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| **OpenBook** |
| Problem Definition and design specifications |
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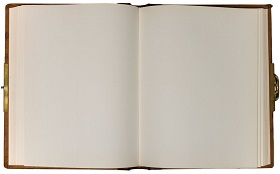
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# Problem Definition

OpenBook is an interactive 3D book. It will appear to be a “book-like” interface which displays the current page of text for the story but also a window which includes a 3d perspective of what is occurring on the current page.

It is not intended that the project will include full sequences of what is occurring, more displaying in a static or slightly animation depiction of the current happenings. There is the option of adding interaction sequences, i.e. clicking on objects in the 3d scene will for the book to change page or continue to a different page altogether. This opens the possibility of the project to be flexible enough to be a “point-and-click” style game or a “choose your own adventure” style experience.

This project will be developed in Unity for ease of access and the possibility of porting it to portable devices.

## Needs

* Display a book which is easily navigated
* Display a 3d scene for the user
* Allow custom books to be created for additional stories

### Optional Needs

* Provide capability for an animated 3d scene
* Allow objects in scene to be clicked to change page

## Objectives

* Display a book which is easily navigated
* An interface which reflects an actual book
* Easy to find buttons which reflect their purpose
* Developer can add different sized fonts, colours and styles to text
* Text is easy to read
  + Possibility of resizing text while in use
  + Possibility of changing font and colour
* Display a 3d scene for the user
* Allow easy creation of 3d scenes for book
* Allow easy changing between the scenes for each page
* Allow custom books to be created for additional stories
* Provide easy to use interface for editing books
* Provide easy method to integrate books into a project
* Provide easy method to add multiple books into a single scene

### Optional Objectives

* Provide capability for an animated 3d scene
* Add addition features for each page to have conditions and actions for each page and after pages
* Add the ability for actions to include the following possible functionality
  + Execute script
  + Move object
  + Scale object
  + Rotate object
  + Execute animation on object
  + Remove object
  + Toggle light
  + <more to be added later>
* Allow objects in scene to be clicked to change page
* Objects are made clickable in scene with simple script
* Objects can trigger
  + An action (see above)
  + Next page
  + Previous page
  + Go to page
  + Finish book
  + Restart book
  + <more to be added later>

## Boundaries

* Hardware
  + Must be low hardware requirements so it can be ported to mobile devices
  + Storage is organised so it can work cross platform
  + Project should be small in size to be portable
* Software
  + Should be capable of working on
    - Windows
    - Windows RT (Windows Store)
    - Mac OS
    - Linux
    - iOS
    - Android
    - Windows Phone
* Creative ability
  + No creative ability when writing books

# Design Specifications

## User Considerations

### Interface design

The interface is to be designed like a real book. It should be able to include the following items on a single page:

* Page text
* Page 3d scene
* Chapter title
* Previous and next buttons
* Contents page button

The interface must be easy to use despite being provide the feel of a real book. The following options should be available in the final version:

* Customisable font
* Customisable text size
* Customisable text colour
* *Customisable text background?0*

### Social and Ethical Issues

OpenBook should not include any features which require any personal information or offensive material by default. The only possible issue would be custom books including racist, sexist, etc remarks or concepts. This would have to be monitored and if included in a book, not hosting on any official site for OpenBook.

### Environmental Considerations

#### Hardware

* Low CPU requirements
* Low HDD storage requirements
* Low RAM capacity requirements
* Graphics card with DirectX 9 level

These are all to ensure OpenBook runs on multiple devices, including portable devices and web browsers. The following platforms will be available on release:

* Windows OS
* Windows RT
* Windows Phone
* *Mac OS (possible)*
* Linux OS
* iOS
* Android
* Web Browsers

#### Software

No addition software will be required.

The following OS versions are required for OpenBook:

* Windows
  + Window XP SP2 or later
* Windows RT
  + Any version
* Windows Phone
  + Any version
* *Mac OS (possible)*
  + Mac OS X "Snow Leopard" 10.6 or later
* Android
  + Android OS 2.0 or later
  + Device powered by an ARMv7 (Cortex family) CPU
* Web browsers
  + Online games run on all browsers, including IE, Firefox, Safari, and Chrome, among others.

## Developer considerations

### Modules

### Data structures

#### Book Structures

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| **Data** | **Structure** | **Description** |
| Book | Class | This object contains the chapters and all of the code required for managing chapters and the book’s name. |
| Chapter | Class | This object contains the pages and all the code required for managing the pages and the chapter’s name. |
| Page | Class | The object contains all the required data and functions to store text, room names and possible actions and their information. |
| Action | Class | This object contains the code and functions required to add conditions to run an action and then the action. |
| Condition Type | Class | Contains a set condition and parameters applicable to only that condition. For example: Timer condition has a parameter of duration which can be set to the milliseconds wanted. |
| Action Type | Class | Contains the action which will be carried out after the conditions have been met and the parameters to correspond to that action type. For example: Scale would have 3 values to correspond to **x scale**, **y scale** and **z scale** which would be applied over a **duration** at a set **speed**. |
| Chapters | Array of Chapter | Stores the multiple chapters for in the book object. |
| Pages | Array of Page | Stores the multiple pages for in the chapter object. |
| Actions | Array of Action | Stores the multiple actions for in the page object. |

#### Storage

Books will be stored as serialised book files. This is for easy save and load management of multiple books.

### List of Algorithms

* Navigating pages
  + Previous and next functions
  + Moving through chapters seamlessly
* Saving and loading books
  + Serialising the data of the book object
* Monitoring conditions to perform action
  + Checking if the page’s condition’s parameters have been met
  + Performing set actions with applicable parameters