E-Book Application System Integration (E.A.S.I.)

Requirement Specifications

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Prepared For: **Ms. Jen Cannell**   **Questar III**
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Product Overview & Summary

Seraphim's clients, Ms. Jen Cannell and Ms. Jaimé Pfeiffer, are in need of a single sign-on system for students to access and download e-books from their district's libraries. E-Book Application System Integration (E.A.S.I.) will be a web application capable of storing e-books from multiple vendors sites and will act as a central repository for all e-books that the districts will have available. E.A.S.I. will be autonomous – as administrators update the site with new e-books and vendors, the system will automatically access the new content, granting E.A.S.I. service to students for years to come.

Environments

Seraphim will be using the following environments to create, test and complete the project.

Development Environment

The development environment listed below is the hardware and the software that *Seraphim* plans to use in producing the project:

Software Engineering Lab – Computer #1:
- Operating System: Windows 7 Enterprise (x64)
- Memory: 6100 MB
- Disk Space: 499.78 GB
- Processor: 3.20 GHz Intel Core i5-3470
- Relevant Software: Adobe, Google, Microsoft Office programs, Mozilla Firefox, Oracle, Audacity, SmartDraw, Eclipse

Software Engineering Lab – Computer #2:
- Operating System: Mac OS 10.7.5
- Processor: Intel Core i5
- Memory: 4 GB Ram
- Speed: 2.5 GHz
- Relevant Software: iMovie, iPhoto, Photo Booth, Safari

Server:
- Operating System: CentOS 5.2, Kernal 2.6.18-92e15
- Server Name: oraserv.cs.siena.edu
- CPU Type: Intel Xeon 2.66 GHz
- Memory: 8GB Memory

Ms. Mathews' Development Environment:
- Operating System: Microsoft Windows 7 Home Premium
- Processor: Intel® Core™ i7-3610QM CPU @ 2.30Hz 2.30 GHz
- Memory: 8.00 GM

- Relevant Software: Adobe Reader X, BlueJ, caliber, Eclipse, GIMP, Git Bash, Google Chrome, Google Drive, HTML-Kit, Mozilla Firefox, Notepad++, Putty, Skype, SQL Server Management Studio, WinSCP

Mr. Mango's Development Environment:
- Operating System: MS Windows 7 Home Premium 64-bit SP1
- Processor: Intel Core i7 720QM
- Speed: 1.60GHz
- Memory: 8.0GB Dual-Channel DDR3 @ 659MHz
- Audio: NVIDIA High Definition Audio
- Monitor: Vizio 42" Internet TV
- Relevant Software: Aptana, Eclipse, GIMP, Audacity, Notepad++, Google Chrome, Mozilla Firefox, Opera web browser, Android 4.4.2 on Samsung galaxy s3

Mr. Street's Development Environment:
- Operating System: Windows 7 Home Premium 64-bit
- Processor: Intel(R) Core(TM) i7-2600 CPU @ 3.40 GHz
- Memory: 8192 MB RAM
- Display: NVIDIA GeForce GTX 550 Ti
- Audio: Dual Speakers IDT High Definition Audio
- Monitor: 23" Cross Width High Definition Video
- Relevant Software: Eclipse

Mr. Roth's Development Environment:
- Operating System: MS Windows 7 Home Premium 64-bit SP1
- Processor: Intel Core i7 2675QM
- Speed: 2.20GHz
- Memory: 8.0GB RAM
- Audio: Intel ® Display Audio
- Relevant Software: Audacity, Notepad++, Google Chrome, Mozilla Firefox, Microsoft Office 2007, Adobe Reader, PageBreeze 5

Mr. Carpenter-River's Development Environment:
- Operating System: Windows 7 Home Premium Service Pack 1
- Processor: Intel i5-3317U - 20 GB SSD in cache
- Memory: 6 GB
- Speed: 1.70 GHz
- Audio: Dolby Home Theater v4
- Monitor: Generic PnP Monitor - Intel(R) HD Graphics 4000
- Relevant Software: Eclipse, Notepad++, Google Chrome, Firefox, Skype

Operating Environment
The operating environment for this software will be any Mac, PC or smartphone that has internet capability and access our server.

Maintenance

The maintenance environment will consist of all hardware and software used to create our software (to be determined by the client).

Development Life Cycle

Seraphim's Software Development Life Cycle, located to the right, describes the process Seraphim will go through in order to plan, create, test and eventually deploy E.A.S.I..
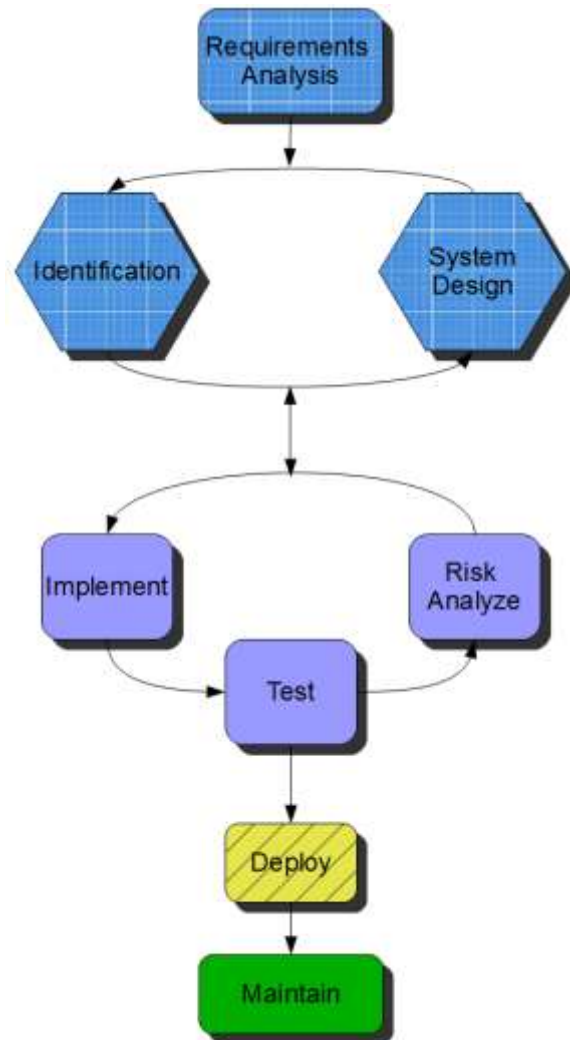
Requirement Analysis: Obtaining the client's needs.

System Design & Identification: Defining software functionality.

Implementation & Risk Analysis: Creating system and refine based on resources.

Testing: Confirm that the system meets established standards.

Deploy: Bring the system to a live state.

Maintenance: Keep the system functioning once completed.

Use Case Narratives

Seraphim will have the following user types to access E.A.S.I.:

Student

The Student will log into E.A.S.I. using a district, username and password, and will only be allowed access into the system if providing the right credentials. All users are Students. The Student will have access to all the books available to the Student's district and level. The Student has the ability to view the books as Genres, Subjects, Levels or as an unique search. Each of these options will display the e-books found in the corresponding categories. The Student can search by title, author or ISBN-13, or use the advanced search to find e-books across categories and file types. The Student can access their account, which will display the Student's first and last name, user type, district, and history of the e-books viewed or downloaded. The Student will have the option to log out, or will be automatically logged out after being inactive for five minutes.

Teacher

The Teacher has access to all processes that a Student does:

> The Student will log into E.A.S.I. using a district, username and password, and will only be allowed access into the system if providing the right credentials. All users are Students. The Student will have access to all the books available to the Student's district and level. The Student has the ability to view the books as Genres, Subjects, Levels or as an unique search. Each of these options will display the e-books found in the corresponding categories. The Student can search by title, author or ISBN-13, or use the advanced search to find e-books across categories and file types. The Student can access their account, which will display the Student's first and last name, user type, district, and history of the e-books viewed or downloaded. The Student will have the option to log out, or will be automatically logged out after being inactive for five minutes.

The Teacher has access to all books available in the Teacher's district, regardless of level. The Teacher has access to a level known as "Education", which has teaching e-books. The Teacher has the ability to edit Student accounts, either by individually adding or removing accounts, changing their level of access, or adjusting individually which e-books a Student has access to.

Administrator

The Administrator has access to all processes that a Student does:

> The Student will log into E.A.S.I. using a district, username and password, and will only be allowed access into the system if providing the right credentials. All users are Students. The Student will have access to all the books available to the Student's district and level. The Student has the ability to view the books as Genres, Subjects, Levels or as an unique search. Each of these options will display the e-books found in the corresponding categories. The Student can search by title, author or ISBN-13, or use the advanced search to find e-books across categories and file types. The Student can access their account, which will display the Student's first and last name, user type, district, and history of the e-books viewed or downloaded. The Student will have the option to log out, or will be automatically logged out after being inactive for five minutes.

The Administrator has access to all processes that a Teacher does:

> The Teacher has access to all books available in the Teacher's district, regardless of level. The Teacher has access to a level known as "Education", which has teaching e-books. The Teacher has the ability to edit Student accounts, either by individually adding or removing accounts, changing their level of access, or adjusting individually which e-books a Student has access to.

The Administrator has access to a suite of tools accessible from the "My Account" page: "User Types", "Vendors", and "Books". The Administrator, clicking the "User Types", will allow them to find a Student, Teacher or Administrator and change their information. Changing their information could mean: adding or removing a Student, Teacher or Administrator, changing which districts a Student or Teacher is associated with, etc. The Administrator, accessing "Vendors", will access a page of all vendor sites currently in the system, their corresponding

credentials, and the ability to add, remove or update a vendor site's information. The Administrator, viewing "Books", will have the ability to find e-books brought into the system from the vendor sites and change the information attached to the e-books. This information includes: the district it's available to, the description, the Subject, the Genre, or the Level. The Administrator may choose to remove individual books from the system.

User Permission Chart

The following table presents the abilities that are possible to perform within E.A.S.I. and which user types have access to that ability.

Legend:

X
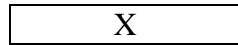
Enabled Permission

	Student	Teacher	Administrator
Access e-books	X	X	X
Search e-books	X	X	X
Modify student information		X	X
Access teaching e-books		X	X
Add/Remove Students		X	X
Add/Remove Vendors			X
Add/Remove Teachers			X
Add/Remove Administrators			X
Modify E-Book Information			X

UML Use Case Diagram

The idea of a UML Use Case diagram is to display the full functionality of the system in a visual manner. It shows the relationship between each of the user case narratives and the activities on which they will partake onto the system. It also displays the actions that the system will participate in without the user initiating the action.

UML Use Case Legend

Actor: Actors (human or non-human) interact with the system. Human actors will be found on the left side of the System Boundary, while non-human actors will go on the right side. Each actor name will be displayed below the actor icon, and will be attached to one or more actions found within the System Boundary.

System Boundary: Contains all actions an Actor is capable of performing within the system.

Scenarios/Uses: The actions (or activities) that will occur within the system, and often are used to show how actors interact with the system. These actions may also show system-initiated actions, without the need for users to activate them.

Participation Line: The Participation Line will connect actors with their appropriate uses, showing which uses the actor will be participating in.

<<Extends>>
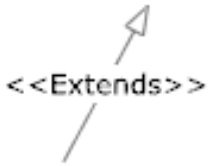
Extends Relationship: Used to show the relationship between uses, with the use being pointed at the sub-use and the use being pointed from is the parent. For example, Use Case A is a feature of Use Case B.

<<Include>>

Includes Relationship: Used to show the relationship between uses, with the use being pointed at the sub-use and the use being pointed from is the parent. For example, Use Case A has a feature of Use Case B.

UML Use Case Diagram

Figure 1, as shown on the next page, shows the E.A.S.I. system as represented in a UML Use Case Diagram, using the legend above.

Data Flow Diagrams

Data Flow Diagrams (DFDs) are a visual representation of the information between different system processes. The DFDs are used to describe the way data will be stored and retrieved by the system and those that influence the system. Each DFD examines a system component at a different level of detail.

Data Flow Legend

Process: A process is a system function that will represent data that is being stored, transferred or otherwise manipulated.

Entity: An entity represents sources of data into the system and the destinations of which data is sent from the system.

Data Flow: A data flow arrow shows the movement of information between entities.

Data Store: Data storage shows the location where data is held, either temporarily until it moves onto another location, or permanently, for the system's own use.

Context Diagram

The Context Diagram describes the users and processes that interact with E.A.S.I. This includes, but is not limited to, databases such as Books and Account Information, users such as Student, Teacher and Administrator, and access to information given and taken from the Vendor sites. This diagram is the highest level of the Data Flow diagrams, and hopefully clarifies how the system receives and outputs information.
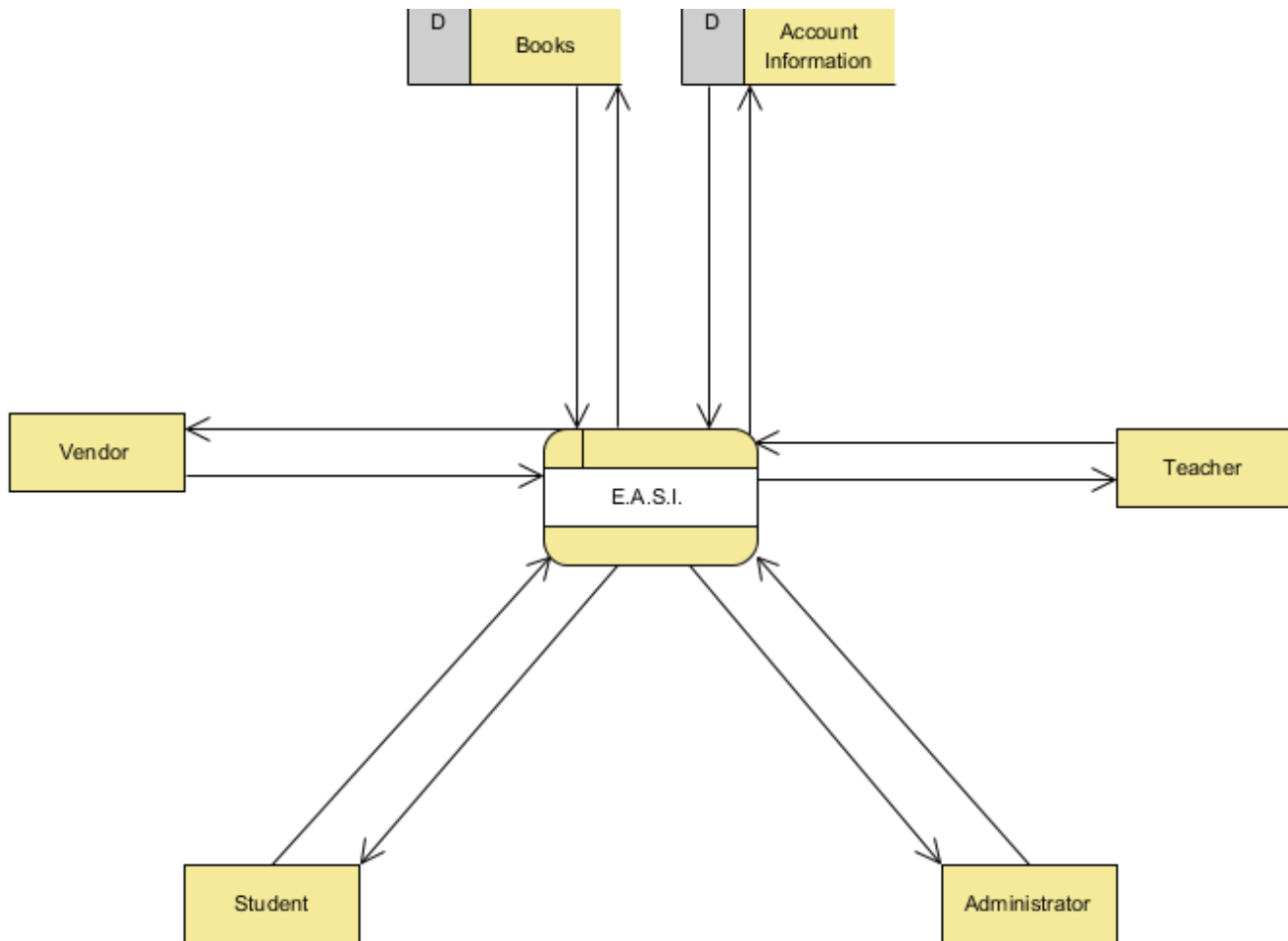
Level 0 Diagram

The Level 0 Diagram is the next highest level of Data Flow diagram, and expands on the initial information provided in the Context Diagram. It shows the major processes that will be present in E.A.S.I., as well as how information is controlled among and in-between the processes. The Level 0 Diagram shows what the major activities the system and users will be engaged in.

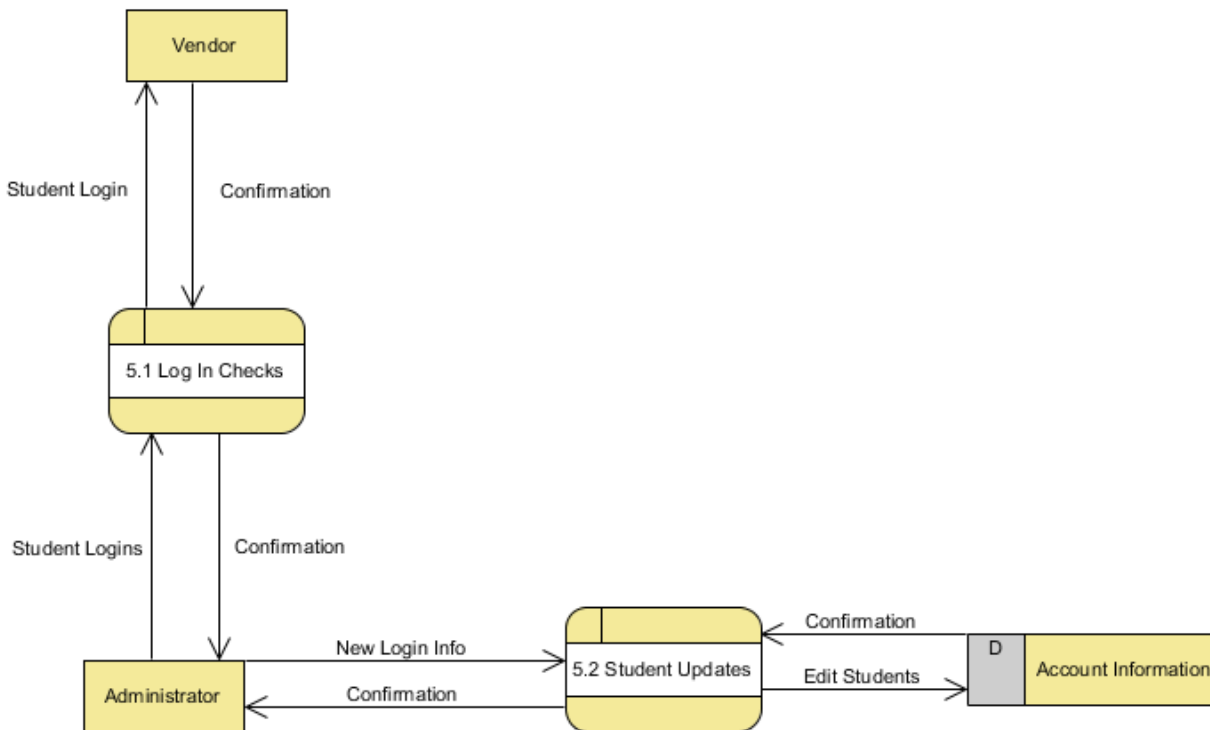Figure 2, as shown on the next page, shows E.A.S.I.'s Level 0 Diagram.

Level 1 Diagrams

All subsequent diagrams after a Level 0 expand on the specific processes originally displayed in the Context and Level 0 diagrams.

Withdraw
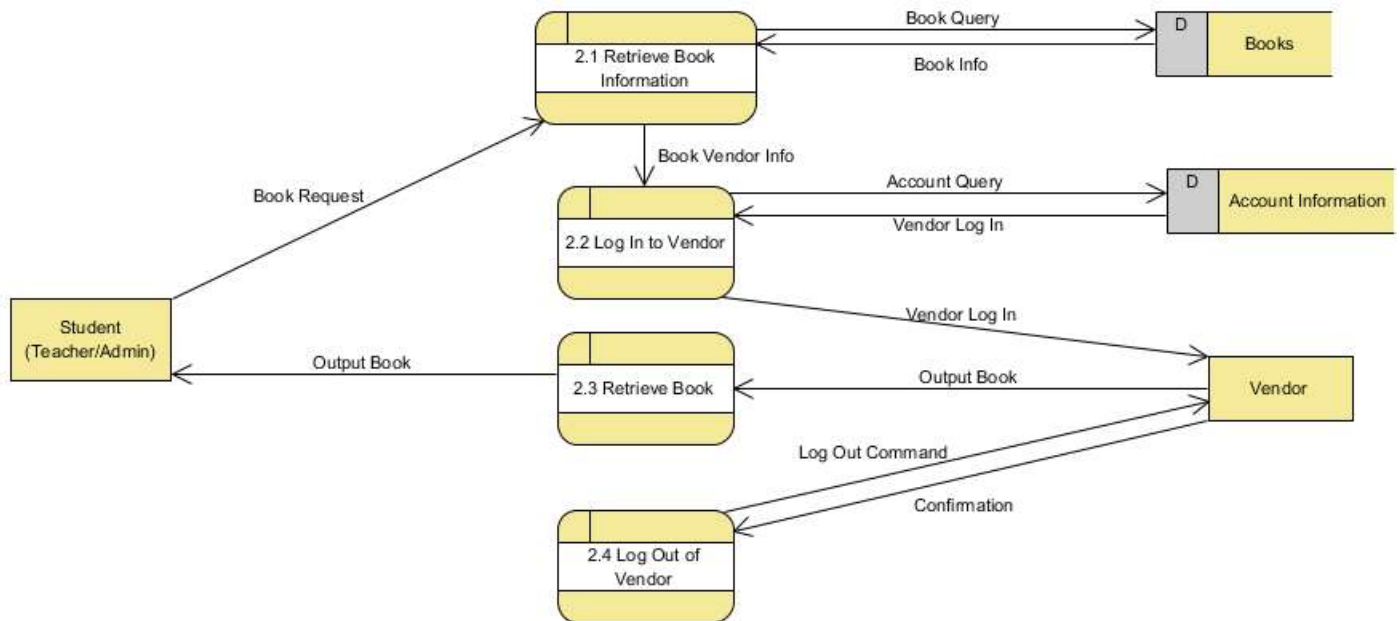
Add/Remove Vendor

Prototypes

The following images and explanations are visual representations of the first prototypes that will be created as E.A.S.I. The prototypes presented here do not represent the final design of E.A.S.I. and are subject to change, but they do represent some of the core functions and processes that E.A.S.I. is guaranteed to have.

Access Screen

This access screen, as shown below, represents the login screen for E.A.S.I. All users will be presented with this screen, and must enter correct credentials in order to access the system.

The login screen will have the following features:

- A drop down listing every district that is available for the system
- A username and password to access the system
- A small tutorial (located as a ? next to the end of Username: ? and Password: ? in the loginscreen.png file) for where to find the username and password; this will be presented in the form of pop-ups when hovering over the images
- A "Sign In" button
- A "Need Help?" link, which provides a small pop-up explaining how to contact someone in charge (most likely the administrator in charge of maintaining the system)
- Any login attempts that fail will be represented with an error message that displays what goes wrong next to the correct field of choice

- Each of the representations of the images will have links to their main websites (in order): http://www.questar.org/, http://oraserv.cs.siena.edu/~perm_seraphim/, and http://www.capitalregionboces.org/

E.A.S.I. Website

The main page of the website, as shown below, is what all users will first encounter when correctly entering into the system (as long as the user provides the right district, username and password credentials).
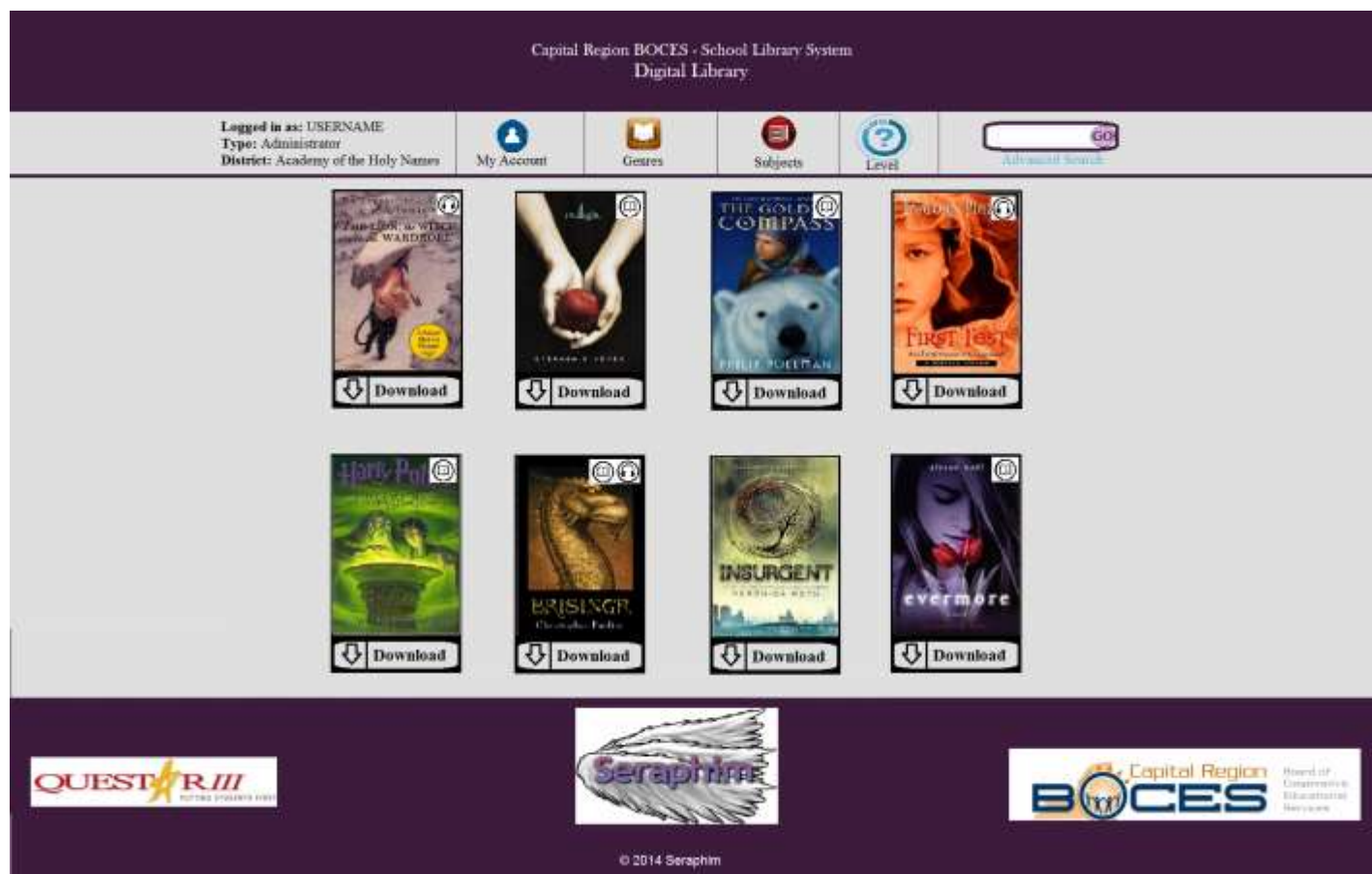
The website will have the following pages:

- The main page, as shown above
- "My Account", a page to organize their account settings (or, for administrators, to organize other user type account settings or book settings)
- "Genres" will be a drop-down that leads to pages that have all the Fantasy books, Science Fiction, etc
- "Subjects" will be a drop-down that leads to pages that have all Science, Math, History, etc, books
- A page to show all possible Genres and Subjects, with the amount of books available in each topic
- "Levels" will be a drop-down that leads to pages that have only books for certain levels.
- Searching in the search box will lead to the "search" page, which shows all the books found for the inputted text
- Clicking "Advanced Search" will lead to a separate page to search using advanced settings
- Clicking on any book cover will lead to a single page with that book's information

All pages of the website will have:

- The "header" (the top of the page; everything along the menu, such as the "Genres" and Search bar, and above)
    - Clients request that message header should be: "Capital Region BOCES and Questar III – School Library System"
- The "footer" (the bottom of the page, where the images for Questar III, Capital Region BOCES, and Seraphim, are)
- A logout button/link (not shown in pictures above); the user will be automatically logged out after five minutes of inactivity
- Whenever books are displayed (such as on the main page, searching, or in Genres/Subjects/Levels), they will show:
    - The book cover
    - Whether the book is available as viewing (default), downloadable as an e-book, or downloadable as an audiobook
    - When scrolling over the book image, a small, transparent, "block" will pop up over the book cover, displaying the title and author
    - Clicking on the book cover leads to a page that displays more information about that book
    - A download button, with an arrow, below the book; clicking the download button allows you to download the book as an e-book (default), while clicking the arrow allows you to choose to view or choose a download option (if the book is available in multiple formats, such as e-book and audiobook)
    - Books will only appear depending on the user's level
    - Books will display in rows/columns, and will only have so many rows; their will be a "Next Page" and "Previous Page" options at the bottom

The main page will have the following features:

- A set number of books, in rows/columns
- All books will be randomly selected, from the database, of available books from the district for that user's level
- The books display method (as discussed in the above section)

The "My Account" page will have the following features:

- The ability to see their first and last name (that's connected to the account)
- The ability to view their username, user account type (either student, teacher or administrator), and their district (students + teachers will not be able to change any of these)
- Individual abilities as dictated by their user account type (for example, administrators adding/removing vendors)
- History: See what e-books the user has checked out

The "Genres" will include:

- The following genres: Biography & Autobiography, Comic & Graphic Novels, Drama & Literature, Historical Fiction, History, Humor, Mystery & Thriller, Romance, Science & Nature, Sci-Fi & Fantasy, Fiction, Non-Fiction, Arts, Business & Finance, Education, Law, Medicine, Multicultural Studies, Religion, Social Science, Technology, Adventure, Audiobooks, Classics, Film, Horror, Music, Philosophy, Picture Books, Sport, Thrillers
- Genres will appear in alphabetical order
- These Genres will only show in the drop down menu if the topic is available (if there are 1+ books in the category)
- To ensure that the menu drop down doesn't get too long, only the first 6 or so options will appear; the last option will be to "See all Genres", which will lead to a page that:
  - Will show ALL Genres and the amount of books available in each genre

The "Subjects" will include:

- The following subjects: Language Arts, Mathematics, Science, Health, Physical Education, Art, Music, Foreign Languages, English, Social Science, Technology
- Subjects will appear in alphabetical order
- These Subjects will only show in the drop down menu if the topic is available (if there are 1+ books in the category)
- To ensure that the menu drop down doesn't get too long, only the first 6 or so options will appear; the last option will be to "See all Subjects ", which will lead to a page that:
  - Will show ALL Subjects and the amount of books available in each genre

The "Levels" options:

- Levels will be: K-5, 6-8, and 9-12
  - Teachers and Administrators will have access to an Education level
- When choosing a level, one will see all books found for that level
- Students in higher levels have access to books in lower levels
- Students can have access to specific books, as directed by Teachers or Administrators

Searching/Advanced Search options:

- Any search part will lead to a page that shows all book options. If none are found, it will show the message "No books found!"
- Searching involves entering in book title, author or ISBN-13
- Advanced Search will at least be able to:
  - search parts available in normal searching
  - search in any number of categories from Subjects, Genres, or Levels
  - search for viewing, e-books or audiobooks

Book Descriptions pages will have:

- A bigger version of the book cover

- Full description of the book
- Title, Author, ISBN-13, Publisher information
- The ability to view/download it

What E.A.S.I. will be doing in the background:

1. As administrators add the credentials for a vendor site, the system will automatically "grab" the e-books from the site, along with the information, and incorporate it into our database.
2. The system will check for new e-books bought on the vendor site every 24 hours.
3. As users download/view an e-book, the system will automatically "inform" the vendor site, corresponding to the user and the user account on the vendor site.
4. The system will only contact the vendor site when the user goes to view/download an e-book.
5. The system will handle all internal requests, such as search, clicking, logging in, etc.

Requirements Inventory

The Functional Requirements Inventory are the list of features that E.A.S.I. is expected to perform, and defines the behavior of the system. The Non-Functional Requirements will specify E.A.S.I. properties, those that are not necessarily specific functions of the system but rather what the system is intended to present to the user. Each of the inventories are subject to change as Seraphim progresses further into the design of E.A.S.I.

Functional Requirements

E.A.S.I. has three types of users: Students, Teachers and Administrators, each with their own functions when interacting with the system. The following list details the requirements of each human user that will interact with E.A.S.I.:

Student

- Will use the main login screen to access the system
  - The credentials will include the district, username, and password of the user
  - Any failed login attempt (ex. wrong username & password combination) will display the appropriate error message
- Access to e-books' information, such as the e-book cover, description, title, author, ISBN-13, publisher
- Ability to download e-books in the available formats (view, e-book or audiobook)
- Ability to organize and search e-books
  - Able to organize by Genre, Subject or Level
  - Able to search across categories or for specific e-books
- Will be able to log out of E.A.S.I.

Teacher

- Will inherit all functional requirements specified for the Student
- Ability to change student account information
  - Ability to view and change username or password

- o Ability to view and change user's level access
- o Ability to get a Student access to specific e-books
- o Change how many books they can "check out"
- Access to special level of books for teachers only
- Ability to add/remove Student accounts
  - o Add district, username, password and level

Administrator
- Will inherit all functional requirements specified for the Teacher
- Ability to change the district for Student accounts
- Ability to add or remove Student accounts
  - o Add student accounts for each vendor site
    - ▪ An "import" system will be in place so that the administrators can import a document containing all the username and password information for all the students
- Ability to add or remove Teacher accounts
- Ability to add or remove Administrator accounts
- Ability to add or remove vendors (e-books)
- Ability to adjust details for e-books
  - o Genre, Subject or Level
  - o Descriptions

Non-Functional Requirements
The following list contains those items that are not specific features in the software, but rather what E.A.S.I. is expected to accomplish overall. These features cannot be objectively measured. E.A.S.I. (E-Book Application System Integration) will have the following features:
- The system will be responsive, which is the ability of the system to respond to queries within a reasonable amount of time
- The system will be scalable, with the ability to control access about 85,000+ students
- The system will be secure, allowing users to transverse the system without accessing protected data
- The system will be viewable on multiple platforms and browsers
- The system will be intuitive for all users
- The system will be able to maintain itself

Exception Handling
The goal of Seraphim is to create a system that accomplishes the functions provided in the Software Plan as well as listed above. As part of these goals, E.A.S.I. will be able to handle all software exceptions as they arise; in the event of an exception error, the system will be able to handle it without the entire system failing. All the input into the system will be validated before the input is stored or made available to the users. At this stage of the project, the potential errors to the system are still unknown, but do include validation of user credentials and vendor information. Exceptions might be made possible either through user interaction or by the system itself, but in either case, E.A.S.I. will be designed to recover from any such events.

Implementation Priorities

While there are many functions and add-ons that would make the system more desirable, some functions are needed as the bare minimum for the system to do what is required. The most important components of E.A.S.I. are as follows, in order of most to least importance:

1. Ability to access e-books
2. Ability for validated users to access the system
3. System to automatically access vendor e-books
4. Ability to add/remove vendors
5. Ability to add/remove students/teachers

Modifications and Enhancements

E.A.S.I. currently allows users to securely login and access e-books, as well as be able to manage the system for the future. Our clients, Ms. Jen Cannell and Ms. Jaimé Pfeiffer, have indicated they had several other functions they wish to implement as well, such as statistics for which users are accessing e-books, but are well aware that these functions come secondary to what the system definitely needs to accomplish. At this time, Seraphim is primarily concerned with ensuring that the system will reach its goal: providing a secure location for students to access e-books. All other functions will be considered once this is completed.

Acceptance Criteria

The accepted criteria for E.A.S.I. will include all previously stated requirements and functions listed in this document as well as the Software Plan. If the final product is unable to meet the specified requirements or functions, a reasonable explanation must be provided, which will be measured by the supervisors, Dr. Meg Fryling and Dr. Darren Lim. Each portion of E.A.S.I. will be tested in each stage to ensure that the individual components function before having the system integrated as a whole. At the end of the project, an acceptance test will take place to ensure Seraphim has met the system and client needs. Once the acceptance test has taken place, Seraphim and the clients will measure the requirements that have been successful.

Testing Requirements

E.A.S.I. will be vigorously tested on both mobile and desktop machines, using Windows, Linux and Mac Operating Systems as well as the popular browsers: Mozilla Firefox, Internet Explorer, Google Chrome, Opera, and Safari. Testing protocol (the acceptance test) will be designed by Seraphim at a later stage using the Requirements Specifications.

Appendices

Glossary of Terms

E.A.S.I.: E-Book Application System Integration, the name of the e-book digital library being created for Capital Region BOCES and Questar III.

Prototype: An early sample of the product to project what the designers anticipate the system to look like.

UML: Unified Modeling Language, a standardized modeling language to present a graphical overview of the functionality of the system.

Timeline

The following is the list of tasks to be completed throughout this year for the E.A.S.I. system:

Task	Duration (Days)	Start	Finish
Establish Team	2	9/3	9/4
Software Plan	8	9/11	9/19
Software Plan Presentation	3	9/20	9/23
Team Website Creation	6	9/24	9/30
Requirements Specification	23	10/1	10/24
Requirements Specification Presentation	3	10/25	10/28
Data Dictionary	12	10/29	11/10
Unit Tests	15	10/29	11/13
UML Diagrams	19	10/29	11/17
Preliminary Design	10	11/18	11/28
Preliminary Design Presentation	6	11/29	12/4
Client Meetings	~ 20	9/11	12/2
Team Meetings	~ 20	9/10	12/4
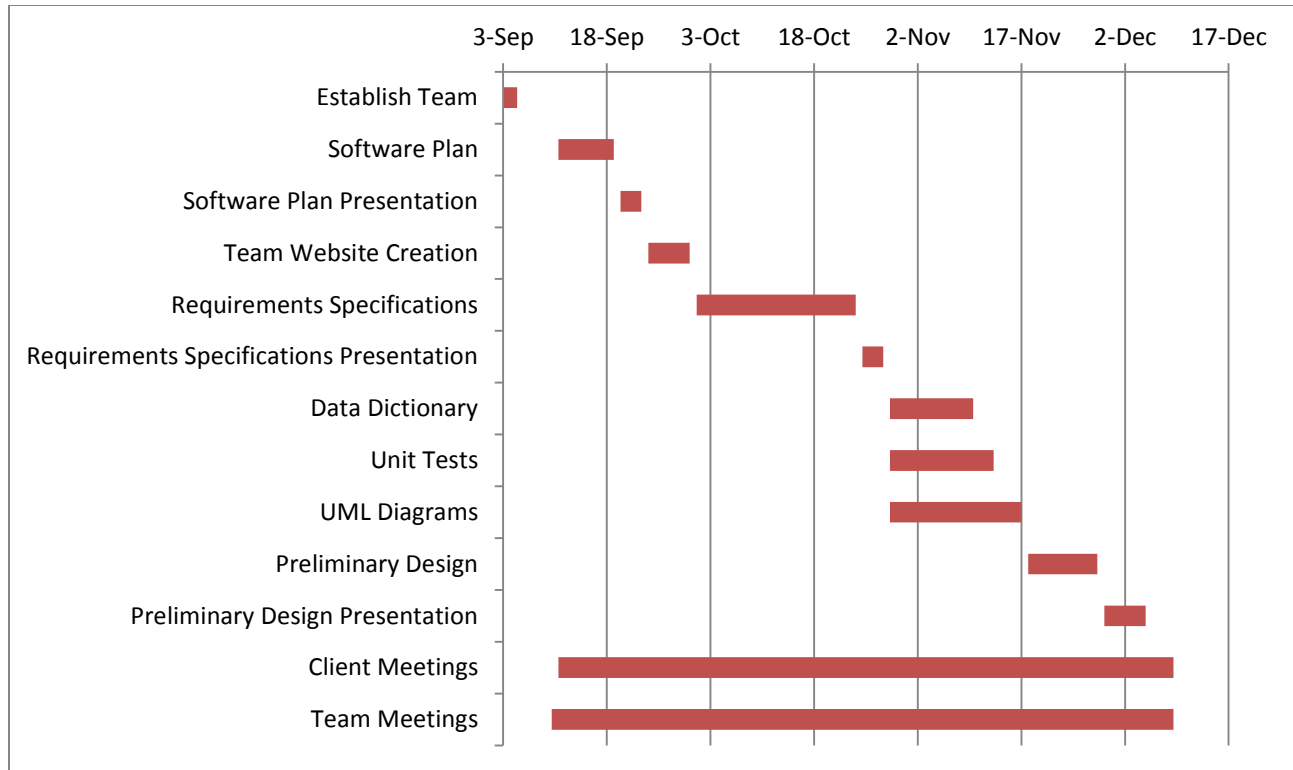
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