People and Families of the Bible

By:

Nathan Friedly

A Proposal Submitted to
the Faculty of the Information Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Technology

University of Cincinnati
College of Applied Science

May 2010

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People and Families of the Bible

Abstract

People and Families of the Bible is a Web Site for viewing information about the people who are recorded in the bible. It shows the ancestry of an individual in the structure of a family tree, a list of verses where the person is mentioned, sex, name changes, and other information about each person. The family trees are generated based on the information in the database and can be easily navigated by clicking on different individuals. The entire Web Site can also be accessed via the search interface. The search engine intelligently recognizes both verse references and names. If a verse reference is supplied it limits the search according to that reference. If a name is supplied it takes the visitor directly to the person's page or a disambiguation page if two or more people share the name. Search results show the sought after terms in highlighted in the results and when a name appears in the text of a verse, an in text link is provided to their page. Links are subtly colored according to the person's sex. The administration side of the Web Site eases data entry by automatically suggesting possible parents and verses where a person is mentioned. The Web Site is built with the Ruby on Rails framework and SQLite database.

Introduction

The Bible has a wealth of information on individuals and families which is not always easy to access and understand. Researching a person and especially a family often involves a concordance or computer, written notes, and a large investment of time. In this endeavor several issues present themselves such as when several people have the same name or the name of an individual changes. For example, a researcher could find Abraham's children, Esau and Isaac, mentioned in Genesis 25:9, but he or she would not find any mention of Abraham's parents. This is because he was named Abram when he was born (Gen 11:26) and later had his name changed. (Gen 17:5) (1 pp 17, 23, 35)

I have sought after a tool to ease my own research in this area for a long time but without success. This is why I decided to build it myself. This tool is a website / database that includes a search feature and pages for individual people and family lines named in the Bible. Anywhere a verse is displayed on the site, names and families will be clickable links that take to viewer to the appropriate page. The Web Site released at the end of Senior Design does not have an exhaustive database; however, I intent to complete that database in time.

Problem Definition

It is difficult to follow people and family lines through the Bible. Reasons for this include name changes and spelling issues, as well as the lack of clearly delineated family trees.

There are one or two reference books that could be used to study the people and families of the bible, but they are large and heavy and do not have the speed and accessibility of a computerized system. (4)(5) There are numerous websites devoted to biblical research, but I have not found a

single one that meets this need. The closest resource I have found was a list of people with a short description for most of them; however, this website did not have a search feature or information concerning their lineage or the possible name changes and variations in the spelling of their name. (10)

People are certainly looking online for information regarding the people and families of biblical times. There are over 300 million results in Google for '"who is *" Bible'. (12) However, the results in Google vary in quality.

A tool that could be easily found via search engines and also easily referenced in online communication would be optimal.

Examples

Quite a few difficulties can be encountered while endeavoring to research the Bible. Here are just a few of the obstacles one might encounter.

- The name Melchizedek is spelled differently in the book of Hebrews than anywhere else in the Bible.

  > **Psalms 110:4** The LORD hath sworn, and will not repent, Thou art a priest for ever after the order of Melchizedek. (1 p. 832)
  >
  > **Hebrews 7:17** For he testifieth, Thou art a priest for ever after the order of Melchisedec. (1 p. 1833)

  Even most computerized Bible tools will not catch this in a search.

- There are at least two different people named "Joseph" (1 pp. 43, 1308)

- Genesis chapter 5, eleven generations are named, however the reader must look elsewhere to find the names of the rest of the children for each generation except the last. (1 pp. 10-11)
- In Judges 16:3, Samson fulfilled a promise that was made to Abraham in Genesis 22:17. However the fact that they are related is not immediately available, a reader would need to spend some time researching the family ancestry written elsewhere. (1 pp. 31, 348)

Solution Description

A database to organize the information and a web interface to access it is the optimal solution for this problem. The website allows for rapid searching and viewing of the information in an organized and consistent format. It also contains an administration section to manage the database.

Because it is made available in the form of a Web Site the information will be accessible from anywhere in the world. This allows all users to locate the information via third party sources such as Google or other Web Sites in addition to directly using the search feature.

Design and Layout

The entire Web Site was planned with mockups before I began any development. I planned to have a fairly simple design and layout; the color scheme would primarily consist of black, white, and shades of blue. Most links would be blue, but links to People and Family pages would be colored in purple and orange respectively.

The homepage would consist of a search box and a short introduction to the site. Figure 1 shows the original mockup of this:

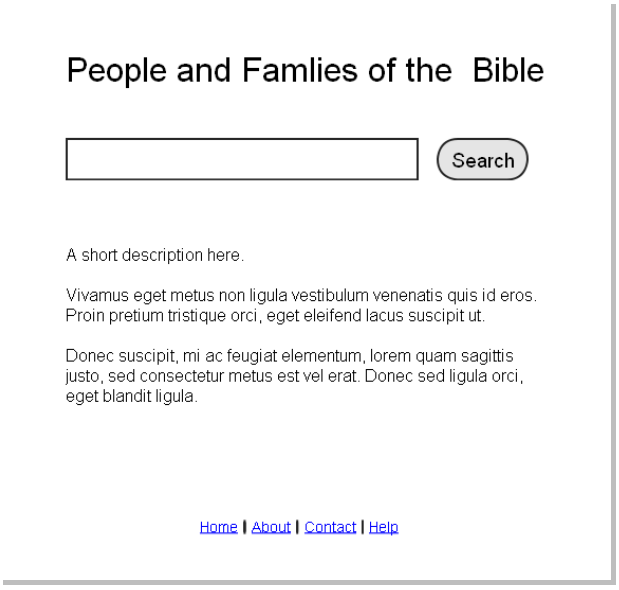


Figure 1: Homepage Mockup

Figure 2 shows the mockup for the search results page. This was planned to be a list of verses that contain the searched keywords. Within the verses, the keywords would be in boldface and any individuals or families linked to their page. The pagination at the bottom of the search results would show the chapter and verse references shown on each page. (Pagination is the interface used for navigating through search results or any other dataset that is too large to fit on a single page.)

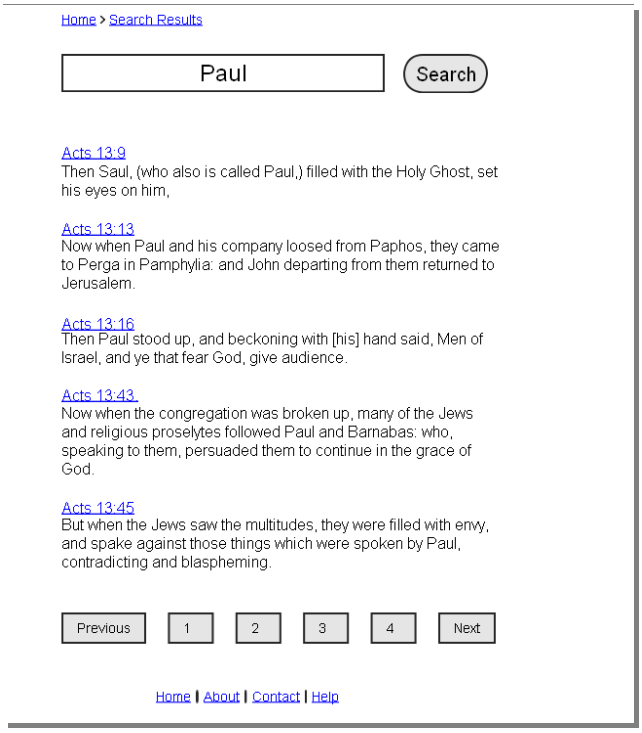


Figure 2: Search Results Mockup

The pages for families would contain a family tree with each name linked to the appropriate individual, as well as a description of the family. Figure 3 shows the mockup I made for a family tree page.

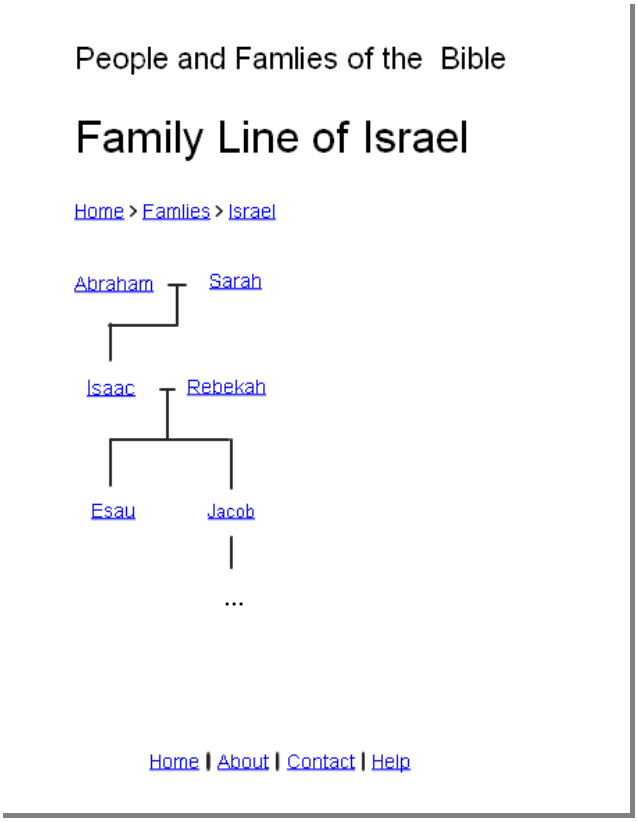


Figure 3: Family View Mockup

I planned to have separate pages for individual people to display their name, direct family, description, and verses. The direct family tree would be similar to the family tree from the family page, and the verses will be displayed and paginated similar to the search results. I later decided to combine these two pages after testing showed that it would be much easier to navigate.

Search Functionality

I planned to have an intelligent search engine where if the keywords given are recognized as a person or family, the Web Site will take the user directly to the appropriate page. Otherwise, the Bible will be searched for the keyword. This is similar to how the search feature works on Wikipedia.

On a Bible search, the user may use the keyword “IN” followed by a book of the Bible, for example “Paul IN Acts”, and the search is restricted to that book of the Bible.

Searches for specific books return the appropriate passage.

User Profile

Users

The intended user includes nearly any person who is looking to research the Bible. The users may be of any age and nearly any level of IT literacy. The user must be capable of using a computer and web browser but is not expected to understand significantly more than this. In short, if a user is able to understand Google, they should be able to use this Web Site.

Administrators

Administrators will be given a somewhat more advanced interface, but the site is still straightforward and understandable.

Administrators are able to add new people and families by entering their name or names, relationships, a short description of their life, and a list of verses where each person is mentioned. After a name is entered, the Web Site automatically suggests a list of verses containing that name.

I am currently the only administrative user.

Design Protocols

The Web Site code is organized, documented, tested, and compliant through the use of various architecture patterns, code commenting, version control, and testing tools. It is hosted on a remote server and accessible at http://biblepeople.info.

Organization

Ruby on Rails uses a Model–View–Controller (MVC) architecture where all database interactions are handled in the models, user interfaces are defined in the views, and controllers connect these two and perform any business logic necessary. (2 p. 351) This architecture and many other Ruby on Rails conventions were adopted for the entire codebase.

Compliancy

The Web Site contains valid HTML and CSS code and complies with the Americans with Disabilities Act of 1990 (ADA Compliant). The validators at w3.org were be used to check the HTML and CSS code.

Documentation

Each class and function in the code is preceded with a comment describing its use and purpose. Complex sections and non-obvious variables are also commented.

Additionally, a “getting started” section is presented to the users on the home page which provides instructions for basic and advanced usage of the Web Site.

Unit Testing

Rails includes a unit testing framework which allows a developer to specify what the code should do and then run the tests later to ensure that nothing was broken during the development of a different part of the application. I put this framework to use, running it after development iterations to catch any potential mistakes or regressions. (A regression is where something that previously worked stops working. Without unit testing, these errors are often overlooked because they were found to be functional in previous tests.) (3 pp. 568-570)

Usage testing

I sat down with two different people and observed them using the site, then asked a series of questions afterwards to gain additional feedback. I made several changes to the Web Site based on the results of these tests, including a search box at the top and several bug fixes. Appendix 1 gives the results of these tests.

I also personally browsed through the site as both a visitor and an administrator and made many changes based on what felt more natural and straightforward. One of the largest changes I made was combining the people and family pages together because I found it time consuming and annoying to navigate back and forth between the two constantly.

Versioning

I made heavy use of the Git version control system both to keep a record of the development process and allow for simple rollbacks in the case of regressions. I used the rollback feature on several occasions during development. Appendix 2 gives a summary of the development history.

Database

The database contains the complete text of the King James Bible. (9) Other translations may possibly be added at a later date. The database also has tables for the individuals, as well as alternate spellings of names or name changes. Foreign keys and junction tables help to link to data and ensure integrity. Figure 4 shows a diagram of the database structure.

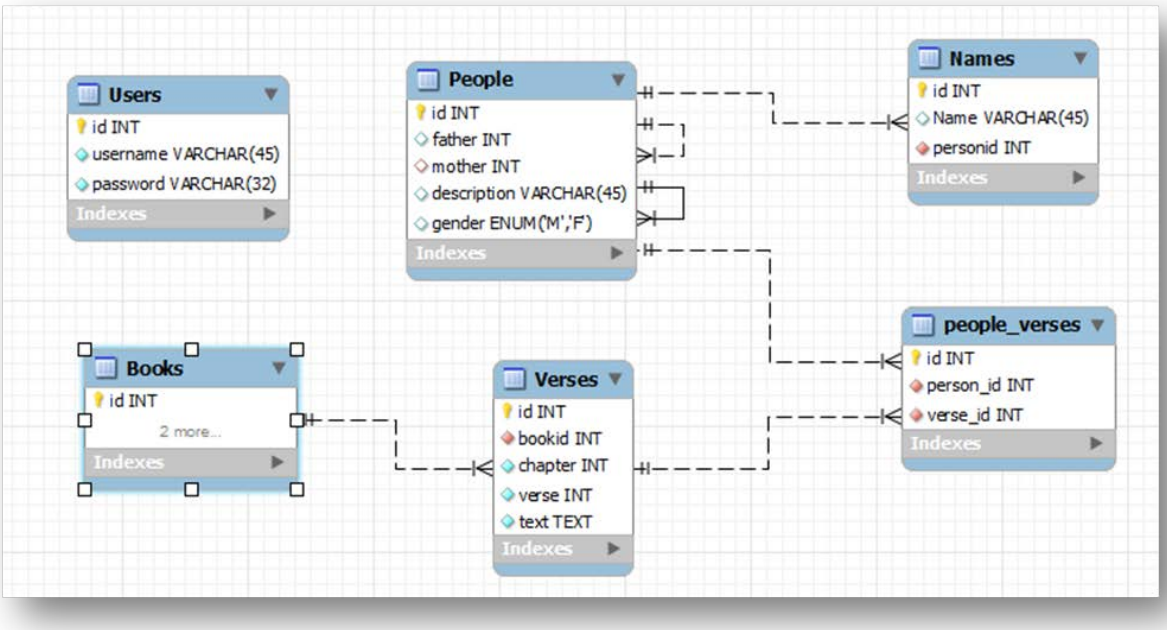


Figure 4: Database diagram

Deliverables

- Live website with:
    - Pages for viewing people, families, scriptures
    - Complete King James text of the bible
    - Database of at least 50 names and 5 families

    - Search Feature capable of finding:
        - People
        - Keywords anywhere in the bible
        - Keywords with the search limited to a single book of the Bible
    - Automatic disambiguation pages when two or more people share a name
    - Admin feature for adding additional names and families
- Documentation
    - Revision history
    - Testing

Design and Development

Software

The Web Server runs the Apache HTTP Server on top of Debian Linux. It also has Ruby on Rails and Phusion Passenger installed. Phusion Passenger is a module for Apache for deployment of Rails applications.

I used the SciTE tool included with Ruby as a lightweight development environment.

Ruby on Rails

The code was written using the Ruby on Rails framework (this is often shortened to Rails or RoR) and the Ruby programming language.

Ruby is a dynamic, object-oriented, reflective programming language. Nearly everything in the language can be modified at runtime. (8) Although it is a general purpose programming

language, it is most commonly used for Web Sites in conjunction with the Rails framework. (2 p. 351)

Rails is an open source framework built on top of Ruby. It is geared at agile/rapid development and emphasizes “convention over configuration”, allowing the developer to focus on only the unique part of their application. (2 p. 351)

Budget for Hardware and Services

The Web Site is hosted at DreamHost which negates any hardware costs. The server hardware is not advertised on their website, but probing the hardware via the command line revealed the following configuration:

Intel® Xeon E5405 2 Ghz Quad-core Processor

16 Gb RAM

3.8 Gb Hard Drive

5.3 Tb Network Attached Storage (NAS)

Item	Retail Cost	Incurred Cost
DreamHost hosting service (Yearly Cost) (11)	$ 131.40	$ 0.00
Domain Name (Yearly Cost)	9.95	9.95
Total	$ 141.35	$ 9.95

Table 1: Hardware and Services budget

Budget for Software

The Web Site will employ entirely open-source products. Any necessary licensing fees are included in the hosting cost above.

Item	Retail Cost	Incurred Cost
Debian GNU/Linux 4.0 (etch)	$ 0.00	$ 0.00
Apache	0.00	0.00
Ruby 2.3.4	0.00	0.00
Rails 1.8.7	0.00	0.00
Phusion Passenger 2.2.5	0.00	0.00
SQLite 2.8.17	0.00	0.00
Total	$ 0.00	$ 0.00

Table 2: Software Budget

Timeline

Development of the project will span the entire 3 quarters of Senior Design. The primary milestones are:

- **Individual and Family views & overall design** – Develop an overall style and write HTML and CSS code for each page of the Web Site. The RoR code to display these pages will also be written in this milestone.

- **Search Functionality** – The basic keyword search feature will be developed and then expanded to cover the more advanced features such as jumping directly to pages or searching within verses.

- **Administration Functionality** – Adding and defining of people and families.

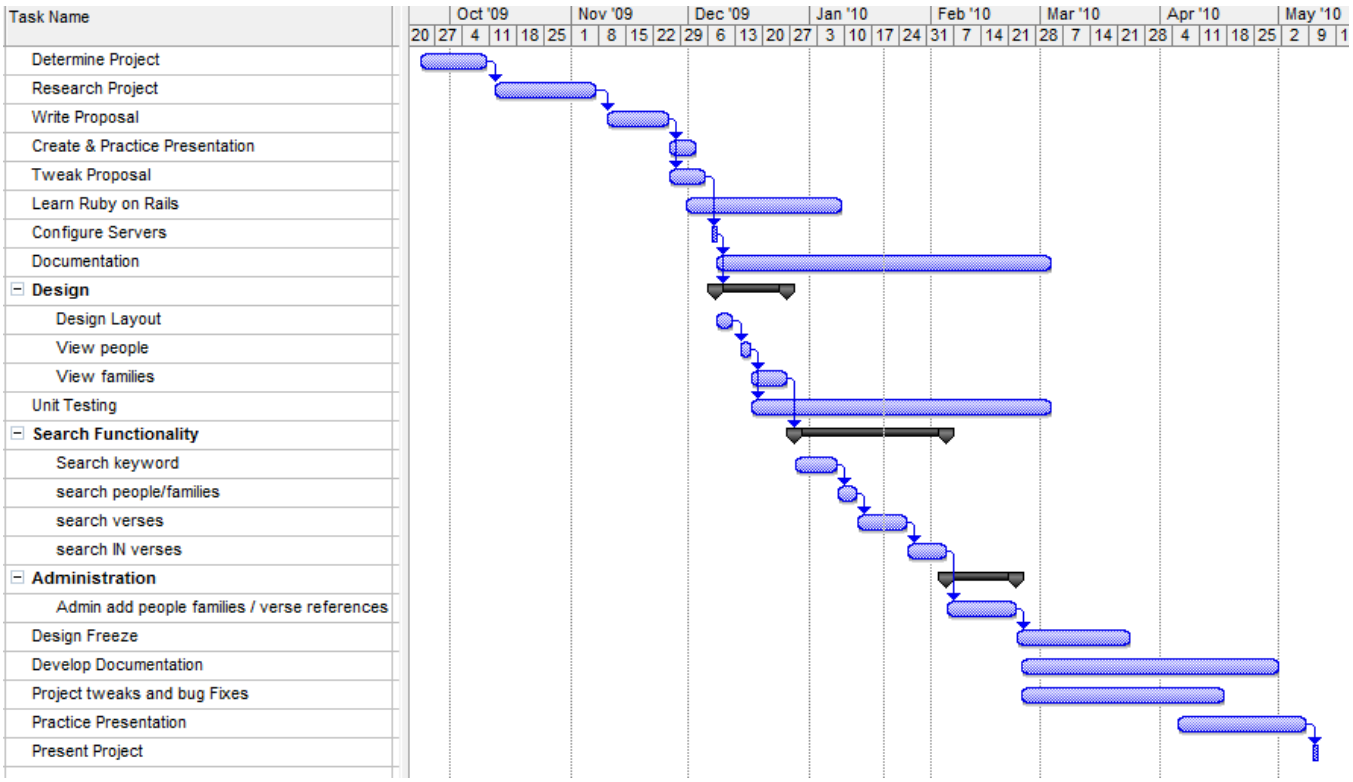


Figure 5: Project Timeline

Proof of Design

The home page, shown in Figure 6, presents the user with a search form and some basic instructions on how to use the site.

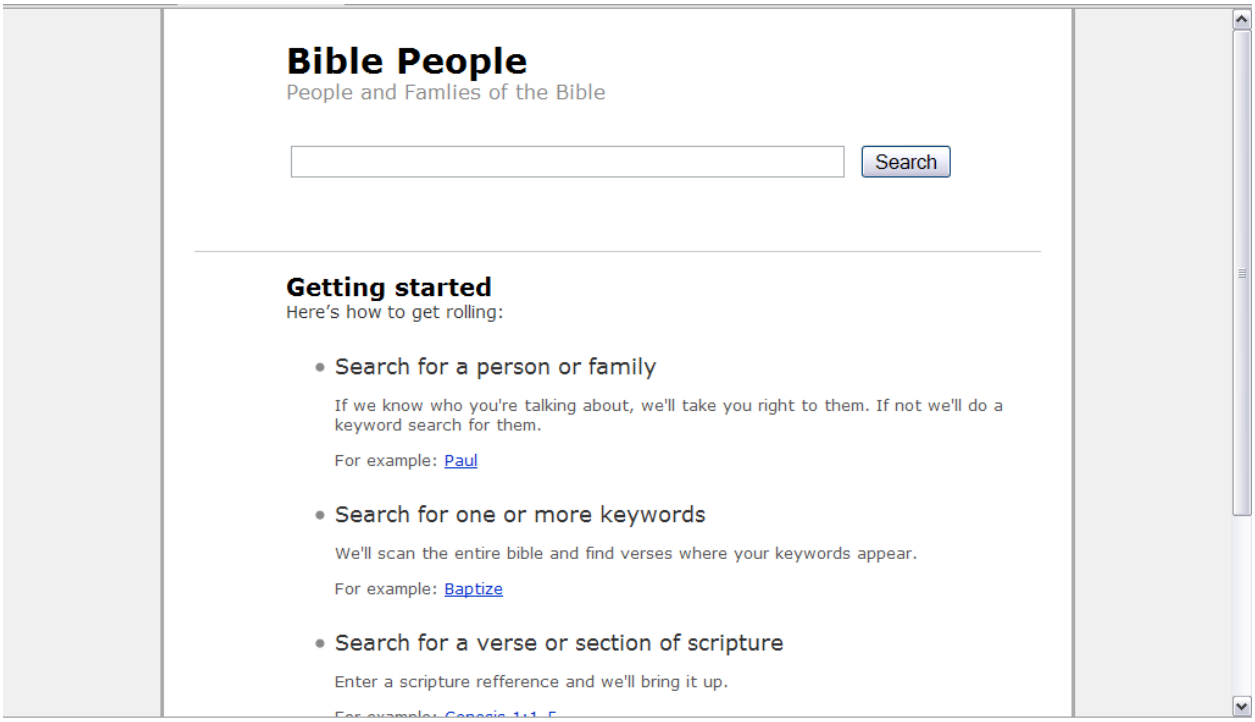


Figure 6: Home Page

The site name is clearly displayed and the search box is the primary focus of the page.

The instructions cover a variety of usages of the search engine from simple to advanced, and each includes clickable example searches.

Also on the home page, but not visible in the screen shot, are links at the footer for visitors to see a list of people in the bible defined within the site and a log in to the site for administrators. The footer is consistent across the entire site. Logged in administrators have additional links in the footer for the various administration functions, and the log in link is replaced with a log out link.

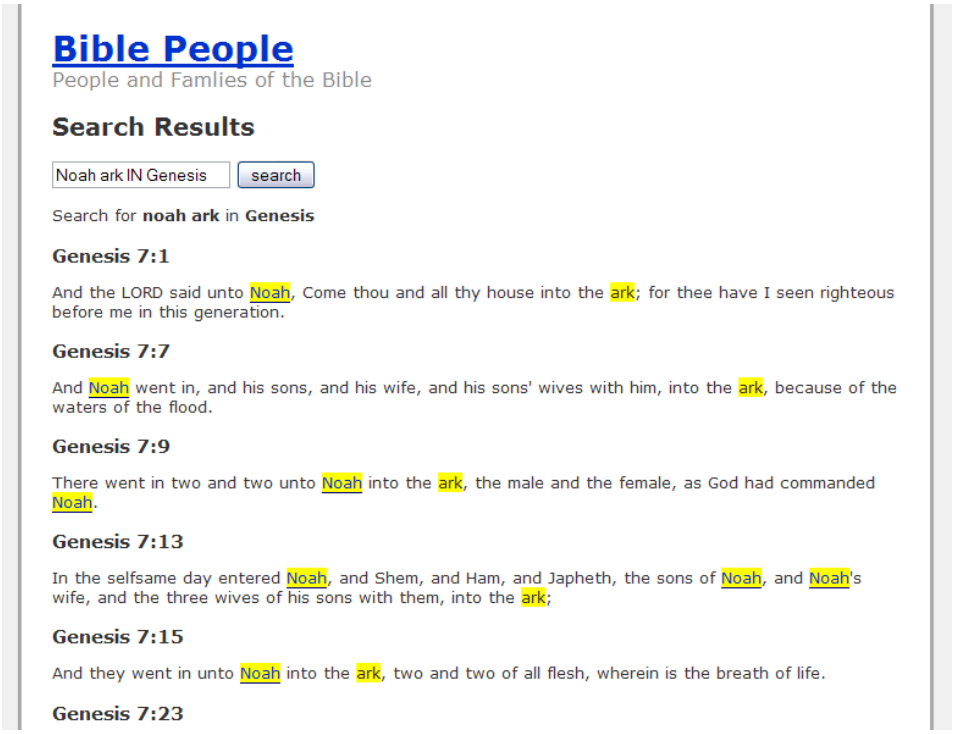


Figure 7: Search Results

The Search Results show in Figure 7 present a list of verses where the keyword appeared with the keyword highlighted.

Any people mentioned in those verses have their names linked to their page. These links indicate the sex of the user in the color of the underline. (This is more clearly shown in Figure 13.)

Figure 8: Pagination

Searches that bring more than 20 results are automatically paginated, as shown in Figure 8. The current page is plain text, not a clickable link and the number of additional links is limited. Links

to the previous, next, first two, last two, and several pages near the current page are given. The previously mentioned footer links are also visible in Figure 8.

Figure 9: Disambiguation page

If a known name is entered into the search form, the visitor will be taken directly to that person's page. If more than one person shares the name, a disambiguation page will be given instead. The disambiguation page gives a little bit of information about each person sharing the name, including their direct family and the first verse in the bible where they are mentioned.

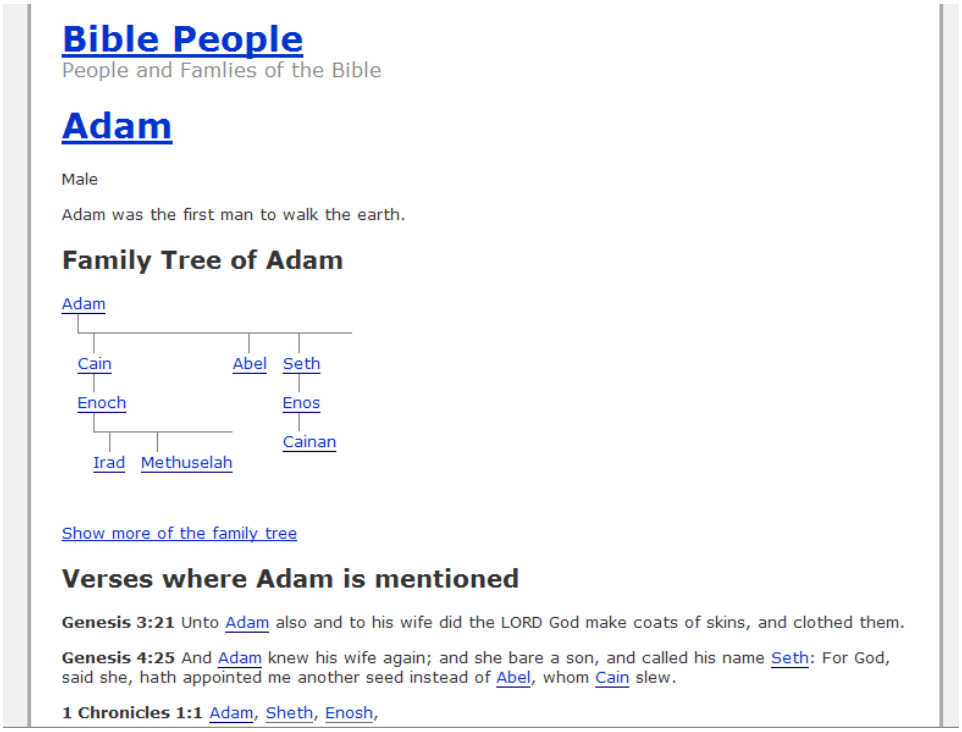


Figure 10: Person View

Clicking on a name in the search results will present the visitor with a page showing all of the known information about that person, including a limited family tree and a partial list of verses where the person is mentioned. Figure 10 is an example of this. Both the family tree and the list of verses have “show more” links that can be clicked to expand their respective portion of the page.

Information shown includes the person’s name or names, sex, parents, children, and a short description. Information that is not in the database is omitted from the page.

Just as in the search results, clicking a name in the family tree or verse list will take the visitor to the page for that person.

Figure 11: Administrator Login

Figure 11 shows the administrator login page necessary to access the administrative portions of the website.

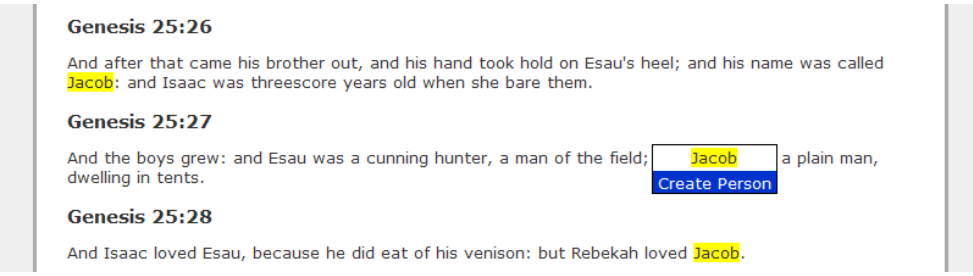


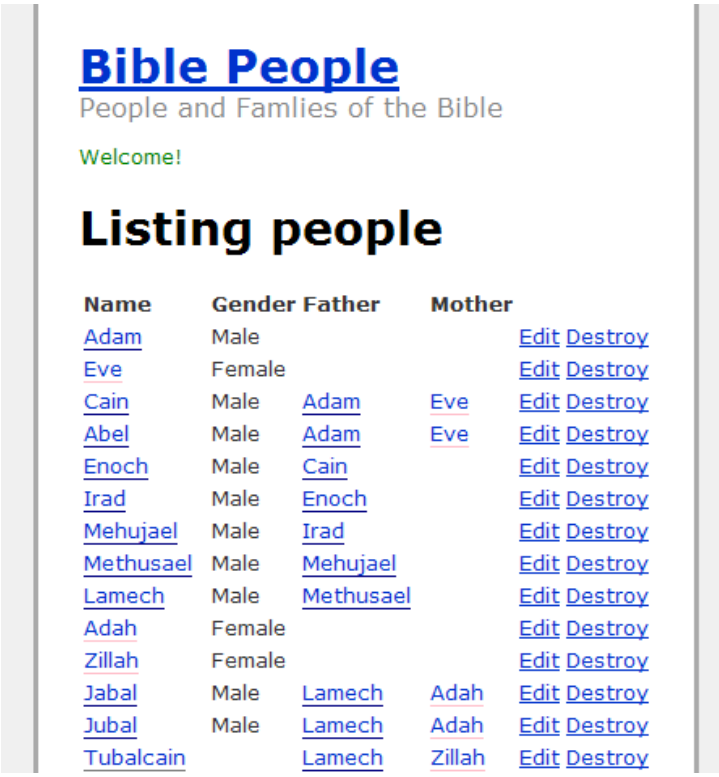
Figure 12: Create a New Person from a Search Result

Logged in administrators have the ability to click on a name in a search result or verse listing and create a person from that name, as shown in Figure 12. When a name (or any unrecognized word) is clicked, a popup menu appears with the option to create a person from the clicked word. Clicking on the Create Person link takes the administrator to the page shown in Figure 13.

Figure 13: Creating a new person

When creating a new person, as shown in Figure 13, the administrator can specify the name or names, sex, parents, a description, and a list of verses where the person is mentioned. An autocomplete suggests known people for each parent and does not suggest women for the father or men for the mother.

If the administrator clicks “Add” beneath the Name input, an additional name input appears. For each name listed, a search is automatically preformed and the results are appended via AJAX. In these results, the administrator can specify in which verses the person appears, or just check the “All” checkbox to select all verses in which the person’s name appears.



Bible People

People and Famlies of the Bible

Welcome!

Listing people

Name	Gender	Father	Mother	
Adam	Male			Edit Destroy
Eve	Female			Edit Destroy
Cain	Male	Adam	Eve	Edit Destroy
Abel	Male	Adam	Eve	Edit Destroy
Enoch	Male	Cain		Edit Destroy
Irad	Male	Enoch		Edit Destroy
Mehujael	Male	Irad		Edit Destroy
Methusael	Male	Mehujael		Edit Destroy
Lamech	Male	Methusael		Edit Destroy
Adah	Female			Edit Destroy
Zillah	Female			Edit Destroy
Jabal	Male	Lamech	Adah	Edit Destroy
Jubal	Male	Lamech	Adah	Edit Destroy
Tubalcain		Lamech	Zillah	Edit Destroy

Figure 14: List of Known People

Figure 14 shows the list of known people and some basic information about them. The underline color of the links indicates the sex of the person: Navy blue indicates a man, pink indicates a woman, and gray indicates that the sex is unknown. The list is shown without the “Edit” and “Destroy” for unauthenticated users.

Listing names

Name	Person	
Adam	6	Show Edit Destroy
Eve	7	Show Edit Destroy
Cain	8	Show Edit Destroy
Abel	9	Show Edit Destroy
Enoch	10	Show Edit Destroy
Irad	11	Show Edit Destroy
Mehujael	12	Show Edit Destroy

Figure 15: Names Administration

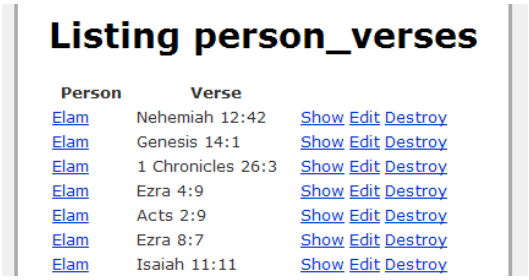


Figure 16: Linking Administration

Figure 15 and Figure 16 show additional administrative controls to manage the list of names and which people are linked to in which verses.

Conclusion

A review of the project shows that I have fulfilled all deliverables. User testing has shown that the People and Families of the Bible website meets the need of its' users and creates a new electric reference resource. Although the database is not complete, I would recommend using what data is already in place to someone who wants to research the Bible.

I plan to continue filling in the database and hope to have an exhaustive resource within 2-3 years. I may consider bringing on additional administrative users to assist me in this goal.

This was an engaging project where I learned a new programming language and framework and I look forward to the completion of its exhaustive database.

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Appendix 1: User Testing Results

Usability Test 1: Daniel Johnson

Is the site's purpose readily apparent?

Somewhat, but it appears to be more search-oriented than people oriented.

Was anything confusing / frustrating?

The "IN" keyword must be capitalized

Were you able to look someone up?

Yes

Any recommendations?

- Include other translations, or at least name spellings from other translations

- Include some form of spell check / search suggestions

- Accept the "OR" keyword

- Search for phrases in quotes"

- Allow "s" on the end of words

- Accept complete verse references

- Hyphens in names don't work

- Fix css issue in family tree

Anything you liked specifically?

- Family trees

- Linked names

- Multiple spellings

- Search engine, aside from issues

Is the site enjoyable to use over all?

- It shows promise.

Usability Test 2: Erin Friedly

Is the site's purpose readily apparent?

Yes.

Was anything confusing / frustrating?

- I would like to see a search box on each page, and

- I would like to see the marriage relationships of both men and women.

- Combined search icon (person + magnifying lens) is confusing.

    - (Follow up with magnifying lens only): Icon is redundant

Were you able to look someone up?

Yes.

Any recommendations?

Previously mentioned frustrations. Also, you should sell the idea.

Anything you liked specifically?

The site was easy to navigate and wasn't cluttered.

Is the site enjoyable to use over all?

Yes.

Appendix 2: Revision History

This is a list of all of the commits made to the Git Version Control System. Generally a commit was made after a portion of code was completed and tested. More time between commits generally indicates that more work was done.

This information is also available online at

http://github.com/nfriedly/BiblePeople/commits/master

2010-05-03 15:10:53 Major bugfix update: verse linking does not re-link a word, person.linkName will only use one of their names if they have more than one, or an id if they share a name with someone else, disambiguation pages now automatically appear when people share a name

2010-05-03 15:10:53 added search => person's page feature and modified pages to allow people to be identified by name

2010-05-03 15:10:53 added basic framework for keyword redirects. (does not actually work yet)

2010-05-03 15:10:53 Fixed highlighted search terms regression

2010-05-03 15:10:53 added verses display to people view

2010-05-03 15:10:53 combined person and family-tree views, improved verse-people linking, colored people link's underline by sex

2010-05-03 15:10:53 linked people in verse references

2010-05-03 15:10:53 interface tweaks, js to add multiple names

2010-05-03 15:10:53 added footer links and removed new/edit/delete person links for unauth'd users

2010-05-03 15:10:53 tweaked family trees, disabled javascript clicker on non-search pages

2010-05-03 15:10:53 finished parent aurocomplete, added authentication, started family trees, several small bugfixes

2010-05-03 15:10:53 added sex, started code for parent autocompletes (2)

2010-05-03 15:10:53 added sex, started code for parent autocompletes

2010-05-03 15:10:53 saving & displaying person names now works

2010-05-03 15:10:53 testing person-name relationship (might not work)

2010-05-03 15:10:53 built people models, modified layout, started admin js

2010-05-03 15:10:53 added temporary workaround for invalid references being used

2010-05-03 15:10:53 reference and search models added, basic search IN reference working

2010-05-03 15:10:53 added log/* to .gitignore

2010-05-03 15:10:53 added support for multi-term search

2010-05-03 15:10:53 basic search functionality + pagination

2010-05-03 15:10:53 merged conflicting .gitignorefiles

2010-05-03 15:10:53 home page styles and help

2010-05-03 15:10:53 Added bible to dev database, basic verses view working

2010-05-03 15:10:53 Initial commit - ruby on rails core