Lab II - Product Specification Outline

CS 411W Lab II

Prototype Product Specification
For
Blackboard Archive Extractor

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1 Introduction

Blackboard is an online learning management system used by educational institutions throughout the world. Blackboard acts as a centralized online tool for managing a course. A teaching professional can provide content, such as homework assignments or notes, for students to view or download. (Blackboard, 2017). Blackboard is widely used, found at over 17,000 institutions throughout the world. (Corcoran, 2014). At ODU, Blackboard courses can only be saved for a period of two years before being exported to an archived format.

At Old Dominion University, teaching professionals are required to undergo periodic reviews. For tenured professors, these reviews occur every five years. (Old Dominion University, 2005). All course materials used since the previous review must be presented at each review. Much of this material may be stored in a Blackboard Course Archive, which cannot be automatically processed or extracted. (Pressley, 2017)

1.1 Purpose

Blackboard Archive Extractor will be an application designed to assist Old Dominion University teaching professionals in the extraction of Blackboard Course Archives. The Blackboard Archive Extractor will allow a teaching professional to provide a Blackboard Course Archive, and then produce a website as the result. The resulting website will provide all the content found within the Blackboard Course Archive. This content will be formatted in such a way that the content is readily available for review by the teaching professional's review board. The Blackboard Archive Extractor will not extract any information which was contained within other course management systems, such as the ODU Personal Learning Environment.

1.2 Scope

The primary goal of the application is to ease the process of extracting Blackboard Course Archives through automation. Dr. Zeil, an Old Dominion University Professor, originally proposed the project.

The Blackboard Archive Extractor prototype will extract Blackboard Course Archives. Blackboard offers many different content formats, such as journals and blogs. For the purposes of the prototype, only downloadable files, assignments, journal entries, and forum posts will be extracted. Additional formats may be included after the completion of the primary target formats.

1.3 Definitions, Acronyms, and Abbreviations

Blackboard: An online learning management system which allows professors to provide course material to students online.

Blackboard Archive: A zip file containing all material relating to a single Blackboard course, including material such as homework assignments and presentations. **Command Line Interface (CLI):** An interface for an application which is operated through a command line or a terminal.

Graphical User Interface (GUI): An interface for an application which provides graphical elements, such as buttons and menus for the end user.

Hypertext Markup Language (HTML): A markup language used to build the base layout and content of a webpage.

IMS Course Cartridge (IMSCC): A standardized archival format for learning management systems to use for course archives. The Blackboard Course Archive follows this format.

Learning Management System (LMS): An application or tool which allows professors to organize and manage course material for a class. This is typically an online, cloudbased application.

Old Dominion University (ODU): The University at which the Blackboard Archive Extractor is being developed.

Root Index: A webpage which acts as a directory for all material and subpages within the website.

1.4 References

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Old Dominion University. (2005, December 21). Retrieved from ODU Faculty Handbook:
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Pressley, T. R. (2017). *Lab 1 - Blackboard Archive Extractor Product Description.*

1.5 Overview

This product specification contains the description of the major components of the Blackboard Archive Extractor. This includes the architecture of the application, as well as the data structures, algorithms, and libraries that will be used in the development of the Blackboard Archive Extractor prototype.

2 General Description

The Blackboard Archive Extractor prototype will vary from the complete Blackboard Archive Extractor product in several areas. The architecture of the prototype will not be different than the architecture of the product. The prototype will not be fully featured, and will only support basic functionality compared to the full product.

2.1 Prototype Architecture Description

The Blackboard Archive Extractor will allow a user to use an interface to input a Blackboard Archive. The prototype will output the content of the archive in the format of an HTML website. After the given archive is accepted as valid input, three major phases, encompassed by two primary algorithms, occur. The linking algorithm encompasses the parsing and linking phases, and the formatting algorithm encompasses the reformatting phase.

2.2 Prototype Functional Description

The Blackboard Archive Extractor has four major components. These components are the user interface, parsing phase, linking phase, and reformatting phase. The application begins extracting the archive after the user identifies the location of the archive to extract, and the location in which to save the output website. The application then extracts the archive file, and begins interpreting the information contained in the archive. The parsing phase is the first step to interpreting the information. Each Blackboard Archive contains a manifest file, describing the contents and purpose of the various resource files found within the archive. The parsing phase

processes this manifest file to build associations between Blackboard course content, and the resource files found within the archive.

After a resource is found in the manifest file, the linking phase begins on that element's associated resource file(s). During this phase, the application creates a "content node" which acts as a representation of the content associated with the resource. A node may contain information such as a homework assignment, or a pdf file. The node is linked to a parent "type node", which is simply a reference to the type of content (i.e. homework assignment, pdf, forum post). A "root node" holds all the type nodes, creating a tree structure which can be easily be traversed to build the output website. Figure 2.2 contains an example of this tree structure.

During the reformatting phase, the tree structure built during the parsing and linking phases is traversed. Each node in the tree is turned into a webpage. The root node builds the "root index", which lists all content types found within the archive. The type nodes are used to build type pages, which index all content of a type. For example, the "homework" type page would list all homework assignments found in the archive. Figure 2.1 shows the relationship between all of the phases of the Blackboard Archive Extractor.
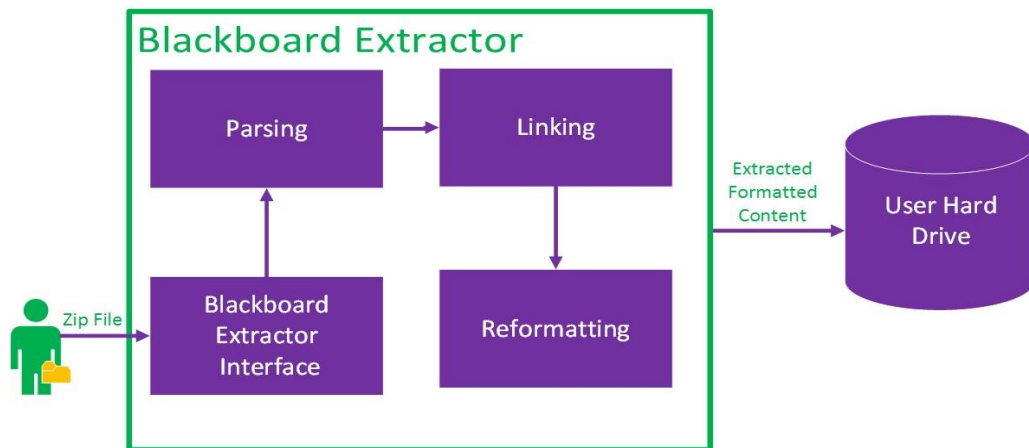

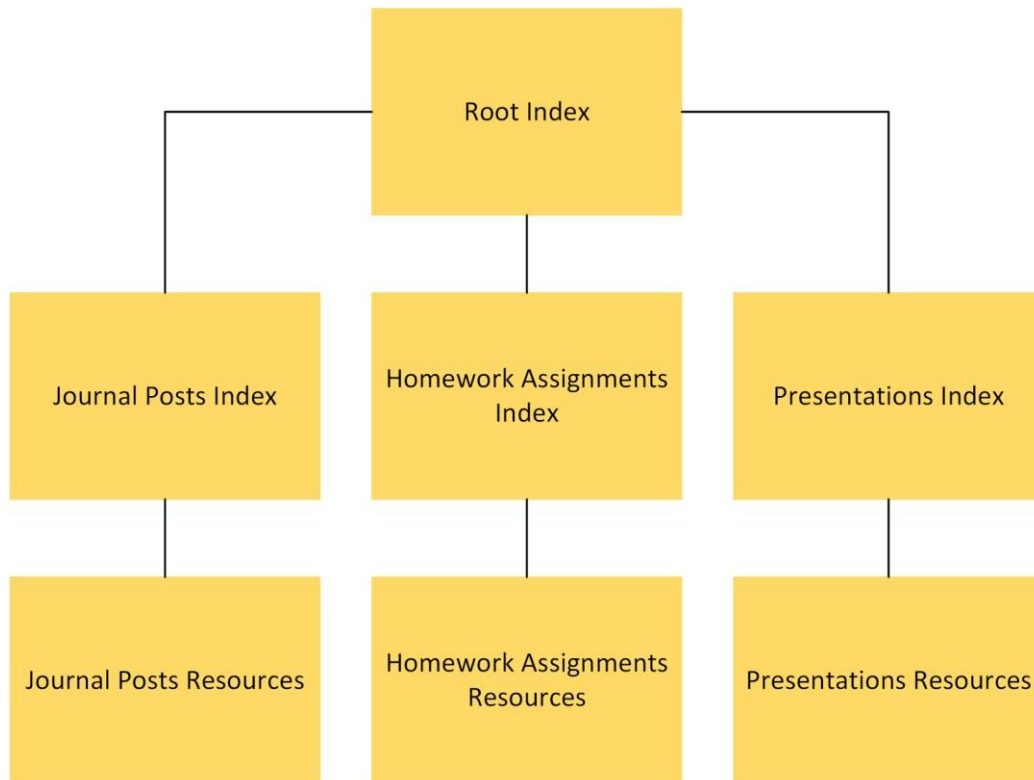**Figure 2.1 Major Functional Components (Pressley, 2017)**

Figure 2.2 Content Tree Structure (Pressley, 2017)

2.3 External Interfaces

The only external interfaces provided by the application will be user interfaces. The user interfaces will be both a command-line interface and a graphical user interface.

2.3.1 User Interfaces

The application has two primary interfaces. The command line interface is used whenever the application is provided with two valid command-line arguments. When the user does not use the command-line arguments, the application will open with a graphical user interface (GUI). The GUI will contain three controls. The first control will allow the user to specify the location of a Blackboard Archive to extract. The location can be specified manually, or through a drag-and-drop method. The second control will allow the user to specify the location in which to save the resulting HTML website. The final control will be a confirmation button to begin the process of extracting the Blackboard Archive.