

IFT 402

Information Technology Capstone II

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Systems Analysis & Design Document

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Introduction

This paper is an accumulation of all papers written for IFT 401 with additions, revisions, and recommendations from Dr. Walsh. Sections have been removed and added as this is not intended to simply be every IFT 401 milestone pasted together. I have included much of the same milestone work as presented in prior blocks; however, additions have been made to meet the extra requirements of the IFT 402 version of the document. This paper is a complete system analysis and design document largely completed in IFT 401 with improved work and additional components completed for IFT 402 requirements.

Project Charter Core

Project Concept

This project is aimed at self-promotion and portfolio creation. The website will serve as a dynamic online resume for future projects and give employers an idea of what I am able to accomplish. The idea is to create the website from scratch in code that I write myself. Dr. Walsh offered the idea of creating a dynamic resume which I have incorporated into the project design extensively and will be the focus of the website.

Problem Statement

My website is outdated, currently unusable for anything, and a poor display of my ability.

Technology Solution

My technology solution is a website that can be used as a resume to display skills to employers.

Project Benefits

- An interested party visits the website and gets a clear understanding of my professional ability in terms of coding ability, accomplishments, and presentation decisions.
- Accumulates knowledge from various Arizona State University courses and combines it into one clear vision and final product.
- Creates an online presence and resume.
- Displays commitment to project completion and level of execution.

Stakeholders

- I am a stakeholder. The main goal of this website is to promote myself and to provide a resume showcasing my ability.
- Arizona State University wishes for student success. Having an online resume display accumulated knowledge from the courses provided at the University will have a good impact on the student and show what ASU has to offer.
- Recruiters who wish to see skills displayed by a candidate.

Process

I plan to use the Agile Scrum Sprint framework. As Drumond (2021) describes, this Agile framework uses “a product backlog” (the design analysis paper), “a sprint backlog” (a plan for each build) and “an increment which is the goal of the sprint” shown in a build video and presentation. This development life cycle naturally fits into the requirements and timeline of the course while also being an effective tool for the development of a product. This life cycle allows one to adapt as obstacles or better practices are discovered which can create a product feasible in the short amount of time given. Instead of having a daily scrum meeting with the team, I will record my individual progress and obstacles which can be used at the end of the cycle to help create the build video at the end of the sprint. Everything in the paper will ideally be delivered as described; however, if complications arise the individual increment goals can be adjusted to deliver an iteratively developed product at some stage of development where each stage is usable.

Requirements

Business Process Map

The business process map shows 4 major functions in each swim lane labeled at the top. These major functions determine the flow of data and user interaction with the website as outlined below. Important notes are that frontend is considered everything the user sees and interacts with. This aligns with the requirements of user registration and navigation. Backend is everything that happens behind the scenes, like database management and table form formatting.

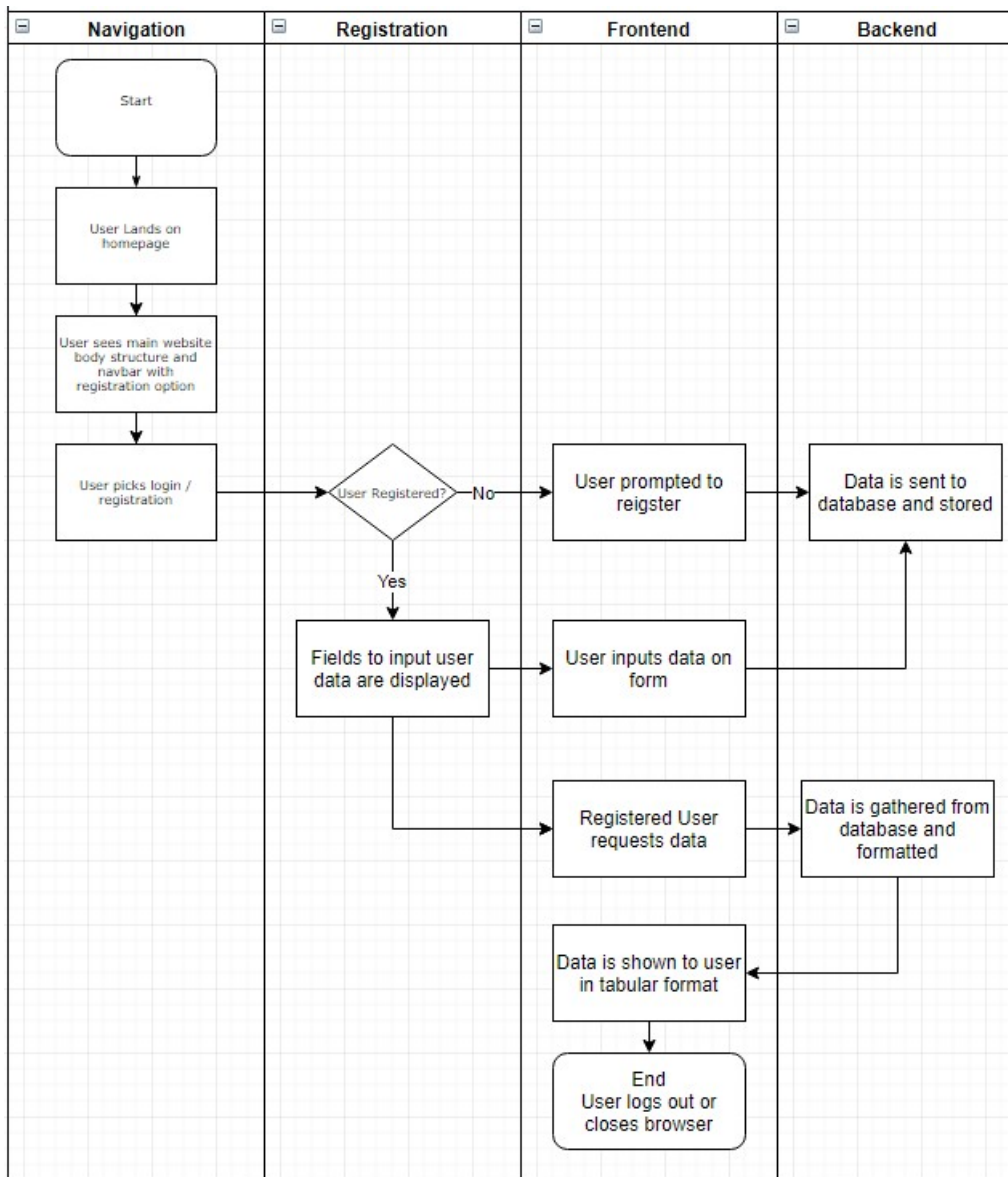


Figure 1: Created using draw.io (Alder, G. & Benson, D. (n.d.))

Major Functions

These four major functions will focus on “‘what’ these functions are and what it will do for the user”. (Walsh, T. (2018)

1. The user will be able to navigate the website easily. Navigation will include a navbar on the top of the website under a banner. As data is accumulated navigation will be expanded to a top horizontal navbar and a side vertical navbar. The navigation will list demonstrated skills allowing the user to easily access examples of ability.
2. The user will be able to access sample code. The code will be examples that I have created throughout different ASU courses or on my own to meet specific goals. The project requirements will be explained briefly then my code will be pulled from the database and displayed to the user.
3. The user will input data to be stored on the database. The user will have fields to input various user data. The fields will be any information the user wishes to share. The user can also input what skills they wish to see which will be stored. Username, password, email, programming languages and skills the user wants to see are examples of stored data.
4. The user will request for specific data from the database. The user will access the information input via major function 3 and the data will be presented to the user in tabular format. For example, the user will add programming languages or skills the user wishes to see, and all available will be displayed.

Specific Requirements

Navigation

- The user will be able to click direct dynamic links specifically associated with the resume.
- The user will be able to login and register from any page.
- The user will be able to navigate to most or all pages from any page.
- The user will easily be able to recognize and use the navigation on each page.

Code for Resume

- The resume will outline skillsets and accomplishments
- The skillsets and accomplishments will be dynamically linked to other pages
- The other pages will provide relevant information about what has been accomplished by the creator.

Database Storage

- User information will be stored on the database
- The information will be encrypted
- Code may be stored on the database
- The user will be able to save profile information of skillset preferences

Database Retrieval

- The user will be able to display work from the creator to the user based off user input and interaction
- The requested information should only be showed to the user.
- Publicly available information can be retrieved through a search bar

System Design

User Interface

Homepage

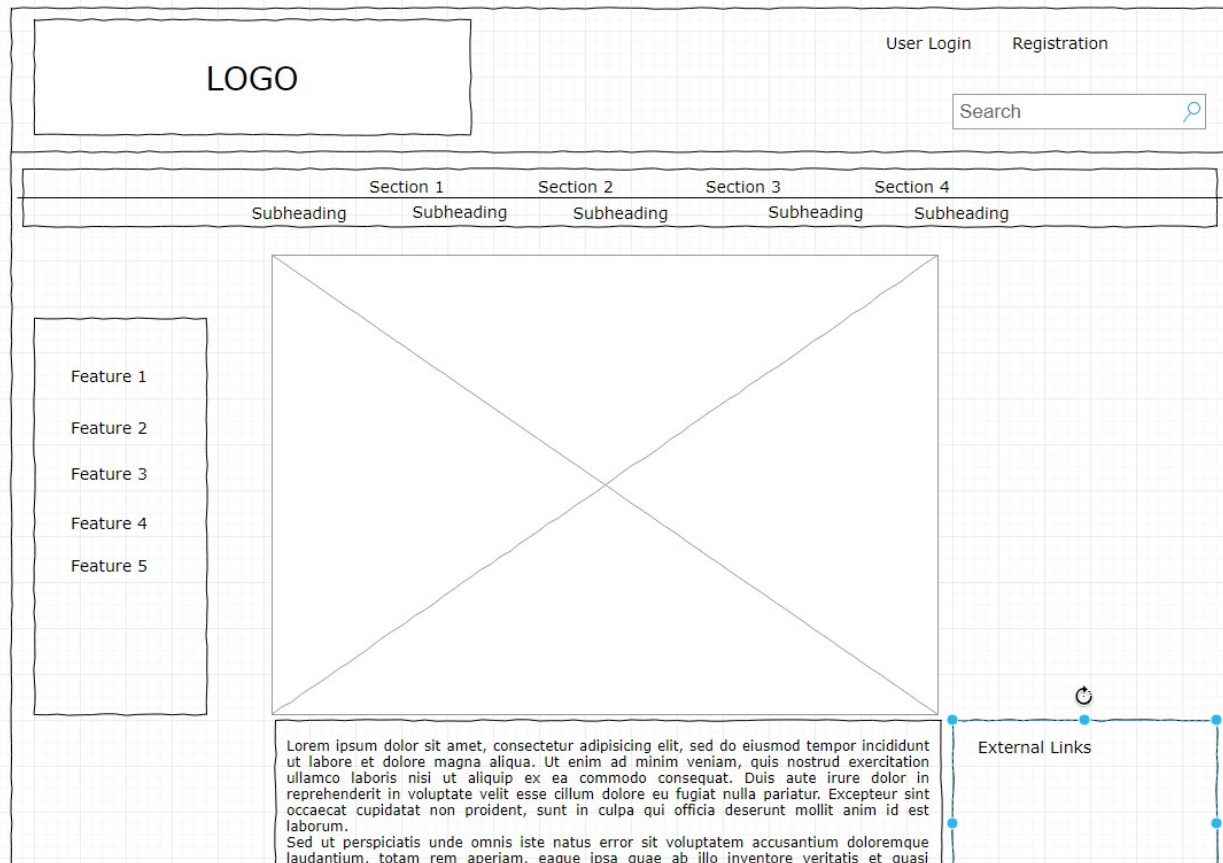


Figure 1: Homepage created using draw.io and a modified Layout Template 4

The user will be welcomed and given a brief description of the project. The user will be able to navigate to skills and register.

Logging in

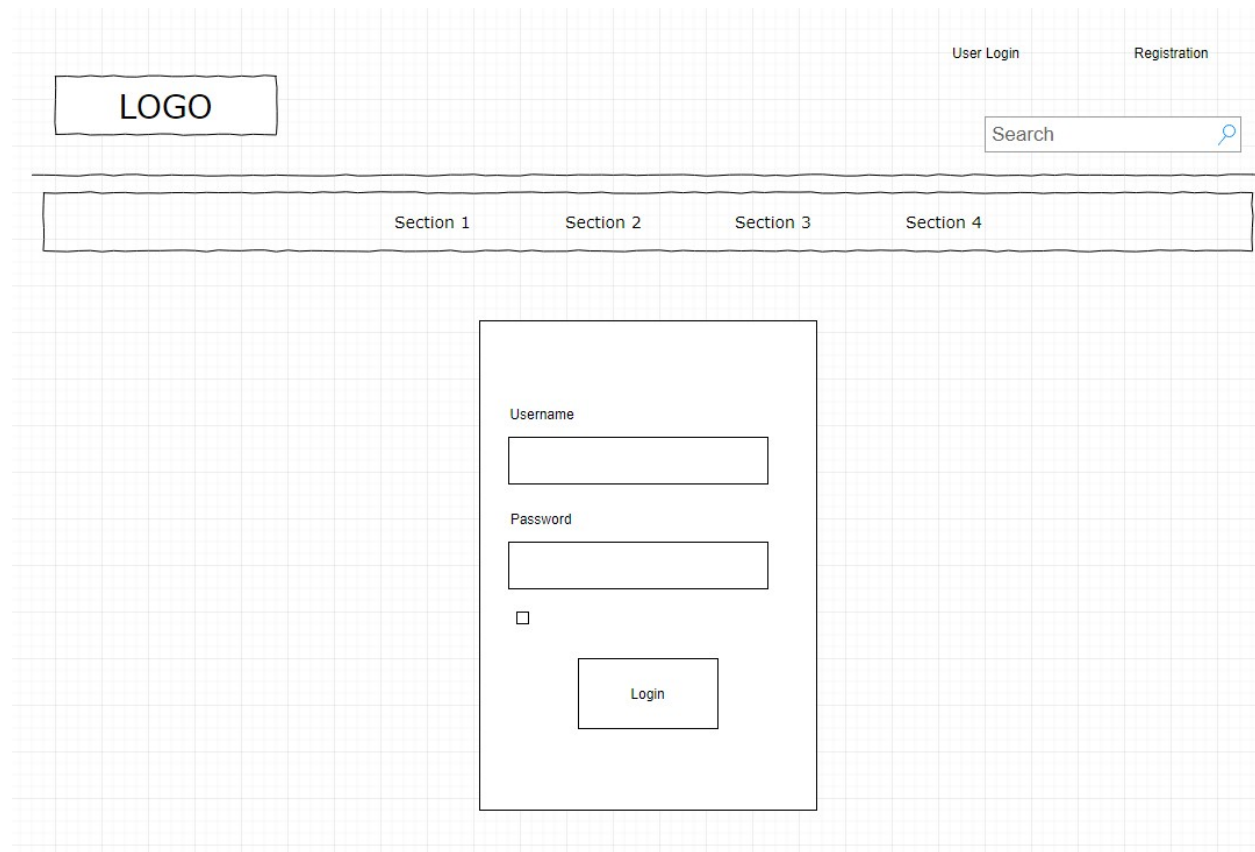


Figure 2: Login Page created using draw.io Layout template.

The user will register on this page.

User Story

The login wireframe follows industry standards in providing a clear space for user access. The user will click on “User Login” at the top right of any webpage and be redirected to a page that looks like the one above for user login. The registration page will be very similar but have more boxes for certain information like company or recruiter affiliation as well as a space for selecting relevant candidate interests for a specific job.

Infrastructure Architecture

Creating a topology diagram for this scale of website seems overkill as the process appears straight forward and most of the development is done using remote hosting services and cloud services. If a topology diagram still is required, I will create one using the description provided here. The website will be hosted on a domain using servers provided by the hosting company. The remote user will connect via the internet to the domain. The domain will access the databases provided by myself or cloud database services. Users will be accessing the website and databases via standard internet protocols. The system design portion of the presentation describes the system infrastructure as well.

Information Architecture

Data Components

While it may be a stretch to include big data analysis on this small-scale self-promotion website, some user metrics may be useful in determining how to shape the website and highlight what aspects of the resume are the most compelling to visitors. By allowing visitors to register and enter what they are looking for, the database can be used to pool and tally specific keywords and report what skillsets are most desired by visitors.

Security and Privacy Architecture

Authentication and Authorization

JSON Web Tokens will be used for authentication and authorization purposes. According to Nemeth (2015): “if you have to support a web application only, either cookies or tokens are fine... with JWT take care of XSS.” I have prior experience in IFT 481 with XSS attacks, so I will build the website to use JWT and prevent XSS attacks.

Encryption

SHA-2 encryption can be used for username, password, and website encryption as well as complete necessary steps for enhanced TLS and SSL website development.

According to Chapple (2010), HTTPS is an option to “protect communications between the client and the server from eavesdropping and to provide the client with assurances about the server’s identity.” Accomplishing HTTPS encryption will be a good asset to show prospective employers that I understand the SSL encryption process and how to certify a website with trusted CA’s for HTTPS communication.

Development Tools and Programming Languages

Development tools used for the entire process will be Sublime Text for website coding, PyCharm for Python application coding separate from the website, Asana for planning and calendar creation and MySQL and myPHP admin for database management.

A Django framework will be used that employs Python for backend website development. Python is also used to connect the frontend with backend. HTML5, JS, and CSS will be used for frontend development. JSON Web Tokens will be used for authentication as described above. MySQL and PHP will be used for database creation. As necessary, the MySQL relational databases will be used with Amazon Web Services, if feasible, considering the extra money required to make the website more professional.

The framework language and database languages were chosen in 2019. I may find better alternatives during the development process which I may switch to. The timeframe available for the project may not allow all the website to be developed by me. If that is the case, other resources may be used in conjunction with what I have created to lessen the time burden and deliver a final product. This could be through APIs, frameworks or other open-source developments that apply to my objectives.

This project will require an improved skillset to accomplish everything that is planned in the system design phase. To accomplish this task, technical assistance will be sought from supervisors for direction in how to approach encryption techniques for website development.

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