

Requirements Specification

Proposed Project:

Dynamic Network Device Mapping System (DNDMS)

Clients:

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Dynamic Network Device Mapping System (DNDMS)

Requirements Specification Table of Contents

| | |
|--|--------|
| 1. Product Overview and Summary | - 3 - |
| 2. Development, Operating, and Maintenance Environments | - 3 - |
| 3. Data Flow Diagrams (see attached Data Flow Diagram document) | - 3 - |
| 4. Prototypes | - 3 - |
| 4.1 Login Screen: | - 4 - |
| 4.2 Administrator Menu: | - 5 - |
| 4.3 Administrator Floor Plan: | - 5 - |
| 4.4 Room Layout: | - 7 - |
| 4.5 Administrator Control Panel: | - 8 - |
| 4.6 Permissions Panel: | - 9 - |
| 4.7 Search Dialogue: | - 8 - |
| 4.8 Department Head Menu: | - 9 - |
| 4.9 Faculty Menu: | - 8 - |
| 4.10 Department Head Floor Plan: | - 9 - |
| 4.11 Faculty Floor Plan: | - 9 - |
| 5. Functional Requirements | - 15 - |
| 5.1 Use-Case Narrative: | - 15 - |
| 5.2 Functional Requirements Inventory: | - 16 - |
| 6. Performance Requirements | - 22 - |
| 7. Early Subsets and Implementation Priorities | - 22 - |
| 8. Foreseeable Modifications and Enhancements | - 23 - |
| 9. Acceptance Criteria | - 23 - |
| 10. Testing Requirements | - 24 - |
| 11. Appendix | - 24 - |
| 11.1 Cross Reference Index | - 24 - |
| 11.2 Glossary of Terms | - 24 - |
| 11.3 Timeline (Gantt Chart) | - 25 - |

1. Product Overview and Summary

Our clients, Systems Administrators Ken Swarner and Eric Crossman, have certain physical limitations when attempting to recover information regarding components connected to the School of Science network. The most burdensome limitation seems to be the need for close physical proximity to a device in order to find information regarding that device.

The Dynamic Network Device Mapping System (DNDMS) will allow our clients to retrieve information regarding components connected to the network through a web-based building map, so that physical location of the user is irrelevant. Our clients will be able to gather information regarding a specific network device; add, delete, and edit information about devices; and edit user permissions.

There will be three user groups included in the DNDMS. Administrators will have access to all commands integrated into the application and will be able to view all devices connected to the network. The “Department Head” users group will be allowed to view the building map, but will only have access to see components connected within their area of the building. The “Faculty” users group will be further limited and see only devices within their office, as well as printers that they can use.

2. Development, Operating, and Maintenance Environments

The Dynamic Network Device Mapping System (DNDMS) will be developed on computers provided by Siena College. The DNDMS will be designed and programmed on the Siena College Software Engineering workstations: one PC and one Mac. SKYNET software will develop a web-based graphical interface that will run on an Apache web server provided by our clients. An Oracle 10G Release 2 database will also be provided by our clients in order to store information regarding the network devices connected to the School of Science network.

The Device Mapping System will be functional in at least 3 different web browsers: Microsoft Internet Explorer 7.0, Mozilla Firefox 2.0, and Apple’s Safari.

Information regarding maintenance will be discussed at a later time.

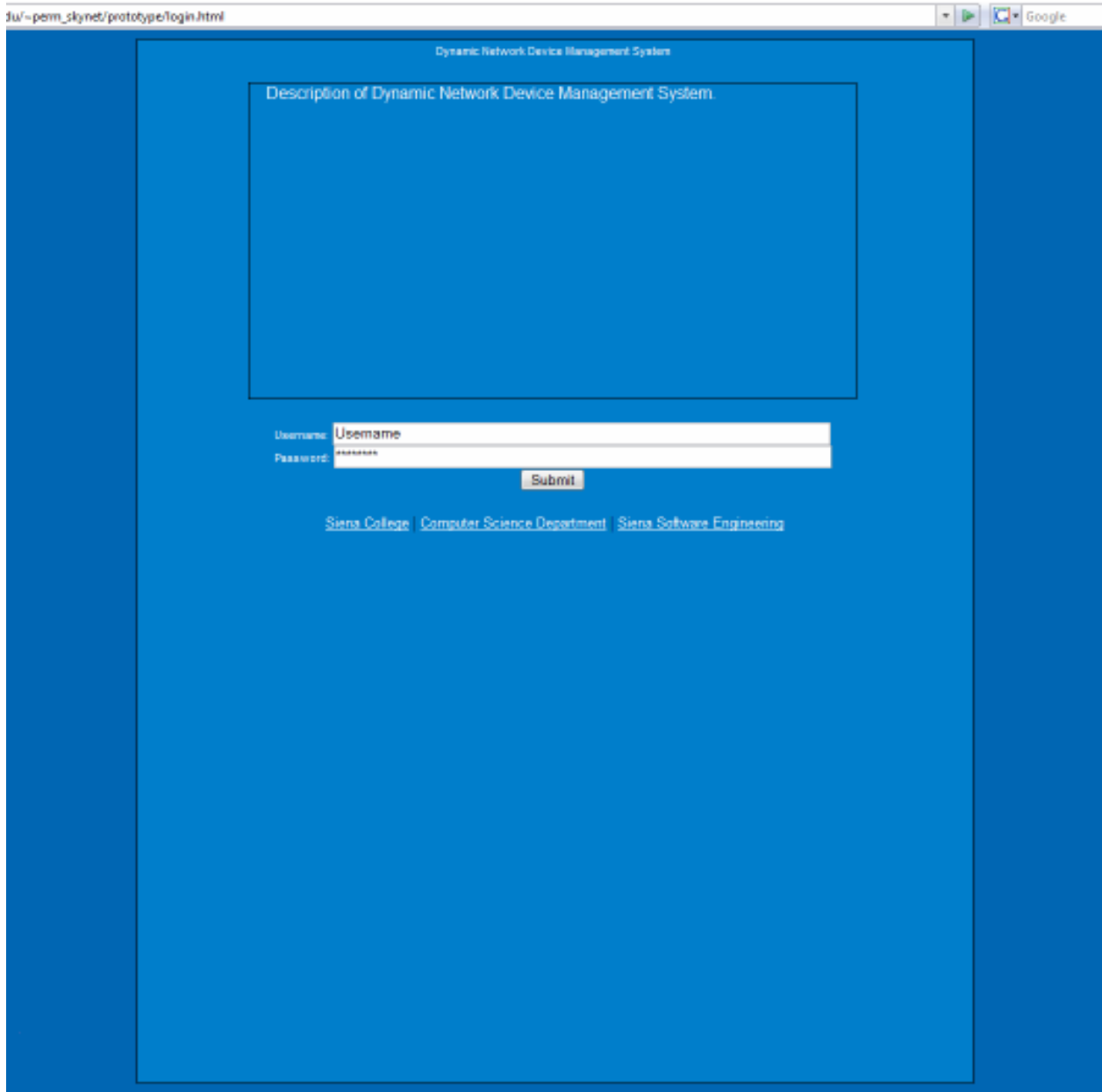
3. Data Flow Diagrams

Please refer to Data Flow Diagram document.

4. Prototypes

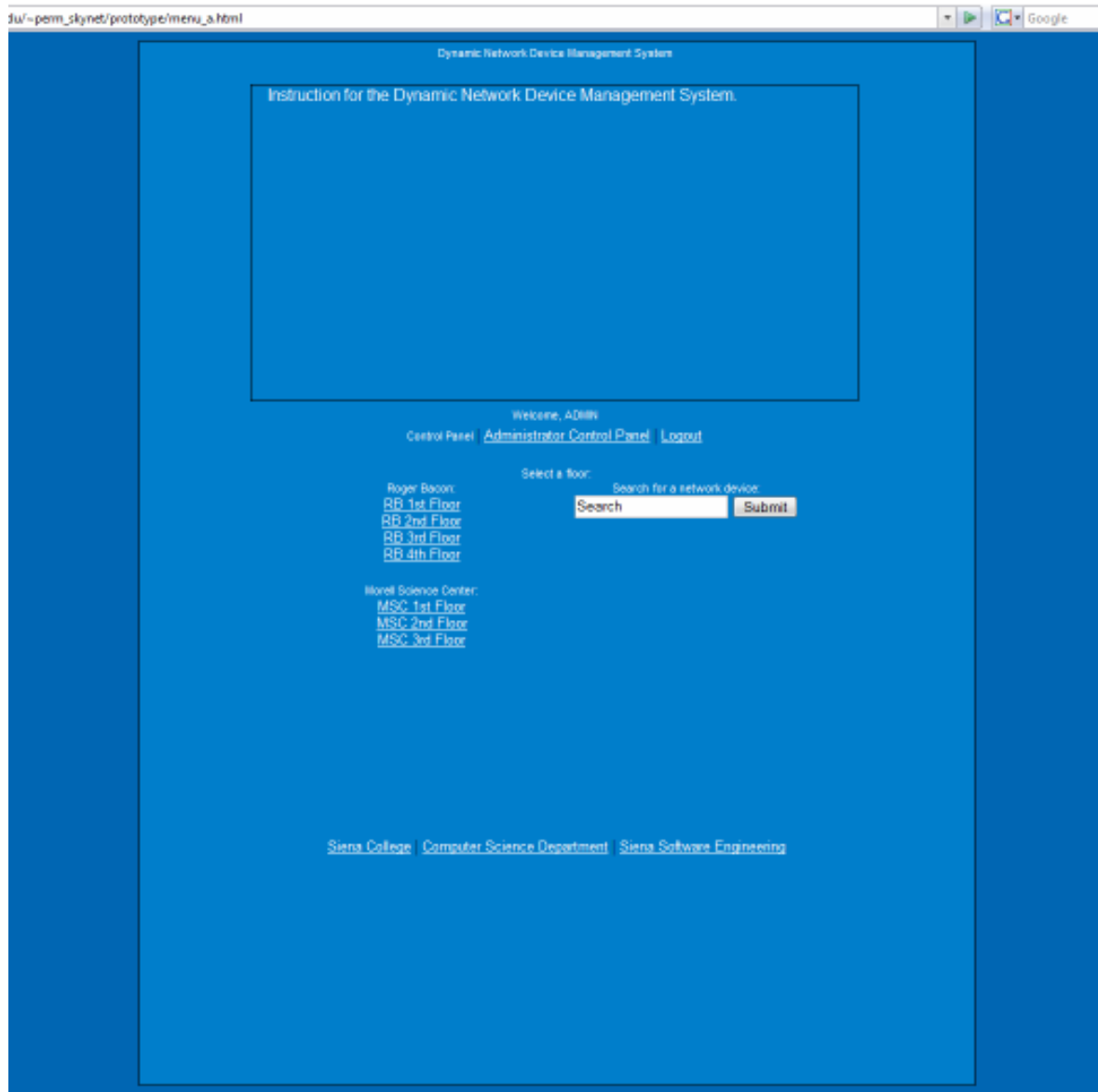
The following prototype screens demonstrate how the functions of the system will be presented to the users. The design shown is flexible and by no means final; these only serve to better communicate in a graphical manner the functional requirements of the system.

4.1 Login Screen:



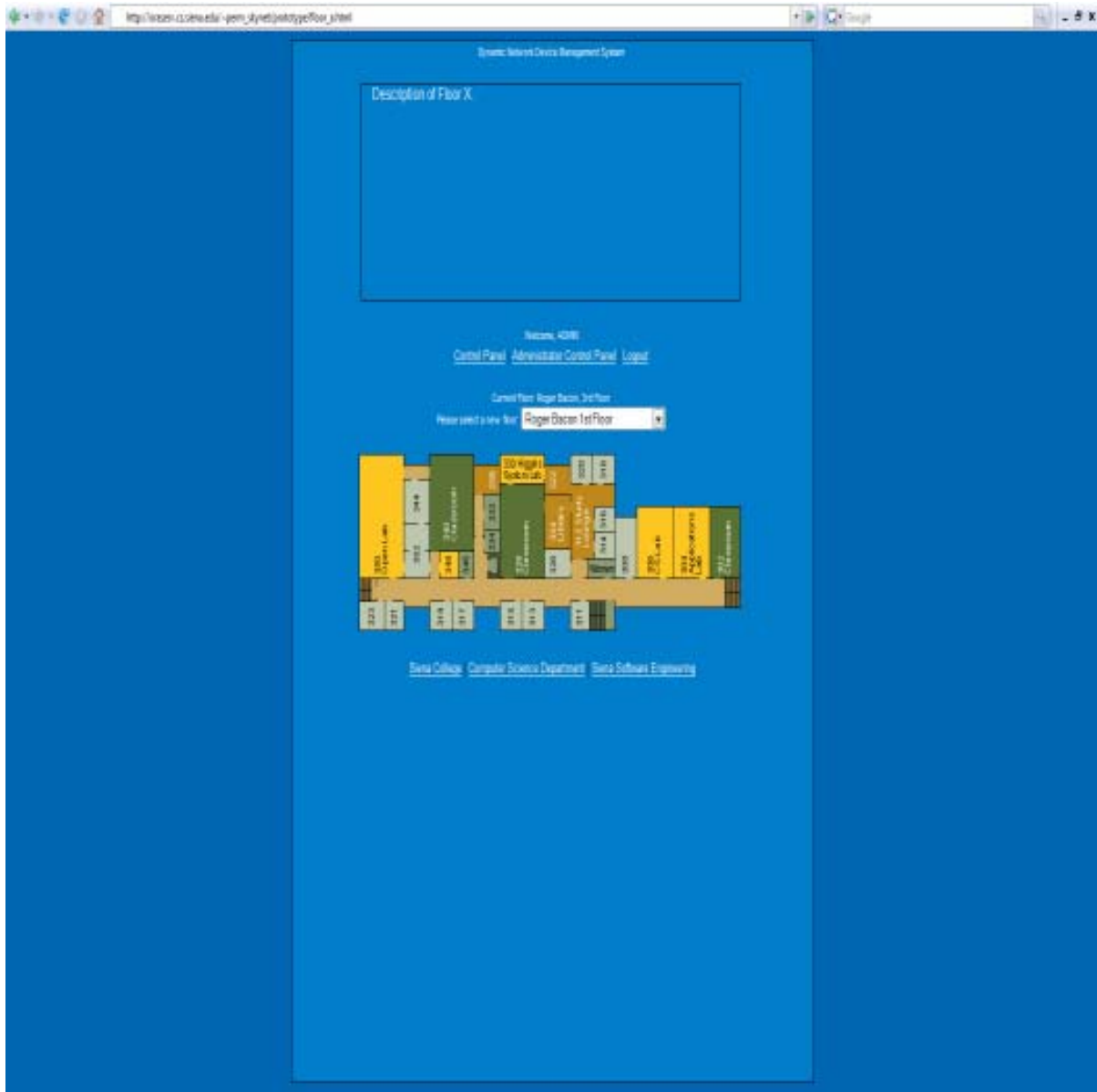
The login page has a description box to give the user(s) a general overview of the purpose of the tool. The page then allows the user to log on. There is also the feature of being able to go to the Siena College website, the Siena College Computer Science Department website, and the Software engineering website. From the Software engineering website the user will be able to view SKYNET's personal homepage.

4.2 Administrator Menu:



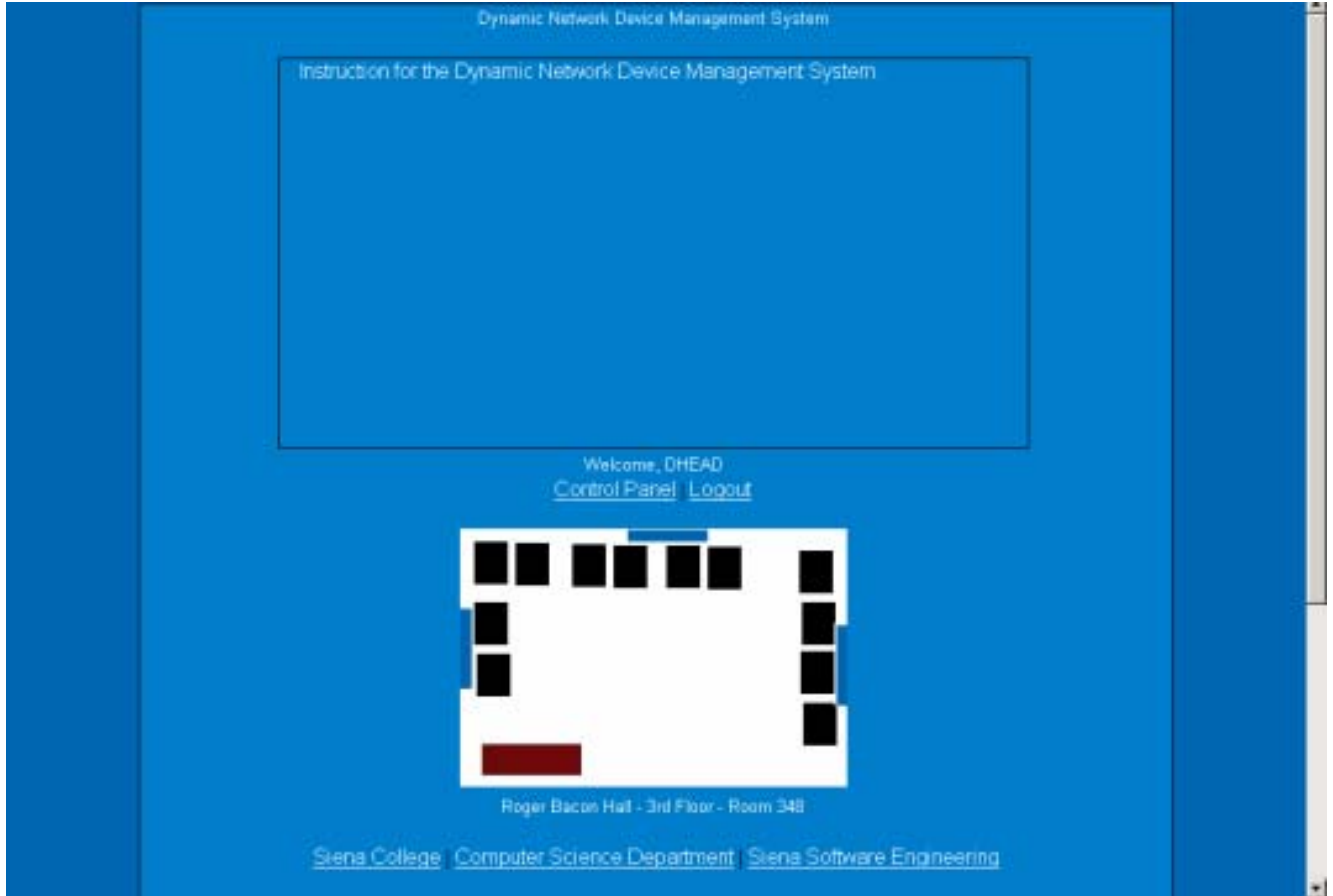
The menu page will contain a basic instruction for how to navigate the floor maps and will allow for the administrator to have access to all floors of Roger Bacon and Morrell Science Center. There will also be a search function that will allow the administrator to search for a network device to find out where it is located. The page will also have direct access to the websites that can be reached on the log in page.

4.3 Administrator Floor Plan:



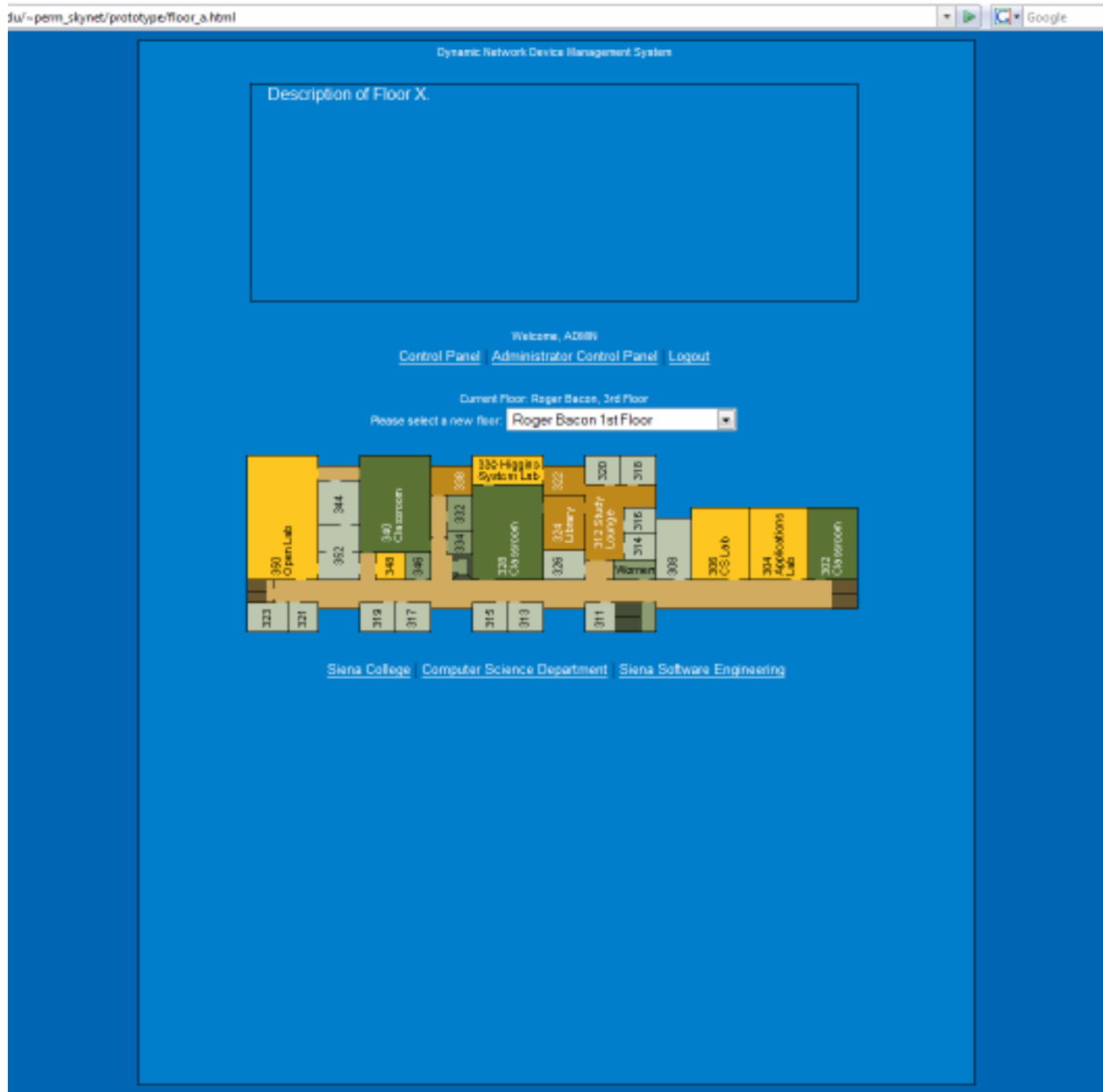
The floor page will allow the administrator access to all floors by use of the dropdown menu. The description box will display all important information that relates to the floor that is selected. All rooms will be viewable by the administrator. The administrator will be allowed to click on any room to view that room (including hallways).

4.4 Room Layout:



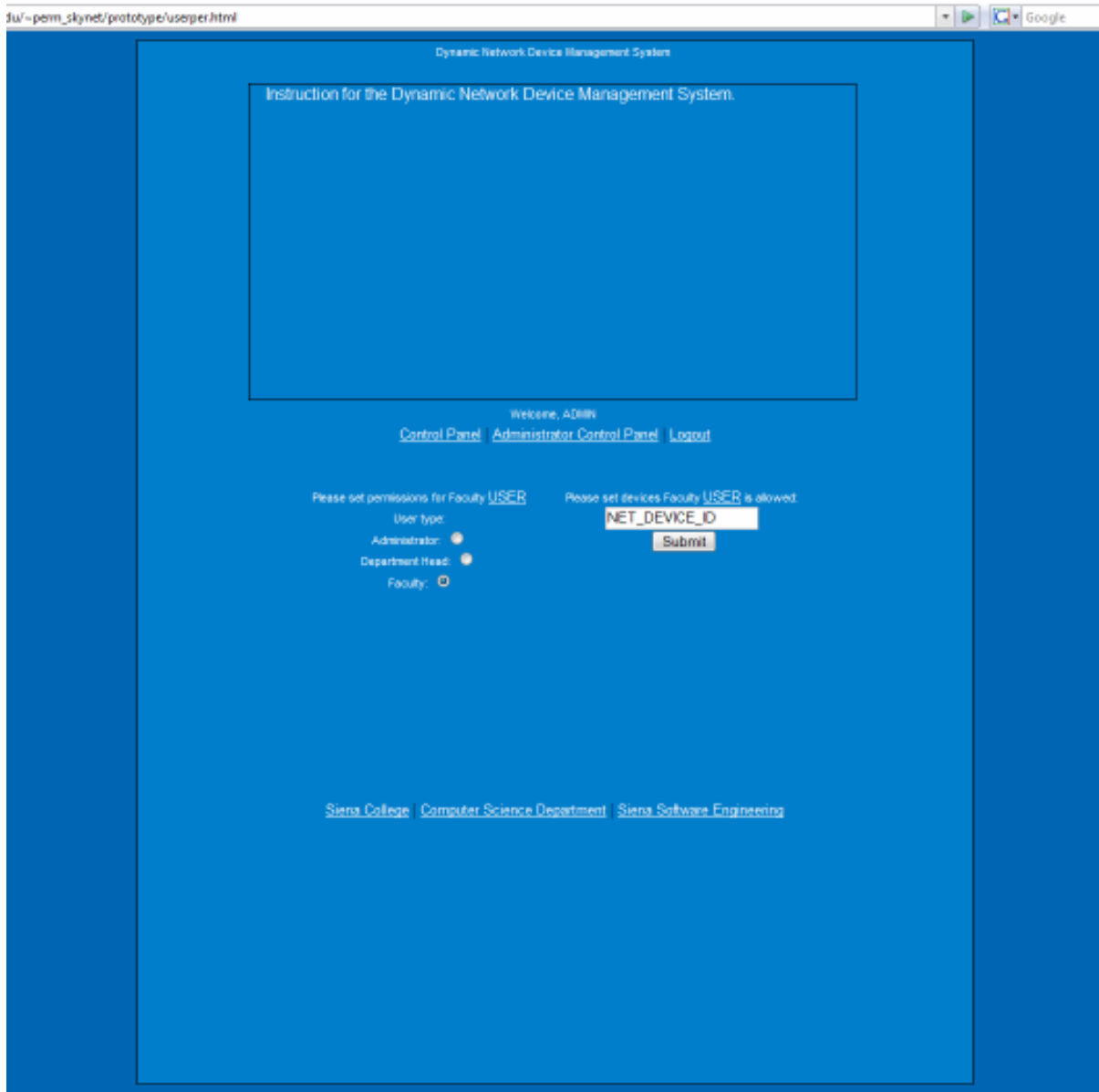
The administrator, department head and faculty members will all have the same view of the room page. The room page will have a description of the room and the layout for viewing. Since this page doesn't allow any user to modify it and is simply for viewing purposes it will show up the same to all users who have access to the page.

4.5 Administrator Control Panel:



The administrator control panel is only accessible by the administrator and will have a simple description that explains how to perform edit users and devices. The administrator will be able to add new users and delete or view current users. The administrator will also be able to add, delete and view devices to rooms of their choosing.

4.6 Permissions Panel:



The permissions page is also only available by the administrator and allows the administrator to apply different user permissions to the users. The administrator will also be allowed to give users access to network devices.

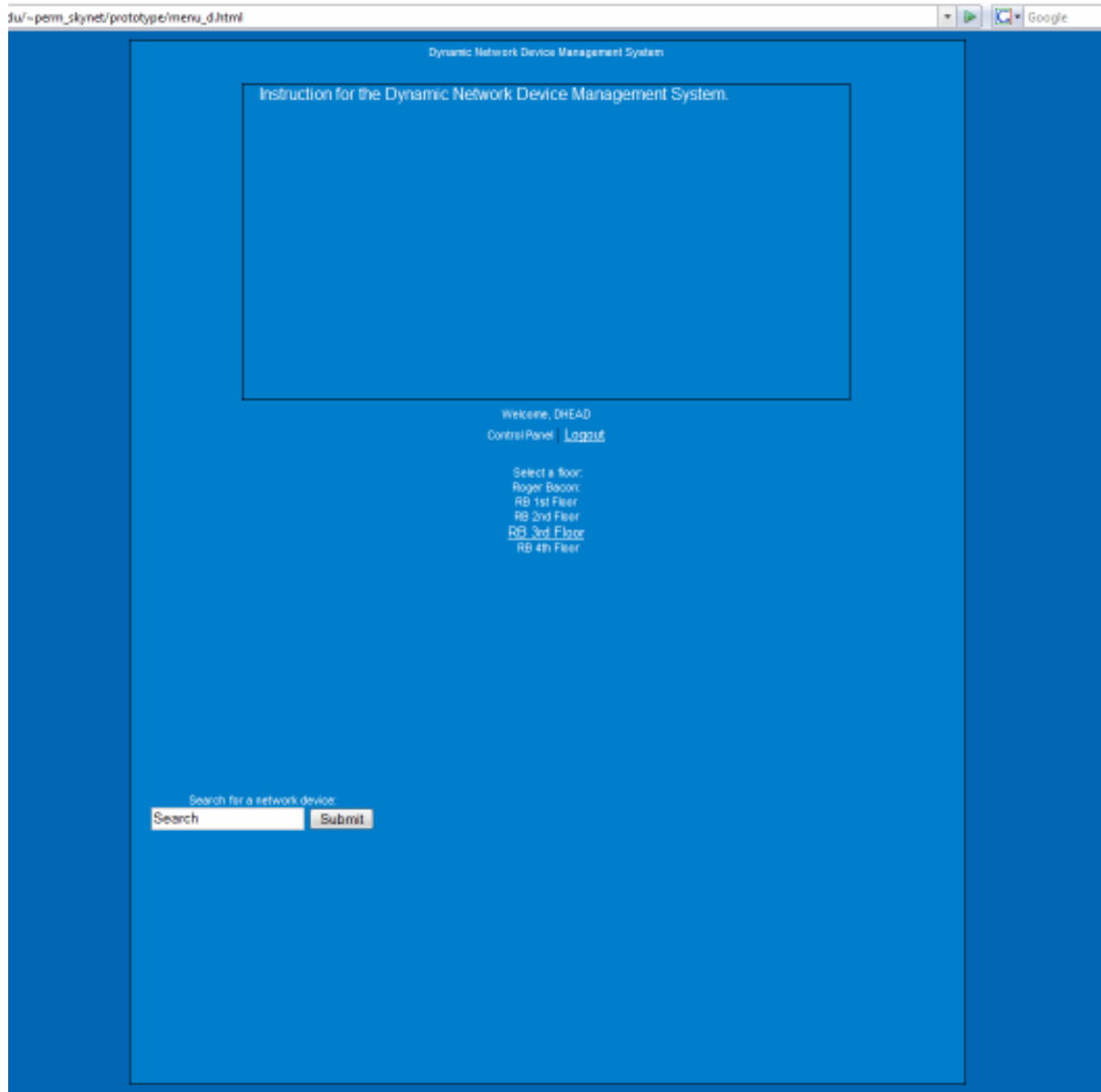
4.7 Search Dialogue:

The screenshot shows a web browser window with the address bar containing "Ju/~perm_skyne/prototype/search.html". The page title is "Dynamic Network Device Management System". The main content area has a blue background and contains the following elements:

- A large empty rectangular box at the top with the text "Instruction for the Dynamic Network Device Management System." inside.
- A welcome message: "Welcome, Admin".
- Navigation links: [Control Panel](#), [Administrator Control Panel](#), and [Logout](#).
- A "Select a floor:" label above a dropdown menu currently set to "Asset Tag Number".
- An "Enter search criteria:" label above a text input field containing "Search".
- An "Enter item:" label above another text input field containing "Search".
- A "Search" button.
- An "Advanced Search Options:" section with three rows of dropdown menus:
 - Building: Roger Bacon Hall
 - Floor: 1
 - Room: ###
- Network Device Type: Desktop
- An "Adv Search" button.
- Footer links: [Siena College](#), [Computer Science Department](#), and [Siena Software Engineering](#).

The search page is an administrator only page that allows the administrator to quickly search under any criteria he/she wishes. The administrator can search by the computers asset tag number or but putting in the building, hall and floor number along with the device they are trying to find.

4.8 Department Head Menu:



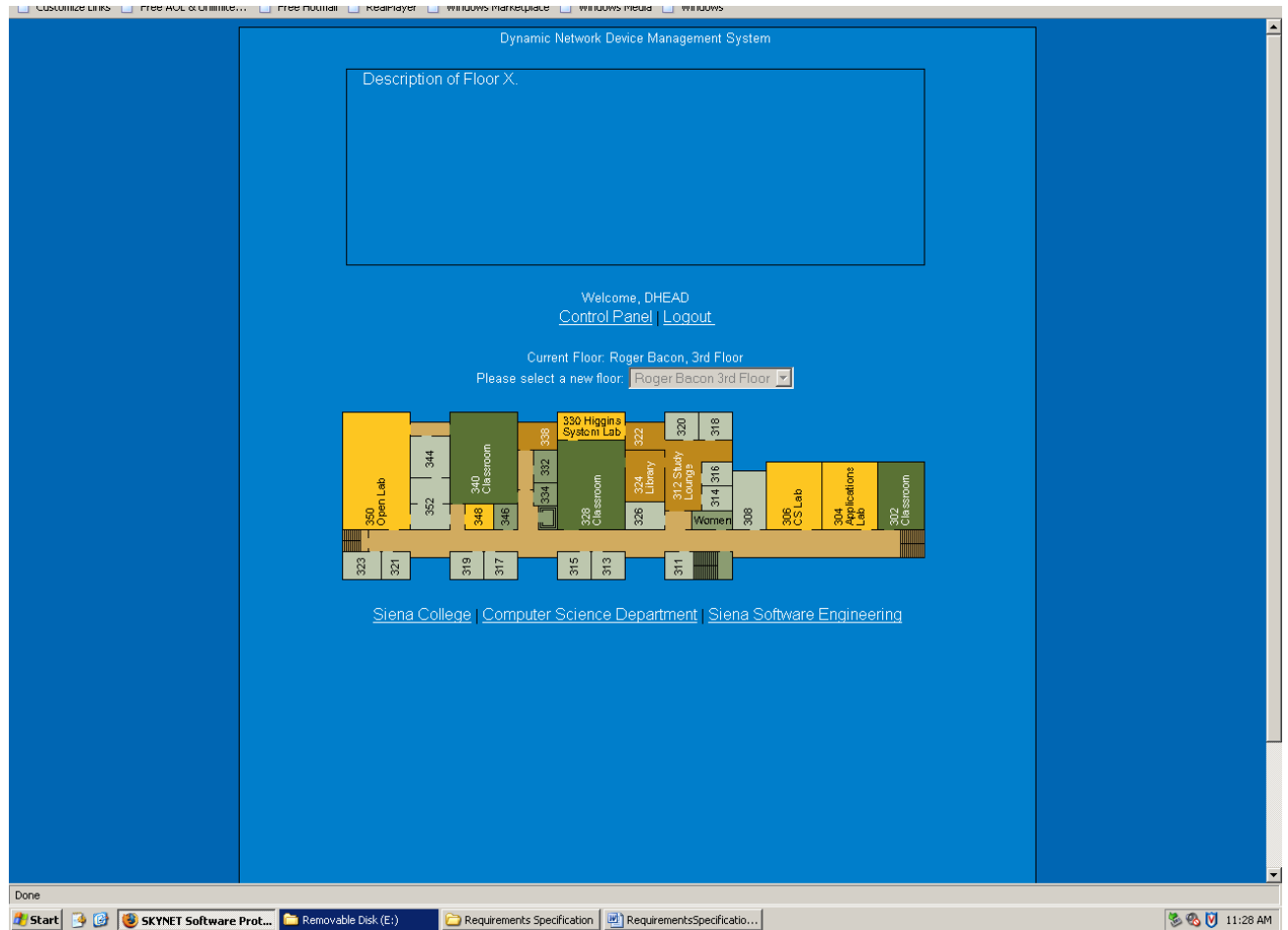
The department head menu page is different from the administrator page due to two considerable changes. The department head will only have access to their own floor. In this case the department head will only have access to the third floor of Roger Bacon. This page also contains links to the three websites we have designated for all users to have access to.

4.9 Faculty Menu:



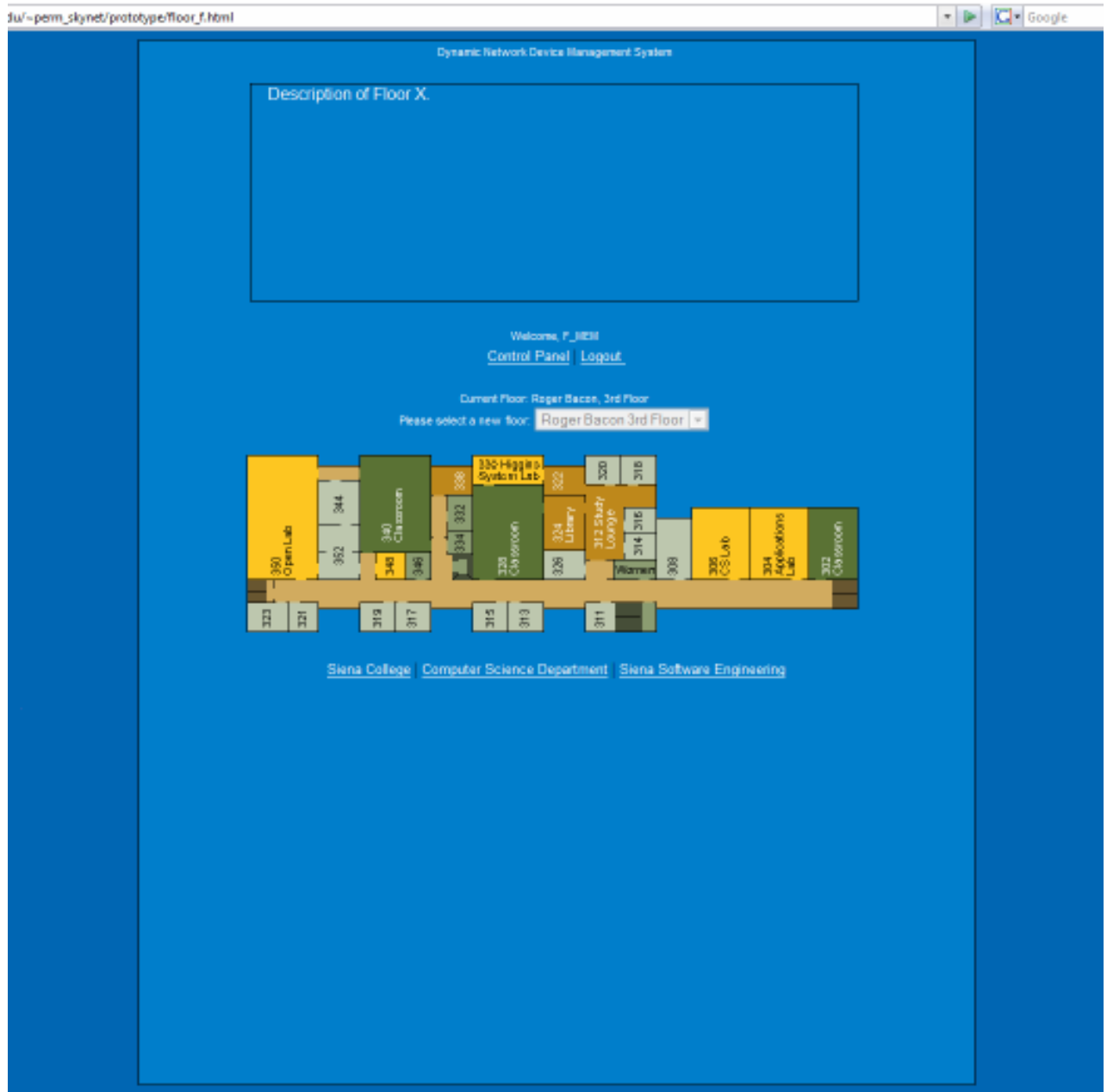
The faculty member will have the same access on the menu page as the department head. They will have access only to one floor whose description will show up in the description box. Since the difference between the department head and the faculty member is based on the rooms accessible on a floor, the access up to this point will not change and will be first noticeable on the floor page.

4.10 Department Head Floor Plan



The floor page for the department head is almost identical to the administrators however the department head will only have access to their own floor and the drop down menu will not allow for them to change floors. The department head will be able to access any room on the floor by clicking on the room (including the hallway).

4.11 Faculty Floor Plan



The floor page for the faculty member will be much like the department heads' view however they will only be able to click their own room to access. They will also be able to click the hallway where printers they use may be located.

5. Functional Requirements

5.1. Use-Case Analysis Narrative

SKYNET's Dynamic Network Device Mapping System will provide functionality for three user groups; *Administrator, Department Heads, and Faculty.*

Administrators will have all functions of the program available to them at all times.

When an *Administrator* logs in, he will be presented with a screen displaying Roger Bacon and Morrell Science Center. From there, the *Administrator* can choose to view a particular floor within one of the two buildings. Once a floor is selected, a visual floor map will display within the web browser showing all devices connected to the network. This information will be pulled from a database, which will be updated any time the administrator makes a change to the floor map from within the DNDMS. If the *Administrator* desires, he can zoom into the floor map to the room level. This way, an *Administrator* will be able to see all devices connected to the network from within the DNDMS.

The *Administrator* will be given access to make additions and subtractions from the current School of Science inventory, as well as from the list of currently connected network components. The *Administrator* will have the capability to select a room he wants to move a network device to from a pull-down menu that contains each room number in the School of Science.

When an *Administrator* wants to find a specific computer within the School of Science, he will no longer have to physically search each room in the buildings. With the DNDMS, *Administrators* will be able to search through the list of devices by such attributes as MAC address, serial number, and IP address.

An *Administrator* will also have the ability to add and remove *Department Heads* and *Faculty* from the DNDMS. If a new user is hired, the *Administrator* can add a new user and choose that new user's permissions. Alternatively, if a user leaves Siena, the *Administrator* can easily remove that person's permission to the DNDMS.

Department Heads will be able to view the network devices in their entire department.

Department Heads will not be able to make any changes to the floor plan, but can view all components, within their department, connected to the School of Science network.

Faculty, which includes anyone who works in the School of Science other than the *Administrators* and *Department Heads*, will be able to view the network devices in their office and any printers that are accessible to them. Faculty members will also not have access to make changes to the database or floor plans within the DNDMS – they will have read-only access of the view of their office and printers they may use.

5.2. Functional Requirements Inventory

The following list outlines the required functionality to be included in the final solution. The requirements are listed according to user case and then by screens the user will view.

General:

The Dynamic Network Device Mapping System is web-based.

Administrator User:

The Administrator user will have an account.

The Administrator user will have a username and password.

The Administrator will establish usernames and passwords for other users.

Login Screen:

The user will log in with correct username and password.

An incorrect login will provide an appropriate error message.

Welcome Screen:

The user will have access to a control panel on the welcome screen.

The user will be able to perform a search for certain devices or a specific device based on indicated search criteria.

The user will be able to select a floor of Roger Bacon Hall from a menu to view a floor plan layout.

The user will be able to select a floor of Morrell Science Center from a menu to view a floor plan layout.

The user will be able to logout from the welcome screen by clicking the "Logout" link.

Control Panel Index Screen (Administrators only):

The user will be able to change user passwords in the control panel.

The user will be able to change user permissions for devices in the control panel.

The user will be able to insert notes pertaining to a specific room or devices within a room.

The user will be able to log out from the control panel index screen.

User Control Panel Screen:

The Administrator user will be able to choose a user for which the password is to be changed.

The Administrator will enter a new password for the chosen user.

The Administrator will submit changes.

A message will appear indicating that a change has been accepted.

The Administrator user will be able to log out from the user control panel screen.

User Permissions Control Panel Screen:

The Administrator will be able to choose a user for which the permissions are to be set.

The Administrator will be able to search for or choose a device or set of devices for which the user's permissions are to apply.

The Administrator will be able to choose the permission level for the user with reference to the chosen device(s): read or restrict.

The Administrator will submit the changes.

A message will appear indicating that a change has been accepted.

The Administrator user will be able to log out from the user permissions control panel screen.

Room Notes Control Panel Screen:

The Administrator user will be able to choose a building and floor for the corresponding room.

The Administrator will be able to enter a room number for which to add notes.

The Administrator will be able to add notes into a text box for the chosen room.

The Administrator will submit the changes.

A message will appear indicating that a change has been accepted.

The Administrator user will be able to log out from the room notes control panel screen.

Floor Plan Screen:

A floor plan for the chosen floor will be displayed on the screen.

The building name and floor number will be displayed on the screen.

The Administrator user will be able to access the control panel from this screen.

Administrator user will be able to view information about all rooms and devices on the floor.

The Administrator will be able to choose a room from the floor plan to view a detailed room layout.

The Administrator user will be able to choose a different floor of either Roger Bacon Hall or Morrell Science Center from a drop down menu.

The Administrator user will be able to log out from the floor plan screen.

Room Layout Screen:

A room layout will be displayed for the selected room.

The existence and location of devices within the room will be indicated in the layout.

The building name, floor number, and room number will be displayed on the screen.

The Administrative user will be able to zoom out to the floor level diagram to which the room belongs.

The Administrator user will be able to choose a device within the room to view the information pertaining to that device.

The information for a specific device will appear below the room layout in a text box.

Any available notes for the selected room will be displayed on the screen for easy reference.

A legend will be displayed below the layout to denote the meaning of symbols in the layout.

The Administrator user will be able to log out from the room layout screen.

Search Screen:

The Administrator user will be able to search for a device on the following criteria:

- Asset Tag Number

- MAC Address

- Serial Number

Summarized search results will be displayed on the same screen.

Search results will be selectable to view more detailed results.

When selected, detailed search results will be displayed in the room layout view.

Faculty/Staff User:

The Faculty/Staff user will have an account established by the Administrator.

The Faculty/Staff user will have a username and password.

Login Screen:

The user will log in with correct username and password.

An incorrect login will provide an appropriate error message.

Welcome Screen:

The user will be able to select a floor of Roger Bacon Hall from a menu to view a floor plan layout.

The user will be able to select a floor of Morrell Science Center from a menu to view a floor plan layout.

The user will be able to logout from the welcome screen by clicking the "Logout" link.

Floor Plan Screen:

A floor plan for the chosen floor will be displayed on the screen.

The building name and floor number will be displayed on the screen.

Faculty/Staff user will be able to view information about devices within their office and printers accessible to them.

Rooms available for viewing will be highlighted so a Faculty/Staff user is aware of which rooms can be selected.

The Faculty/Staff will be able to choose a room from the floor plan to view a detailed room layout.

The Faculty/Staff user will be able to choose a different floor of either Roger Bacon Hall or Morrell Science Center from a drop down menu.

The Faculty/Staff user will be able to log out from the floor plan screen.

Room Layout Screen:

A room layout will be displayed for the selected room.

The existence and location of devices within the room will be indicated in the layout.

The building name, floor number, and room number will be displayed on the screen.

The Faculty/Staff user will be able to zoom out to the floor level diagram to which the room belongs.

The Faculty/Staff user will be able to choose certain devices within the room to view the information pertaining to that device.

The information for a specific device will appear below the room layout in a text box.

Any available notes for the selected room will be displayed on the screen for easy reference.

A legend will be displayed below the layout to denote the meaning of symbols in the layout.

The Faculty/Staff user will be able to log out from the room layout screen.

Department Head User:

The Department Head user will have an account established by the Administrator.

The Department Head user will have a username and password.

Login Screen:

The user will log in with correct username and password.

An incorrect login will provide an appropriate error message.

Welcome Screen:

The user will be able to select a floor of Roger Bacon Hall from a menu to view a floor plan layout.

The user will be able to select a floor of Morrell Science Center from a menu to view a floor plan layout.

The user will be able to logout from the welcome screen by clicking the "Logout" link.

Floor Plan Screen:

A floor plan for the chosen floor will be displayed on the screen.

The building name and floor number will be displayed on the screen.

Department Head user will be able to view information about devices within their entire department.

Rooms available for viewing will be highlighted so a Department Head user is aware of which rooms can be selected.

The Department Head will be able to choose a room from the floor plan to view a detailed room layout.

The Department Head user will be able to choose a different floor of either Roger Bacon Hall or Morrell Science Center from a drop down menu.

The Department Head user will be able to log out from the floor plan screen.

Room Layout Screen:

A room layout will be displayed for the selected room.

The existence and location of devices within the room will be indicated in the layout.

The building name, floor number, and room number will be displayed on the screen.

The Department Head user will be able to zoom out to the floor level diagram to which the room belongs.

The Department Head user will be able to choose certain devices within the room to view the information pertaining to that device.

The information for a specific device will appear below the room layout in a text box.

Any available notes for the selected room will be displayed on the screen for easy reference.

A legend will be displayed below the layout to denote the meaning of symbols in the layout.

The Department Head user will be able to log out from the room layout screen.

6. Performance Requirements

The Dynamic Network Device Mapping System will be designed to run on Internet Explorer 7.0, Firefox 2.0, and Safari 2.0.

The Dynamic Network Device Mapping System will be designed to be viewable on a computer monitor resolution of 1024 x 768 pixels.

7. Early Subsets and Implementation Priorities

The essential components of this system are:

- The ability to show computer attributes and locations on floor maps, navigate the maps and zoom into the floor maps to a room level.
- The ability of the Administrator to add, remove, and move devices to the floor maps.
- The ability for Administrators to set other user permissions.

- The ability for Department Heads to view the network devices in their entire department.
- The ability for Faculty to view their office network devices and the printers that are available to them.

8. Foreseeable Modifications and Enhancements

While this system is in development, and once it is completed, additional functionality may be added. We could potentially make it available for additional floors and buildings to be added later. Additionally, the team would work to make the software compatible with newer versions of browsers that are released after the software is released.

9. Acceptance Criteria

The Web Application Interface will be designed for multiple types of *Users* (Faculty, Department Head, and Administrator). (Please see Use Cases for more detailed *User* information). Each specific *User* will need to have certain abilities. The *Users* and abilities are outlined below. The *Functional Requirements* (Please reference Section 5) will also be revisited upon acceptance to ensure that **all** desired features have been included.

Faculty User(s)

- Navigate to Team SKYNET's Webpage
- Login
- View Office Map
- View Layout of own office

Department Head User(s)

- Navigate to Team SKYNET's Webpage
- Login
- View floor plan
- View layout of own office
- Edit aspects of specific offices

Administrator User(s)

- Navigate to Team SKYNET's Webpage
- Login
- View floor plan
- View device information
- View layout of a specific floor
- View layout of all offices
- View layout of a specific office
- Edit aspects of all offices
- Edit/Add/Delete User(s)
- Edit User(s) passwords

- Edit room layout(s)
- Edit device information
- Set User(s) permissions

10. Testing Requirements

A full test plan will be designed and implemented to be delivered with the final solution. Included in the test plan will be the unit test, the integration test, the system test, and the acceptance test. Specifically, the system will be tested to ensure that the data contained in the databases is only accessible to the specific *users* that have been given access. The system will also be tested to ensure that the login is secure, and that only authorized *users* will be able to login. Testing will also be done to ensure that only *administrative users* will be allowed to edit data. Finally, the system will be tested to ensure that the correct data is displayed properly, and in the correct location.

11. Appendix

11.1 Cross Reference Index

A Cross Reference Index will be provided in the preliminary design phase once all items and processes have been identified.

11.2 Glossary of Terms

Data Flow Diagram - A graphical representation of the flow of data through an information system.

Database – A structured collection of records or data.

Gantt Chart - A type of bar chart that illustrates a project schedule.

Linear Sequential Model / Classic Waterfall Model – A sequential software development model in which development is seen as flowing steadily downwards (like a waterfall) through various phases.

Media Access Control (MAC) - A data protocol that provides addressing and channel access control mechanisms that make it possible for several terminals or network nodes to communicate within a multipoint network (typically a local area network (LAN)).

MAC Address - A 48-bit hexadecimal (12 characters) number given to a device in a network. The address is normally assigned to a device, such as a network card, when it is manufactured.

Local Area Network (LAN) - A small computer network covering a small geographic area like a home, office, or building(s).

Component / Device - Any physical piece of a computer, including the circuitry inside of it.

Network Device - A component/device that is on a network (Printer, computer, scanner, etc.).

Prototype – An original type, form, or instance of an object serving as a typical example or standard for other objects of the same category.

Virtual - An entity that exists in a form that is not natural.

Users Group - A collection of logins that will have the same permissions given to them.

11.3. Timeline (Gaant Chart)

