IS 436 Systems Analysis & Design - 02

Team 6

05/14/2019

Capstone Project

Room Record Management System

Team Members:

Terry Harris
Mark Makris
Stephanie Schouw
Kawshi Perera

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0.0 Executive Summary

The Campus Planning office in the Facilities Management Department at UMBC has a goal of enhancing their room record management system to an automated online information system. With the current system, administrators manually input and update data into an Excel spreadsheet. Additionally, personnel who would like to retrieve this information does so by phone call request. With the volume of data and frequency of change, the system is becoming outdated, difficult to manage, and causes inaccuracies in information reporting. Providing up to date information, on available room resources on campus is essential to the University of Maryland, Baltimore County's future success. Our goal is to create a Room Record Management system that will improve efficiency in information collecting and sharing. The new system will automate tasks such as manually inputting data into spreadsheets and emailing requested documents. In addition, the new system will alleviate the need to physically survey rooms resulting in decreased man hours spent on the ground. While planning the Room Record Management System, it was important for the team to get a clear vision of the current system, so that we can further enhance it. The proposed information system focuses on creating more efficient processes for the day to day operation. The key features listed have the goal of streamlining the processes needed for the Room Record Management System: Electronic Change Request Management, Quick and Efficient Information Sharing, Annual Report Generation, Enhanced Accuracy for Data Collection.

Change regarding room allocation at UMBC is abundant. With electronic change management, the campus office staff will spend less hours on the ground surveying rooms. Emails will be automatically emailed to approved staff members, so that any change in room use can be recorded. Instead of personally contacting staff via phone for information on available rooms, personnel will be able to authenticate themselves online and retrieve the information they need. The system will also be configured to generate reports needed state audits. With these new processes in place, the information that is recorded will be better up to date and more accurate. In conclusion, the need for an automated approach to room resource allocation will benefit UMBC by increasing accuracy in the information that is recorded. The new system will expedite information sharing by allowing users to retrieve information themselves. Reports will be produced on demand, and man hours spent on the ground will be dramatically reduced. The Room Record Management System will provide a solution for UMBC's increasing need to allocate, change, and share information effectively and efficiently.

This section contains the information of the team members working on the project and information on the project we are requesting to work on.

Section 1.0 Systems Request

Team Member	Phone Number	E-mail
Mark Makris	443-510-1687	mmakris1@umbc.edu
Terry Harris	240-883-4199	harris21@umbc.edu
Stephanie Schouw	240-315-7051	schouw1@umbc.edu
Kawshi Perera	240-755-5266	kperera1@umbc.edu

Fig 1.0

1.1 Bio & Team Roles
Mark: Senior IS major-D3 Lead, D1 Administrator
Terry: Senior IS major- D1 Lead, D2 Administrator
Stephanie: Senior IS major-D4 Lead, D3 Administrator
Kawshi: Senior IS major- D2 Lead, D4 Administrator

1.2 Team Meeting Time:
Friday mornings 11:00 am

1.3 Project Sponsor: Sean Holland, CAD Specialist, Facilities Management – Campus Planning, sn.hllnd@umbc.edu, 410-455-2933

1.4 Problem Statement: There is no efficient way to track the usage of rooms on campus to evaluate what additional resources are needed for each department and to decide on any further changes or expansions needed. This causes them to lose credibility with the school for the information they keep. In addition, there is a delay in receiving information for when the function of the room has changed which can cause the information to be inaccurate. The data is currently stored on an Excel file and currently holds close to 15000 rows. This results in inaccuracy when inputting and retrieving data. There are duplicate rooms listed on the spreadsheet because of input error. (ex: Room 301 listed as 301 and 301A). The older system is very time consuming because it takes time to individually go through each row on the spreadsheet.

1.5 Business Need: UMBC Campus Planning collects data manually on the uses for each room in all buildings across campus. This data is used to make sure there is enough space and resources for each department on campus. UMBC must also report this information to the State. The usual information collected in each room is the function of the room and which department utilizes it.

Additionally, departments sometimes request information regarding which rooms on campus are available to them. This information is now manually sent by request. A centralized repository of the data would allow departments to retrieve this information by themselves.

1.6 Business Requirements: Using a Centralized Facilities Management system would assist in addressing any challenges that Facilities Management faces while also cutting down on costs and time spent to gather these statistics. The system would help in quick and efficient decision making. The system will involve functionality such as:

- Submitting help tickets online
- Asset Management
- Inventory Management
- Reporting
- Centralized repository of information collected

1.7 Business Value: Right now, UMBC employs students to conduct routine site surveys of the buildings to determine how they are being utilized. The student workers are sometimes employed during the summer and this sometimes results in inaccurate information. This reporting is typically done twice a year, and there are sometimes considerable delays in gathering these statistics. With an online Information System, the planning office can send a formal document to the Dean or Administrator of the building to the survey and collect the information that way. This Information System would reduce labor hours and help with the delay of information. When there is the inaccuracy of information reported, the loses credibility. With an online system, site surveys can be recorded quarterly, as opposed to twice a year and can help better plan campus space resources.

1.8 Special Issues or Constraints:

- The process of gathering information has been done manually for years. Introducing a new system to the staff can be tedious as time and resources have to be spent training them.
- Implementing a brand-new system can be costly, and a working prototype will cost a considerable amount.

This section contains the Functional & Non- Functional requirements for the Room Record Management system.

Section 2.0 Requirements Definition and Use Cases:

2.1 Functional requirements:

2.1.1 Inventory Management (Process-Oriented)

1.1 The system shall allow users to view current inventory in order to determine if further rooms need to be allocated

1.2 The system shall allow users to update current inventory in order to check the reason for room occupancy.

1.3 The system shall allow any users to view a room.

1.4 The system shall record room size and functional use.

1.5 The system shall record when rooms were last updated and checked.

1.6 The system shall request information from departments about the purpose of each room.

2.1.2 Administrator Management (Process-Oriented)

2.1 The system shall verify any room detail updates through the administrator.

2.2 The system shall provide details about grants, contracts, and audiovisual.

2.3 The system shall provide inventory reports with room size and usage details for the campus planning office.

2.4 The system shall allow staff to retrieve room usage details on departmental rooms.

2.5 The system shall allow details of room such as occupancy and reason for use to be easily transferable to people.

2.6 The system shall provide room location, use, and user.

2.1.3 Reporting (Information-Oriented)

3.1 The system shall generate an annual report on room information to be delivered to the State to get approval for funding of proposed buildings.

3.2 The system shall provide business reports for the campus planning office for

future projects so that funding will be approved.

3.3 The system shall provide reports on changes made to the database so that campus planning office has an update inventory list.

2.2 Nonfunctional requirements:

2.2.1 Operational:

1.1 The system shall update all the rooms in 2 months to provide an accurate inventory list.

1.2 The system shall run on any device including Windows, Mac and Android.

1.3 The system shall reduce the number of workers required to operate to cut labor costs.

2.2.2 Performance:

2.1 The system shall remain active throughout routine maintenance. The maintenance window will be from 1st to 15th January every year.

2.2 The system shall be available for use 24 hours per day 365 days per year.

2.3 The system shall generate a PDF in less than 10 seconds.

2.2.3 Security:

3.1 The system shall have access control based on admin and user roles.

3.2 Passwords will not be viewable at time of access or at any other time.

3.3 Only administrators will be able to view sensitive information pertaining to documents sent to the state.

2.2.4 Cultural & Political:

4.1 The system shall protect all confidential data collected according to State rules and regulations.

4.2 The system shall comply with Industry standards.

4.3 The system shall operate in English.

This section contains the Interview Report and Interview transcript.

2.3 Interview Report:

Name	Position	Date & Time of Interview
Sean Holland	CAD Specialist II	March 1 2019 10:00 am
Heather Bishop	Facilities Planner	March 29 2019 10:00 am

Fig 2.0

2.4 Person Interviewed & Title:

Sean Holland, CAD Specialist I at UMBC Facilities Management

2.5 Interviewer:

Kawshi Perera & Mark Makris

2.6 Purpose of Interview:

- To gather information about how the current system works and its advantages/disadvantages.
- To get information about the stakeholders of the current system.
- To gather required information requirements for the future system.

2.7 Summary of Interview:

- Described current system briefly and some of its major flaws: labor and time intensive
- Currently holding all data in an Excel Sheet and it is almost maxed out.
- Information needs to be electronically available so everyone can access it without reaching out to the Facilities Mgmt. Office. (Time Intensive to go back and forth)
- Discrepancies in accuracy with the data collected
- Most important payoff of future system would be eliminating the cost of labor of hiring students to track data and time spent on training.

Open Items:

- Working on scheduling the second interview
- Collect more artifacts to get better understanding of current system

Detailed Notes: See attached transcript

2.8 Interview Transcript

- What is your Name and Position
  - Sean Holland CAD specialist
- What is your past work experience in the field?
  - University of Baltimore
  - Drafting to design
  - CAD since 2003
- How long have you been with UMBC?
  - 10 years
- Can you describe your typical work day?
  - Range of positions, floor plans up to date, work on specs and standards (part archivist)
- Describe your current system briefly.
  - Excel table controlled by one person
  - At least 50 columns
  - 15000 spaces on campus in the excel table
  - Tracks grants and contracts, audio and visual (smart classroom, etc.)
- When did you realize that the current system was not very effective?
  - 10 years ago
  - Need to report to the state yearly
  - Classroom names have certain specific names but are given general names by others (dance studio = lab)
- The information that is collected is shared with the State, what is the purpose of this?
  - Funding and shares everything
  - Controlled by sq. footage = how much money you need to run it
- Can you describe an example of when you would need to use the system?
  - Yearly basis, fluctuation throughout the year dependent on classroom needs
  - Departments need to review the data as well
  - Info currently isn't accurate
  - November - February
- What would you see as its main functions and features of the new system?
  - Being able to share info easily (not manually likely)
  - Sending info is a disconnect
  - Graphical and tabular data together in new system
  - Electronically and anyone can read it and modify it
  - Not having to hire students to send them out (typically sent out in the summer)

    - No alerts when HR hires/fires someone
    - Need as close to deadline as possible (otherwise inaccurate)
- What would be the most important function if you could only have one?
    - Everyone needs to be able to access the info (electronically)
    - They need to be able to update/modify info so there's less inaccuracies
    - Need a backdoor into PeopleSoft so they can be the final approval
- How would this new system benefit other people in the organization?
    - Gather info quickly
    - Helps to make decisions
- What are some of the problems you face on a daily basis?
    - Out of date info
    - Ex: 231 and 231 A discrepancy (2 doors to same lab)
    - What is the most important payoff you are looking to achieve? Increased revenue? Decreased cost of labor? Time Management?
    - Everything
    - Hiring students takes a lot of time and money (at least 3 students)
        - 40 hours of work
        - Scheduling times, training, they're only here for 2-3 years, some quit, etc.
    - Students go from building to building and survey rooms
- Students might not know how to find info & Some HR shorten names.

2.9 Person Interviewed & Title:

Heather Bishop Facilities Planner at UMBC Facilities Management

2.10 Interviewer:

Mark Makris

2.11 Purpose of Interview:

- To gather information about security controls in the proposed system.
- Gather additional requirements for the system such as being user friendly and who has access to what.

2.12 Summary of Interview: Data scrubbing takes a long time and is a tiresome process. Information is frequently sent back so that corrections must be made. Users need to have access to the information and the Facilities Management Office needs to be cut out as the middle-man. The system needs to be very user friendly and only be available to personnel who request the information on a frequent basis. Only Heather

can modify and approve the data. She is responsible for the data entered so she needs to have additional access control methods when other users are using the system.

Open Items: Gather additional artifacts.

2.13 Detailed Notes: See attached transcript

- What is your name and position?
    a. Heather - Facilities planner

- How long have you been with UMBC?
    a. 2012
    b. What is your past experience in the field?
    Similar role at Towson, before that an architect firm

- What are some of the most common issues that you deal with on a daily basis?
    a. Frequent info sent back, have to manually format it to fit current system (excel or PeopleSoft)
    b. Wants notifications of markups people make
    c. Wants to constrain what is being used in PeopleSoft (nicknames, middle names, etc. confuses people, needs to use the PeopleSoft official names)

- What is the time impact using the current system has on your daily schedule?
    a. Data scrubbing can take double/triple the time it takes
    b. Need to make sure room exists
    c. Can be looking at floor plans, CAD plans, etc. (looking at 5 different things at once)
    d. Employees are not all employed by UMBC, need flexibility for people not in the HR PeopleSoft system
        i. Custom field with explanation (ex: harry smith employed by NIH since 2005)

- Being a facilities planner do you have to access sensitive data? Has security ever been a concern?
    a. Some research is classified, students need to be escorted to lab
    b. Need to tag special restricted rooms (even heather/sean need to be escorted by building manager for certain areas)

    c. Floor plans need to be restricted to certain people (don't want shooters knowing layout of school)

- Do you want the system to be easily accessible to users who are not technologically savvy?
    a. Users can request info instead of going through Sean/heather
    b. People who frequently request info (people they work with) would be given access
    c. Ask email, professor, phone number, etc.

- Should the system be accessible for everyone or just the school departments?
    a. Only identified individuals (not public)
    b. Ex: capstone project had to get permission that would let users find the exact room in a building (gave students floor plan)

- What are some security measures that you use to protect confidential data in the current system?
    a. Students need access to look at data (umbc email) but once they have data, no way to ensure they don't modify/use it to their own benefit
    b. Heather is the only one who has authorization (Sean could make changes, but only if it's an emergency/can't wait)
        i. Wants to just "approve and make change" when Sean uploads mass amounts of data

- With the new system who will have admin rights to enter and modify data?
    a. No, heather should be able to hit an approve before it enters the system

- Sean also mentioned that hiring new recruits to manually collect data is a time consuming and expensive process. Has this been a concern of yours as well?
    a. We'll still have students involved, otherwise every other decision would go through her
    b. Only 1 student doing data scrubbing
    c. Our system helps maintain system instead of students

Need to look up categories and people get confused, wants to be able to search job title and fill in the job title

-One wrong button click could make it that you can't schedule classes in that classroom, could really screw up system

-heather has access to the registrar, so all room changes (classroom switches to office, capacity changes, etc.) goes through her
-manually creates email to 5 people and a dept. Person if it's a department Assigned room, wants template emails (temp. Going offline, permanently going offline, etc.) to send to those 5 people

This section contains the Observation Report of the Room Record Management System.

2.14 Observation Report

Facilities Management Department at UMBC
01/03/2019

Team 6 visited the Facilities Management Office (FMO) at UMBC on 01.03.2019. The interview went smooth as planned and we observed the following while we were there. The FMO was an office in the Parking Services building. Their main objective was to look over all planning, design, operations and maintenance of all 70 buildings at UMBC. The office has a total staff of 4 and they each have a desktop. The office is very neat and almost all of their information is stored electronically. The current information management system is a single Excel file that is controlled by 1 person. There are currently 15000 spaces on campus that are tracked by this single Excel file and the file is about to be maxed out. There is a gap of knowledge between the Campus Planning Office and the current occupants of these rooms. Our interviewee Sean Holland explained to us how difficult it was becoming for them to be up-to-date with gathering information as room data gathered were constantly changing and a bigger problem was how the data was outdated.

The FMO recruits' students to gather information about rooms and they walk to each room and gathers information such as room number, square footage of the room, what it is used for and who occupies it etc. This is both labor and time intensive. While we were at the office, we did not notice any organizational issues but we noticed how the current system was not very effective given the improvements and new additions on

UMBC. When our system is implemented, the information management would be faster and efficient and will automate the whole process.

This section contains the Artifacts gathered during the tour of the office space.

2.15 Artifacts:

Artifact 1: Preview of Current Excel File

CAHSS.xlsx Open with

SP_ID	BLDG_ABBRVTN	SP_SQFT	FLR_SQFT	ROOM_No	ROOMUSE	RM_USE_CODE	DeptId1	DeptName1	OrgId1	OrgName
905_004	PAHB	89.0349732	89	004	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_006	PAHB	407.8267848	408	006	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_007	PAHB	570.7592947	571	007	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_008	PAHB	152.2781543	152	008	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_009	PAHB	475.2289971	475	009	CLASS LAB	01.200.10	10023	Theater	10023	Theate
905_010	PAHB	109.9204856	110	010	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_011	PAHB	285.6879245	286	011	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_012	PAHB	513.0439118	513	012	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_013	PAHB	493.1218319	493	013	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_014	PAHB	248.6545139	249	014	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_101C	PAHB	152.6202082	153	101C	CHAIR OFFICE	01.300.10	10201	Dean of Arts Humanities Soc Sc	10201	Dean of Arts Humanities Soc S
905_102	PAHB	1931.116681	1931	102	CLASS LAB	01.200.10	10023	Theater	10023	Theate
905_102A	PAHB	50.56725349	51	102A	CLASS LAB SERVICE	01.200.15	10023	Theater	10023	Theate
905_102B	PAHB	135.1170321	135	102B	CLASS LAB SERVICE	01.200.15	10023	Theater	10023	Theate
905_102C	PAHB	6.584201395	7	102C	CLASS LAB SERVICE	01.200.15	10023	Theater	10023	Theate
905_103	PAHB	2626.877578	2627	103	THEATRE	01.600.10	10023	Theater	10023	Theate
905_103A	PAHB	136.1624594	136	103A	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_103B	PAHB	163.4313452	163	103B	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_103C	PAHB	48.76524626	49	103C	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_103D	PAHB	285.8694068	286	103D	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_103E	PAHB	126.2559481	126	103E	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_103F	PAHB	625.6835334	626	103F	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_103G	PAHB	85.35060637	85	103G	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate
905_103H	PAHB	80.42898143	80	103H	THEATRE SERVICE	01.600.15	10023	Theater	10023	Theate

CURRENT REQUEST_20170728

fig 2.1

Artifact 2: Current layout of building (Fine Arts Building)

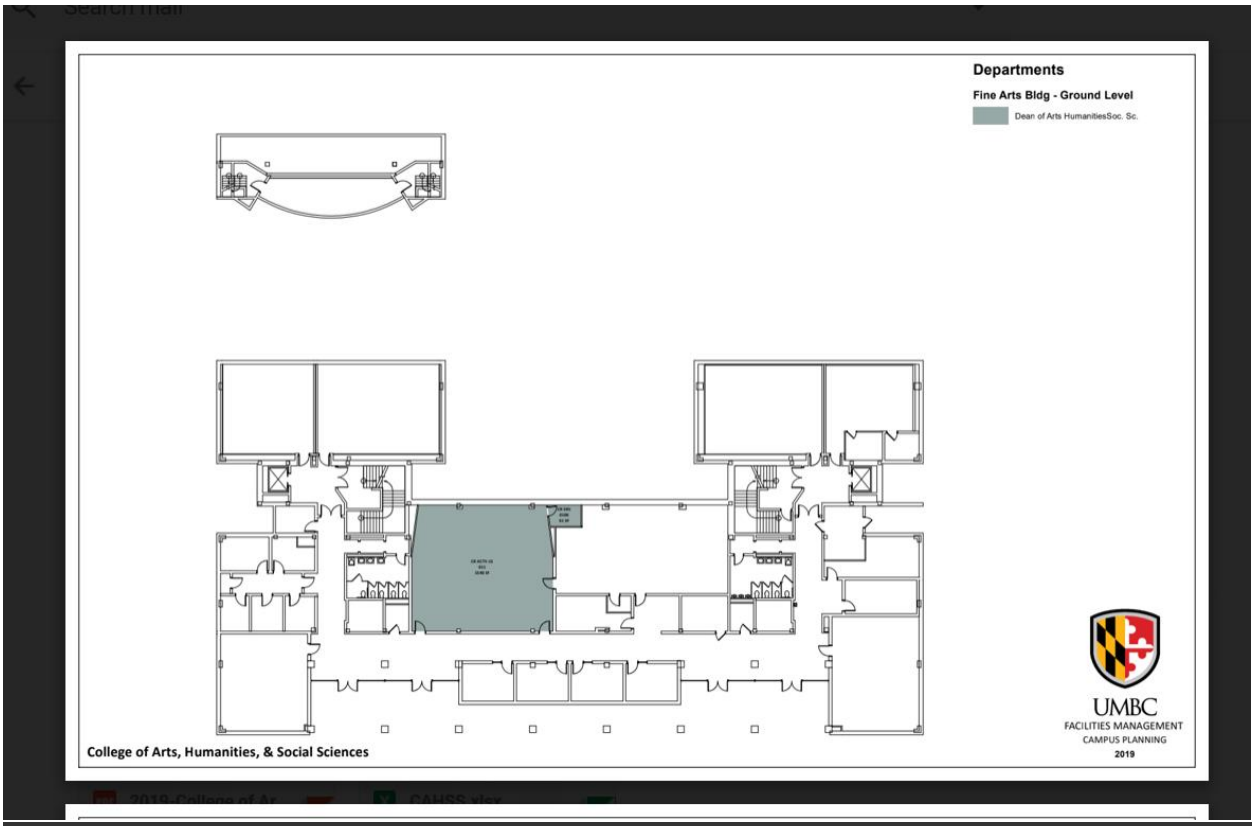


fig 2.2

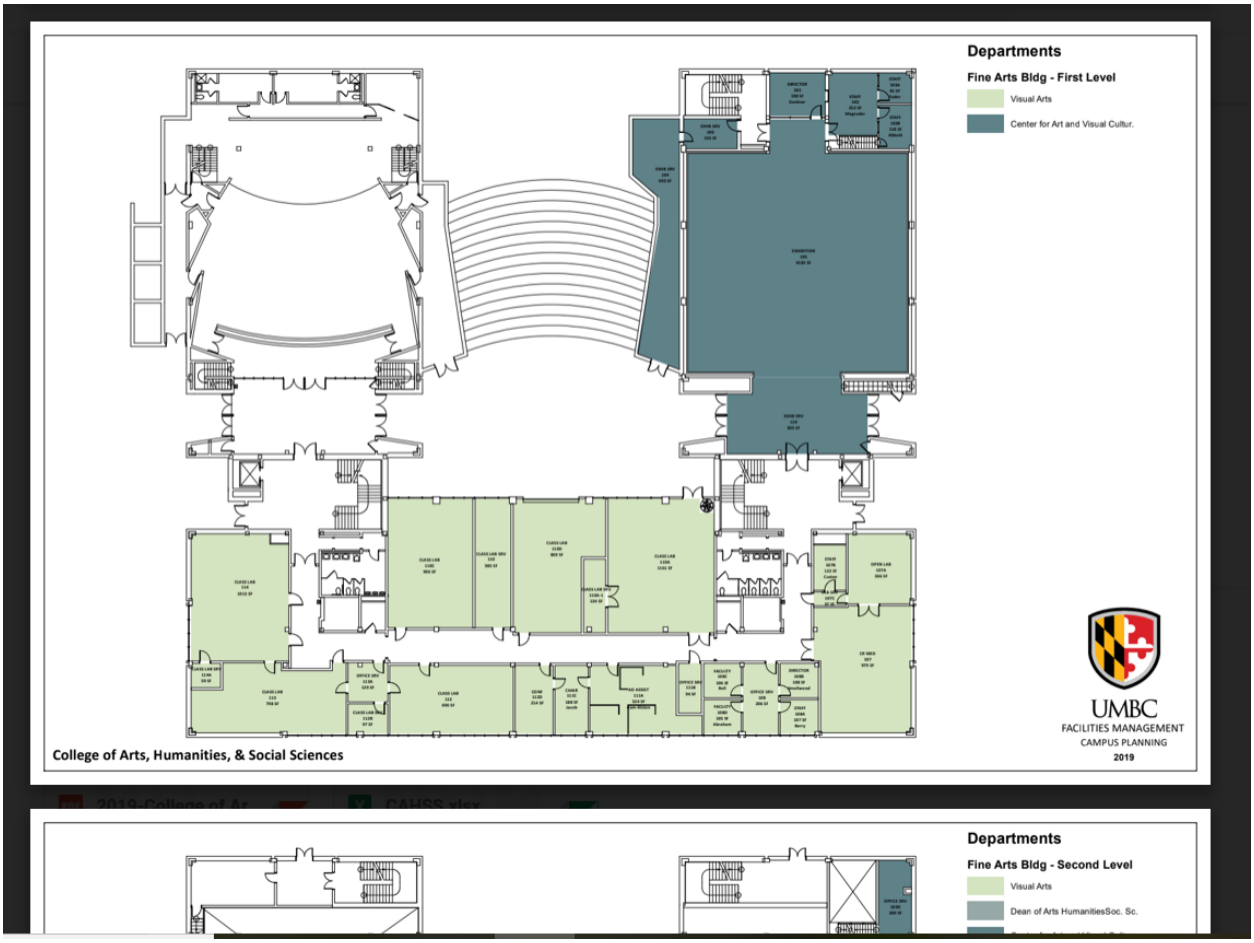

Departments
Fine Arts Bldg - First Level
Visual Arts
Center for Art and Visual Cultur.
College of Arts, Humanities, & Social Sciences
UMBC
FACILITIES MANAGEMENT
CAMPUS PLANNING
2019
Departments
Fine Arts Bldg - Second Level
Visual Arts
Dean of Arts HumanitiesSoc. Sc.

fig 2.3

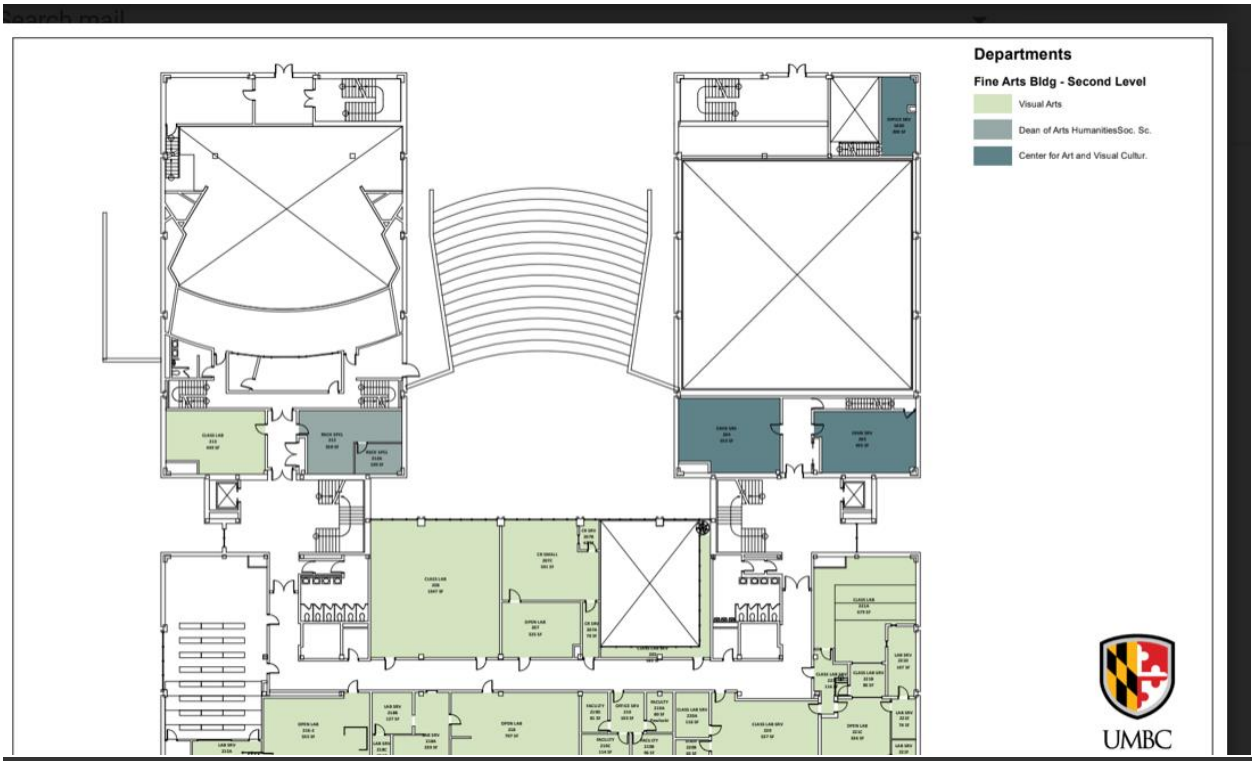

Departments
Fine Arts Bldg - Second Level
Visual Arts
Dean of Arts HumanitiesSoc. Sc.
Center for Art and Visual Cultur.
UMBC

fig 2.4

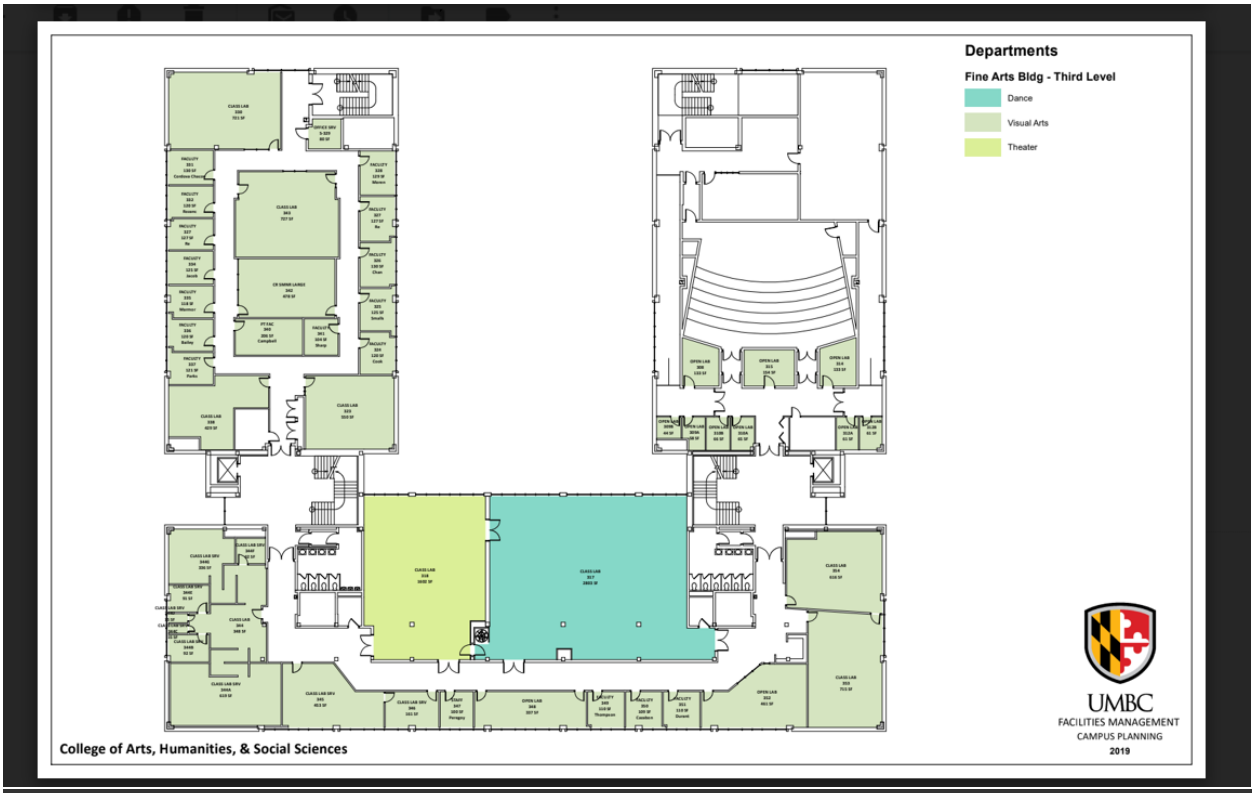

Departments
Fine Arts Bldg - Third Level
Dance
Visual Arts
Theater
UMBC
FACILITIES MANAGEMENT
CAMPUS PLANNING
2019
College of Arts, Humanities, & Social Sciences

fig 2.5

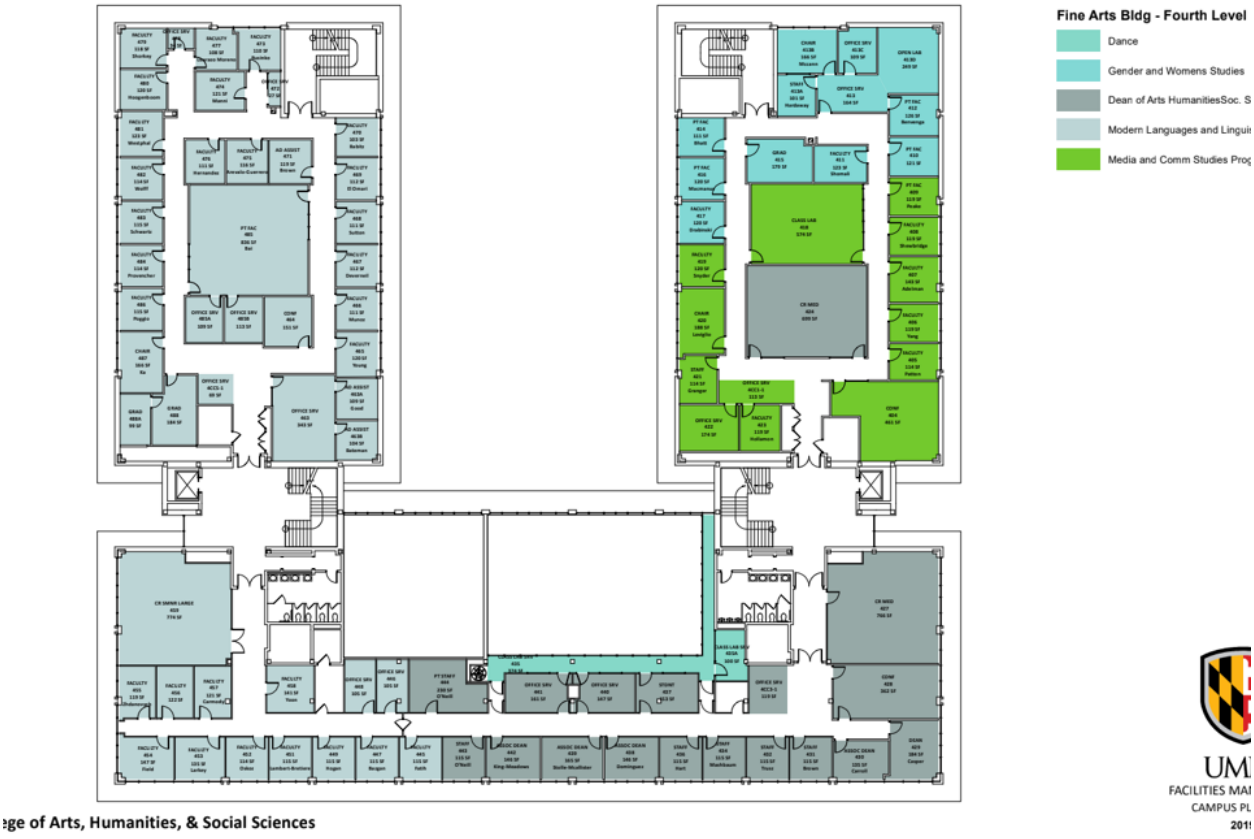

Departments
Fine Arts Bldg - Fourth Level
Dance
Gender and Womens Studies
Dean of Arts HumanitiesSoc. S
Modern Languages and Linguis
Media and Comm Studies Prog
ege of Arts, Humanities, & Social Sciences
UM
FACILITIES MA
CAMPUS PL
201

fig 2.6

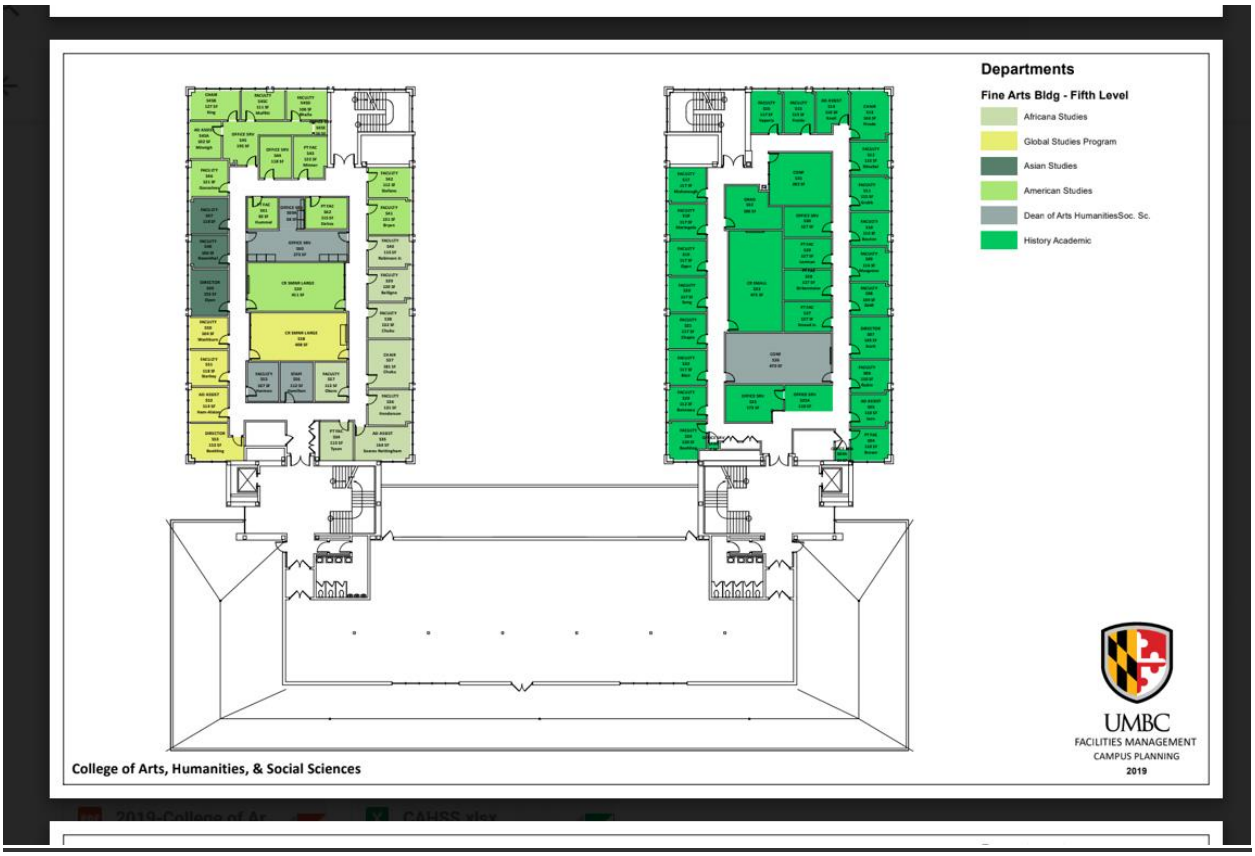

Departments
Fine Arts Bldg - Fifth Level
Africana Studies
Global Studies Program
Asian Studies
American Studies
Dean of Arts HumanitiesSoc. Sc.
History Academic
College of Arts, Humanities, & Social Sciences
UMBC
FACILITIES MANAGEMENT
CAMPUS PLANNING
2019

fig 2.7

This section contains the Use Case Analysis of the Room Record management System.

2.15 Use Case Analysis

Use case 1:

Use Case Name: Generate Annual Report Form
Actor: Administrator
Description: This use case describes how the administrator can generate a PDF of the form that is annually reported to the state of Maryland.
Trigger: Administrator requests an annual report through the electronic system. **Type: ☑External ☐Temporal**
Preconditions: ● Administrator is authenticated. ● Inventory Management datastore is available and online. ● Administrator Management datastore is available and online. ● Reporting datastore is available and online.

Normal course:	**Information for Steps:**
● The administrator requests the annual reporting form from the system using a Report ID number. ● The system checks if there is any size and use data available on classrooms. ● If there is size and use data available on classroom information the system notifies the administrator and an annual report form is generated and the use case ends. ● If there is no size and use data available on classrooms the system asks if the administrator would like to view the data manually. ● If the administrator views the data in the database, they can create their own annual report form manually through the system by inputting/modifying the data directly in the database.	Report ID Available Size and Use Data Generates Report Automatically Size and Use Details Size and Use Data

Postconditions:

- Annual report form is stored on the system.
- Administrator is sent a copy of the annual report in a confirmation email

Summary

Inputs	**Source**	**Outputs**	**Destination**

Report ID Size and Use Data Input	Administrator Administrator	Annual Report Size and Use Data Available Data	Administrator Administrator Classroom use datastore

fig 2.8

Use case 2:

Use Case Name: Update room details
Actor: User
Description: This use case describes how a user can update the size and use information about a room
Trigger: User requests to change the information on one of the rooms. **Type: ☑External ☐Temporal**
Preconditions: ● User is authenticated. ● Record of the room exists.

Normal course:	**Information for Steps:**
● The user selects a room using its location to update the size and use information for. ● The system checks if there is any data available on the classroom selected in the database and shows it to the user if there is. ● The user changes the information of the selected room ● The update request gets sent to an administrator to be approved. ● If approved the changes gets sent to the database and the old information gets archived.	Room location Current size and use data New size and use data New room data Old room data

Postconditions:

- Old information is archived.
- Database is updated with the new information.

Summary

Inputs	**Source**	**Outputs**	**Destination**
Room location	User	Current size and use data	User
New size and use data	User	New room data	Database
		Old room data	

fig 2.9

Use case 3:

Use Case Name: Retrieve Room Details
Actor: User
Description: This use case describes how a user can retrieve information on available room space for their department
Trigger: User requests information on available rooms **Type: ☑External ☐Temporal**
Preconditions: ● User is authenticated. ● Inventory Management datastore is online. ● The Inventory Management datastore is up to date.

Normal course:	**Information for Steps:**
● The user accesses the system and authenticates themselves with their campus login credentials. ● The user inputs their department name into the inventory database system ● The system accesses the Inventory Management datastore. ● The system outputs available rooms for the department.	Users Campus Login Department name Current database information Available room details

Postconditions:

- Inventory management database is accessed
- User receive details about the rooms available for each department.

Summary

Inputs	Source	Outputs	Destination
Campus Login	User	Available Rooms	User

fig 2.10

This section contains diagrams of the flow of information throughout the system.

Section 3.0 Process Modeling

3.1 Context Diagram:

This diagram shows all the inputs and outputs from the entities in the system. It shows what each entity gives and gets out of the system.

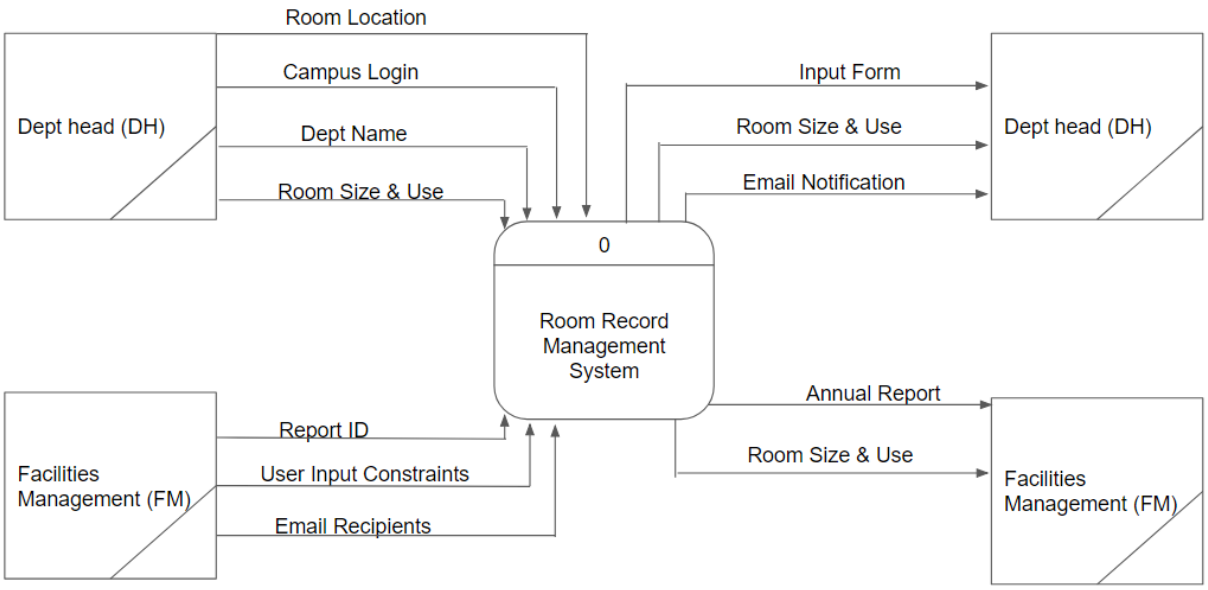


fig 3.1

3.2 Level 0:

This diagram shows how information flows between the entities, data stores, and the five main processes in the system.

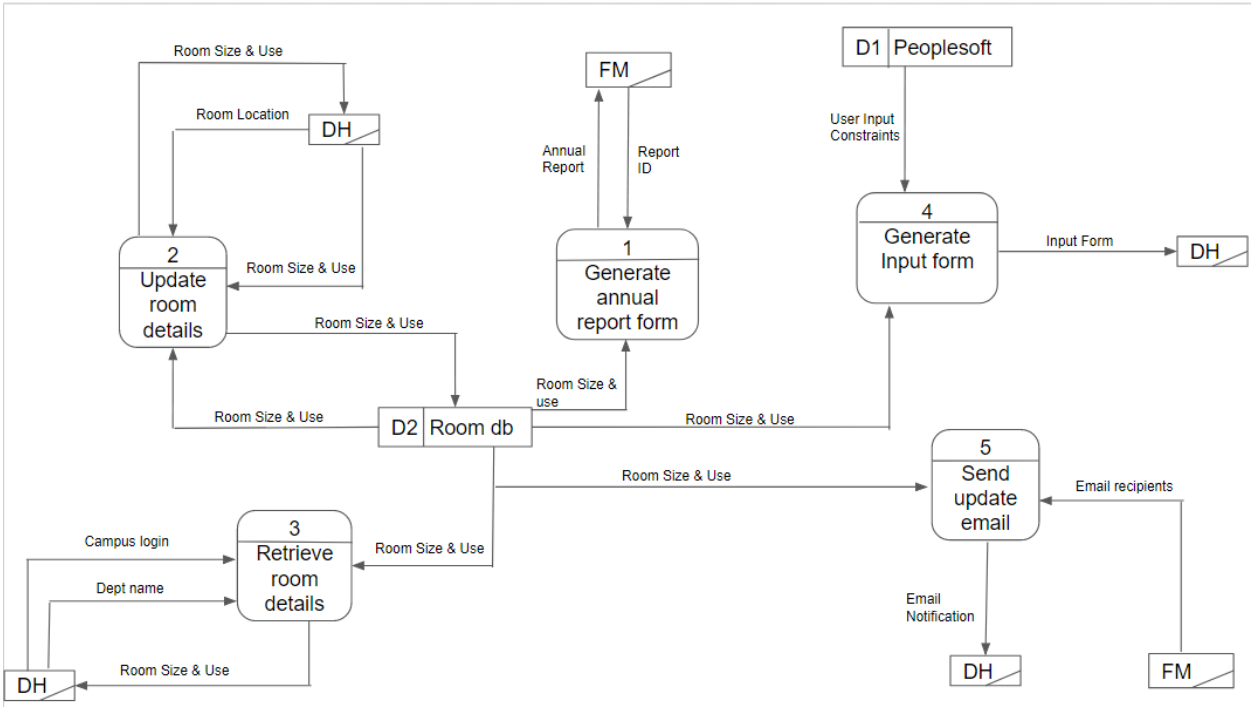


fig 3.2

3.3 Process 1 - Level 1:

This diagram breaks down the process of generating an annual report form for the facilities management.

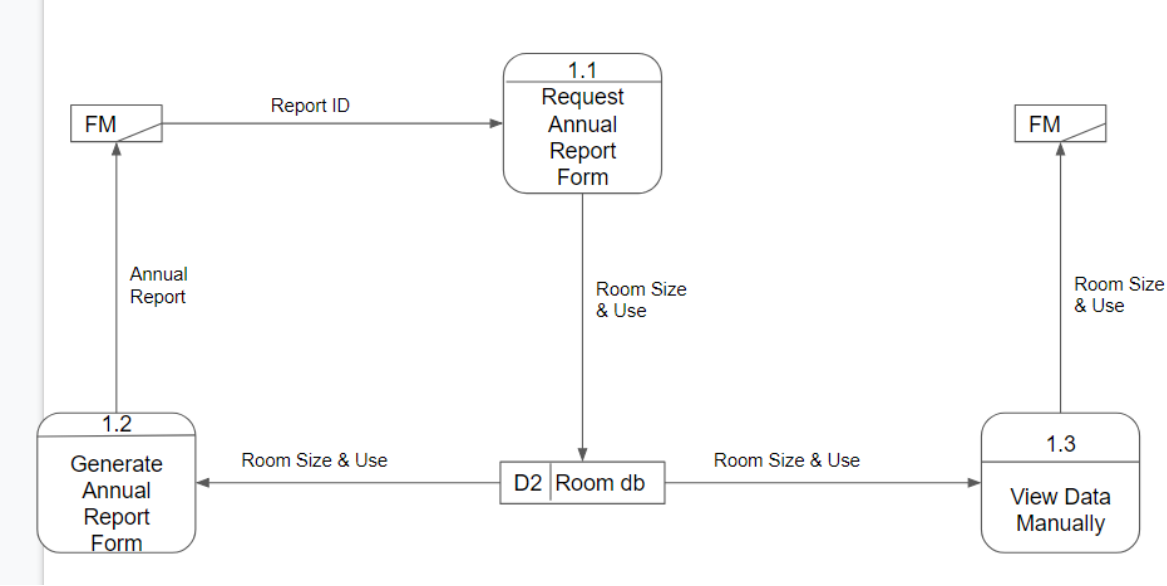


fig 3.3

3.4 Process 2 - Level 1:

This diagram breaks down the process of updating information in the database. It includes selecting rooms to be updating and verifying all the information involved.

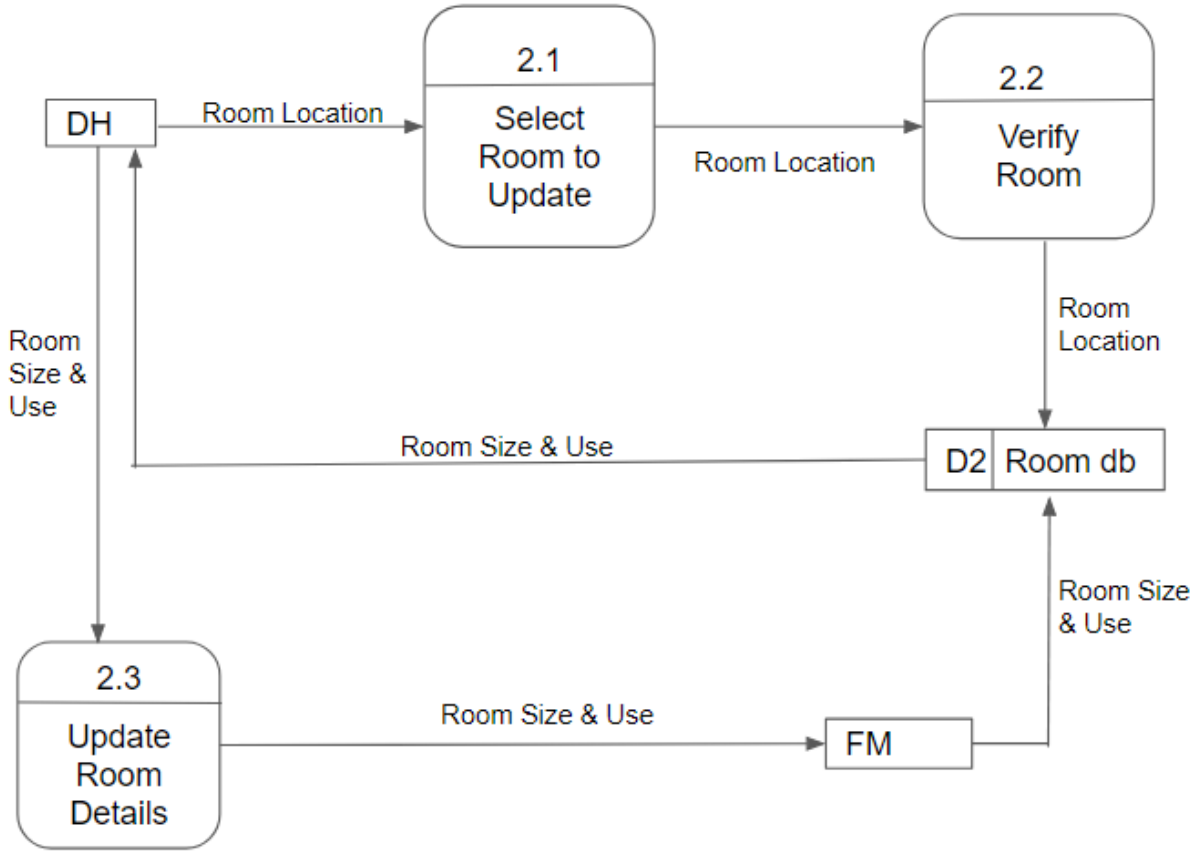


fig 3.4

3.5 Process 3 - Level 1:

This diagram breaks down the process of retrieving information from the database. It includes verification steps and retrieving the relevant information.

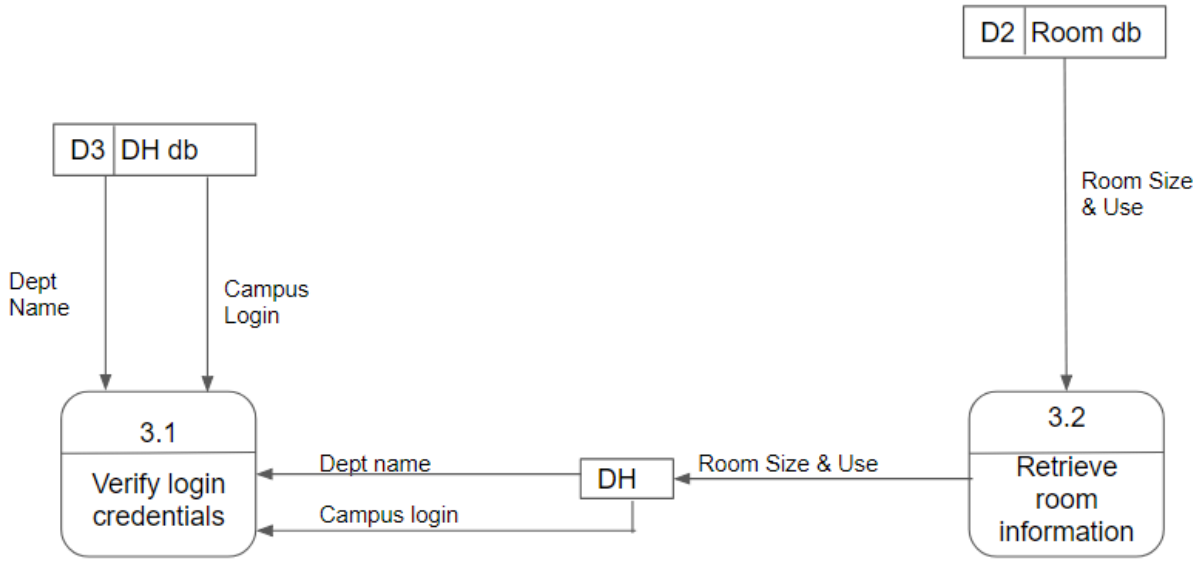


fig 3.5

3.5 Process 4 - Level 1:

This diagram breaks down the process of generating constraints for forms that users will be filling out to update information in the database.

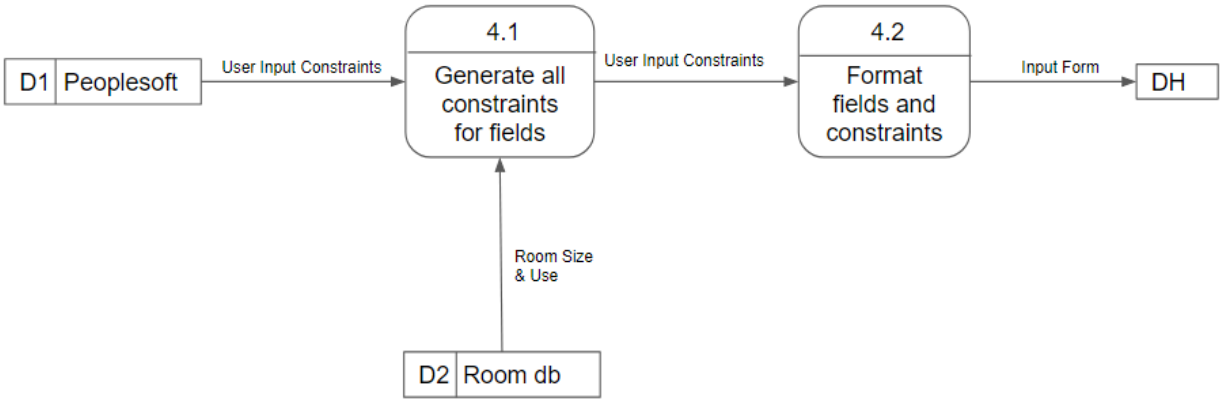


fig 3.6

3.6 Process 5 - Level 1:

This diagram breaks down the process of generating an update email to send to all the people who are impacted by the changes created.

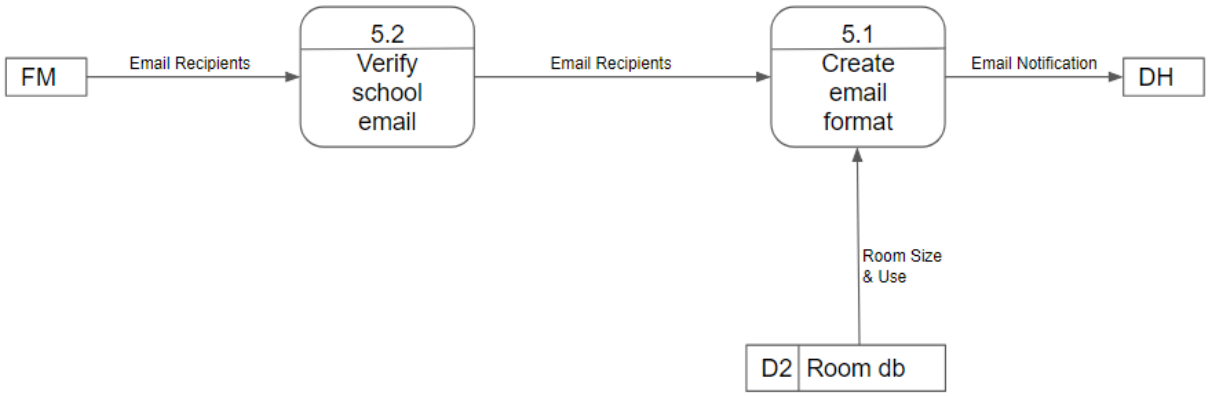


fig 3.7

This section contains more detail on all the information and processes from the flow diagrams.

3.7 Entities:

Name: Facilities Management
Type: Entity
Description: This person will be responsible for verifying data entered by the User. This agent will have access permissions to modify and update data entered into the Room Record Management System.
What it contains: Attributes such as ADMIN_ID, ADMIN_Name
Constraints/data type: ADMIN_ID must be of String data type with length of 10 values. Valid values must be lower case a-z.

Name: Department Head
Type: Entity
Description: This person will be the primary user for the Room Record Management System. This agent will have certain access restrictions and will only be able to enter data.
What it contains: Attributes such as USER_ID, USER_Name
Constraints/data type: USER_ID must be of String data type with length of 10 values. Valid values must be lower case a-z. USER_ID must be unique.

3.8 Processes:

Name: Generate PeopleSoft constraints
Type: Process
Description: the process creates the constraints for the forms that users fill in to change or update room information using PeopleSoft
What it contains: all the information on what PeopleSoft has so that it can limit the options of the user
Constraints/data type: the information inside of PeopleSoft like official names of staff and not nicknames

3.9 Data stores:

Name: Room database
Type: Data Store
Description: a database that holds all the information about a room including its location and what it is being used for
What it contains: many attributes used to describe the exact location of the room and the exact use of the room including who and what for
Constraints/data type: the room location must exist on campus. The person or department using the room must exist in the school records. The use must follow school guidelines.

Name: Peoplesoft
Type: Data Store
Description: FM modifies/updates/checks room data in the Peoplesoft system.
What it contains: Report ID, room size/use
What it is contained in: N/A
Constraints/data type: Format is an online database.
Name: D2 Room db.
Type: Data Store
Description: Information about the rooms in UMBC are stored here, which is used to help generate the annual report form for the Maryland state government.
What it contains: Available size and use data, Current Size/Use Data, Room location
What it is contained in: Peoplesoft
Constraints/data type: Format is a registry of rooms with information on each individual room.

Name: D3 DH db.
Type: Data Store
Description: Users login information and credentials are stored here.
What it contains: Department name, campus login
What it is contained in: Peoplesoft
Constraints/data type: Format is a registry of users in the data store.
Name: D5 Gmail server
Type: Data Store
Description: A Gmail server that contains all pertinent email addresses and email templates necessary to send the room information to the correct authorities.
What it contains: Email**,** email contents, email recipients
What it is contained in: Peoplesoft
Constraints/data type: Format is a list of email templates and email addresses that can be sent to various people.

3.10 Data Flows:

Name: Annual Report
Type: Data flow
Description: Annual report on the rooms in buildings at UMBC.
What it contains: Report ID, Room size/use
Constraints/data type:
Source: Process 1, Generate Annual Report Form
Destination: Entity Admin
Name: Room Location
Type: Data flow
Description: Location of a room that is selected.
What it contains: Room size/use
Constraints/data type:
Source: Process 3, Select Room to Update
Destination: Process 2.1
Name: Campus login
Type: Data flow
Description: UMBC login used to access the Room Record Management System.
What it contains: DH credentials
Constraints/data type:

Source: Process 4, Verify login credentials

Destination: Process 3.1

Name: Email recipients

Type: Data Store

Description: Email addresses of the users authorized to view the room information.

What it contains: Email addresses

Constraints/data type:

Source: Process 6, Create email format

Destination: Process 5.1

3.11 Dictionary

Name	Type	Description	Contains	Constraints
Facilities Management	Entity	This person will be responsible for verifying data entered by the User. This agent will have access permissions to modify and update data entered into the Room Record Management System.	Attributes such as ADMIN_ID, ADMIN_Name	ADMIN_ID must be of String data type with length of 10 values. Valid values must lower case a-z.
Department Head	Entity	This person will be the primary user for the Room Record Management System. This agent will have certain access restrictions and will only be able to enter data.	Attributes such as USER_ID, USER_Name	USER_ID must be of String data type with length of 10 values. Valid values must be lower case a-z. USER_ID must be unique.

Generate PeopleSoft constraints	Process	the process creates the constraints for the forms that users fill in to change or update room information using PeopleSoft	all the information on what PeopleSoft has so that it can limit the options of the user	the information inside of PeopleSoft like official names of staff and not nicknames
Room database	Data store	a database that holds all the information about a room including its location and what it is being used for	many attributes used to describe the exact location of the room and the exact use of the room including who and what for	the room location must exist on campus. The person or department using the room must exist in the school records. The use must follow school guidelines.
Room location	Data flow	Data that indicates the location of a room	A building and room number based on floor and position	It must be a building that exists on the campus and on a floor in that building that exists.

fig 3.8

This section contains the ER diagrams and how information is to be stored in the system.

Section 4.0 Data Model

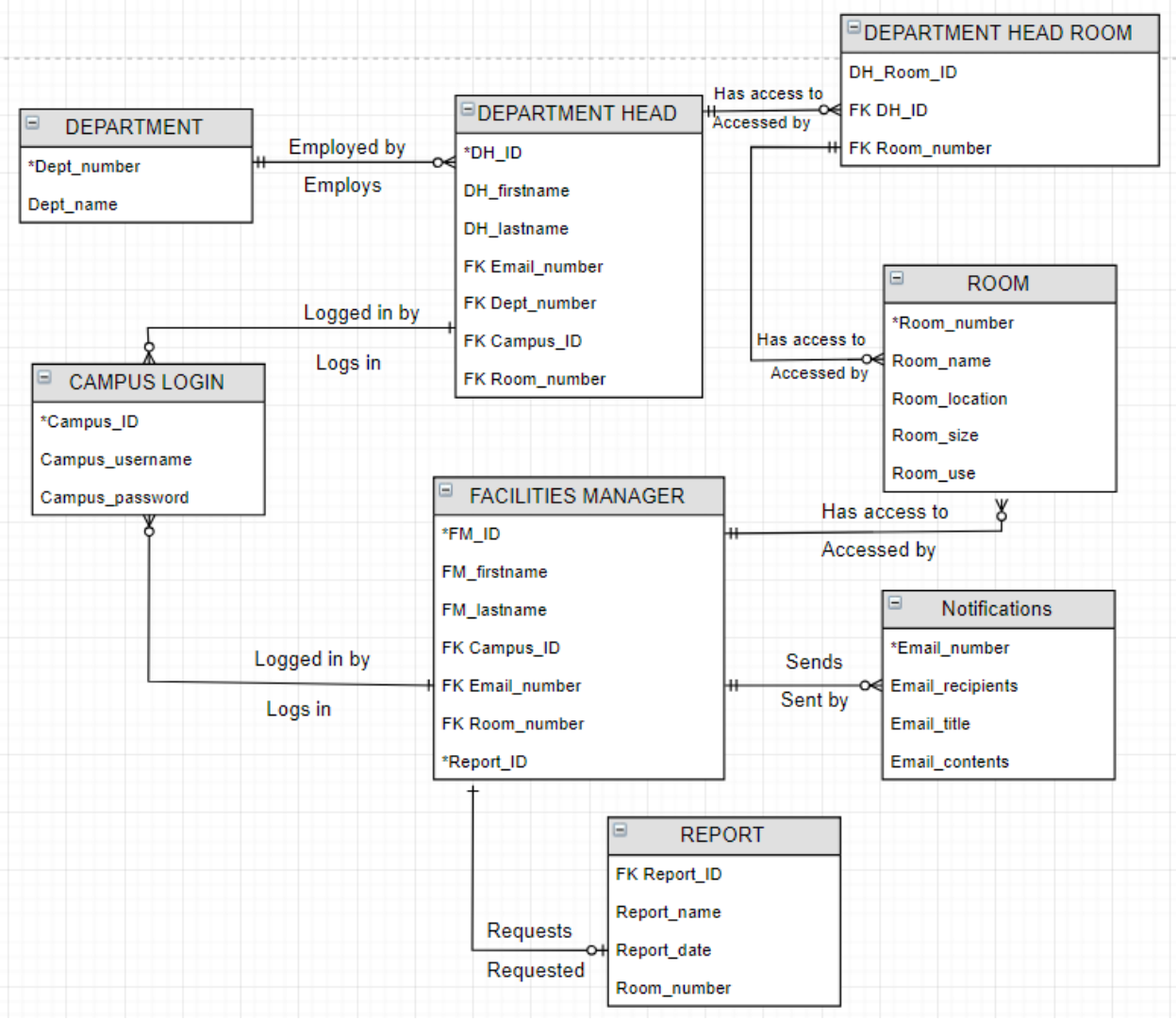


fig 4.1

The department head gets the information about their department from the department entity. The department head or someone in facilities management can log into the PeopleSoft system by accessing the campus login entity, both the department head and the facilities management entity have the foreign key Campus_ID to link back to. Facilities management or a department head can access the details of a room and then modify the details if they wish to do so. The Room entity contains all information about a room in a UMBC building, such as location, name, size and use. Facilities Management can request an annual report from the system, which contains the report name, date of the report and all information from UMBC rooms. Facilities Management can also send emails through the system, which contains a list of recipients, title, contents of an email (similar to a template) and a notification that the email was sent.

Evaluation Criteria	Relative Importance	1: Fishbowl	Score (1-5)	Weighted Score	2: TRXio	Score (1-5)	Weighted Score	3: Room Record Mgmt. System	Score (1-5)	Weighted Sco
Technical Issues:										
Experience with the system	10	Onsite training available as well as training videos	4	40	Integration, Training and Add-on services available	5	50	It will be easy to navigate through the basic system	3	30
Supported Operating Systems	10	Windows, Mac, Linux	5	50	Windows, Mac	4	40	Windows, Mac, Android	5	50
Integration with the existing system	10	Install the software to all the computers	3	30	Install the software to all the computers	3	30	The system will be created for the FMO.	5	50
Economic Issues:										
Cost.	20	$295/month	2	40	$49/month	3	60	No fixed Cost but will take up employee time.	3	60
Organizational Issues:										
Security	20	Software and security updates are available on a regular basis.	5	100	Cloud-based, so added security. Security updates available if the premium version is purchased.	3	60	This is an internal system for selected team members of the FMO.	3	60
Meet all end-user requirements	30	Has set guidelines for all companies.	3	90	Has set guidelines for all companies	3	90	Will meet all end-user requirements	5	150
Total	100			350			330			400

The Room Record Management System has a score of 400 points and is the chosen alternative.

Fig 4.2

4.1 Alternative Matrix

Requirements	**Server Based**	**Client Based**	**Thin Client Server**	**Thick Client Server**
Operational Requirements				
Technical Environment Requirements	✓			
System Integration Requirements	✓	✓	✓	✓
Maintainability Requirements	✓	✓	✓	✓
Performance Requirements				
Availability and Reliability Requirements	✓	✓	✓	✓
Speed Requirements			✓	✓
Security Requirements				
Access Control Requirements	✓			
Cultural/Political Requirements				
Legal Requirements	✓	✓	✓	✓

Fig 4.3

The chosen architecture is Server Based.

Technical Environment Requirements: The server-based model would allow for optimal computer processing power.

System Integration Requirements: All models will need to be integrated with the system.

Maintainability Requirements: All models will need to have maintenance schedules.

Availability and Reliability Requirements: All models will need to be reliable and available at all times.

Speed Requirements: Thin & Thick would produce better speed performance compared to server and client-based models.

Access Control Requirements: The server model would allow centralized authentication.

Legal Requirements: All models should be protected with legal requirements.

This section contains the specifications for the room record management system.

4.2 Specifications

This system is need of a server-based architecture because of the nature of its use. There will be many users using the system and they need to be able to access it at the same time with the same information. There won't be too many users so that the server won't be slowed down too much if everyone is pulling information at the same time. It will have a database of all the information on the server that will then be able to be accessed by all the departments running all the time. It also needs to be server based so that there are no discrepancies between users and so everyone will be guaranteed to be on the same page. This may slow down some processes but it is still worth it because the accurate information is more important.

	Standard Client	Standard Web Server	Standard Application Server	Standard Database Server
Operating system	Windows 8/10 Mac	Linux	Linux	Linux
Special Software	Web application	Apache	Java	Oracle
Hardware	Intel Core i7-8700K 6 core processor	Apache HTTP server	Dell PowerEdge T330 tower	RAID 10
	24-inch LED Monitor	Intel Xeon E3 1220 v6	Intel Xeon E3 1220 v6	4TB SSD SATA drive
	1TB disk drive		2TB SSD SATA drive	Intel Xeon E3 1220 v6
Network	100Mbps	Cat6 ethernet	Cat6 ethernet	Cat6 ethernet

Fig 4.4

This section contains the prototype designs for the room record management system.

Section 5.0 User Interface Design

Use Scenario: E-mail Room Data An employee in Facilities Management chooses someone to email about the most current room information at UMBC.
1. User may search through the list of recipients to send an email to after logging in (5.2). 2. User can choose a template with all pertinent information for specific department heads or create a new email (5.1). 3. User sends an e-mail to a person on the list of recipients (process 5).

fig 5.1

Use Scenario: Update Room Information User needs to update information about a room in Peoplesoft.
1. User may search for a specific room in the Peoplesoft system (2.1). 2. User will look at the current details of the room before entering the new information (2.2). 3. User enters new information about a room (2.3). 4. The Peoplesoft system is updated and the room details are updated (process 2).

fig 5.2

Use Scenario: Download Annual Report Form An employee in Facilities Management generates and downloads an annual report form so they can send it later.
1. User can request a new report form based on the most recent room information in the Peoplesoft system (1.1). 2. The Peoplesoft system generates a new annual report form and that report is saved in the Peoplesoft system (1.2).

3. After the report is generated an email is sent to the user's school email address with the PDF file (process 1).

fig 5.3

This section contains the Interface Standards for the room record management system.

5.1 Interface Standards

5.2 Interface Metaphor: Room Record Management System

5.3 Interface Objects:

- **Department Head:** User that logs in to view information about a room. This person will be the primary user for the Room Record Management System. This agent will have certain access restrictions and will only be able to enter data.
- **FMO personnel:** The FMO Admin who is allowed to make updates to room adjustment details that are entered. His person will be responsible for verifying data entered by the User. This agent will have access permissions to modify and update data entered into the Room Record Management System.
- **Room Database:** A database that holds all the information about a room including its location and what it is being used for
- **Gmail Server:** A Gmail server that contains all pertinent email addresses and email templates necessary to send the room information to the correct authorities.
- **Department Head database:** Users login information and credentials are stored here.

5.4 Interface Actions:

- **Search:** Search for a room by room number or size(sqft)
- **Select**: Select the room to update.
- **Update:** Makes changes to the selected room-update room size, update room use, update room occupant department.
- **Request:** Request additional details about the selected room from the FMO. (Facilities Management Office) by building abbreviation and room number.

- **Create & View Report:** Creates the Annual Report to be sent to the State.

5.5 Interface Icons:

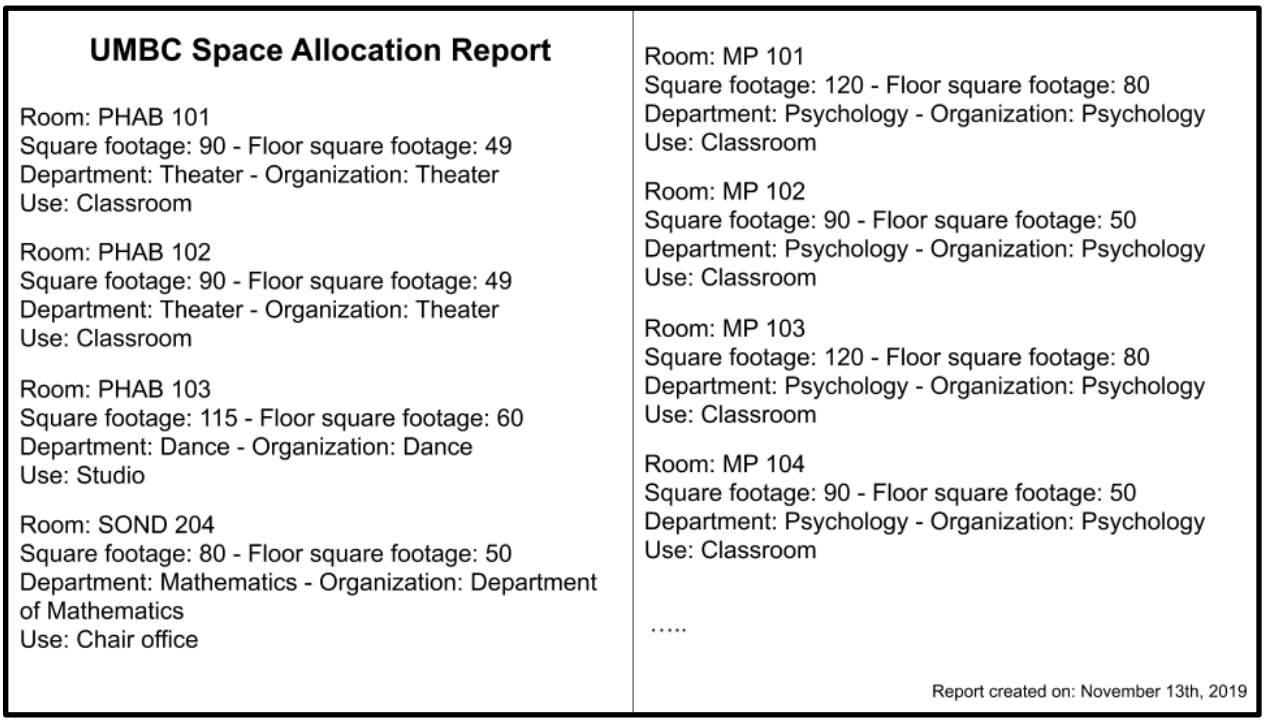
- **Mail Logo** will be used to indicate the email address of the user.
- **Main Menu Logo** will be used to show the main menu.
- **Person Logo** will be used to indicate each user- FMO personnel, Department head.

This section contains the prototype designs for screens and forms for the room record management system.

5.6 Interface Design Prototypes

5.7 Annual Report

Report created for facilities management every year. This is a list of every single room on the UMBC campus with all the relevant information about each room. It is automatically created from the current database at the time.



UMBC Space Allocation Report

Room: PHAB 101
Square footage: 90 - Floor square footage: 49
Department: Theater - Organization: Theater
Use: Classroom

Room: PHAB 102
Square footage: 90 - Floor square footage: 49
Department: Theater - Organization: Theater
Use: Classroom

Room: PHAB 103
Square footage: 115 - Floor square footage: 60
Department: Dance - Organization: Dance
Use: Studio

Room: SOND 204
Square footage: 80 - Floor square footage: 50
Department: Mathematics - Organization: Department of Mathematics
Use: Chair office

Room: MP 101
Square footage: 120 - Floor square footage: 80
Department: Psychology - Organization: Psychology
Use: Classroom

Room: MP 102
Square footage: 90 - Floor square footage: 50
Department: Psychology - Organization: Psychology
Use: Classroom

Room: MP 103
Square footage: 120 - Floor square footage: 80
Department: Psychology - Organization: Psychology
Use: Classroom

Room: MP 104
Square footage: 90 - Floor square footage: 50
Department: Psychology - Organization: Psychology
Use: Classroom

.....

Report created on: November 13th, 2019

fig 5.4

5.8 Room Request Form

Form created to allow users to request to change or view information on a specific room. The user inputs the name of the building and the number of the room. This is taken to the database in order to return the selected room's information.

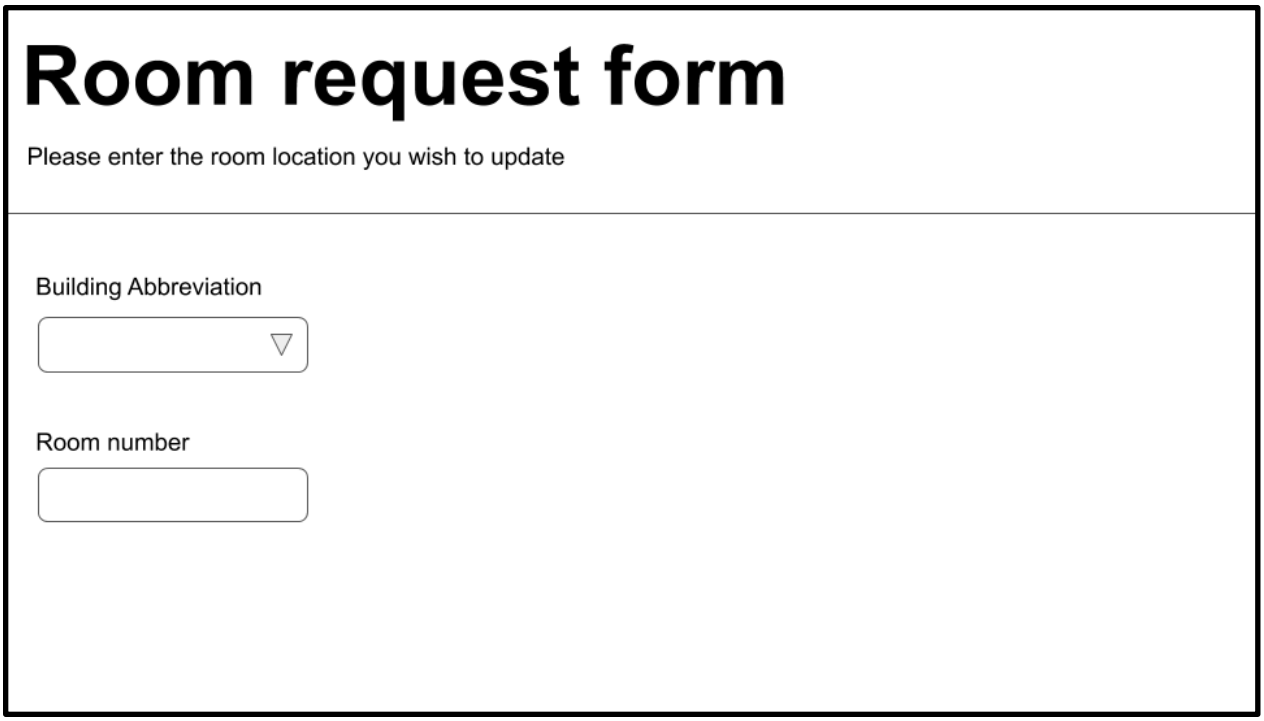

Room request form
Please enter the room location you wish to update
Building Abbreviation
Room number

fig 5.5

5.9 Room Details Form

Form that allows users to adjust information on a specified room. The current information for the rooms is listed on the right and the user can enter any new information they would like on the right.

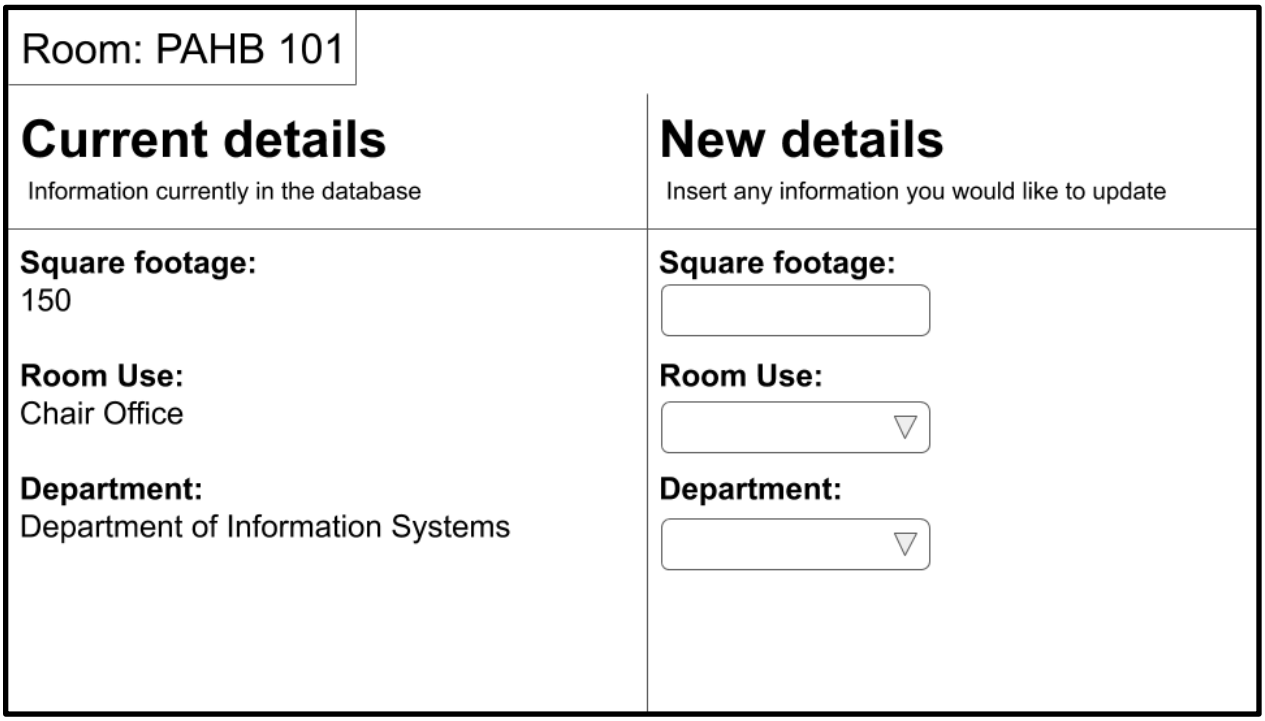


fig 5.6

5.10 Request Approval Page

Form that allows facilities management staff to view changes and approve or deny them. The user requesting the change is listed at the top along with the room that the requests are for. Then all the requested changes are listed below requests in the form of a table to compare the new and old data.

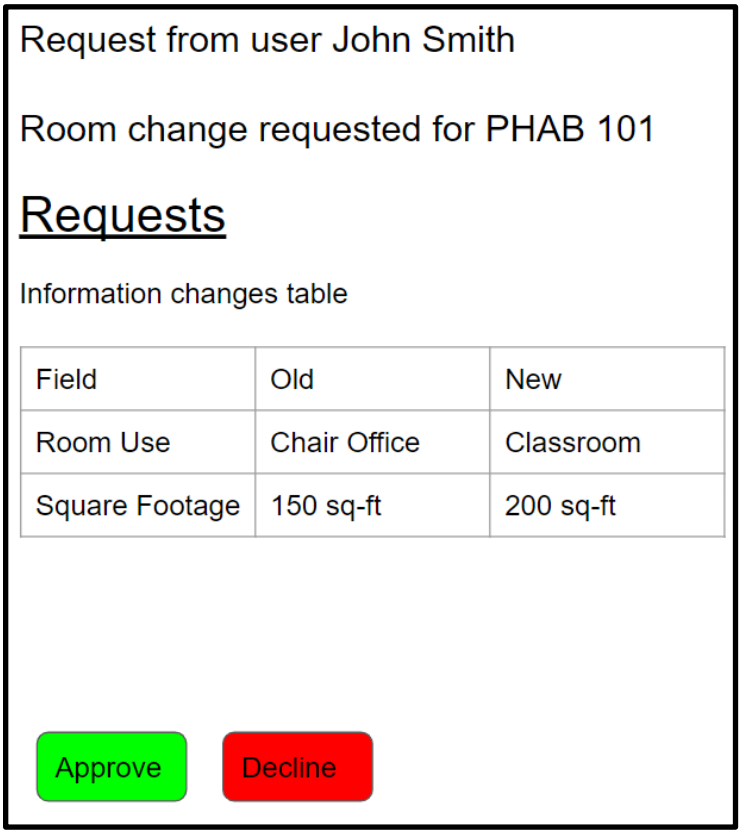
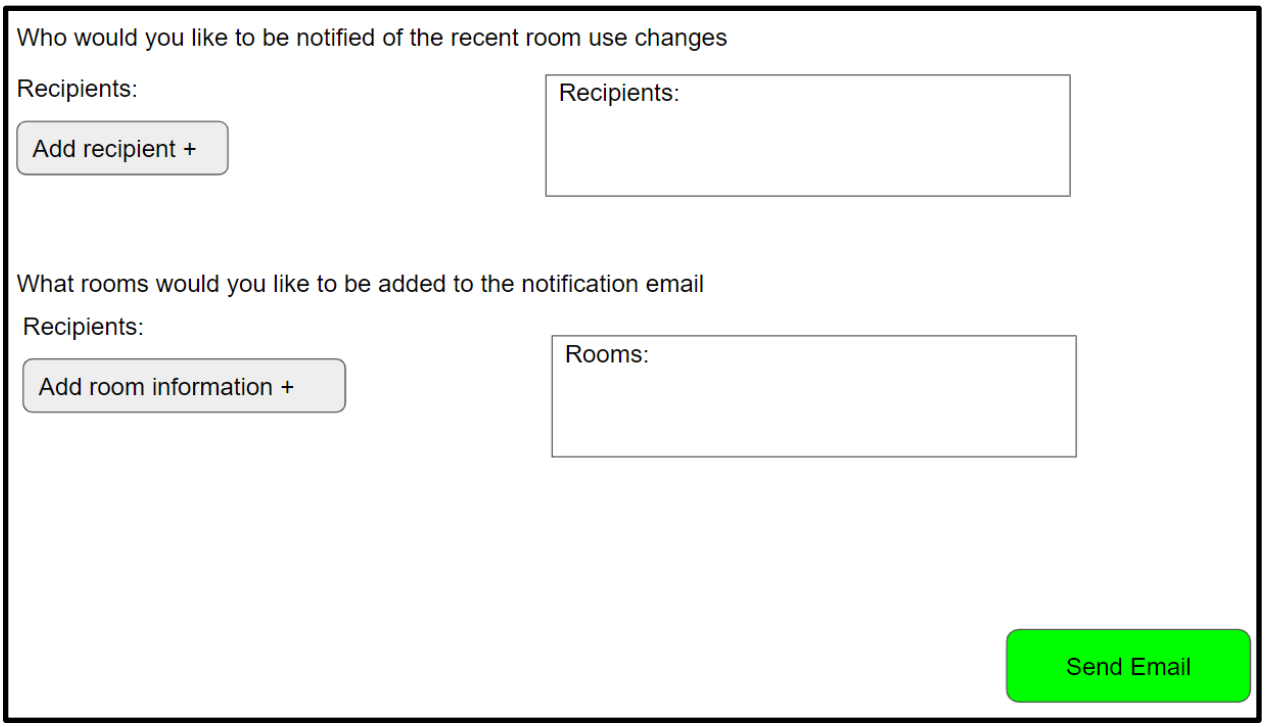


fig 5.7

5.11 Email Creation Form

Form that allows the recipients to be chosen to be updated on room updates. A recipient can be added on the left and the current list of people who will receive the update are on the right. The same goes for the rooms below which will show the changes made to selected rooms.



Appendix

D1 Notes:

1. More decomposition is needed for the problem statement. What is the impact? Keep going with your description. This inefficiency results in?

D2 Admin Notes:

1. Use Generate instead of construct.
2. Great pre conditions.
3. Use case 2 – pre conditions. Does the room exist in the database? Precondition of existence. The room exists in. Availability. The room is available for scheduling if the room exists.
4. Avoid vague language.

D3 Admin Notes:

1. User needs more specificity. Maybe call it Dept head?
2. Reverse lines.
3. 4 boxes for context diagram.
4. Level 0 process 5 not connected to anything.
5. Admin needs process in between data stores.
6. Can use same name for available/new data.
7. View data is good enough.

D4 Admin Notes:

1. Modify the name of table email? Maybe call it notifications.
2. Remove email notification in email box.
3. Looks nice stylistically.

D5 Notes:

1. For the section title of the prototypes please rename to be specific: “Interface Design Prototypes” NOT simply “Interface Designs”.
2. The narratives included for each mockup are only a short blurb and not descriptive enough. For example, the annual report is run each year but what

meaningful information does it provide to the user? Please go back and look at each mockup and expand your descriptions to at least a few sentences each.

3. I noticed that you are using numbering for all mockups and including them in a single page. Go back and revise such that you include a single mockup per page with an appropriate section title.
4. For the “Request Approval Page” and “Email Creation Form” these mockups are vague, and I cannot discern what they are trying to illustrate. These mockups need to be turned into sample forms or wireframes (one per page). Did you review the supplemental lecture slides or the textbook examples?