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Software Capstone
Project Proposal
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- Problem definition:

Eckerd College's process for accepting room draw applications is a lengthy process that can be improved by the use of a web-based system that automatically receives and verifies housing applications. By having the applications online, this will remove the duration it takes for the different types of applications to be submitted. A web-based system will also allow housing to have a visual representation of the statistics relative to room draw (such as housing availability), which is currently nonexistent. Additionally, the procedure for assigning first-year students is flawed, as it consists of a questionnaire that maps roommates together based on few similar responses, as opposed to a standard algorithm that will show the probability of roommates being compatible.

- How is it solved now?

Room draw is an extensive process that is all managed by hand and without the use of online forms that will automatically verify a students eligibility for housing (and their desired housing assignment). Currently, students fill out applications for the dorms that they wish to live in for the new school year. There are different applications for different housing selections - "Omega & Squatting", "Nu, Oberg, & Singles", "Themed, Traditional, and Alta Mar". Students of different class standings are given different 'points': Seniors- 10, Juniors - 7, Sophomore - 5, Freshmen - 1. Points between roommates are combined, and will grant assignment priority to those of higher points that will allow them to have earlier pickings of rooms compared to groups with lower points. After completing the form, students are to physically submit the form to Housing. Students are given the day in which they are to go to Fox Hall and participate in room draw. The days that students attend room draw depends on the type of housing they select (e.g. students that want to live in Omega or are squatting their room attend room draw on a different week than students that want to live in Nu). On the day of room draw, one roommate chooses a number out of a hat, and that number decides the order in which they will be choosing their room (lower numbers choose earlier than higher numbers). Numbers are called out in order from lowest to highest, and rooms are crossed off as they are chosen. Concerning roommate assignments, freshmen are assigned roommates loosely based off of their answers to a survey. If individuals answer a certain amount of questions similarly, they are paired as roommates.

- Challenges to present solutions:
    - The process of submitting and receiving housing applications takes a little over a month for completion.

    - Class standing points are tallied manually, making room for human error (a problem that has led to groups with lower points being able to choose rooms before groups of higher points).
    - Students are shown rooms in complexes that they are unable to occupy (e.g. RA rooms, rooms already assigned to incoming freshmen, etc...).
    - Eckerd's procedure for assigning freshmen their roommates is inaccurate and has no defined algorithm to depict the probability of roommates being suitable matches.
    - Housing staff has no way of recording the amount of students that successfully completes room draw (e.g. if a student is denied omega housing, and does not continue with the room draw process).

- What will you do differently?
    - Online application forms and an online receipt to prove submission (sent to students after submitting their application)
    - Dorm recommendation
    - Reduce total length of room draw process
    - Algorithm for roommate matching
- Team member contributions
    - Ray - development of APIs, requirements gathering, code review
    - Ashley - frontend, web-based design/implementation, documentation

Priorities

The features of this project will be prioritized as such:

1. Online applications
    a. Housing can create applications
    b. Housing can set time periods for applications
    c. Students can submit applications
    d. Students can edit applications
    e. Housing can approve applications
2. Roommate assignment for freshmen
    a. Housing can upload a document with all freshmen and survey info
    b. Document will be parsed
    c. Students will be matched based on preferences
    d. Housing will be able to see the results of matching
    e. Housing will be able to modify results
    f. Housing will be able to export results to a spreadsheet
3. Dashboard for housing stats
    a. Housing can see overview of current room draw status
        i. Number of applications of each type submitted
        ii. Total rooms available
        iii. Total rooms occupied
        iv. Possibly other stats
4. Visual representation of rooms occupied and available
    a. A map of each complex
    b. A display of rooms open/occupied
    c. A key for different room statuses (occupied by RA, for health, for extra, for normal student, or available)
5. A ‘home page’
    a. Students can click a link to housing rules
    b. Students can find other static info like who to contact for questions
6. A tool for room draw day*
    a. Assign random numbers to students
    b. Let them select their rooms online in order
    c. Live updates as rooms are taken

* Since this part is least likely to actually be used we decided that it would be a stretch goal. We will only attempt to do this if we finish everything else early and want to challenge ourselves.

Features / Workflow

Before Room Draw Begins:

- Automate roommate pairing of first year students based on survey answers
    - Import answers (probably excel sheet)
    - Optimize pairs (based on many matching answers but also making sure everyone has some matching answers)
        - Students need at least 4 matching answers
    - Allow housing to manually change/set pairs
    - Export this data into a spreadsheet
    - Possibly send notifications of pairings to students
    - This currently takes many hours for housing to do
- Allow housing to setup rules for dorms:
    - Set theme of dorm (pet friendly, all female, health and wellness, etc)
- Allow housing to reserve rooms for medical/emergency cases
- Allow housing to (manually?) assign rooms to RA's ahead of time
    - RA's can choose their roommates (or maybe housing does this manually?)
- Create visual map of complexes
    - Types of dorms: Omega, Nu, Traditional, Kappa, Iota, Sigma, Westlodge
    - Indication of when a room is occupied and for by who/for what
- Email reminders can automatically be sent to students about application deadlines
    - Once a student applies reminders will be sent relative to that specific student

During Room Draw week(s):

- Housing Perspective
    - Create applications for housing
        - Roommate, preference, class standing, more fields??
        - Validate that roommates want each other
        - Validate (or just import) class standings
        - Set open and close dates for each type of application
            - There are several different applications that happen at different times but application times don't overlap.
- Student Perspective
    - Squatting - students who don't move
        - Students can apply to stay in the same room they are currently in
        - Criteria for squatting:
            - Can't be a corner room
            - Can't be a single
            - Can't be a suite

            - ???
    - Point System housing
        - Students can form groups when applying to Omega, Nu, or Oberg
            - Every student must confirm they are in a certain group
            - Students can only be in one group at a time
            - Points are based on class standings
        - Random numbers are assigned to students
            - Students in the groups with the highest number of points assigned first
            - No two students can have the same number
            - The lowest number in the group dictates when they will pick their room
            - The lowest number student is also the "leader" of the group and will be in charge of picking the room for the group (this seems like it could be a bad idea so maybe groups should be able to pick their leader)
            - **Setup a notification system (email or desktop or ??) so students will be notified when it's their turn in line to pick**
    - Themed Housing
        - Similar to above but with no groups
    - Other housing
        - Regular housing
        - Students who didn't sign up in time
        - ??
    - For all housing
        - students will have a specified time slot (based on their random number)
            - Students must be notified of that time slot
            - Students can select their top 10(or more?) rooms during their time slot
            - Once the lowest number has picked their room the second lowest number can pick their room (or it will auto be assigned based on their preference).. And so forth
            - If students don't pick a room during their time slot (?? to be determined)
        - Students can see a map of the rooms
            - Students can see who the RA is of each dorm
            - Students can see which rooms are still available
        - When students apply (or accept?) a room they can sign (or be sent to somewhere to sign) a form agreeing to the terms of that dorm (health and

wellness / pet friendly have special terms to agree to). All students must agree to housing agreement.

- Make sure students meet criteria for applying to housing
    - If they're a male they can't apply to all female
    - If they want a pet they need to have a pet
        - Otherwise they get a lower preference
- Students have the ability to swap rooms after room draw is done
    - All four students must agree (and put a reason)
    - Students can only openly swap during certain periods
        - Other times housing must approve
        - RA's won't be notified during certain periods

After Room Draw:

- Export data to banner
- Create a new housing term (fall/spring/summer/autumn term)

Summary - Key Components:

- Login / Registration / Permissions System
- Pairing system for first years and random roommates
- Map to display houses that update with RA's and when room's fill
- Application system for housing (lots of rules)
- Room Draw system (assign numbers, students pick housing, etc)
- Admin tools / dashboards
- Database
- REST API
- Documentation
- Setup testing / error catching