Bookworm

Functional Specification

4th Year Project

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Functional Specification Contents

0. Table of contents

1. Introduction

1.1 Overview

Bookworm will be a .Net web application where you can review books, have a customizable and unique profile and gain knowledge of other books that you might be interested in using a recommender system. I want to make a system which is highly visual and visceral, which adheres to web usability standards and practices. I want the user to have an experience that has them coming back for more. To create this experience, the user will have a customizable profile where they can express all of their book related preferences. They will be able to see and view what their friends have read and connect with all kinds of book lovers.

As someone who loves reading, I can understand the frustration of the situations where you have nothing to read. The laborious process of scrolling through book covers and websites in order to find your next book can be time consuming. Having a tailored recommender system which can make suggestions would take the sting away from this situation providing the user with an abundance of options that are specifically suited to the preferences of the reader. Bookworm will provide the user with this recommender system. It will make use of collaborative filtering which is based on the idea that people who share an interest in certain things will probably have similar tastes in other things as well.

1.2 Glossary

Define and technical terms used in this document. *Only include those with which the reader may not be familiar.*

- CRUD
Create Read Update Delete

2. General Description

2.1 Product / System Functions

The fully functioning system will implement these main functions that's outlined below. The system might contain some additional features which will be implemented if the project is running ahead of schedule.

· Sign Up.
· Login.
· Recommend Book Suggestions.
· User Profile.
· Connect with Other Users
· Create, Read, Update and Delete Book Reviews.
· Search for Other Users
· Search for Books
· Allow uploading of Kindle Text file *
· Read Kindle Highlights and Notes online *
· Create pdf/mobi file of Kindle Highlights and Notes *

*Additional features

2.2 User Characteristics and Objectives

The users are anyone and everyone who is passionate about reading. This covers a vast demographic of users, from older users to new burgeoning book lovers. To use some possible examples, you may have an older gentleman or lady that has vast knowledge of books and literature but lacks in computing experience or the young boy or girl starting out searching out a new book after completing their first Harry Potter's book. On the other end of the scale, you could have the tech savvy college student who has grown up hand-in-hand computing devices and reads for both academic reasons and enjoyment.

All of these audiences will be taken into mind with the creation of bookworm, emphasizing simplicity and clarity with the design. Both Neilsen's heuristics [1] and Schneiderman's principles [2] will be made use of to obtain the highest quality user interface and user experience possible.

As illustrated in the introduction the users will be able to have customizable profile, gain knowledge of books, obtain recommendations, create reviews and connect with other book lovers.

2.3 Operational Scenarios

This section should describe a set of scenarios that illustrate, from the user's perspective, what will be experienced when utilizing the system under various situations.

- **Browse the website:**

An unregistered will be restricted to three webpages, the home screen,

A registered user will have full access to the whole site provided they’ve logged in. They will be able to see their profile, their recommendations, book reviews, other user’s profiles.

- **View Recommendations**

A number of recommendations will be visible for the user. These will have their own section on the site.

- **Sign Up**

Any user will be able to sign up to the web application provided they have an email address. They simply fill in all the necessary information on the form provided and hit the sign up button.

- **Edit Profile**

A user who has signed in will be able to edit and customize their profile to their suiting.

- **Delete Profile**

Any user will be able to delete their profile at any time and all data pertaining to that user will be deleted with no restoration point. This will be notified to the user in the event that they attempt to delete their profile

- **Search for Books**

The user will be able to search for any book. If the book is not present in the system this will be indicated.

- **Search for Users**

The user will be able to search out any other users. If the user is not a connection, they will only be able to see a minimal amount of information about them.

- **Add a connection**

As mentioned above, each user will only be able to see a small amount of information for every other user, this will be maintain their privacy. In order to gain full information for another, you must add this user as a connection. On each profile there will be a button which will allow you to make this request, the user can then respond to either accept or reject your request.

- **Delete a connection**

In the event wants to for whatever reason remove a connection, there will be an option to do this on the other user's profile.

2.4 Constraints

Time Constraints

The project has a deadline of 21/5/2017. During the implementation phase I will need to be wary of this deadline and sustain progress in line with how we have scheduled each section of the project in order to complete the project on time.

Server Memory Constraint

Due to the fact that we're hosting the site on a free publication site, there is a limit on the amount of the traffic the site can cater for at any given time. While the amount of memory should be plenty for this site, if there was a dramatic increase in traffic, this could be an issue, resulting in the site going down. The scalability section covers how this could be prevented or dealt with.

3. Functional Requirements

This section lists the functional requirements in ranked order.

3.1 View Recommender Suggestions

Description

Recommender suggestions will be provided to the user by collaborative filtering techniques. These will be presented to the users in a visual way and hig

Criticality

This is the main part of the project making use of a data mining algorithms to provide the user with additional books they would find interesting.

Technical issues

This will involve making use of an external third party system which will take time to get used to and implement to it's highest potential.

3.2 – CRUD Book Reviews

Description

This is will entail the ability to create, read, update and also delete book reviews. Upon creating or updating a book review the user will be able to enter in details as to when they finished the book, what they thought of the book and an overall rating for the book.

Criticality

This is a very important part of the system. The users must be able to create, read, update and delete reviews on the website.

Dependencies with other requirements.

In order to make book reviews a user must be logged in to the system and signed up for the system.

3.3 – User Profile

Description

A customizable profile where the user can enter information about themselves, the books they've read and reviewed, as well as the books they intend on reading.

Criticality

This is very important to the system, it'll be the first place the user will be directed to after they sign up and it'll be a means of viewing information about various other users a user has connected with.

Dependencies with other requirements.

In order to access the user profile a user must have already signed up for the application and on repeated visits to the site, must have logged in.

3.4 – Connect with Other Users

Description
Connecting with other users will enable users to view each other's profiles to the full extent and see all of their reviews and kindle highlights, as well as all the personal information they have disclosed on the site.

Criticality
This is an important aspect of the web applications functionality. In order for the user to feel part of a community they need to be able to connect with other users. This will also increase their ability to be able to find new books and connect with those who have similar tastes.

Dependencies with other requirements.
The person visiting the website must be a member of the site in order to connect with another user and they must also be logged in. In order to find another user they may use the search user functionality, or they find their profile via a review they have left.

3.5 – Search for Books to Review

Description
Users will be able to enter a search query which will return either the book found or an error message saying the book was unable to be found.

Criticality
This is of huge importance to the system, in order to be able to review books, the user must be able to find them.

Dependencies with other requirements.
The user must be logged into the system.

3.6 – Search for Other Users

Description
Users will be able to search and find other users in order to connect with them. This will give them the ability to see each other's full profile comprised of all the reviews each has made as well as all the quotes and other information.

Criticality
This is an important part of the system as it allows users to connect with each other.

Dependencies with other requirements.
The user must be logged into the system.

3.7 - Login

Description
In order to login and use the system, a user will enter their login details which will be in the form of an email address and a password. This should then bring them to their profile screen if the details are correct, otherwise, it should give an error message.

Criticality
Logging into any system is an important part to any system. It protects the users private profile and information and allows them

Dependencies with other requirements.
A user must be already registered with the application.

3.8 – Sign Up

Description
Signing up for the system will involve entering in all the required information from the users name, country, date of birth etc.

Criticality
Signing up for the web application is crucial to be able to use the application. Otherwise, the user is only presented with the homepage and doesn't get the full potential benefits of using the application.

Technical issues
In order to sign in, the data must be validated and ensured to be correctly input. This will be dong using a tool called Fluent Validator [3] Error messages will appear if data is input incorrectly which are tailored to each field of the form.

Non Essential Functionality

This section contains functionality that will be included if time is available to do so and are therefore not central to the systems usage. Over time there may be some additional features added to the system, again time pertmitting.

3.9 – Upload & Kindle Stored Text Online

Description
When using a kindle, users can make highlight text they find important and also make notes on whatever books they're reading. This stored text for both highlights and notes is kept in a file called Clippings.txt on every kindle device. Other than through their books themselves and scowering through this Clippings.txt file (which could contain thousands of highlights and notes depending on how many books the user reads), users are unable to get at their highlights and notes. Bookworm may include functionality which would allow users to visualize all of their nots and highlights online.

This would be done by signing in firstly signing into any users account and then going to the section which will be labelled Kindle text. At this part of the system there would be a section where you can possibly drag and drop the clippings file. The system would take care of the rest and just present the user with all of their highlights and notes.

In order to do this the user's kindle must be connected to whatever device they're using to access the Bookworm web application. This is due to the fact that direct transfer or any service that might take the file from your kindle would require access to the kindle through the internet and this isn't possible since kindle does not have an API.

Criticality

This is not critical to the site but would be a nice added feature to integrate the kindle platform into the system.

Technical issues

I've already done some work on this over the summer in Java, it would mean converting this code into C# in order to be useful to the site.

3.10 – Create PDF/Mobi file of one book's notes & highlights

Description

This is as suggested the ability to create a pdf/mobi file which will contain all the user's notes and highlights which could then be read outside of the system itself.

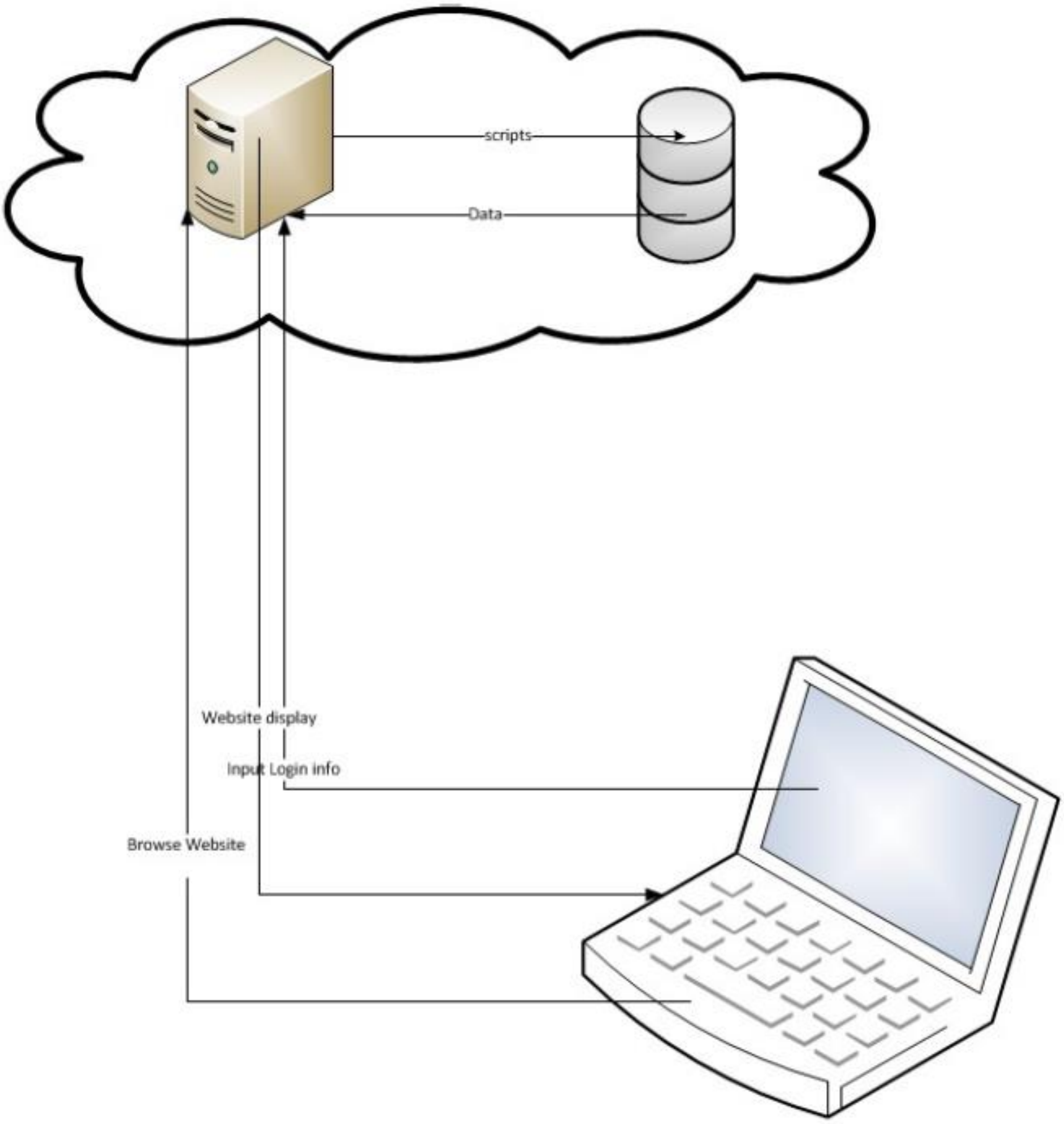
Criticality

Not critical to the system – an extra that will be created time permitting.

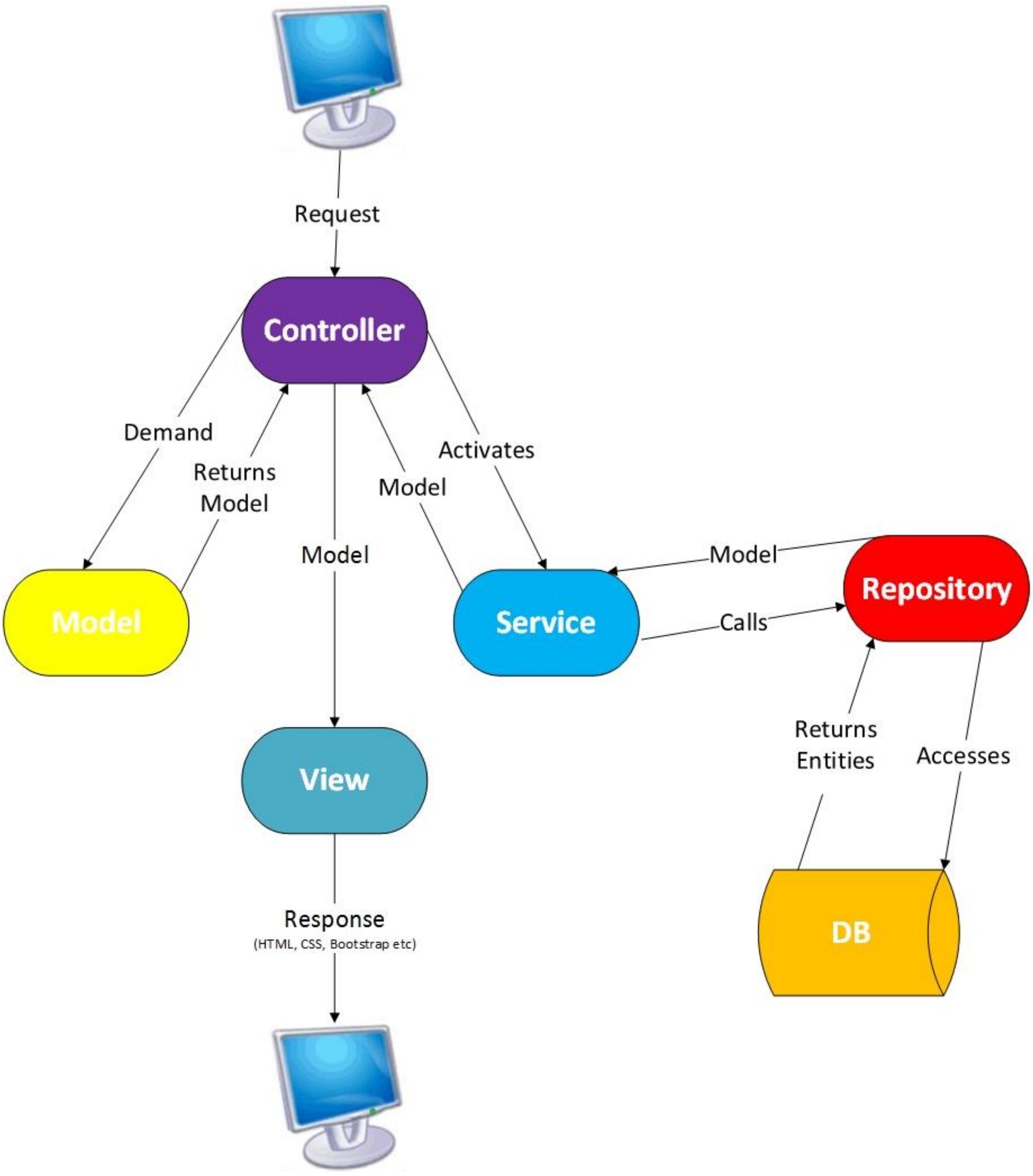
Dependencies with other requirements.

The previous kindle related functionality must be in place for this to work.

4. System Architecture



The above diagram describes the system architecture for our website This section describes a high-level overview of the anticipated system architecture showing the distribution functions across (potential) system modules. Architectural components that are reused or 3rd party will also be highlighted.



This diagram depicts a bit more in depth view of how the system will be structured. It will contain five layers: models, controllers, views, services and repository. It will be explained and expanded upon significantly in the technical specification. It's included for a vague idea of what will be happening at a more detailed level.

4.1 Somee – 3rd Party System

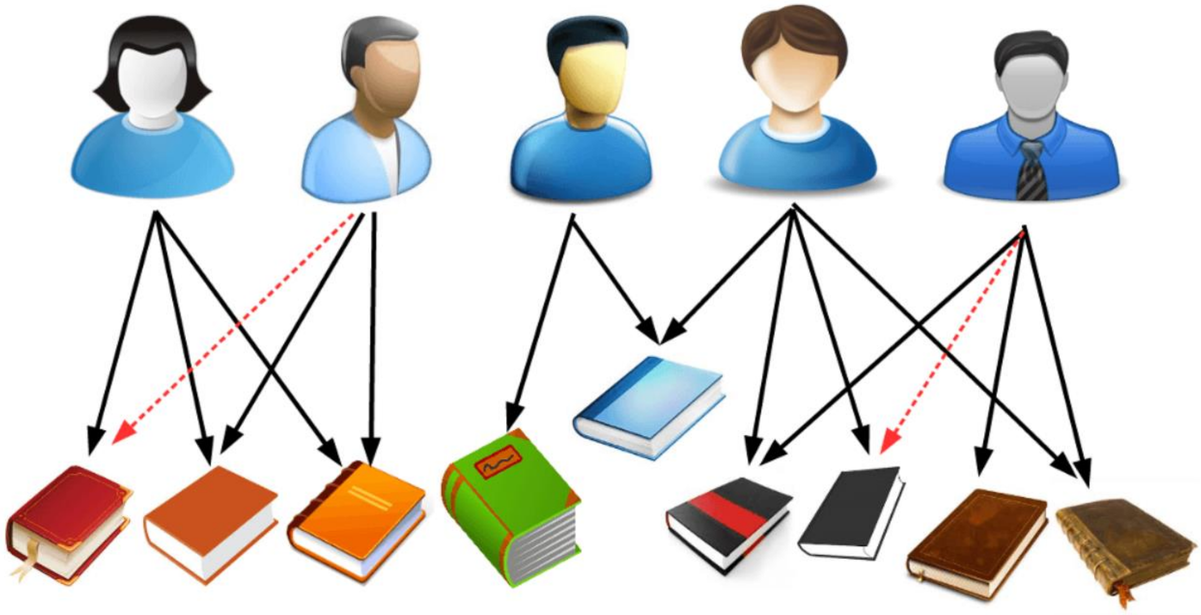
The web application may be hosted on Somee's free .Net hosting.

Features:

- Storage capacity: 150MB

- Transfer rate: 5GB/Month
- Free Subsomain
- IIS 8.0/7.5/6.0
- ASP.Net 4.5/ 4.0/3.5/2.0/ 1.1
- AJAX 3.5/1.0
- MVC 1.0/2.0/3.0/4.0
- Silverlight
- Databases: MS Access 2003, 2007/MS SQL Express 2012, 2008R2
- MS SQL databases size: 15MB
- MS SQL log size: 20MB
- Backup storage size: 40MB

4.2 Recommender System – 3rd Party Tool



The recommender system will make use of collaborative filtering which is based on the idea that people who share an interest in certain things will probably have similar tastes in other things as well. One of the candidate software tools that I'm considering using to aid in this process is Lenskit. Lenskit is an open source tool for recommender systems. In order to implement and test the functionality of the recommender system, I've downloaded a data set from the website Kaggle. This dataset has thousands of user reviews on individual books which have been scraped from the website goodreads.com. [4] This rich data set of user reviews is ideal for the implementation and validation of the intended recommender system. It's also been thoroughly pre-processed and cleaned leaving it in perfect condition data mining algorithms to be applied.

4.3 MySQL Database

The MySQL database will be created initially in SQL Server Management Studio and eventually moved to Somee's free .Net Hosting. This will be used to store the all relevant data for the system from Book information to the user's details. The database will be accessed, modified and deleting from the databases on a routine basis.

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4.4 Operational Attributes:

4.4.1 Scalability:

In the event that the site were to go live and a dramatic increase of drivers and driver divisions, forcing an excessive demand on the resources available with the current Somee[5], scalability may be necessary. For this to happen, the site could need to be moved from the free system, to a more capable cloud structure which provide the additional resources to sustain the site's functionality and to diminish the possibility of the site going down.

4.4.2 Maintainability:

The modularity of five layered system makes this system maintainable. It enables work and changes to be carried out on section of the system (for example the front-end) and have no impact on the rest of the system. It makes the code so much easier to sustain and upkeep. Testing will also be easier to carry out since each part of the system will be predominantly independent and therefore easier to carry out unit testing. The layered approach also makes it easier to change external 3rd party systems since the implementation will not be tied to any vendor, this is applicable to the database for example.

4.4.3 Security:

In order to facilitate privacy of information for each user, the main functionality of the application will be password protected. The user's password which they will choose when signing up for the application will be the means of accessing their profile and the rest of the sites functionality. The password itself must contain at least 6 characters, one upper case letter, one lower case letter and one digit. This should diminish the possibility of an unauthorized access and hackers getting access to the user's personal profile. Security will be enhanced by methods already available on Somee's cloud services.

4.4.4 Portability:

Due to the nature of the project, the front end being a website, the system must be portable to different devices. It must account and adapt according to the device on which it is accessed. Our design will enable this portability across devices. Some ways this will be done in the will be using CSS relative sizing and grid relative sizing (from the Bootstrap framework) to make sure it's fully scaled on whatever device the user visits the site on. For the front end, HTML and CSS, Bootstrap and MVC.Razor are also portable. For the rest of the functionality, C# will be used, this is also a proven portable language.

4.4.5 Availability:

Part of the reason I chose to use Somee's cloud storage for the site is it's well reviewed and reliable. It provides enough ram to enable the site function at a sustainable level. This will lead to 24 hour access to the site.

4.4.6 Correctness:

The aim is to create a system which reach a high level of quality and performs as expected. A lot of testing will be carried out to validate that functionality is working correctly and is sustained. I will look to create a system which fulfils its intended purpose and enable a swift access to whatever the user is looking for.

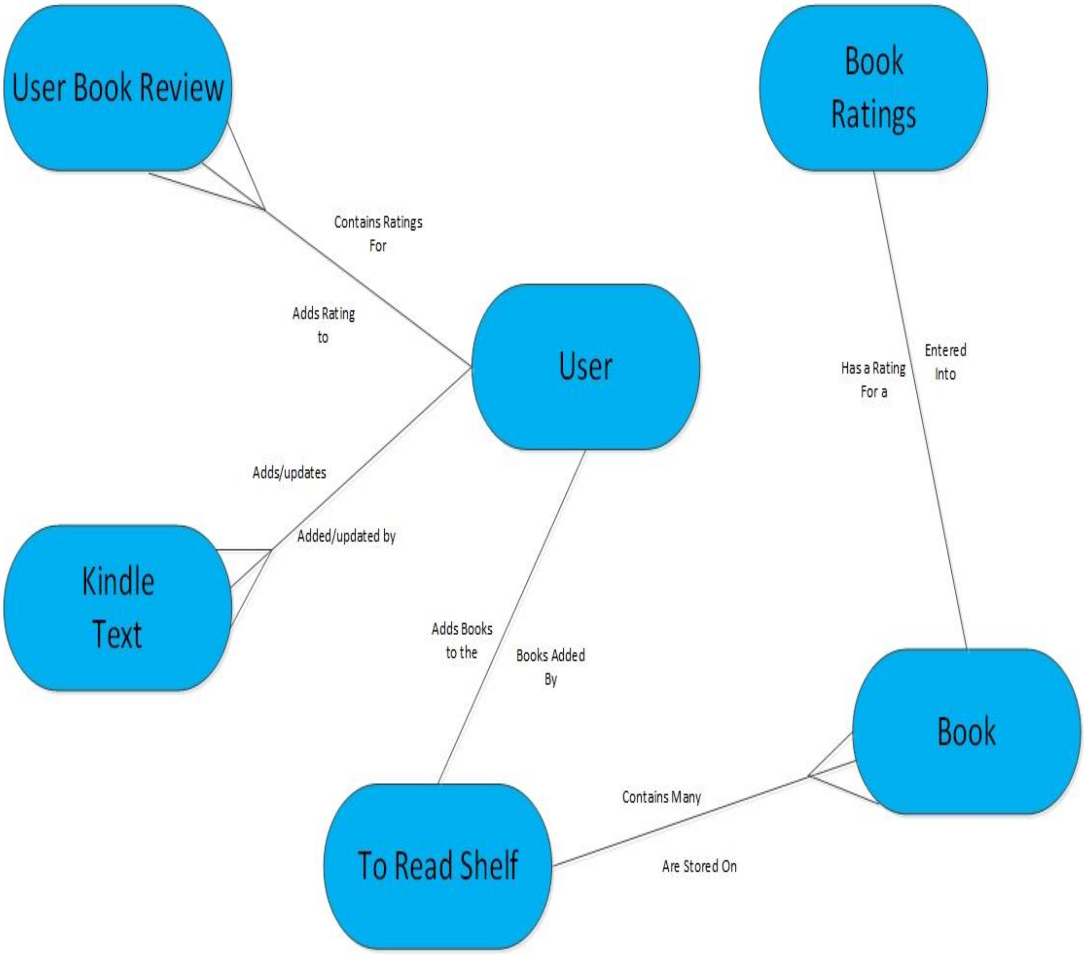
4.4.7 Usability:

As mentioned previously, the intention is to make the web interface as simple as possible to cater for a vast variety of users with varying computing expertise. This will be done by using Norman's principles and Shneiderman's rules of interface design. The website will be designed in such a way so that users of any technical expertise can reach any end goal they had in mind when they visited the site.

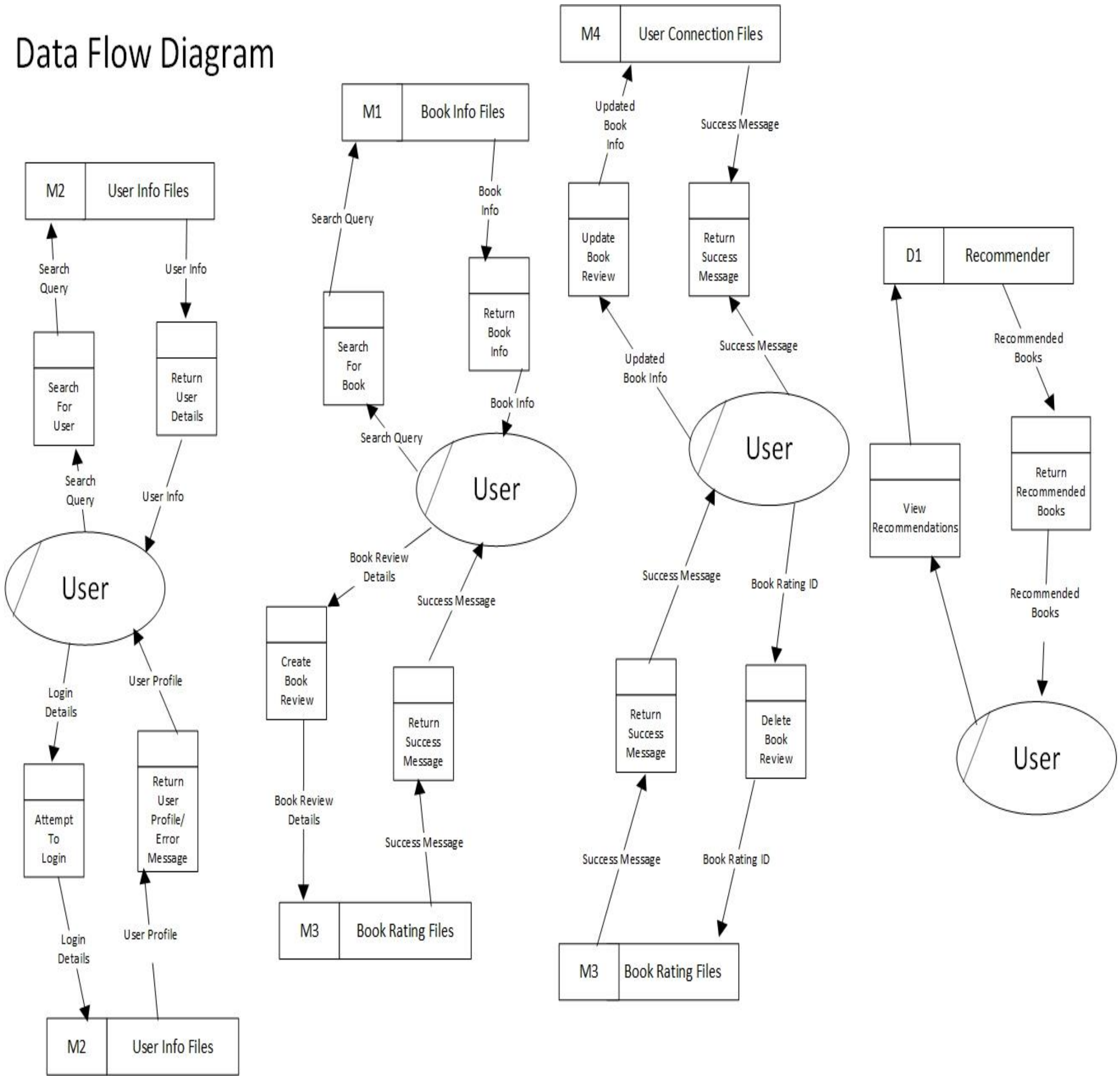
Section 5 High Level Design:

In this section, we will make use of SSADM diagrammatic tools to give a high level overview of the system. This will also include some external entities.

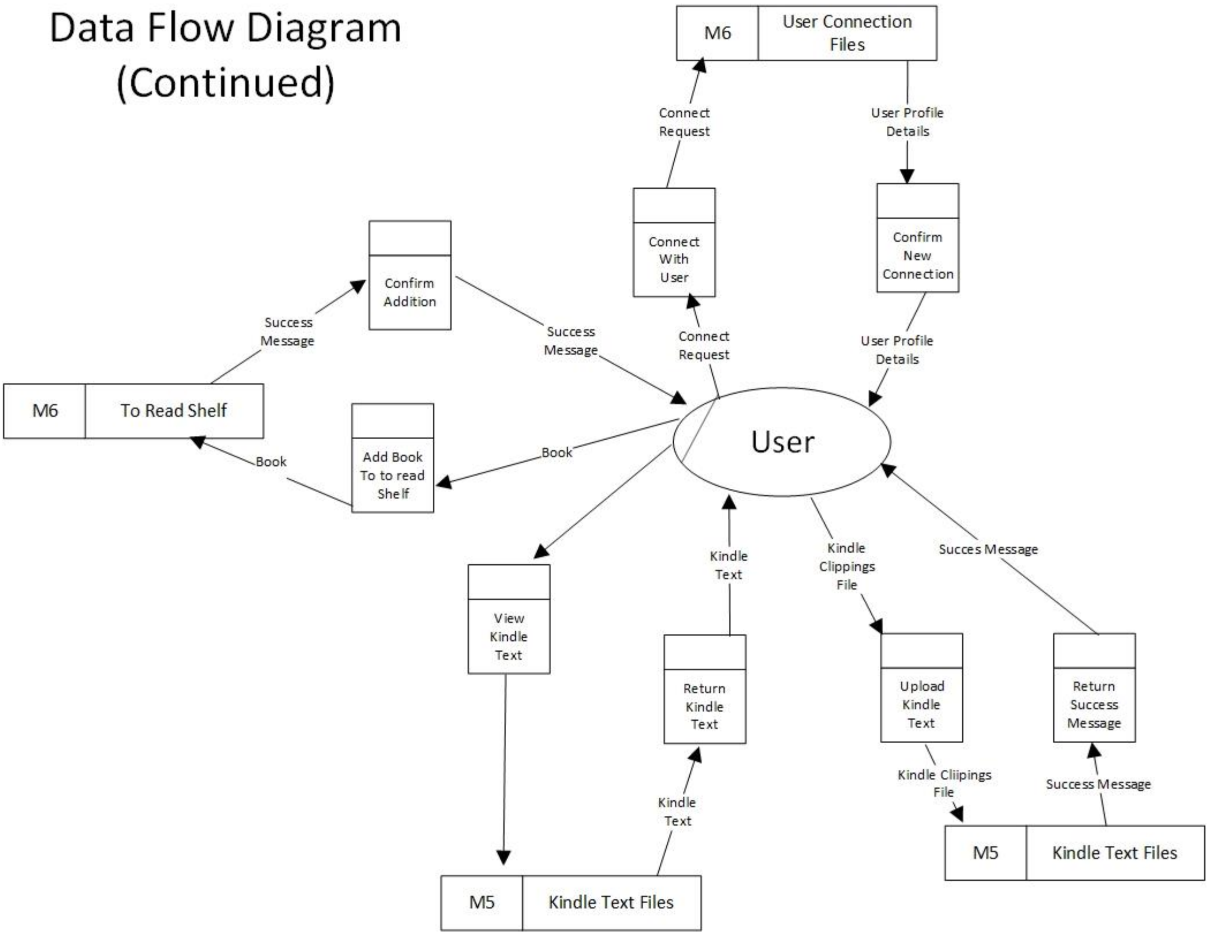
Logical Data Model



Data Flow Diagram



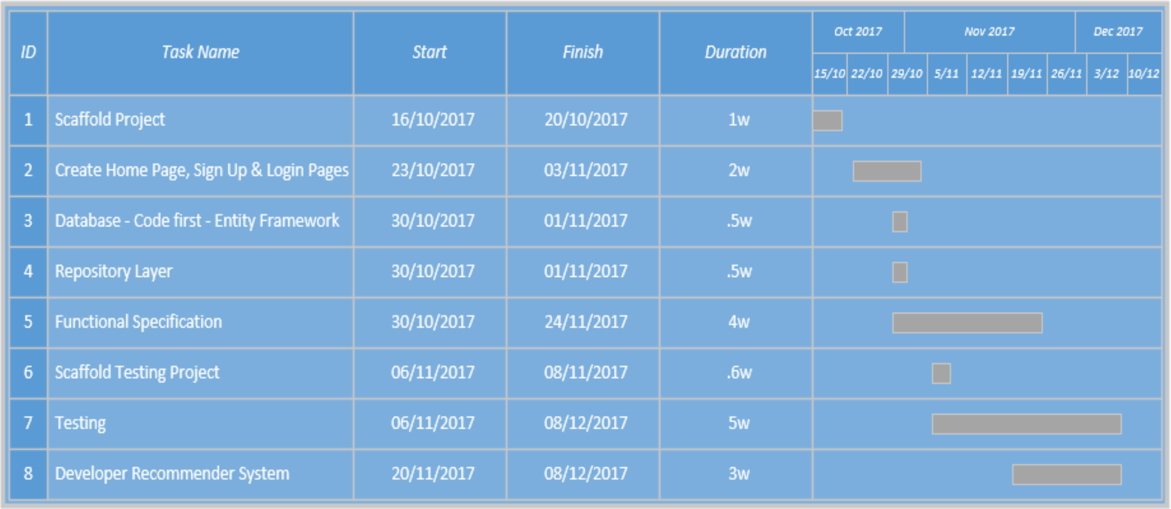
Data Flow Diagram (Continued)



6. Preliminary Schedule

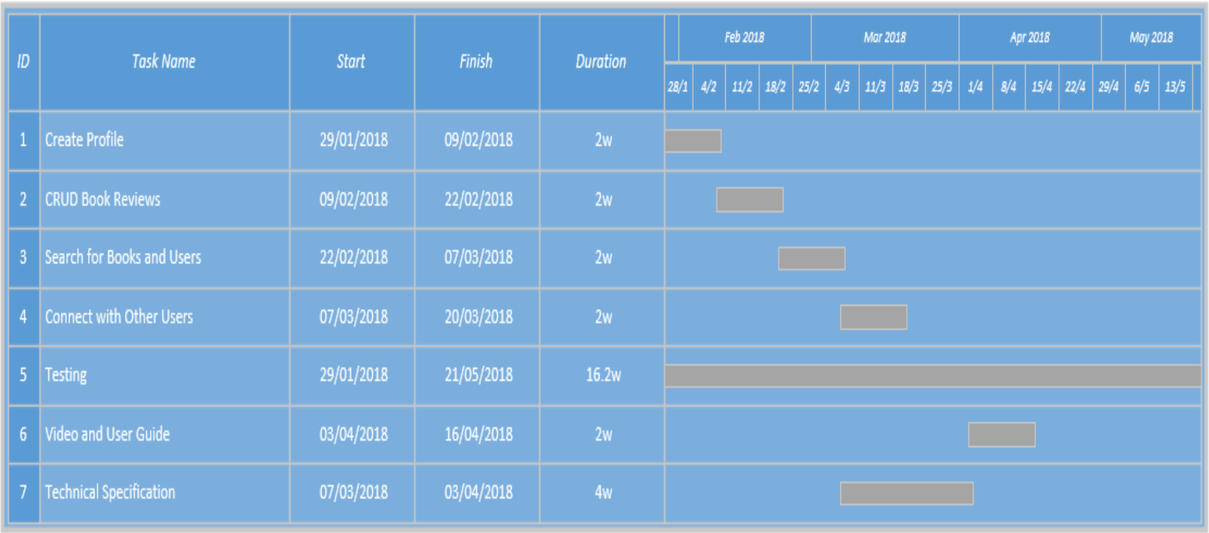
This section provides an initial version of the project plan, including the major tasks to be accomplished and their tentative start/stop dates via two Gannt charts.

Gannt Chart – Semester 1



ID	Task Name	Start	Finish	Duration
1	Scaffold Project	16/10/2017	20/10/2017	1w
2	Create Home Page, Sign Up & Login Pages	23/10/2017	03/11/2017	2w
3	Database - Code first - Entity Framework	30/10/2017	01/11/2017	.5w
4	Repository Layer	30/10/2017	01/11/2017	.5w
5	Functional Specification	30/10/2017	24/11/2017	4w
6	Scaffold Testing Project	06/11/2017	08/11/2017	.6w
7	Testing	06/11/2017	08/12/2017	5w
8	Developer Recommender System	20/11/2017	08/12/2017	3w

Gannt Chart – Semester 2



ID	Task Name	Start	Finish	Duration
1	Create Profile	29/01/2018	09/02/2018	2w
2	CRUD Book Reviews	09/02/2018	22/02/2018	2w
3	Search for Books and Users	22/02/2018	07/03/2018	2w
4	Connect with Other Users	07/03/2018	20/03/2018	2w
5	Testing	29/01/2018	21/05/2018	16.2w
6	Video and User Guide	03/04/2018	16/04/2018	2w
7	Technical Specification	07/03/2018	03/04/2018	4w

7. Appendices

[1] – Neilsen’s Heuristics
https://www.nngroup.com/articles/ten-usability-heuristics/

[2] – Schneiderman’s Principles -
https://faculty.washington.edu/jtenenbg/courses/360/f04/sessions/schneidermanGoldenRules.html

[3] – Fluent Validator
https://github.com/JeremySkinner/FluentValidation/wiki

[4] – Goodreads Kaggle Data Set
https://www.kaggle.com/zygmunt/goodbooks-10k/

[5] – Somee .Net Free Hosting
https://somee.com/FreeAspNetHosting.aspx