same node to be accessed differently depending on user privileges and participation roles. To see the implementation with proposed eBook Management System refers to the Figure 30 and Figure 31.


e
eBook Management System using W-CMS
Home
Instructor
My account
Create content
Administer
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Cost: $20.00
Price: $0.00

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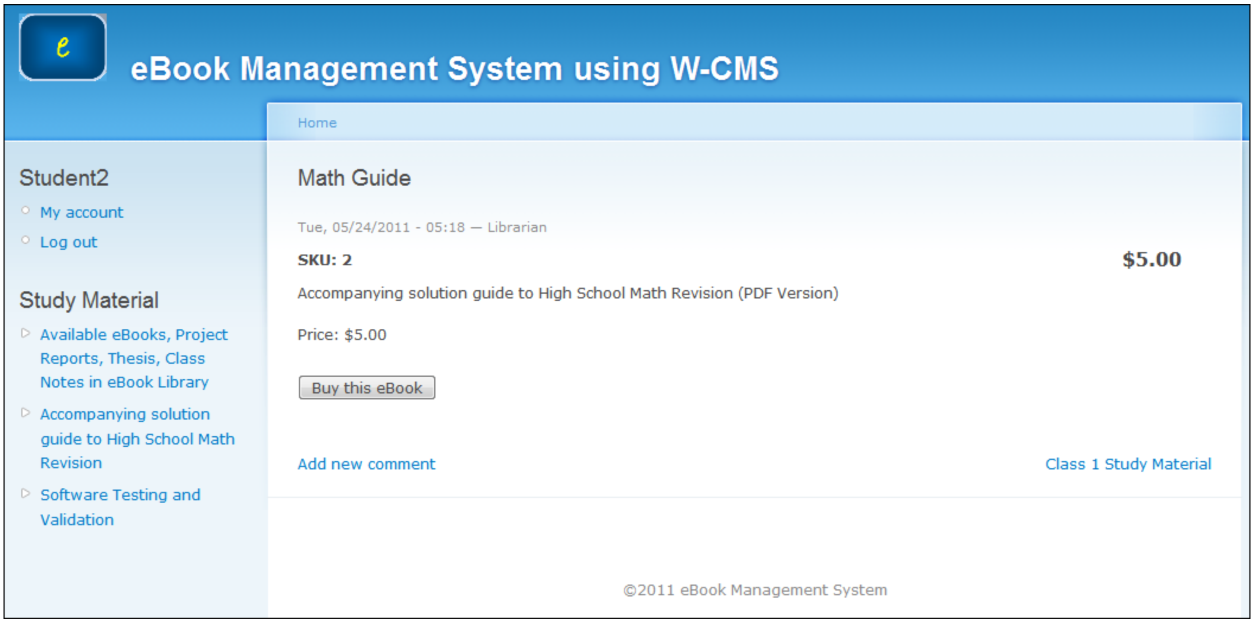
Figure 30: Discount Price Displayed for Member


e
eBook Management System using W-CMS
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My account
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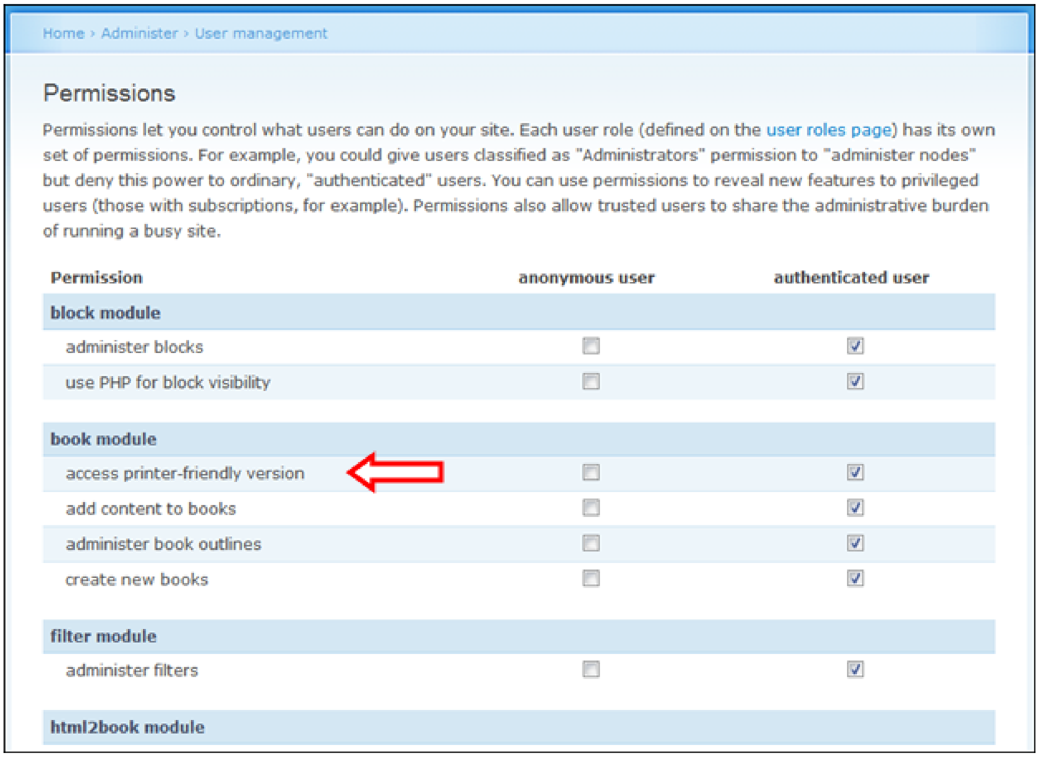
Figure 31: Original Price Displayed for Non-Member

8.3.10 Denying Printing Permissions to Non-members

It is very important to block print feature for non-members who are just supposed to visit the site and view the eBooks contents. To restrict piracy, the Book Page Access module needs to be customized. The proposed system uses customized Book Page Access to override printing permissions for non-members.



Home › Administer › User management

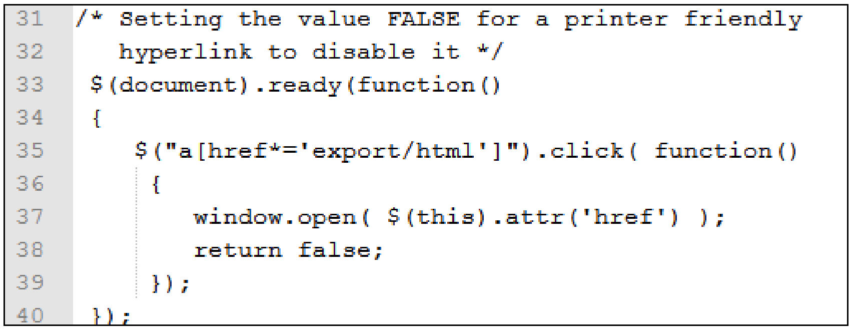
Permissions

Permissions let you control what users can do on your site. Each user role (defined on the user roles page) has its own set of permissions. For example, you could give users classified as "Administrators" permission to "administer nodes" but deny this power to ordinary, "authenticated" users. You can use permissions to reveal new features to privileged users (those with subscriptions, for example). Permissions also allow trusted users to share the administrative burden of running a busy site.

Permission	anonymous user	authenticated user
block module		
administer blocks	□	☑
use PHP for block visibility	□	☑
book module		
access printer-friendly version	□	☑
add content to books	□	☑
administer book outlines	□	☑
create new books	□	☑
filter module		
administer filters	□	☑
html2book module		

Figure 32: Print Feature Disabled for Non-members

Figure 32 shows the control panel for configuring print permissions. Again it can be configured per user or per role. Initially described vocabulary tag can be assigned to any node and then can be configured using CCK to enable or disable *printer-friendly version* function. Refer to code snippet 7.



```
/* Setting the value FALSE for a printer friendly
   hyperlink to disable it */
 $(document).ready(function()
 {
    $("a[href*='export/html']").click( function()
     {
        window.open( $(this).attr('href') );
        return false;
     });
 });
```

Code Snippet 6: Customizing Print Support Through Book Access Module

This concludes the integration, implementation, and customized configuration for Online and Offline eBook Management System using Web-based Content Management System.

9. Summary of features provided by the eBMS

The eBMS protects the document from printing in one pass. The system makes use of a node structure to generate the book pages. If the web page is printed from web browser command, only single node gets printed. So to print around 1000 nodes is practically infeasible. With suitable authentication and roles i.e. privilege the complete document can be printed. So it puts the restriction of making pirated or multiple copies of a literature.

Secondly, the eBook is imported in web page format by eBMS. Unlike other library systems, it does not need any plug-in or installation of proprietary software. So users do not need to buy any software. Unlike other online library systems, eBMS is completely web based, so it is platform independent and can be accessed anywhere on any computer.

10. Secure way of handling Access Control by eBMS:

This section focuses on default access controls permitted by Drupal, the deficiencies in that and how eBMS hardens it up to make the system secure and robust. Drupal has a dedicated security team since 2005 that looks after all security threats and incidence response to patch up the loop holes [7]. Core Drupal modules i.e. modules which are available on clean Drupal installation are very much secured, but the concern is about third party modules available to integrate with Drupal core. Drupal being an open source system, contributors across the globe build their customize modules on the top of these core modules. In this process the third party modules can be vulnerable to few security loopholes.

10.1.1 User privilege levels defined by eBMS

eBMS defines each of the *Users* with specific *Roles*. Each user and role combination enforces various privilege levels and corresponding access controls. It defines the contribution level for that particular user. The *users* or contributors for eBMS site are mainly Instructor, Student1, Student2 (for specific class), Teaching Assistant (TA for Class1) for specific class, and Librarian (Library admin for book keeping and managing orders). According to user contribution privileges; a TA and an instructor have an access to add new pages, but students and librarian do not have. Only a librarian or instructor can add new books; but a book for sell and shopping cart costs assignments can only be done by librarian. eBMS achieves these access levels and capabilities by defining *roles* to set the permissions for the *users*. The assigned roles include Course Instructor, eLibrary Admin, TA-Class1, and Students.

Following Table 3 defines *per role per user access* controls defined by eBMS:

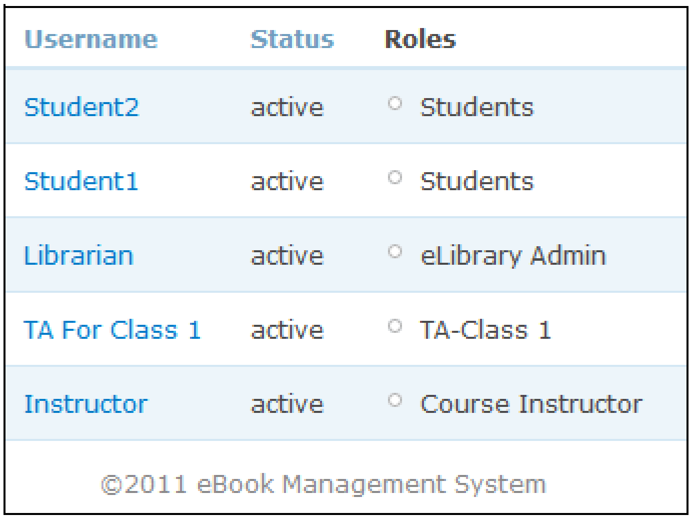
Per User	**Per Role**	**Privilege Level**
Instructor	Course Instructor	Admin: level 0
Librarian	eLibrary Admin	Admin: level 0
TA for Class1	TA-Class1	Intermediate user: level 1
Student1	Students	Normal user: level 2

Student2	Students	Normal user: level 2
Guest User	Anonymous user having Guest Access	Visitor user: level 3 (i.e. least access to contents for guests)

Table 3: eBMS per role per user - user privilege levels

Figure 33 shows the above mentioned users and roles assignments and it can be managed by eBMS administrators at following URL:

```
http://ebookcms.cs-sjsu.org/?q=admin/user/user
```



Username	Status	Roles
Student2	active	○ Students
Student1	active	○ Students
Librarian	active	○ eLibrary Admin
TA For Class 1	active	○ TA-Class 1
Instructor	active	○ Course Instructor

©2011 eBook Management System

Figure 33: eBMS users and roles assignment

10.1.2 Security measure against php scripting attacks by eBMS

While building a site, developers need to take care of by default permissions and settings assigned by Drupal for the modules. Drupal *page creation body area* accepts php code as input along with another scripting languages mainly html. The code or scripts posted in body area are generally saved in respective database tables. Attacker can write a small piece of php code and can execute malicious code to deploy XSS, Web Defacement, Database stealing attacks [6, 8].

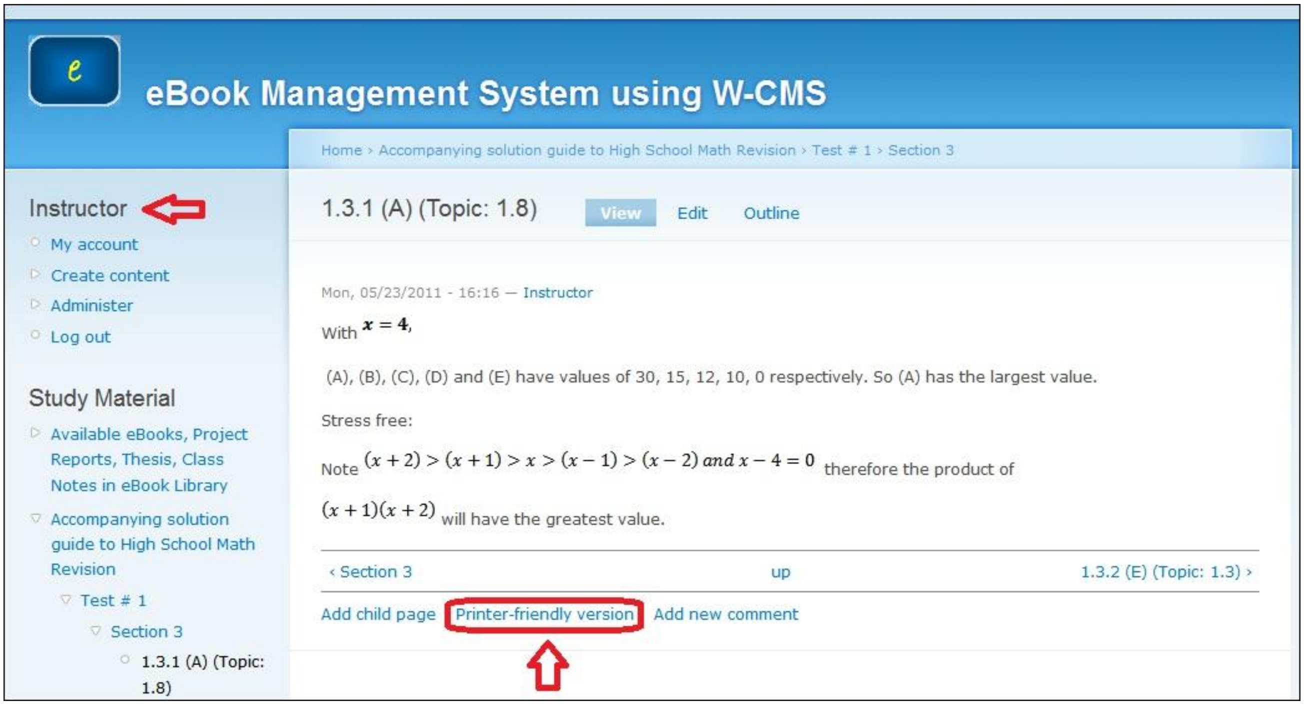
eBMS takes care of this attack by not allowing access to create new contents to privilege level 2 and level 3 users i.e. students and visitors. Also by disabling an access to the *php input filter* malicious scripts can be blocked.

10.1.3 Tokenization

As shown in Section 8.1.5 and Figure 12, eBMS assigns pseudo-randomly generated unique *private_keys*. The eBMS assigns these token distinctly for every forms created by users. These forms contain a new *Book Page* or a *Story Page* created or a *Comment* posted. This prevents possible script kiddies to deploy any attack on nodes [8]. The malicious script posted or inserted by them will be assigned a token which will not match with the distinct key for eBMS key generated at eBMS W-CMS installation. So those scripts' nodes will be discarded.

10.1.4 Web-page print permissions controlling by eBMS

eBMS effectively uses the *users* and *roles* combination as explained in Section 10.1.1. eBMS does not allow access to level 1, 2, and 3 users for printing the document in printer friendly version, but this access is allowed for the level 0 users. Following Figure 34 and Figure 35 show the comparison between printing-access controls assigned to the users.


eBook Management System using W-CMS
Home › Accompanying solution guide to High School Math Revision › Test # 1 › Section 3
Instructor
My account
Create content
Administer
Log out
Study Material
Available eBooks, Project Reports, Thesis, Class Notes in eBook Library
Accompanying solution guide to High School Math Revision
Test # 1
Section 3
1.3.1 (A) (Topic: 1.8)
View
Edit
Outline
‹ Section 3
up
1.3.2 (E) (Topic: 1.3) ›
Add child page
Printer-friendly version
Add new comment

1.3.1 (A) (Topic: 1.8)

Mon, 05/23/2011 - 16:16 — Instructor

With $x = 4$,

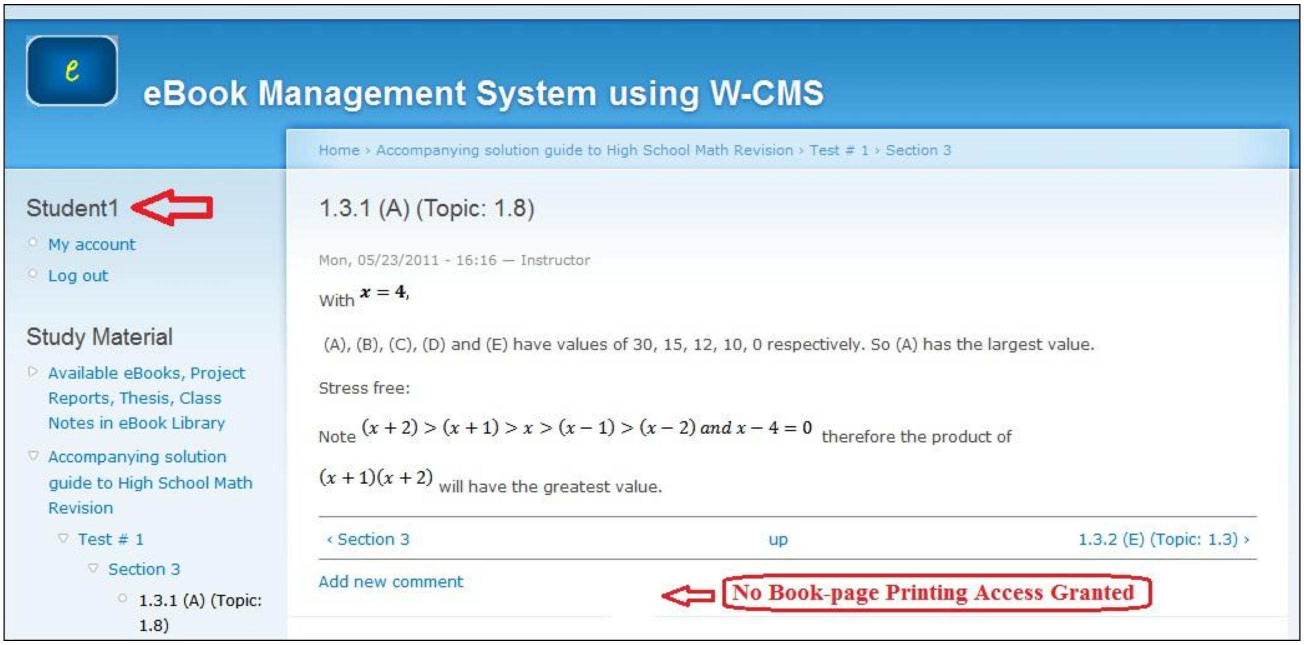
(A), (B), (C), (D) and (E) have values of 30, 15, 12, 10, 0 respectively. So (A) has the largest value.

Stress free:

Note $(x+2) > (x+1) > x > (x-1) > (x-2)$ *and* $x - 4 = 0$ therefore the product of

$(x+1)(x+2)$ will have the greatest value.

Figure 34: Print privilege allowed for level 0 users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Study Material
Available eBooks, Project Reports, Thesis, Class Notes in eBook Library
Accompanying solution guide to High School Math Revision
Test # 1
Section 3
1.3.1 (A) (Topic: 1.8)
‹ Section 3
up
1.3.2 (E) (Topic: 1.3) ›
Add new comment
No Book-page Printing Access Granted

1.3.1 (A) (Topic: 1.8)

Mon, 05/23/2011 - 16:16 — Instructor

With $x = 4$,

(A), (B), (C), (D) and (E) have values of 30, 15, 12, 10, 0 respectively. So (A) has the largest value.

Stress free:

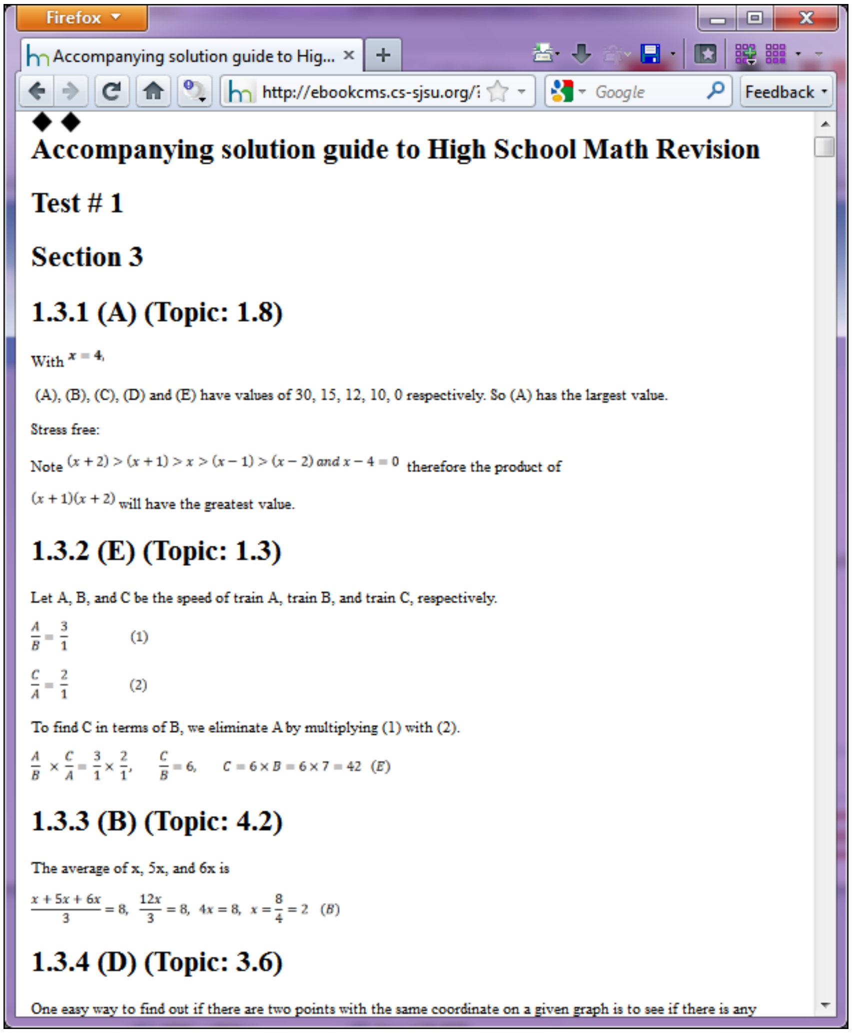
Note $(x+2) > (x+1) > x > (x-1) > (x-2)$ *and* $x - 4 = 0$ therefore the product of

$(x+1)(x+2)$ will have the greatest value.

Figure 35: Print privilege disallowed for level 1 user

10.1.5 Disallowing one-pass printing

We have seen print access controlling in Section 10.1.4. But what if user tries to print the web-page through web browser print functionality? eBMS node access functionality controls the full book print in one pass. When user with admin level 0 user accesses the printer-friendly feature as shown in Figure 34, the printer friendly version of an eBook is rendered which can be printed in one pass using web browser's print function and also can be saved in pdf format as shown in Figure 36 below.


Firefox
Accompanying solution guide to Hig...
http://ebookcms.cs-sjsu.org/
Google
Feedback

◆ ◆

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Test # 1

Section 3

1.3.1 (A) (Topic: 1.8)

With $x = 4$,

(A), (B), (C), (D) and (E) have values of 30, 15, 12, 10, 0 respectively. So (A) has the largest value.

Stress free:

Note $(x+2) > (x+1) > x > (x-1) > (x-2)\ and\ x - 4 = 0$ therefore the product of

$(x+1)(x+2)$ will have the greatest value.

1.3.2 (E) (Topic: 1.3)

Let A, B, and C be the speed of train A, train B, and train C, respectively.

$\frac{A}{B} = \frac{3}{1}$ (1)

$\frac{C}{A} = \frac{2}{1}$ (2)

To find C in terms of B, we eliminate A by multiplying (1) with (2).

$\frac{A}{B} \times \frac{C}{A} = \frac{3}{1} \times \frac{2}{1}, \quad \frac{C}{B} = 6, \quad C = 6 \times B = 6 \times 7 = 42 \ (E)$

1.3.3 (B) (Topic: 4.2)

The average of x, 5x, and 6x is

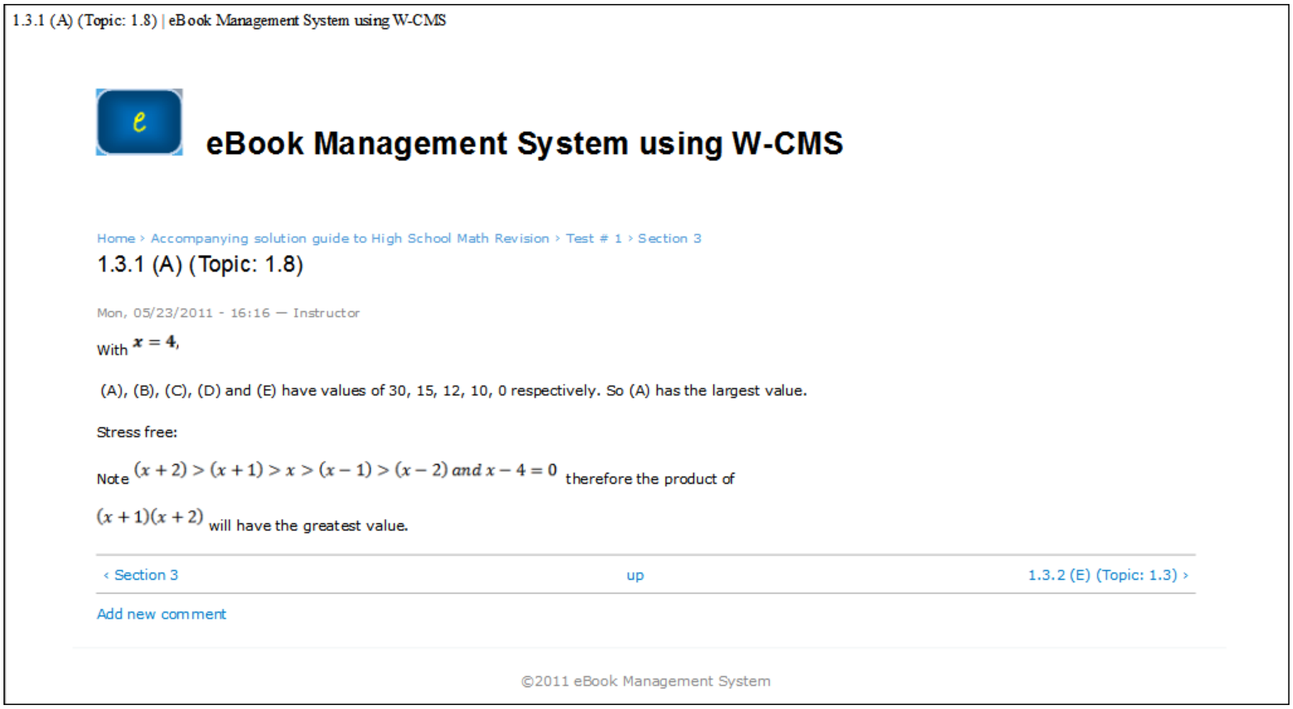
$\frac{x + 5x + 6x}{3} = 8, \ \frac{12x}{3} = 8, \ 4x = 8, \ x = \frac{8}{4} = 2 \ (B)$

1.3.4 (D) (Topic: 3.6)

One easy way to find out if there are two points with the same coordinate on a given graph is to see if there is any

Figure 36: Level 0 user having one-pass print access

For all users other than level 0 privileges, cannot access printer-friendly feature for that eBook page as we shown in Figure 35 above. So even if browser's print feature is used, only that particular page i.e. node is available to print. Refer to Figure 37. In this case, to print whole book or to save it as pdf; user needs to repeat the printing actions many times as much as the number of thousands of pages for that particular eBook! So this eBMS feature makes it impractical, time consuming for user to print all pages or nodes one-by-one.



1.3.1 (A) (Topic: 1.8) | eBook Management System using W-CMS

eBook Management System using W-CMS

Home › Accompanying solution guide to High School Math Revision › Test # 1 › Section 3

1.3.1 (A) (Topic: 1.8)

Mon, 05/23/2011 - 16:16 — Instructor

With $x = 4$,

(A), (B), (C), (D) and (E) have values of 30, 15, 12, 10, 0 respectively. So (A) has the largest value.

Stress free:

Note $(x+2) > (x+1) > x > (x-1) > (x-2)$ *and* $x - 4 = 0$ therefore the product of $(x+1)(x+2)$ will have the greatest value.

‹ Section 3 up 1.3.2 (E) (Topic: 1.3) ›

Add new comment

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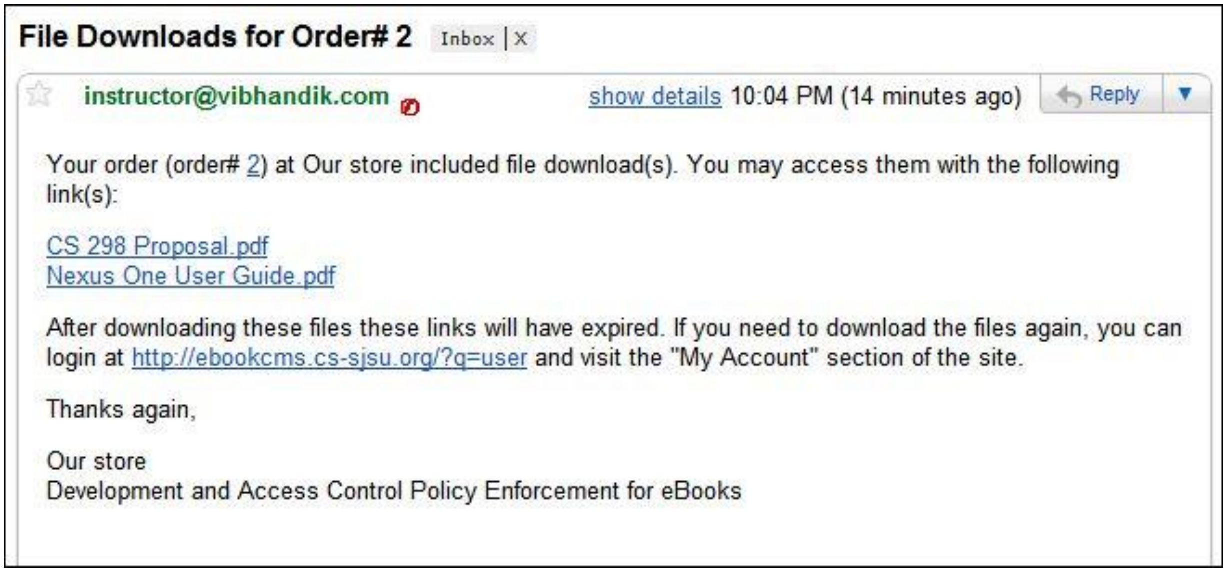
Figure 37: Level 1, 2, and 3 users having only a node printing at a time

Thus eBMS restricts users from piracy of the valuable literatures available at the eBMS' eBook Library.

10.1.6 Online orders managements for eBooks by eBMS

After user has ordered the eBooks, he receives an email notification for his purchase and order processing. Refer to the Figure 38:


File Downloads for Order# 2
Inbox | X
instructor@vibhandik.com
show details 10:04 PM (14 minutes ago)
Reply

Your order (order# 2) at Our store included file download(s). You may access them with the following link(s):

CS 298 Proposal.pdf
Nexus One User Guide.pdf

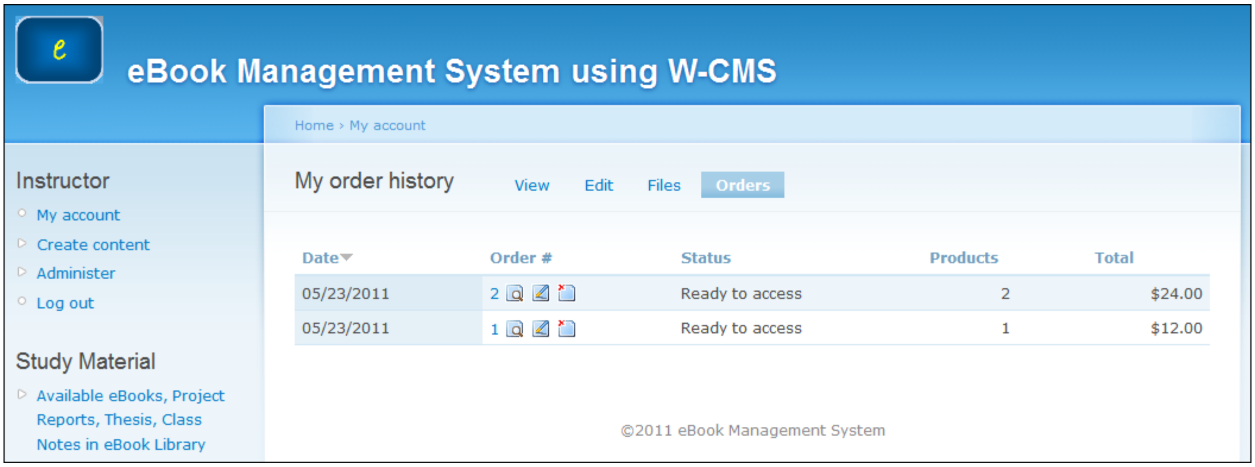
After downloading these files these links will have expired. If you need to download the files again, you can login at http://ebookcms.cs-sjsu.org/?q=user and visit the "My Account" section of the site.

Thanks again,

Our store
Development and Access Control Policy Enforcement for eBooks

Figure 38: File Download email notification after order completes

The above email is for confirmation of order completion. After this email confirmation, user can check the order history in his personal eBMS library account. Refer to the Figure 39:


e
eBook Management System using W-CMS
Home › My account
Instructor
My account
Create content
Administer
Log out
Study Material
Available eBooks, Project Reports, Thesis, Class Notes in eBook Library
My order history
View
Edit
Files
Orders
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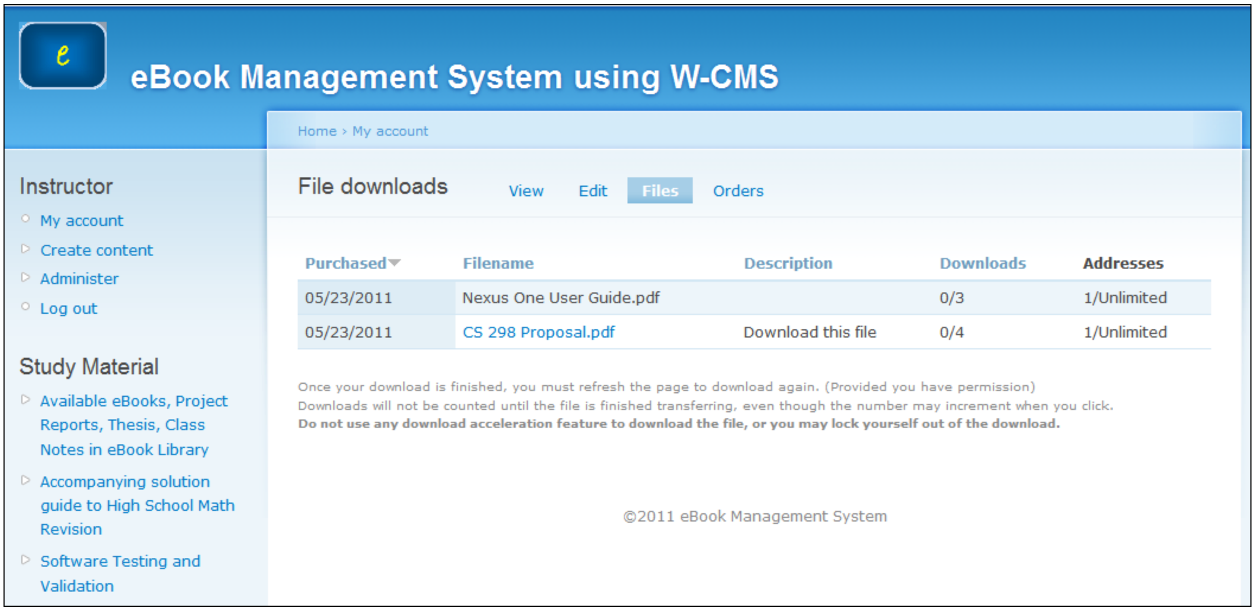
Date	Order #	Status	Products	Total
05/23/2011	2	Ready to access	2	$24.00
05/23/2011	1	Ready to access	1	$12.00

Figure 39: Order history review in eBMS library account

10.1.7 File download limit controlling by eBMS

After order in completed as mentioned in Section 10.1.6, the eBooks are now ready to be downloaded. As we have discussed earlier, user can buy required credits or can pay for no of downloads by multiple payments. As shown in Figure 38 above and Figure 40 below, user can download the eBooks available under “Files” in his account for limited times depending on his purchase and payment. Here user can download “CS 298 Proposal.pdf” eBook only for 4 times.


e
eBook Management System using W-CMS
Home › My account
Instructor
My account
Create content
Administer
Log out
Study Material
Available eBooks, Project Reports, Thesis, Class Notes in eBook Library
Accompanying solution guide to High School Math Revision
Software Testing and Validation
View
Edit
Files
Orders

File downloads

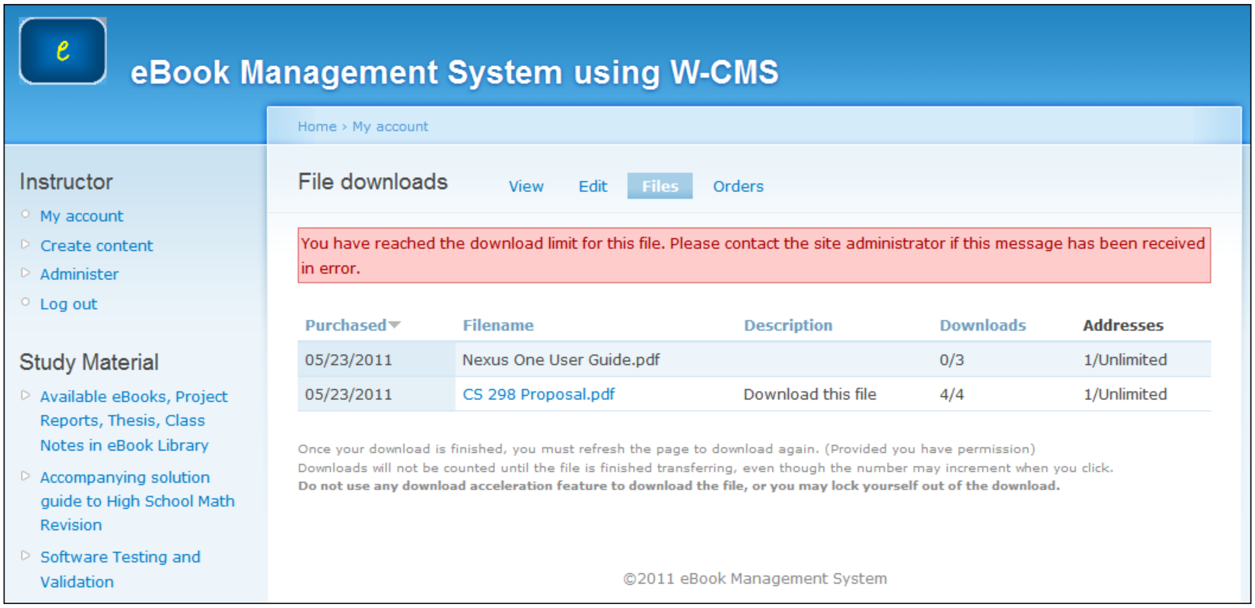
Purchased	Filename	Description	Downloads	Addresses
05/23/2011	Nexus One User Guide.pdf		0/3	1/Unlimited
05/23/2011	CS 298 Proposal.pdf	Download this file	0/4	1/Unlimited

Once your download is finished, you must refresh the page to download again. (Provided you have permission)
Downloads will not be counted until the file is finished transferring, even though the number may increment when you click.
Do not use any download acceleration feature to download the file, or you may lock yourself out of the download.

©2011 eBook Management System

Figure 40: User account and purchased file view

After 4 downloads, if user attempts to download, the eBMS systems shows the notification if the maximum download limit is reached and further denies access to download an eBook. Refer to the following Figure 41 to view the download access controls enforced by an eBMS.


e
eBook Management System using W-CMS
Home › My account
Instructor
My account
Create content
Administer
Log out
Study Material
Available eBooks, Project Reports, Thesis, Class Notes in eBook Library
Accompanying solution guide to High School Math Revision
Software Testing and Validation
File downloads
View
Edit
Files
Orders

You have reached the download limit for this file. Please contact the site administrator if this message has been received in error.

Purchased	Filename	Description	Downloads	Addresses
05/23/2011	Nexus One User Guide.pdf		0/3	1/Unlimited
05/23/2011	CS 298 Proposal.pdf	Download this file	4/4	1/Unlimited

Once your download is finished, you must refresh the page to download again. (Provided you have permission)
Downloads will not be counted until the file is finished transferring, even though the number may increment when you click.
Do not use any download acceleration feature to download the file, or you may lock yourself out of the download.

©2011 eBook Management System

Figure 41: Maximum download limit reached notification

Thus eBMS controls over the file access, downloads depending on the payment and number of units purchased for downloads.

11. Conclusion

Proposed eBook Management System is primarily developed considering University Environment, where professors can publish their notes, books online. Using this system it is possible for professors to make the thesis reports available to all students at single pass. No need to provide hard copies or no need to download soft copies on your local machine. Any library member, enrolled student can access these resources any time and from anywhere. So dependency on carrying the computer, laptop, and flash drives everywhere can be reduced.

Another big advantage of access control policies is to be able purchase the required data only and save the money! In other words, for many courses only few chapters are required for course curriculum. For that class, students need to buy whole book with thousands of pages and 10-15 chapters. Students need to invest and finally waste the money for the contents they were never required to study! But using the proposed system the library admin, professor can make available eBook and can make available certain chapters only which are needed for the course requirement. Now students will be paying only for selected or required contents and rest of the money for unnecessary contents are saved. Thus eBook Management System provides fine control over lower level nodes also (i.e. specific page, text can be hidden), which hardly any other available online library system might be providing.

Apart from educational institution, authors will be benefitted to post their writing on their own website or library. Many times the sold books are distributed in pdf or soft copy format. So it is vulnerable for piracy of contents. The buyer can misuse the copy by illegal distribution. By making use of a proposed system, Digital Rights can be managed for the original author. For unauthenticated user, the contents will not available or it will not be printable or will not be readable for long time. So the authors can have better access control on their copyrighted materials.

All these are commercial benefits. On the developer's front, integrating and configuring the Drupal modules and develop an ecommerce site with lesser scripting or designing knowledge is possible. There are many similar modules available for Drupal. But the selection of appropriate module is of a prime importance. So anyone with the zest of learning new things can build on skills to use CMS and CMF effectively.

eBMS has an advantage of being modular and flexible system. Any time any content, any new module can be added, modified, deleted or integrated without affecting the working and performance of the library system. The proposed system can be made faster and easier than it is by eliminating manual interference while pre-processing the book. Some extra support from Core Drupal developers will be highly appreciable.

12. Future Scope

Drupal has more than 8000 modules available. But there was no any single package available that can do the achieved task. Customizing many modules and then selecting fewer appropriate once is bit time consuming. Instead the functionalities of all related or depended modules can be integrated in one and can be specially developed for developing similar online store or library services.

Support for other text file types can be added by parsing their tags similar to doc to html conversion tags. There are few website performance check services such as Nagios [12], Pantheon [13] etc. Using that the Drupal system can be migrated to smart-phone or tab devices. Nowadays smart-phone platform is picking up the market. So it will add an advantage to the system if it is also configurable for smart devices.

13. References

[1] Hoofnagle, C., 2003-2004. Digital rights management: many technical controls on digital content distribution can create a surveillance society. The Columbia Science and Technology Law Review, V. (URL: http://www.stlr.org/cite.cgi?volume=5&article=6), [29.05.05].

[2] Henke, H., 2001. Electronic books and epublishing. A practical guide for authors. London: Springer-Verlag.

[3] Bide, M., 2004. Digital Rights Management: preventing or enabling access? Serials.

17 (2), pp.141-147.

[4] Association of American Publishers., 2000. Digital rights management for ebooks: publisher requirements, Version 1.0. Association of American Publishers Inc.

http://www.publishers.org/digital/ index.cfm, [23.05.05].

[5] “Library Management” [Online Document], March. 2011 [2011 March 23]

http://www.mobileread.com/forums /attachment.php?attachmentid=46713&d=1267348578

[6] “Open Source Security - Drupal Security” [Online Document], May. 2011 [2011 May 25]

http://www.madirish.net/?article=449

[7] Benjamin J. J., Gregory J. K., 2010. *Drupal Security White Paper v1.1*, pp.3.

http://drupalsecurityreport.org/sites/drupalsecurityreport.org/files/drupal-security-white-paper-1-1.pdf [17.07.2010]

[8] “Spyware, viruses, & security forum: VULNERABILITIES / FIXES” [Online Document], May. 2011 [2011 April 28] http://forums.cnet.com/7723-6132_102-525217.html

[9] “Glossary of terms used in Module 2” [Online Document], May. 2011, [2011 May 10]

http://www2.unescobkk.org/elib/publications/ictlip/module2/glossary.htm

[10] “Content Management System” [Online Document], May. 2011, [2011 May 10]

http://en.wikipedia.org/wiki/Content_management_system

[11] “Web Based Content Management Systems – The Preference of the Wise” [Online Document], May. 2011, [2011 May 10] http://photoshop2cms.com/?p=42

[12] “Nagios” [Online Document], May. 2011, [2011 May 10] http://drupal.org/project/nagios

[13] “Optimizing Drupal” [Online Document], May. 2011, [2011 May 10] http://www.webperformance.com/load_testing/blog/2010/09/optimizing-drupal-from-baseline-drupal-to-the-pantheon-drupal-platform/

[14] “List of Content Management Systems” [Online Document], May. 2011, [2011 May 10] http://en.wikipedia.org/wiki/List_of_content_management_systems

[15] “Watchdox: online library system” [Online Document], May. 2011, [2011 May 10] https://www.watchdox.com/

[16] “Calibre Software” [Online Document], May. 2011, [2011 May 10] http://www.mobileread.com/forums/attachment.php?attachmentid=46713&d=1267348578

[17] “Drupal” [Online Document], May. 2011, [2011 May 10] http://drupal.org

[18] “Joomla!” [Online Document], May. 2011, [2011 May 10] http://www.joomla.org/

[19] “Wordpress” [Online Document], May. 2011, [2011 May 10] http://wordpress.com/

[20] “CMF” [Online Document], May. 2011, [2011 May 10] http://en.wikipedia.org/wiki/Content_management_framework

[21] John K. VanDyk: *Pro Drupal Development*, Spring, NY: Apress, 2008.

[22] “Drupal Modules Index” [Online Document], May. 2011, [2011 May 10] http://drupal.org/project/modules/index

[23] “Wamp Server 2.0i” [Online Document], May. 2011, [2011 May 10] http://www.wampserver.com/en/

[24] “Ubercart” [Online Document], May. 2011, [2011 May 10] http://www.ubercart.org/

[25] “Content Access” [Online Document], May. 2011, [2011 May 10]

http://drupalmodules.com/module/content-access

[26] “Taxonomy” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/documentation/modules/taxonomy

[27] “Library” [Online Document], May. 2011, [2011 May 10] http://drupal.org/project/library

[28] “CCK Content Construction Kit” [Online Document], May. 2011, [2011 May 10]

http://drupalmodules.com/module/content-construction-kit-cck

[29] “Book Access” [Online Document], May. 2011, [2011 May 10]

http://drupalmodules.com/module/book-access

[30] “Book Page Access” [Online Document], May. 2011, [2011 May 10]

http://drupalmodules.com/module/book-page-access

[31] “HTML2Book Splitter” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/html2book

[32] “HTML-Kit Download” [Online Document], May. 2011, [2011 May 10]

http://www.chami.com/html-kit/

[33] “HTML Tidy” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/htmltidy

[34] “HTML Office Filter” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/office_html

[35] “Regular Expression.info” [Online Document], May. 2011, [2011 May 10]

http://www.regular-expressions.info/tutorial.html

[36] “Session Limit” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/session_limit

[37] “Limited Content Views” [Online Document], May. 2011, [2011 May 10]

http://drupalmodules.com/module/limited-content-views

[38] “Vocabulary Access Permission” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/vocabulary_access

[39] “Restricted Text” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/restricted_text

[40] “What is Ubercart” [Online Document], May. 2011, [2011 May 10]

http://www.ubercart.org/what_is_ubercart

[41] “Ubercart Price Per Role” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/uc_price_per_role

[42] “Ubercart Price Per User” [Online Document], May. 2011, [2011 May 10]

http://drupal.org/project/uc_price_per_user

Appendix A: WAMP Server Installation

As discussed in Section 5.1, WAMP server is freeware software and can be downloaded at http://www.wampserver.com. WAMP stands for *Windows-Apache-MySQL-PHP* package that provides inbuilt libraries and backend interface through *phpMyAdmin* which is configured at localhost running on port 8080. After installing it creates the *wamp* directory in the destination drive. The *www* directory resides under the *wamp* directory; where the actual website resources are stored. The selected Drupal distribution and the set up files reside under *www* directory. The *www* directory can contain any number of Drupal installations under one cover. The *www* directory is a root directory for any Drupal installation and website contents hosting. It acts as a repository to store all configuration files, libraries, resources, and user files. The MySQL database can be shared among all these Drupal installations.

Here, **`C:/wamp/www/<Drupal Core folder 1>`**

`C:/wamp/www/<Drupal Core folder 2>` ……… and so on.

After putting the WAMP server online, services such as phpMyAdmin and MySQL are started automatically (and manually from WampServer control panel). Files on the WAMP servers are then hosted to the web servers with dedicated domain name. Thus WAMP is used for developing and testing the website on local machine before making it available online publically. In other words, it acts as a simulator.

Appendix B: phpMyAdmin and MySQL Database Configuration

Before installing Drupal, the important step is to set up the database. WampServer 2.0i installation provides the releases for MySQL 5.1.36 and PHP 5.3.0. The Database administrator can configure the database access policies by setting user name and password credentials along with the read-write permissions to the database. The database can be configured and accessed at:

URL: **`http://localhost/phpmyadmin/`**

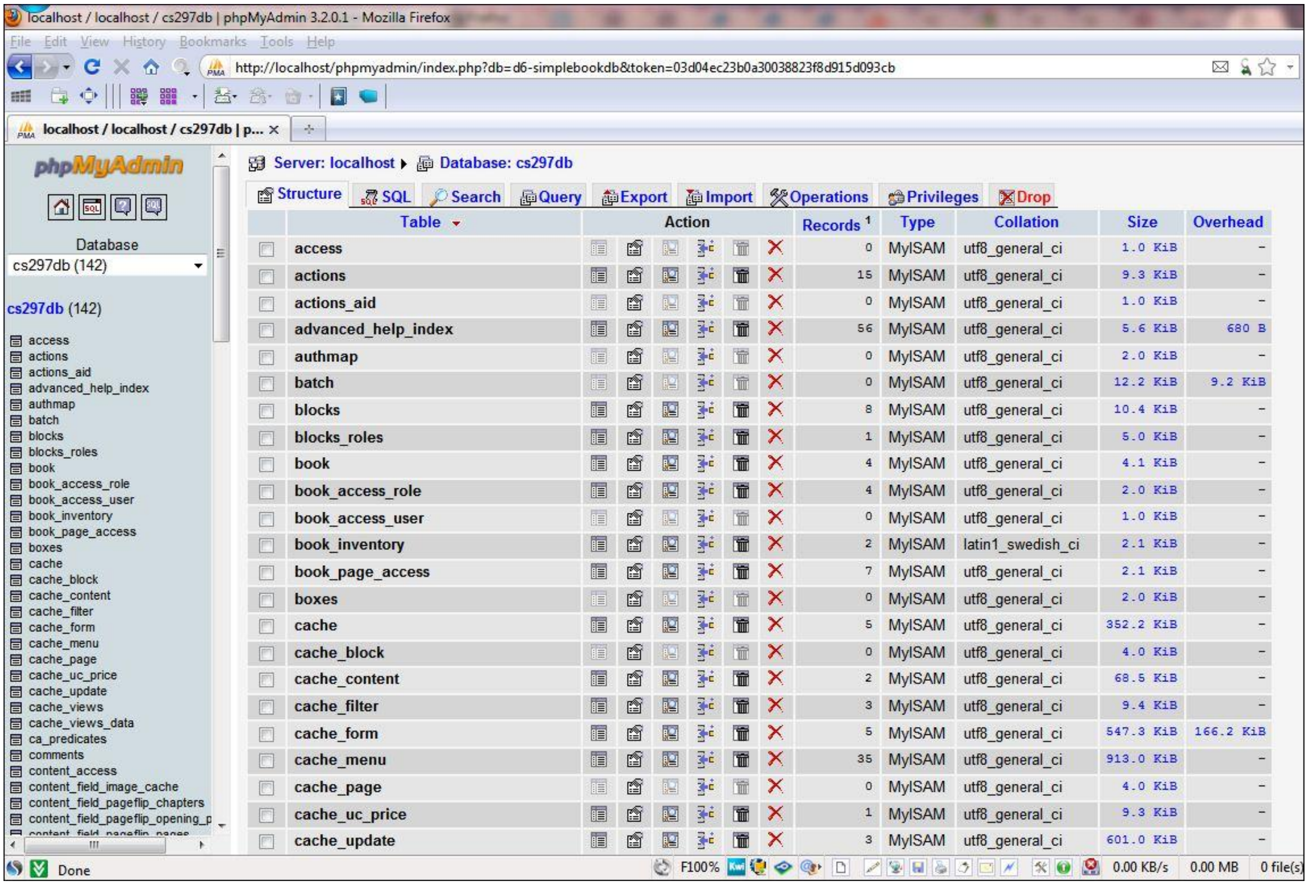


	Table	Action	Records [1]	Type	Collation	Size	Overhead
□	access		0	MyISAM	utf8_general_ci	1.0 KiB	–
□	actions		15	MyISAM	utf8_general_ci	9.3 KiB	–
□	actions_aid		0	MyISAM	utf8_general_ci	1.0 KiB	–
□	advanced_help_index		56	MyISAM	utf8_general_ci	5.6 KiB	680 B
□	authmap		0	MyISAM	utf8_general_ci	2.0 KiB	–
□	batch		0	MyISAM	utf8_general_ci	12.2 KiB	9.2 KiB
□	blocks		8	MyISAM	utf8_general_ci	10.4 KiB	–
□	blocks_roles		1	MyISAM	utf8_general_ci	5.0 KiB	–
□	book		4	MyISAM	utf8_general_ci	4.1 KiB	–
□	book_access_role		4	MyISAM	utf8_general_ci	2.0 KiB	–
□	book_access_user		0	MyISAM	utf8_general_ci	1.0 KiB	–
□	book_inventory		2	MyISAM	latin1_swedish_ci	2.1 KiB	–
□	book_page_access		7	MyISAM	utf8_general_ci	2.1 KiB	–
□	boxes		0	MyISAM	utf8_general_ci	2.0 KiB	–
□	cache		5	MyISAM	utf8_general_ci	352.2 KiB	–
□	cache_block		0	MyISAM	utf8_general_ci	4.0 KiB	–
□	cache_content		2	MyISAM	utf8_general_ci	68.5 KiB	–
□	cache_filter		3	MyISAM	utf8_general_ci	9.4 KiB	–
□	cache_form		5	MyISAM	utf8_general_ci	547.3 KiB	166.2 KiB
□	cache_menu		35	MyISAM	utf8_general_ci	913.0 KiB	–
□	cache_page		0	MyISAM	utf8_general_ci	4.0 KiB	–
□	cache_uc_price		1	MyISAM	utf8_general_ci	9.3 KiB	–
□	cache_update		3	MyISAM	utf8_general_ci	601.0 KiB	–

Figure 42: Database Creation and Configuration using phpMyAdmin

Figure 42 shows the creation and configuration of a database on localhost. The advantage of setting up the database before installing a Drupal is that, while installing a Drupal core, it automatically detects the available databases through WAMP server and it is easy to select and assign particular database to the exact Drupal integration. Database admin needs to set up the permissions, user roles for accessing database while configuring through above process.

Appendix C: Drupal Installation

Now next step is to select appropriate version for Drupal core. Recently Drupal 7.x has been launched. But yet it is in development phase and all the necessary modules for configuring library system are not yet upgraded to v7.x from v6.x. Drupal 6.x is the most stable version available till date. Also in future, migration to v7.x will not be tedious process because, by that time, Drupal 6 modules will be upgraded to have Drupal 7 compatibility. As Drupal provides high degree of modularity; without affecting previous installations; Drupal core can be upgraded to the latest version.

Here are the steps to be followed for localhost Drupal 6.x installation:

1. Download Drupal latest version (here Drupal 6.20) from http://drupal.org/download
2. Extract the files into a directory under C:\wamp→www.
3. Move the contents of that directory into a directory within your web server's document root(…webroot/htdocs/drupal6.20)
4. Go to http://localhost/phpMyAdmin
5. Create new database called *ebookcmsdb* and database admin.
6. Go to http://localhost/D6.20-eBMS and enter the database details for the database which you have created in step 5.
7. Progress with Drupal installation steps and create Drupal site admin username and password. This is the admin user having all site creation, maintenance, configuration privileges.
8. Other non-admin users can be created by clicking “create new account” on the home page of your site at http://localhost/D6.20-eBMS

9. After developing a site, next step is to upload the site contents to the public site.

10. For that you need a dedicated domain name. For eBook CMS it is

    www.ebookcms.cs-sjsu.org

Appendix D: Implementation and Environment Set Up for eBook Management System using WCMS

1) FTP your Drupal files to the following

   a. FTP: with your ftp user name

   b. FTP password

2) Export your database for this Drupal site by accessing your phpmyadmin

   a. Select the database that links to your Drupal site

   b. Select export menu in the top middle area

   c. Select zipped next to compression in the bottom of the page

   d. Select Go to start exporting the file to somewhere in your Laptop

3) Import this exported database to the public site by accessing http://ebookcms.cs-sjsu.org/phpmyadmin

   a. Use your user id and password to login

   b. Select ebookcms on the left menu if it is not selected

   c. Select import menu on the top middle area

   d. Select Browse and look for the exported database file you downloaded to your laptop in step 2.d

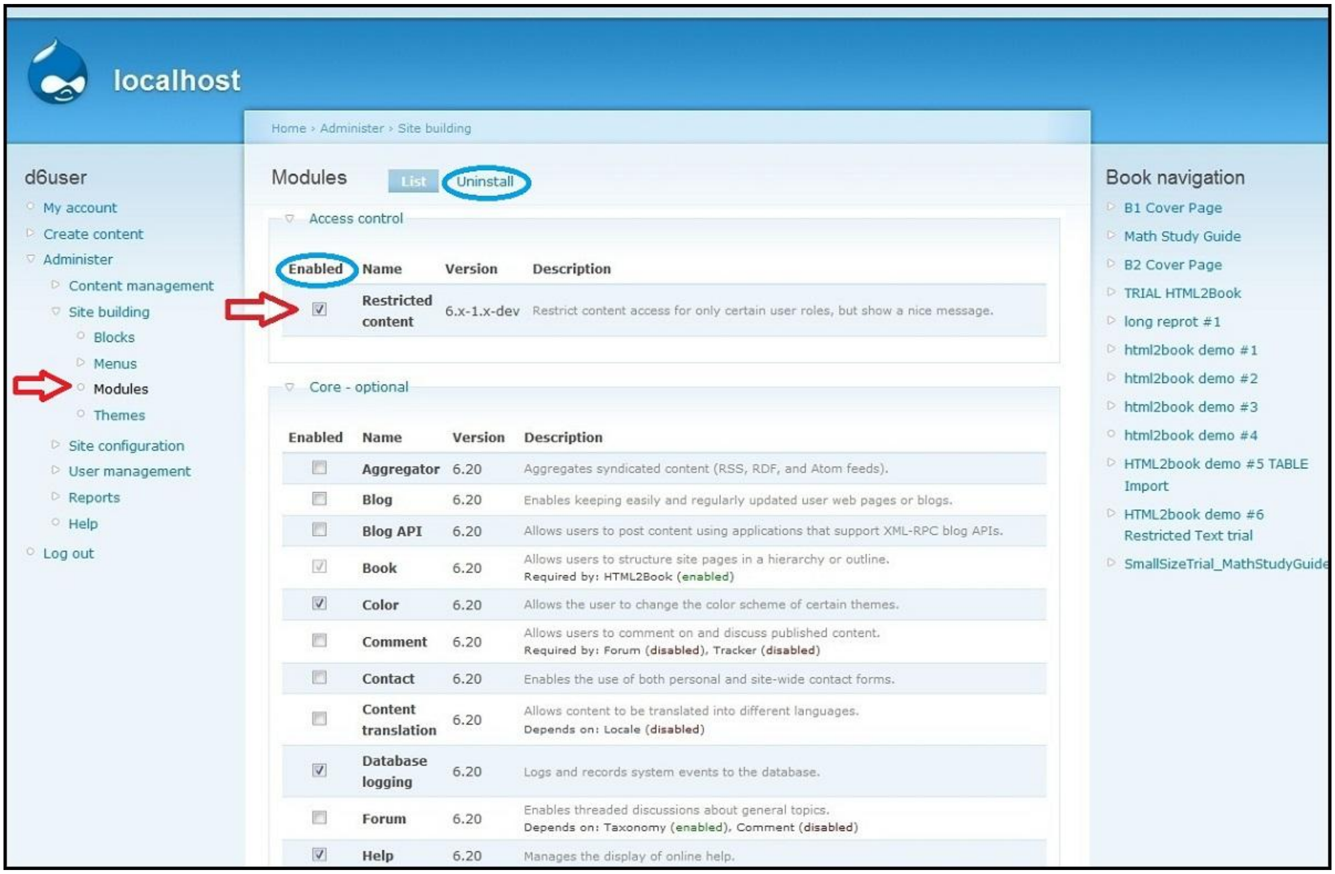
   e. Select "Go" to start importing

4) After completing all the above mention steps, Drupal site is reproduced under http://ebookcms.cs-sjsu.org/

Appendix E: Adding Third-party Modules Through eBook Admin Control Panel

Third party modules are those, which are developed by volunteers, code committers. These volunteers commit their code to the Drupal modules' index. As these modules are open sourced, other committers keep them updating for removing bugs, adding functionalities.

The reason to add third party module is that, Drupal ships with only core modules which are just enough to set up the structure of the web site. Now to have desired functionality on the top of these core features, third party modules need to be integrated.



Access control

Enabled	Name	Version	Description
☑	Restricted content	6.x-1.x-dev	Restrict content access for only certain user roles, but show a nice message.

Core - optional

Enabled	Name	Version	Description
□	Aggregator	6.20	Aggregates syndicated content (RSS, RDF, and Atom feeds).
□	Blog	6.20	Enables keeping easily and regularly updated user web pages or blogs.
□	Blog API	6.20	Allows users to post content using applications that support XML-RPC blog APIs.
☑	Book	6.20	Allows users to structure site pages in a hierarchy or outline. Required by: HTML2Book (enabled)
☑	Color	6.20	Allows the user to change the color scheme of certain themes.
□	Comment	6.20	Allows users to comment on and discuss published content. Required by: Forum (disabled), Tracker (disabled)
□	Contact	6.20	Enables the use of both personal and site-wide contact forms.
□	Content translation	6.20	Allows content to be translated into different languages. Depends on: Locale (disabled)
☑	Database logging	6.20	Logs and records system events to the database.
□	Forum	6.20	Enables threaded discussions about general topics. Depends on: Taxonomy (enabled), Comment (disabled)
☑	Help	6.20	Manages the display of online help.

Figure 43: Enabling, Disabling and Uninstalling of Modules

The modules should be extracted to the *modules* directory. To activate the features of the module, it should be enabled from the admin settings. The above admin control panel shown in Figure 43 allows administrator to enable or disable the module just by clicking a check box. After enabling certain modules, the features associated with it, are integrated with the related core module and can be used in conjunctions. The integration of *restricted content* module for the proposed eBook Management system is shown in Figure 8.