CS 340 - Project Step 7: Final

Group: Lucky 7

Group members:

Rich Brinkly (Brinkly, Richard):

Max Belyaev (Belyaev, Maxim):

Project Title: University Building Department Planning

Project URL on Flip3: http://flip3.engr.oregonstate.edu:9842

Executive Summary

The most significant changes we made to the project came late in the game. We found that the M:M relationship we initially had between Departments and Space types was not really the way we would represent this in real life. We discovered that we had certain things being populated into a room that were in fact their own entity – Accessories. So, we made an adjustment to have Rooms related to Departments and Rooms also be related to Space types. And then Accessories being a M:M relationship with Rooms represented by a new join table called RoomAccessory. This represents the different amenities present with the rooms. This was a significant change and caused a lot of rework to existing items.

We also removed much of the calculated values from the database as it was causing confusion with reviewers and was out of scope for the class. These are generally something that are dependent on info from other tables and when a new line is entered into a table with blanks or no way to fill in a value (because its calculated) people didn't know why. These are typically recalculated on demand as they could slow down a website. We did leave in the efficiency factor as it was already complete and functioning. We added an explanation that is was calculated in the web site to relive the confusion.

There was late work to do more data entry validation on the search and add functionality to prevent internal server error user experiences. This was typically due to freeform text entry fields that need to match existing entries. As part of this we also moved many of the queries into a sub file called queries.py . As such there were some reviewers who were experiencing some challenges because of this change over timing. However it is all functional now.

Many of the reviewers focused on user experience and supported some of the work we were putting in for data validation. Much / all the data validation is on the front-end side before if it submitted to the DB as a query. This prevented some of the server errors.

For the most part off of the points that the reviewers and graders made were adopted. There was only a few confusion items on the point of some reviewers that were not acted on or they were not understood what the reviewer was referencing.

Note that because of the foreign key references in the Rooms table, when creating the table from scratch, the other reference tables must be created first. Same for the data insert / population.

CS 340 - Project Step 7, 202203012 Final:

Outline

Group members:

Rich Brinkly (Richard): Code writer and Project management

Max Belyaev (Maxim): Code writer and Test planning

<mark>**All changes highlighted in yellow</mark>

***All change explanations are in red

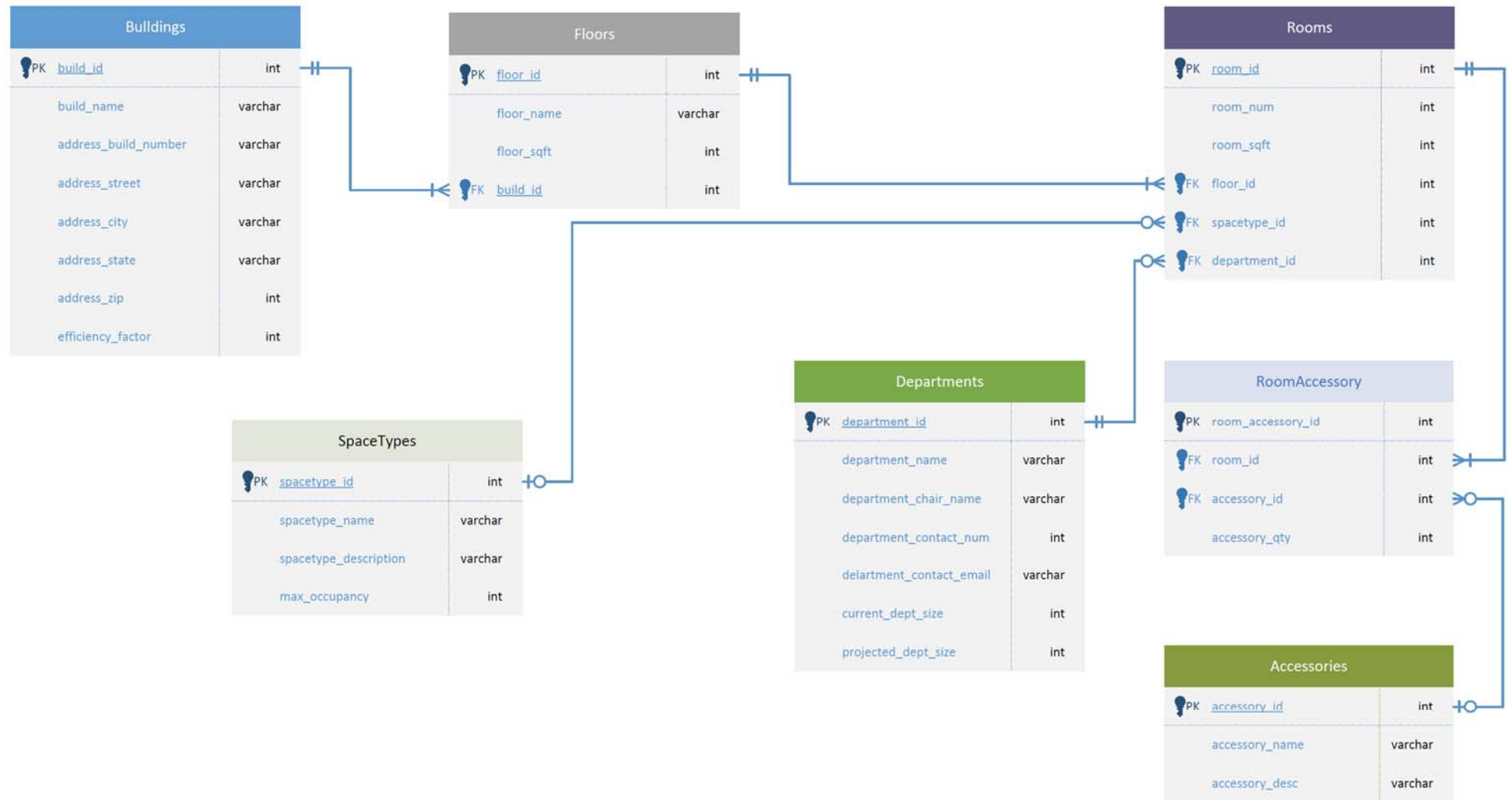**Project Title**: University Building Department Planning

Overview

The University Facility Management team oversees 100 university multi floor buildings. For planning purposes (future expansion or re-allocation), the management team needs to generate reports to university administration on current space utilization and make any recommendations for future space utilization. A database will be used to record current information about each building and be able to handle 500 floors (average 5 floors per building) and a total of 10,000 rooms (average 20 rooms per floor) with about 20 unique spacetypes and 50 different accessories. It will track assigned and available room in each building on each floor. While additional buildings and floors may be added/removed annually, spacetypes and rooms reallocation can happen on as needed basis depending on department needs. Allocations to all university departments will be identified with the different types of spaces using a database driven website.
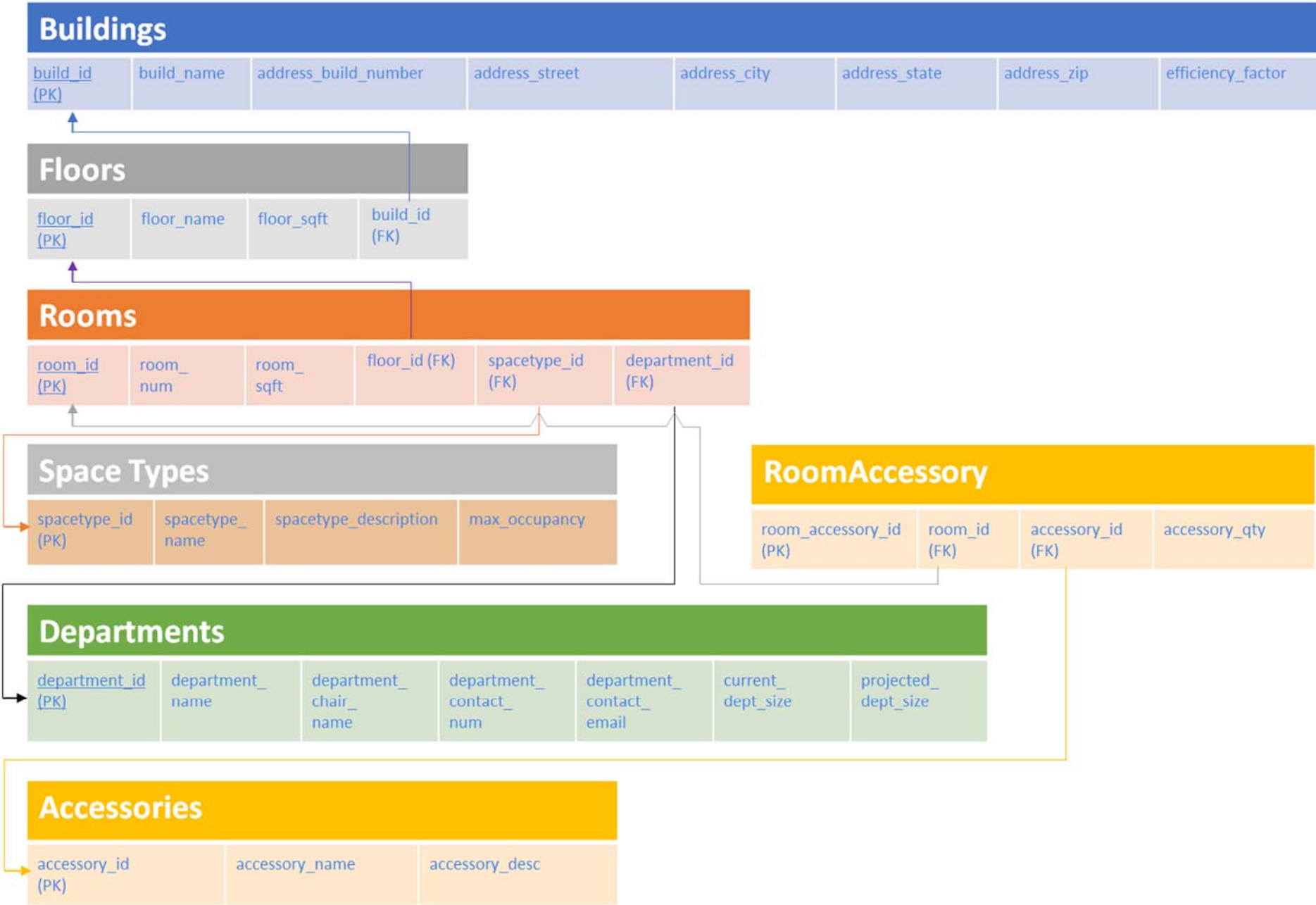
Database Outline, in Words

- **Buildings**: records the details of a building that's part of the university campus
  - build_id: int, auto_increment, unique, not NULL, PK
  - build_name: varchar
  - address_build_number: varchar, not NULL
  - address_street: varchar, not NULL
  - address_city:varchar, not NULL
  - address_state: varchar, not NULL
  - address_zip: int, not NULL, MUST be 5 digits
  - efficiency_factor: int, calculated value (glross_sf/ usable_sf)
  - Relationship: a 1:M relationship between Buildings and Floors is implemented with build_id as a FK inside of Floor

- **Floors**: records the details of a floor contained within a building; by floor representing a smaller part of the building it will allow to group SpaceTypes and examine SpaceTypes and use of space at a smaller scale.
  - floor_id: int, auto_increment, unique, not NULL, PK
  - floor_name: varchar(MAX 2 characters), not NULL
  - floor_sqft: int, NOT NULL
  - build_id: int, auto_increment, unique, FK
  - Relationship: a 1:M relationship between Buildings and Floors is implemented with build_id as a FK inside of Floor
  - Relationship: a 1:M relationship between Floors and Rooms is implemented with floor_id as a FK inside of Room

- **Rooms:** records the details of a room on a particular floor; in conjunction with floors it will create a "floor plan"(list of rooms on the particular floor to be exact) that will allow for designers to plan for future department growth.
  - room_id: int, auto_increment, unique, not NULL, PK
  - room_num: int, not NULL
  - room_sqft: int, not NULL

- floor_id: int, not NULL, FK
- spacetype_id: int, FK
- department_id: int, FK
- Relationship: a 1:M relationship between Floors and Rooms is implemented with floor_id as a FK inside of Room
- Relationship: a 1:M relationship between Rooms and SpaceTypes is implemented with spacetype_id as a FK inside of Room
- Relationship: a 1:M relationship between Rooms and Departments is implemented with department_id as a FK inside of Room
- Relationship: a M:M relationship between Rooms and Accessories is implemented with room_id and accessory_id as a foreign keys inside of joined RoomAccessory table

- **SpaceTypes**: records the details of what type of space is particular area/room; Standardized room name (Office, Conference room, Multi-Purpose Room)
  - spacetype_id: int, auto_increment, unique, not NULL, PK
  - spacetype_name: varchar (MAX 50 characters), not NULL
  - spacetype_description: varchar (MAX 250 characters)
  - max_occupancy: int
  - Relationship: a 1:M relationship between Rooms and SpaceTypes is implemented with spacetype_id as a FK inside of Room

- **Departments**: records the details of a university department that occupies Spaces; Having Space Types associated with departments will help designers to ensure required adjacencies between departments are met during expansion planning.
  - department_id: int, auto_increment, unique, not NULL, PK
  - department_name: varchar, not NULL
  - department_chair_name: varchar, not NULL
  - department_contact_num: int, not NULL, MUST be 10 digits
  - delartment_contact_email: varchar(MUST contain "@")
  - currrent_dept_size: int, not NULL
  - projected_dept_size: int, not NULL
  - Relationship: a 1:M relationship between Rooms and Departments is implemented with department_id as a FK inside of Room

- **Accessories**: records room accessories and items in the room. For example, if room has TV screen and AV connection, projector, conference room table, or chair
  - accessory_id: int, auto_increment, unique, not NULL, PK
  - accessory_name: varchar(250), unique, not NULL
  - accessory_description: varchar(250)
  - Relationship: a M:M relationship between Rooms and Accessories is implemented with room_id and accessory_id as a foreign keys inside of joined RoomAccessory table

- **RoomAccessory**: intersect table that models the M:M relationship between Rooms and Accessories. Table also keeps track of number of accessories in the room.
  (example: room_accessory_id (id num) | room_id (points to room 101)| accessory_id (points to "chair") | accessory_quantity = 10)
  - room_accessory_id: int, auto_increment, unique, not NULL, PK
  - room_id: int, not NULL, FK
  - accessory_id: int, FK
  - accessory_quantity: int, not NULL

Final ERD

Buildings

PK	build_id	int
	build_name	varchar
	address_build_number	varchar
	address_street	varchar
	address_city	varchar
	address_state	varchar
	address_zip	int
	efficiency_factor	int

Floors

PK	floor_id	int
	floor_name	varchar
	floor_sqft	int
FK	build_id	int

Rooms

PK	room_id	int
	room_num	int
	room_sqft	int
FK	floor_id	int
FK	spacetype_id	int
FK	department_id	int

SpaceTypes

PK	spacetype_id	int
	spacetype_name	varchar
	spacetype_description	varchar
	max_occupancy	int

Departments

PK	department_id	int
	department_name	varchar
	department_chair_name	varchar
	department_contact_num	int
	delartment_contact_email	varchar
	current_dept_size	int
	projected_dept_size	int

RoomAccessory

PK	room_accessory_id	int
FK	room_id	int
FK	accessory_id	int
	accessory_qty	int

Accessories

PK	accessory_id	int
	accessory_name	varchar
	accessory_desc	varchar

CS 340 -W22 – Group: Lucky 7
Max Belyaev, Rich Brinkly
University Building Department Planning
V5.1

Final Schema

Buildings

build_id (PK)	build_name	address_build_number	address_street	address_city	address_state	address_zip	efficiency_factor

Floors

floor_id (PK)	floor_name	floor_sqft	build_id (FK)

Rooms

room_id (PK)	room_num	room_sqft	floor_id (FK)	spacetype_id (FK)	department_id (FK)

Space Types

spacetype_id (PK)	spacetype_name	spacetype_description	max_occupancy

RoomAccessory

room_accessory_id (PK)	room_id (FK)	accessory_id (FK)	accessory_qty

Departments

department_id (PK)	department_name	department_chair_name	department_contact_num	department_contact_email	current_dept_size	projected_dept_size

Accessories

accessory_id (PK)	accessory_name	accessory_desc

UI Screen shots:

Home	Buildings	Floors	Rooms	SpaceTypes	Departments	Accessories	Rooms & Accessories

The University Facility Management team is in charge of 100 university multi floor buildings. For planning purposes(future expansion or re-allocation), the management team needs to generate reports to university administration on current space utilization and make any recommendations for future space utilization. A database will be used to record current information about each building. It will track assigned and available space in each building on each floor. Allocations to all university departments will be identified with the different types of spaces using a database driven website.

Please use the tabs at the top of the page to navigate to the various table views.

Home	Buildings	Floors	Rooms	SpaceTypes	Departments	Accessories	Rooms & Accessories

University Buildings

Records and details of buildings that are part of the university campus
(* calculated value, update depends on other table data to be entered)

Search Buildings   Add New Building

ID	Building Name	Building Address		City	State	Zip Code	* Efficiency Factor		
18	Music Center	1123	Main Street	New York	NY	10024	0.00	✎	🗑
19	Administration Building	1616	N Front Ave		WA	98683	0.00	✎	🗑
21	Art Center	1001	Brush Street	Newark	NJ	10098	0.00	✎	🗑
23	A Nuclear lab	202	SW Way Out There Ave	Eugene	OR	99998	0.43	✎	🗑
28	Nuclear lab	123	ABC St	Gary	In	12345	None	✎	🗑
29	Weniger Hall	400	103 SW Memorial Pl	Corvallis	OR	97331	None	✎	🗑
32	amanda hugnkiss	clock tower	andy feltherbush st	anyville	ca	89993	None	✎	🗑
34	Cedar Hall	222	123 Tall Street	Pittsburgh	Pe	15222	None	✎	🗑

CREATE/INSERT/ADD NEW BUILDING POPUP PAGE

Home   Buildings   Floors   Rooms   SpaceTypes

University Buildings

Records and details of buildings that are part of the university ca
(* calculated value, update depends on other table data to be er

Search Buildings   Add New Building

ID	Building Name	Building Address	de	* Efficiency Factor

New Building   ✕

Building Name:

Building Number:

Street Name:

City:

State:

Zip Code:

Close   Submit

SEARCH BUILDINGS POPUP PAGE

Home   Buildings   Floors   Rooms   SpaceTypes   Departments

University Buildings

Records and details of buildings that are part of the university campus
(* calculated value, update depends on other table data to be entered)

Search Buildings   Add New Building

Search Buidlings   ✕

Building Name:

Street Number:

Street Name:

State:

Zip Code:

Close   Submit

ID	Building Name	Street Num	Street	State	Zip Code	* Efficiency Factor		
18	Music Center	1123	Main S	NY	10024	0.00	✏	🗑
19	Administration Building	1616	N Fror	WA	98683	0.00	✏	🗑
21	Art Center	1001	Brush	NJ	10098	0.00	✏	🗑
23	Life Science Building	202	SW Wa	OR	99998	0.23	✏	🗑
28	Nuclear lab	123	ABC St	In	12345	0.00	✏	🗑
29	Weniger Hall	400	103 SV	OR	97331	0.00	✏	🗑
32	amanda hugnkiss	clock tower	andy f	ca	89993	0.00	✏	🗑
34	Cedar Hall	222	123 Ta	Pe	15222	0.00	✏	🗑
36	Carry St Housing	123	Carry S	VA	23220	0.00	✏	🗑
39	Library	123	Main S	NJ	N/A	0.00	✏	🗑
40	Visual Arts Center	401	Broad	VA	23220	0.00	✏	🗑
41	Pollak	1204	Harriso	VA	23220	0.00	✏	🗑
45	Student Housing	50	Jackso	GA	N/A	0.00	✏	🗑

EDIT BUILDINGS POPUP PAGE

Edit Building

Building Name:

Music Center

Building Number:

1123

Street Name:

Main Street

City:

New York

State:

NY

Zip Code:

10024

Close   Submit

DISPLAY FLOORS PAGE

| Home | Buildings | Floors | Rooms | SpaceTypes | Departments | Accessories | Rooms & Accessories |

Floors

Add New Floor

ID	Floor Number	Square Feet	Building		
35	B1	5000	Administration Building	✏	🗑
43	B2	50000	Administration Building	✏	🗑
17	10	100	Life Science Building	✏	🗑
56	25	6592	Life Science Building	✏	🗑
52	LL5	250	Life Science Building	✏	🗑
32	CC	30000	Music Center	✏	🗑

EDIT FLOOR POPUP PAGE

ADD NEW FLOOR PAGE

Edit Floor

Floor Number:

10

Floor Square Feet:

100

Associated Building:

A Nuclear lab

Close   Submit

New Floor

Floor Number:

Floor Square Feet:

Associated Building:

Choose...

Close   Submit

DISPLAY ROOMS PAGE

| Home | Buildings | Floors | Rooms | SpaceTypes | Departments | Accessories | Rooms & Accessories |

Rooms

Add New Room

ID	Space Type	Room Number	Room Sq.Ft.	Department	Floor	Building		
24	Office - Single	99	2	Physics	10	A Nuclear lab	✏	🗑
23	Board Room	125	2	Computer Science	B1	Administration Building	✏	🗑
27	Rest Room	3101	100	English Literature	B2	Administration Building	✏	🗑
28	Board Room	Test B2	1	English Literature	B2	Administration Building	✏	🗑

EDIT ROOMS POPUP PAGE

Edit room

Room Number:

99

Room Square Feet:

2

Associated Building:

A Nuclear lab ⌄

Associated Floor:

10 ⌄

Associated Department:

Physics ⌄

Associated Spacetype:

Office - Single ⌄

Close   Submit

ADD NEW ROOMS POPUP PAGE

New Room

Room Number:

Room Square Feet:

Associated Building:

Choose... ⌄

Associated Floor:

Choose Building First... ⌄

Associated Department:

Choose... ⌄

Spacetype:

Choose... ⌄

Close   Submit

DISPLAY SPACETYPE PAGE

| Home | Buildings | Floors | Rooms | SpaceTypes | Departments | Accessories | Rooms & Accessories |

SpaceTypes

Add New SpaceType

ID	Name	Description	Max. Occupancy		
4	Office - Single	Office for one person	1	✏	🗑
5	Small Conference Room		4	✏	🗑
6	Board Room	Room for important buildings	24	✏	🗑
11	Empty	Vacant	0	✏	🗑
12	Rest Room	Womens	6	✏	🗑

EDIT SPACETYPE POPUP PAGE

Edit Spacetypes

Spacetype Name:

Office - Single

Spacetype Description:

Office for one person

Max Occupancy:

1

Close   Submit

ADD NEW SPACETYPE POPUP PAGE

New Spacetype

Name:

Spacetype Description:

Spacetype Max Occupancy:

Close   Submit

DISPLAY DEPARTMENTS PAGE

| Home | Buildings | Floors | Rooms | SpaceTypes | Departments | Accessories | Rooms & Accessories |

Departments

Records the details of a university department that occupies Spaces; Having Space Types associated with departments will help designers to ensure required adjacencies between departments are met during expansion planning.
(* calculated value, update depends on other table data to be entered)

Add New Department

ID	Name	Chair	Phone	Email	Current Head Count	Projected Head Count	* Current Space Sq.Ft.		
1	Computer Science	Bill Gates	2147483647	gates@bill.ms	100	1000	2	✏	🗑
2	English Literature	William Shakespeare	2147483647	bshakes@highnmighty.edu	2	15	101	✏	🗑
3	Physics	Albert Enstien	2147483647	al_u238@losalamos.gov	99	98	2	✏	🗑
4	test	not test	2147483647	maximvbelyaev@gmail.com	1	3	0	✏	🗑

EDIT DEPARTMENTS POPUP PAGE

Edit Department

Department Name:

Computer Science

Department Chair Name:

Bill Gates

Department Phone:

2147483647

Department Email:

gates@bill.ms

Current Head Count:

100

Current Head Count:

1000

Close   Submit

NEW DEPARTMENT POPUP PAGE

New Department

Department Name:

Department Chair Name:

Department Contact Number: (##########)

Department Contact Email:

Department Current Size:

Department Projected Size:

Close   Submit

DISPLAY ACCESSORIES PAGE

Home	Buildings	Floors	Rooms	SpaceTypes	Departments	Accessories	Rooms & Accessories

Accessories

Add New Accessory

ID	Accessory Name	Accessory Description		
1	Projector	Epson S1002	✏	🗑
2	Sink	Dual, hot/cold	✏	🗑
3	Lecturn	Portable w/ AV connections	✏	🗑
4	Cabinet	Base, fixed	✏	🗑
5	55" TV	Wall mounted TV with HDMI connection	✏	🗑
6	Chalk Board	Old School Blackboard	✏	🗑

EDIT ACCESSORY POPUP PAGE

Edit Accessory

Accessory Name:

Projector

Accessory Description:

Epson S1002

Close   Submit

NEW ACCESSORY POPUP PAGE

New Accessorye

Accessory Name:

Accessory Description:

Close   Submit

DISPLAY ACCESSORY ROOM PAGE

| Home | Buildings | Floors | Rooms | SpaceTypes | Departments | Accessories | Rooms & Accessories |

Accessories in Rooms

Add New Room Accessory

Building Name	Floor Name	Room Number	SpaceType Name	Accessory Name	Accessory Quantity		
Administration Building	B2	3101	Rest Room	Chalk Board	1	✏️	🗑️
Administration Building	B2	Test B2	Board Room	None	3	✏️	🗑️
Administration Building	B2	Test B2	Board Room	None	0	✏️	🗑️

EDIT ACCESSORY ROOM POPUP PAGE

Edit Room Accessory

Building Name:

Administration Building ⌄

Floor Name:

B2 ⌄

Room Number:

3101 ⌄

Accessory Name:

Chalk Board ⌄

Accessory Quantity:

1

Close Submit

ADD NEW ACCESSORY ROOM POPUP PAGE

New Accessory

Building Name:

Choose... ⌄

Floor Name:

Choose Building First... ⌄

Room Number:

Choose Floor First... ⌄

Accessory Name:

Choose... ⌄

Accessory Quantity:

Number of accessories in the room

Close Submit

THE END