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# **Online Career Center**

By

**Abel Torres**

A.A.S., Community College of the Air Force 2014  
BCIS, DeVry University, 2016

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For the Degree of Master of Science,

With a Major in Computer Science



Governors State University  
University Park, IL 60484

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## **ABSTRACT**

The FairJobs Online application is a Web Application that connects the job seeker with the recruiter in open public fairs. For example, have you gone to a job fair and looked around endlessly but did not find what you wanted? What if you were looking for IT jobs and did not find any because you were looking for those big IT companies that were not at the fair. What if those jobs were there but under a recruiter you missed because you were not searching deeper or the advertisement was not there? You missed out on a potential opportunity!

The proposed application will connect the job seeker and the recruiter before the big event. All the job seeker has to do is register and fill out custom information or apply for positions posted by recruiters. The recruiter receives a list of job seekers that match the criteria or applications from postings he is advertising for and emails appointments or send out valuable information for meetup. On the job fair day, the job seeker will be scheduled to go those stations directly and the rest is history.

Then main goal to make valuable use of time for both parties and even have a good turnout for the event host. Requirements include but not limited to GUI interface programmed in C# and ASP.NET is needed for user friendly accessibility with account log in page, a back-end SQL database to handle account information, reports and custom queries. 3 types of entity interfaces must be created: Jobseeker interface, Recruiter interface and Administrator interface to manage the site. The website needs to the ability to send email notifications and real time confirmation, if time allows a mobile app for on-the-go use.

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## ***1 Project Description***

The FairJobs Online application is a web application built using ASP.NET and C#, and it utilizes SQL Server for the back-end database. It is comprised of three main modules, the Job Seeker, Recruiter, and Admin interfaces.

The Job Seeker module is for potential employees that are looking for job openings and job fair events taking place near them. A Job Seeker can register a personal account, which they can then use to login into the application at any time. This account allows them to see and apply to job postings from Recruiters and view upcoming job fair events in their area. Applying for a job posting uses their account information and allows them to upload a resume. Once logged in they are able to edit their account information at any time.

The Recruiter module is for employers that are looking to fill open positions. An employer can register an account for their respective business and then log in with that account at any time. Recruiters can then create job postings and register for upcoming job fair events. They can also search for Job Seekers based on the profile information. If they find a Job Seeker they want to contact they can reach out to them through the contact information provided in their profile.

The Admin module is for general management of the FairJobs Online application itself. An Admin can modify and delete Job Seeker and Recruiter accounts if needed. They are also the ones that manage the available events. They are able to create, delete, and edit the list of events on the website.

### ***1.1 Competitive Information***

This application will be competing directly with other job searching applications. Some of the most common examples would be LinkedIn, Monster.com, Indeed, and CareerBuilder. One of the big differences with our application is that it provides information about live events where recruiters will be present to have in person conversations about employment opportunities. Currently none of those competitors provide this functionality.

### ***1.2 Relationship to Other Applications/Projects***

This application utilizes Microsoft SQL Server to store data, and was built using Microsoft Visual Studio. There is no relation to other projects.

### ***1.3 Assumptions and Dependencies***

It is assumed that no other application or update to a current application will be introducing the same job fair event functionality the FairJobs application will provide.

This application will depend on the continued support of SQL Server and ASP.NET.

This application should not cause any major changes in customer operational procedures. For Job Seekers it will function similarly to existing job searching applications with the added job fair functionality. For Recruiters it will be an additional place for them to put job postings and allow them to reach potential employees through job fair events.

### ***1.4 Future Enhancements***

There are two major future enhancements planned for this application.

- The addition of in application messaging features
- The development of a mobile version of the application

## ***2 Project Technical Description***

This application was built in Microsoft Visual Studio. The GUI was built using ASP.NET and the code behind was written in C#. Persistent data was needed to for user accounts, user profile information, event information, job postings, and job applications. To store this data we utilized Microsoft SQL Server. To access this data from within the application we used Entity Framework within C#. User logins used C# session states to keep track of the logged in user while navigating through the application. For security, user passwords are encrypted using SQL Server deterministic encryption.

### ***2.1 Application Architecture***

See Figure 1 below for a visual of the Application Architecture.

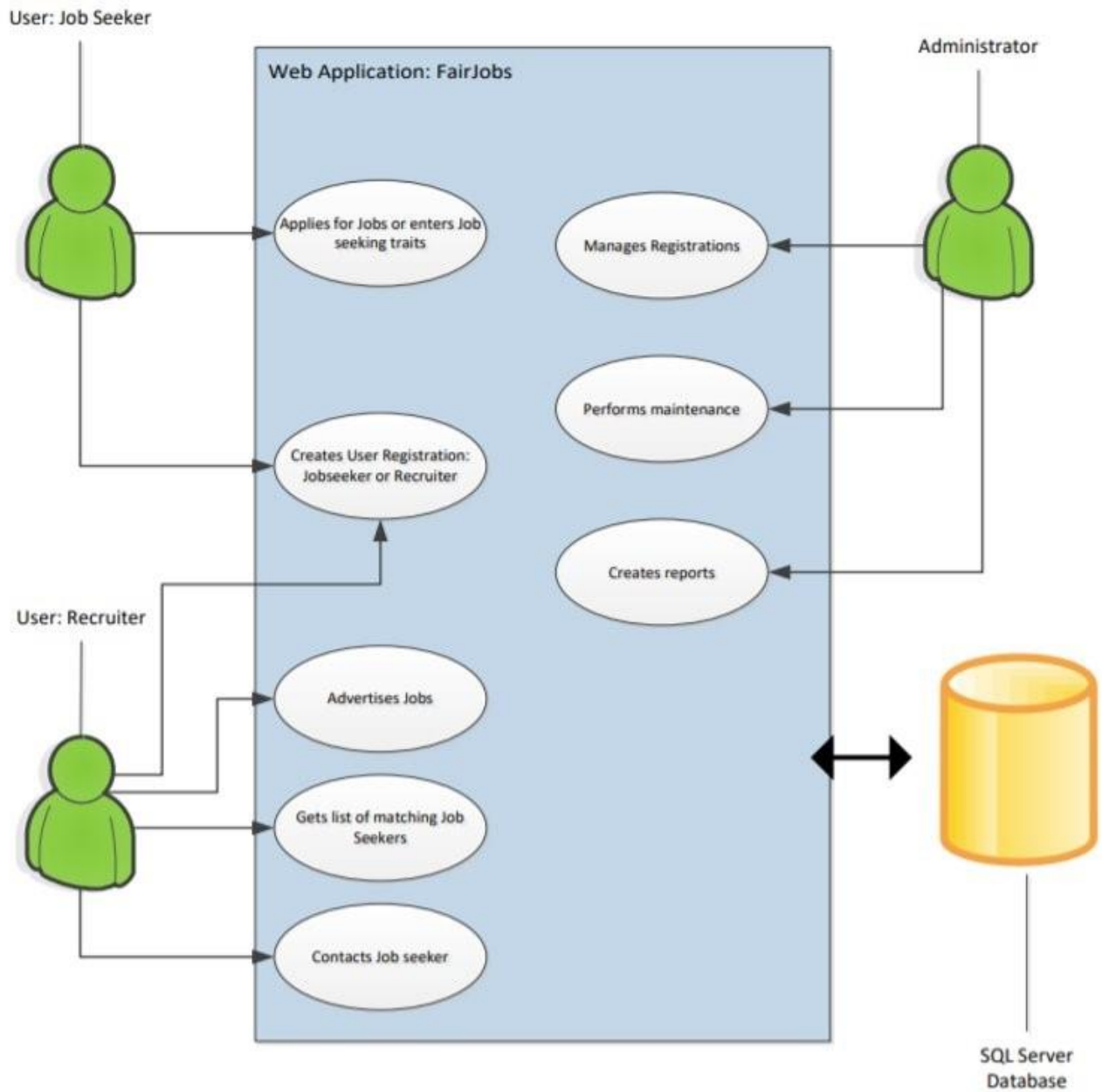


Figure 1. Application UML Diagram

## 2.2 Application Information flows

Anyone who visits the website:

- Along the top of the page there are buttons to go to the Home, About, and Contact pages
  - Home – Brings the user to the home page
  - About – Brings the user to a page with information about the FairJobs application
  - Contact – Brings the user to a page with contact information for the administrators of the FairJobs application
- On the Home page there are options for Job Seekers, Recruiters, Upcoming Events, an Admin login link, and a Learn more button
  - Job Seekers – Can login with an existing account or register a new account
    - Login – Brings the user to a login page for Job Seekers; they must have a valid account to login or it will display an error
    - Register Now – Brings the user to a page to provide personal information to create a Job Seeker account
  - Recruiters – Can login with an existing account or register a new account
    - Login – Brings the user to a login page for Recruiters; they must have a valid account to login or it will display an error
  - Admin – Can login with an existing administrator account
  - Upcoming Events – Brings the user to a page that lists all the upcoming job fair events along with their locations, dates, and times
  - Learn More – Brings the user to the About page

Job Seekers:

- Along the top of the page there are buttons that bring them to the Home, View Jobs, Events, Update Profile, and Sign Out pages
  - Home – Brings the user to the Job Seeker home page
  - View Jobs – Brings users to a page where they can search for available job postings
  - Events – Brings the user to a page that lists all the upcoming job fair events
  - Update Profile – Brings the user to a page that allows them to edit their profile information
  - Sign Out – Signs the user out of their account and brings them to a page informing them they have been signed out
- On the Home page there are options for viewing job openings, updating the user profile, and viewing event recruiters
  - View Job Openings – Brings the user to a page where they can search for available job postings
  - Update User Profile – Brings the user to a page where they can edit their profile information
  - Event Recruiters – Brings the user to a page where they can see what recruiters are going to be at what events and contact them by clicking their email address
- View Jobs page
  - Options to filter job postings by Career Industry, Event Date, and Job Title
  - Gives the Job Title, required Skillsets, required Experience, information about the job fair event they will be at, a link to see more details about the posting, and an Apply Now link to apply for the job
    - Apply Now brings the user to another page that fills in most of the needed information automatically based on what is in the user's profile
    - The user can then edit the information and fill in any missing information before applying
    - The user can also upload a resume document they have stored on their computer
    - They can then press the Submit button to submit their application for the respective job posting
- Event Recruiters page
  - Lists all the recruiters and what events they are currently registered for
  - The user can click the Recruiter's email to contact them directly for more information if desired

Recruiters:

- Along the top of the page there are buttons that bring to the Home, Post Jobs, View Job Applicants, and Sign Out pages
  - Home – Brings the user to the Recruiter home page
  - Post Jobs – Brings the user to a page where they can post listings for available jobs
  - View Job Applicants – Brings the user to a page where they can view the current applicants for jobs listings they have posted
  - Sign Out – Signs the user out of their account and brings them to a page informing them they have been signed out

- On the Home page there are options for adding job postings, viewing job applicants, searching for job seekers, and a link to update their profile
  - Add Jobs – Brings the user to a page where they can post a listing for available jobs
  - View Job Applicants – Brings the user to a page where they can view who has applied for the job listings they have posted
  - Search for Job Seekers – Brings the user to a page where they can search for registered job seekers
  - Update Profile – Brings the user to a page where they can edit their profile information
- Add Jobs
  - There are tabs to add a job posting and view currently posted jobs
  - To add a job, they fill out the job information page, which includes what event they will be at to find applicants for the job; once the information is filled out, they click the Submit button to post the job
  - The View Jobs tab allows the user to see what jobs they have already posted, and Edit or Delete the posting if needed
- View Job Applicants
  - Shows a list of Job Seekers that have applied for posted jobs
  - The user can contact them directly by clicking their email address or using the phone number they provided
  - There is a download link to download the resume that the Job Seeker attached to the application
  - There is a link to delete the user application if needed
- Search for Job Seekers
  - Shows a list of all Job Seekers that can be filtered by skill, experience, and job interests
  - Can contact the Job Seeker by clicking their email or using the provided phone number

#### Administrators:

- Along the top of the page there are buttons that bring them to the Home, User Management, Event Management, and Sign Out pages
  - Home – Brings the administrator to the Administrator home page
  - User Management – Brings the administrator to a page where they can manage registered users (Job Seekers, Recruiters, and other Administrators)
  - Event Management – Brings the administrator to a page where they can manage the list of upcoming job fair events
  - Sign Out – Signs the administrator out of their account and brings them to a page informing them that they have been signed out
- On the Home page there are buttons for going to the User Management and Event Management pages
- User Management
  - There are tabs that filter the users by Job Seekers, Recruiters, and Administrators
  - Each tab lists its respective users with the user information and links to Edit and Delete accounts
- Event Management
  - The top section of the page has fields and a Submit button for adding new job fair events to the system
  - The bottom section lists the events that have already been added to the system with links to Edit or Delete the event if needed

### ***2.3 Interactions with other Applications***

This application will need to directly interact with a Microsoft SQL Server database. The application needs a valid login to use to access the SQL database and models were built with Entity Framework to access the SQL data.

### ***2.4 Capabilities***

This is a web-based application, so a wide range of web browsers need to be able to display and run the web page.

This application requires the storage of persistent data, so the database must be capable of retrieving, adding, deleting, and updating needed data. This will include user data, event data, job listings, job applications, and resume document storage.

### ***2.5 Risk Assessment and Management***

There are other well-known competitors already on the market, so the launch of the application will need to be well advertised. It will also need to include well liked functionality already included in competitor applications along with additional functionality not available in those applications to get users to switch to using it. Another option would be to focus on organizations that host job fair events to help push the additional functionality that this application brings to the market.



### 3 Project Requirements

#### 3.1 Identification of Requirements

##### <GSU-FairJobs-1 General-Use-01>

**The application must have a general information for unregistered users.**

Implementation: Mandatory

The application needs to have a general home page users can log in from, and view general About and Contact information for the application providers. There needs to also be a place for unregistered users to view upcoming job fair events.

##### <GSU-FairJobs-1 User-Accounts-02>

**The application must allow for multiple types of user accounts to be added, updated, and deleted.**

Implementation: Mandatory

The application should allow for Job Seeker, Recruiter, and Administrator accounts to be added, updated, and deleted. All of these accounts will allow for different access to the features of the application.

##### <GSU-FairJobs-1 Job-Seeker-03>

**The application must allow Job Seekers access to the functionality their role is entitled to.**

Implementation: Mandatory

The Job Seeker user accounts must be able to log into the application and have access to job postings list, events list, a list of what events Recruiters will be at, a way to update their profile, and a way to sign out of the application.

##### <GSU-FairJobs-1 Recruiter-04>

**The application must allow Recruiters access to the functionality their role is entitled to.**

Implementation: Mandatory

The Recruiter user accounts must be able to log into the application and have access to a way to post job openings, view their current job postings, view applicants that have applied to their job postings, search for job seekers, and a way to sign out of the application.

##### <GSU-FairJobs-1 Administrator-05>

**The application must allow Administrators access to the functionality their role is entitled to.**

Implementation: Mandatory

The Administrator accounts must be able to log into the application and have access to a way to manage all accounts in the system (Job Seekers, Recruiters, and Administrators), manage the list of upcoming events (add, remove, and edit events), and a way to sign out of the application.

##### <GSU-FairJobs-1 Job-Postings-06>

**The application must have a page to allow for the viewing and posting of job openings.**

Implementation: Mandatory

For the Job Seeker accounts this page will need to allow the user to view and apply for posted jobs, which includes being able to upload a resume.

For the Recruiter accounts this page will need to allow the user to view, edit, and delete any jobs they have already posted, as well as create new job postings.

##### <GSU-FairJobs-1 Edit-Profile-07>

**The application must allow all types of user accounts to edit their profile information.**

Implementation: Mandatory

There needs to be a page for all account types (Job Seeker, Recruiter, and Administrator) to edit their profile information if needed.

##### <GSU-FairJobs-1 View-Recruiters-08>

**The application must allow Job Seekers to view registered Recruiters.**

Implementation: Mandatory

There needs to be a page for the Job Seekers to see the registered Recruiters and what job fair events they are going to be attending.

##### <GSU-FairJobs-1 View-Applicants-09>

**The application must allow Recruiters to view applicants to their job postings.**

Implementation: Mandatory

There needs to be a page where Recruiters can view Job Seekers that have applied for jobs they have posted and download any resume documents that were uploaded with the application.

<GSU-FairJobs-1 Search-Job-Seekers-10>

**The application must allow for Recruiters to search for Job Seekers.**

Implementation: Mandatory

Recruiters should be able to search through all registered Job Seekers and use their provided contact information to reach out to them.

<GSU-FairJobs-1 Event-List-11>

**The application must allow for all account types to view the list of upcoming job fair events.**

Implementation: Mandatory

All account types should be able to view the list of upcoming job fair events.

<GSU-FairJobs-1 Site-Management-12>

**The application must allow for Administrators to manage user accounts and the job fair event list.**

Implementation: Mandatory

Administrators need a page where they can edit and delete currently registered Job Seeker, Recruiter, and Administrator accounts.

Administrators need a page where they can add new job fair events, and edit and delete already existing events.

<GSU-FairJobs-1 Messaging-13>

**The application should have an internal messaging system.**

Implementation: Optional

Job Seekers, Recruiters, and Administrators should be able to contact each other using a messaging system built into the application rather than external email.

<GSU-FairJobs-1 Mobile-14>

**The application should have a mobile version.**

Implementation: Optional

This would be a mobile version of the application and would provide all the same functionality.

### ***3.2 Operations, Administration, Maintenance and Provisioning (OAM&P)***

For the initial launch we would be administering and maintaining the application. We would provide regular backups of the SQL Server data. Since we would be the administrators all event postings would have to be sent as requests to us. We would confirm the authenticity of the requested job fair event before posting it, which would give assurance to our users that any posted events are real and will be taking place. Weekly maintenance would be run on the database to make sure everything is functioning properly.

### ***3.3 Security and Fraud Prevention***

One of the main security measures put in place is the encryption of the user account passwords. The passwords are not stored as plain text in any part of the application. The calls to the SQL database are also written in a way that does not allow for SQL injection attacks.

### ***3.4 Release and Transition Plan***

To better facilitate application updates, we would setup a separate test system. This test system would be a different instance of the application that the users are not able to reach. This would allow us to put up the new release and do internal testing before updating the production system that the users use. Once we know an exact release date, we would also inform the users of when it is happening along with providing changelog documentation for the upcoming update so they can better prepare for the changes.

## **4 Project Design Description**

The Fair Jobs Application is an Online Web Application that connects the Job Seeker to the Recruiter in open Public Fairs. This Application connects the Jobseeker and the Recruiter before the Job Fair Events happen. All that the Job Seeker must do is, fill out an online form in the Application that requires the basic information of that person's degree, his job interests, and Register themselves to all the jobs they are looking for. Then the Recruiter gets a list of people who applied for that position. The Recruiter can post varieties of positions that are to be filled in his company. The Admin of this application handles all the events and the job postings, log in details, and all that related to the app. Admin can add or delete any person's information, details about the job description, and even the Recruiter's posts on the jobs too.

When you open the application, on the home page, we can see the job seeker login, upcoming events, and recruiter login. The upcoming events have the date, time, event name, and location of the event. Jobseeker registration consists of username, password, security questions and must fill out the personal information like first name, last name, email, phone, interests, work experience, and key skills. After logging in as job seeker one can find three sections, view job openings, update a user profile, and event recruiters. In the job openings, we must choose the career interested, event date, and job title. Then, it will show the list of jobs that matches the requirements. We can search the details, we may see the description of the job, location of the job, company name, a skill that is hiring for, recruiter name, recruiter email, the experience of the candidate, and the event date and we can apply directly. Then, it brings us to the virtual resume that carries all the information provided during registration and we can add our additional educational information and must upload the person's resume. Then, it is going to pass the resume. Before applying for the job, if we view the recruiter's event, we can see recruiters name, email, company, industry, event name, and location of the event.

In the recruiter's login, we can see add job, view job applicants, search for job seekers. In addition to jobs, we add company id, recruiter id, job title, qualification, job description, skills, experience, and event information. After the submission of details, we can see the job posted in view jobs. We can view applicants, where we can see the information of the application like his name, contact details, the experience of the applicant, skills and we can also download the resume of the applicant. The recruiter can contact the job seeker through the email just by clicking on his email it will automatically redirect to the Recruiter's email page which is hyperlinked to the email already. If you find no one applying for the jobs, then the Recruiter can search and filter for the Registered job seekers in the database, who has the skills that suit the vacant position and offer them a job. We can filter based on the job seeker's skills, experience, and job interests.

You can also find the Administrator login page. The admin manages the data regarding job seekers and recruiters. They can post the job events, edit or delete the data of the registered job seekers or the recruiters from the database. There is this feature in the database is that the password you enter is stored in an encrypted format. So, when somebody tries to hack the application, they can find the username, login id but not the password. This way the data is secured.

## **5 Internal/external Interface Impacts and Specification**

Due to this being a brand-new application all internal and external interfaces were built from scratch and described in detail in previous sections. Interface changes will be detailed here on future version iterations.

All user, event, job posting, and job application data will be persistent data and stored in a Microsoft SQL database.

## **6 Design Units Impacts**

This is a new application so below is a list of the new functional areas associated with this application.

- A. Anonymous User Functionality
- B. Job Seeker Functionality
- C. Recruiter Functionality
- D. Administrator Functionality

### **6.1 Functional Area A/Design Unit A**

#### **6.1.1 Functional Overview**

The Anonymous User Functional Area covers the functions a non-logged in user is able to access and actions they can perform.

### **6.1.2 Impacts**

This is a new application, so this area was built according to the design requirements.

### **6.1.3 Requirements**

Requirement General-Use-01 will be fully implemented and delivered in this area.  
Requirement User-Accounts-02 will be partially implemented and delivered in this area.  
Requirement Event-List-11 will be partially implemented and delivered in this area.

## **6.2 Functional Area B/Design Unit B**

### **6.2.1 Functional Overview**

The Job Seeker Functional Area covers the functions a user logged in as a Job Seeker is able to access and actions they can perform.

### **6.2.2 Impacts**

This is a new application, so this area was built according to the design requirements.

### **6.2.3 Requirements**

Requirement User-Accounts-02 will be partially implemented in this area.  
Requirement Recruiter-04 will be fully implemented and delivered in this area.  
Requirement Job-Postings-06 will be partially implemented and delivered in this area.  
Requirement Edit-Profile-07 will be partially implemented in this area.  
Requirement View-Applicants-09 will be fully implemented and delivered in this area.  
Requirement Search-Job-Seekers-10 will be fully implemented and delivered in this area.  
Requirement Event-List-11 will be partially implemented in this area.

## **6.3 Functional Area C/Design Unit C**

### **6.3.1 Functional Overview**

The Recruiter Functional Area covers the functions a user logged in as a Recruiter is able to access and actions they can perform.

### **6.3.2 Impacts**

This is a new application, so this area was built according to the design requirements.

### **6.3.3 Requirements**

Requirement User-Accounts-02 will be partially implemented in this area.  
Requirement Recruiter-04 will be fully implemented and delivered in this area.  
Requirement Job-Postings-06 will be partially implemented and delivered in this area.  
Requirement Edit-Profile-07 will be partially implemented in this area.  
Requirement View-Applicants-09 will be fully implemented and delivered in this area.  
Requirement Search-Job-Seekers-10 will be fully implemented and delivered in this area.  
Requirement Event-List-11 will be partially implemented in this area.

## **6.4 Functional Area D/Design Unit D**

### **6.4.1 Functional Overview**

The Administrator Functional Area covers the functions a user logged in as an Administrator is able to access and actions they can perform.

### **6.4.2 Impacts**

This is a new application, so this area was built according to the design requirements.

### **6.4.3 Requirements**

Requirement User-Accounts-02 will be partially implemented in this area.

Requirement Administrator-05 will be fully implemented and delivered in this area.

Requirement Edit-Profile-07 will be partially implemented and delivered in this area.

Requirement Event-List-11 will be partially implemented in this area.

Requirement Site-Management-12 will be fully implemented and delivered in this area.

## **7 Conclusion**

The FairJobs Online application gives a place for Job Seekers and Recruiters to streamline the hiring process. Job Seekers are able to create accounts, view job postings, apply for jobs, and see what Recruiters are going to be at upcoming job fair events. Recruiters are able to create accounts, post job openings, view applicants and reach out directly to potential employees. One of the main advantages this application is the ability to view and register for upcoming job fair events. This allows Job Seekers and Recruiters to easily organize a face to face meeting. For some future improvements we would like to give the application an internal messaging system and create a mobile application with all the functionality available in the full web version.

## **8 References**

Mary Delamater and Anne Boehm, Murach's ASP.NET 4.6 Web Programming with C# 2015, 978-1-890774-95-0, August 2016

Mahesh Chand, Using ASP.NET FileUpload Control, <https://www.c-sharpcorner.com/article/Asp-Net-2-0-fileupload-control/>, August 19, 2019

Jakub Szymaszek, SSMS Encryption Wizard – Enabling Always Encrypted in a Few Easy Steps, <https://techcommunity.microsoft.com/t5/sql-server/ssms-encryption-wizard-enabling-always-encrypted-in-a-few-easy/ba-p/384545>, March 23, 2019

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