MID -TERM PROJECT REPORT- INTERACTION DESIGN PRACTICE

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RentOCenter App

For Rental Apartment Customer Service and Tenants

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Executive Summary

Indianapolis has IUPUI located in the heart of the city. Also there are many companies located around the downtown area of Indianapolis. When people move for their educational or professional careers, the first thing they have to think about is accommodation. There are ample of apartments located in the downtown area to accommodate everybody. To take care of all the accommodation related activities each apartment has its own leasing office. Each leasing office in turn has to manage all their internal activities including advertising, customer inquiries, maintenance, tenant's customer service, amenities, property management and so on. Our project focuses on designing a system to address the daily pain points of the leasing office employees. Although there are many applications available to manage the information related to the day to day activities of these offices, they have many limitations. We aim to provide a better solution by augmenting the existing systems and addressing the pain points for better support in managing the various activities of the leasing offices.

Throughout the course of six interviews and more than two hours of observations we identified many unique challenges amongst the three communities we visited. When we began affinity diagramming our insights, we discovered there were three themes that emerged from each community. These are the critical requirements to address because they are consistent problems that both take up a significant amount of the property manager's time and degrade the resident's services from staff and quality of living in their community. The first is that managing parking in a 'near-campus' and 'downtown' environment is very time consuming and challenging. The second theme was that tenants are consistently unhappy with the inconvenience surrounding packages delivered to the office because they were not home. A key frustration is that the rental office might close around the time most tenants are arriving home from work, leaving their package stranded in the rental office. Finally, all the communities we visited struggled to manage the various aspects of the community; maintenance, security, parking, leasing, administrative duties, and an overwhelming amount of paper artifacts.

The design alternative that we chose to pursue further were.

- Package delivery and access system.
- Rent payment tracking system.
- Interactive parking alert and towing system.

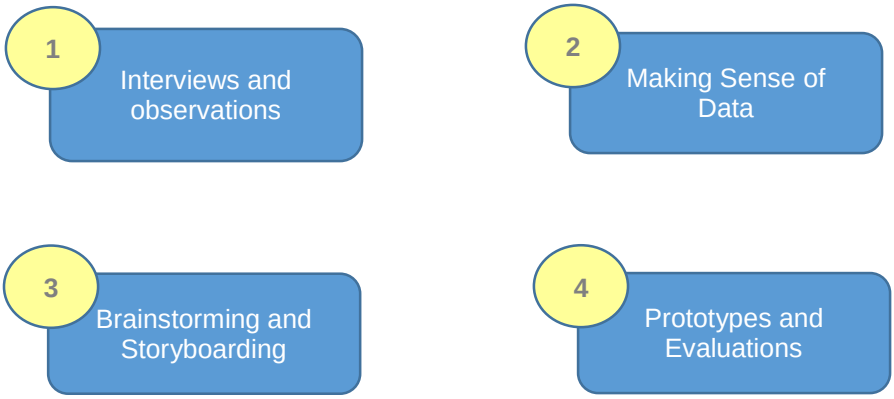
In order to address these primary pain points of the customer service we decided that the best solution to implement moving forward is a centralized system that accommodates all of the proposed solutions. This system will be accessible by all staff, residents, and managers, with a role-based permissions system. This way we restrict access to the appropriate modules; ensuring that the maintenance staff has access to maintenance tickets but not resident personal information, such as social security numbers, is critical. We intend for this system to be used on both PC and mobile platforms, which allows the Property Manager, residents, and staff more flexibility.

The proposed system will reduce overall manual paperwork, allowing Property Managers more time to focus on the big problems they have to deal with instead of the minutia of mailing re-leasing reminder letters or late payment notices. The system allows residents the freedom to access their packages after-hours while keeping the peace-of-mind that their property is safe. Finally, the system allows Property Managers and security personnel to manage an extremely difficult parking situation in an organized, efficient and fair way.

We designed a mobile app **RentOCenter** as a solution to the primary issues of rental office customer service. Our aim was to fulfill the mission of the rental apartment executives, to provide excellent customer service and keep them always connected.

Activities Performed

In order to achieve our goal we performed the following major steps.



The detailed report of these activities can be found by following the links below.

1. Interviews and Observation Report
2. Making Sense of the Data Report
3. Brainstorming & Storyboarding Report
4. Prototype and Evaluation Report

Interviews and Observations

Summary

Indianapolis has IUPUI located in the heart of the city. Also there are many companies located around the downtown area of Indianapolis. When people move for their educational or professional careers, the first thing they have to think about is accommodation. There are ample of apartments located in the downtown area to accommodate everybody. To take care of all the accommodation related activities each apartment has its own leasing office. Each leasing office in turn has to manage all their internal activities including advertising, customer inquiries, maintenance, tenant's customer service, amenities, property management and so on. Our project focuses on designing a system to address the daily pain points of the leasing office employees. Although there are many applications available to manage the information related to the day to day activities of these offices, they have many limitations. We aim to provide a better solution by augmenting the existing systems and addressing the pain points for better support in managing the various activities of the leasing offices.

The first important thing we observed participant complaining "We are old school", to convey that they could have more gadgets so that inquiries and maintenance activities could be documented more fast and accurate. We also observed the staff getting annoyed over parking issue and she literally said "this is frustrating". She was expecting to have some automated system to document all the parking violations. At the same she did entry on paper register and went to stick parking violation sticker on vehicle. She looked very tired and said "Oh gosh, again!!!" as she wanted to access the system meant for parking violations. She expected to have a centralized system for all including maintenance, rent and financial activities, storage management and so on. As we went through all the interviews and observations we felt that next time if we want to more interview session it will be great to conduct diary studies, because in 15 minutes of time there are things which we were not able to catch.

We gathered a lot of information and identified the areas that could be explored including a paperless system, central and mobile applications for easy access and a better design to address parking related violations. To investigate the more novel design strategies we identified the key steps causing a pain in daily activity.

1. Paperless System: During our observation we identified three situations where they used paper system including (a) Guest Card: Guests are supposed to fill the cards if they come for the inquiries (b) Maintenance team expects a paper card to address the complaints from tenants (c) And all the parking violation related entries are kept in separate register. There is scope to design an automated system such that leasing office employee's intervention in this cases could be reduced substantially.
2. Centralized System and Mobile application: To achieve the paperless system design aspects could be discovered in order to deploy centralized system approach to take care of keeping all the logs and generating related reports. If mobile user friendly interface made available to tenants, employees, guests and maintenance people that is going to cover more than half of the daily pain points of the leasing of office customer service personnel.
3. Parking Issues: Design could be explored around the parking spot problem by providing a simple mobile application with a design to report violations. There is scope for investigation design strategies for easy reporting and notification to the owner or towing party. The design strategies will include thing like scanning a license plate to report the violation at the same to issue the notice to customer. Another strategy is to explore the tag based entries and exit to the vehicles to generate automated parking logs of the vehicles with respect to the assigned spot.

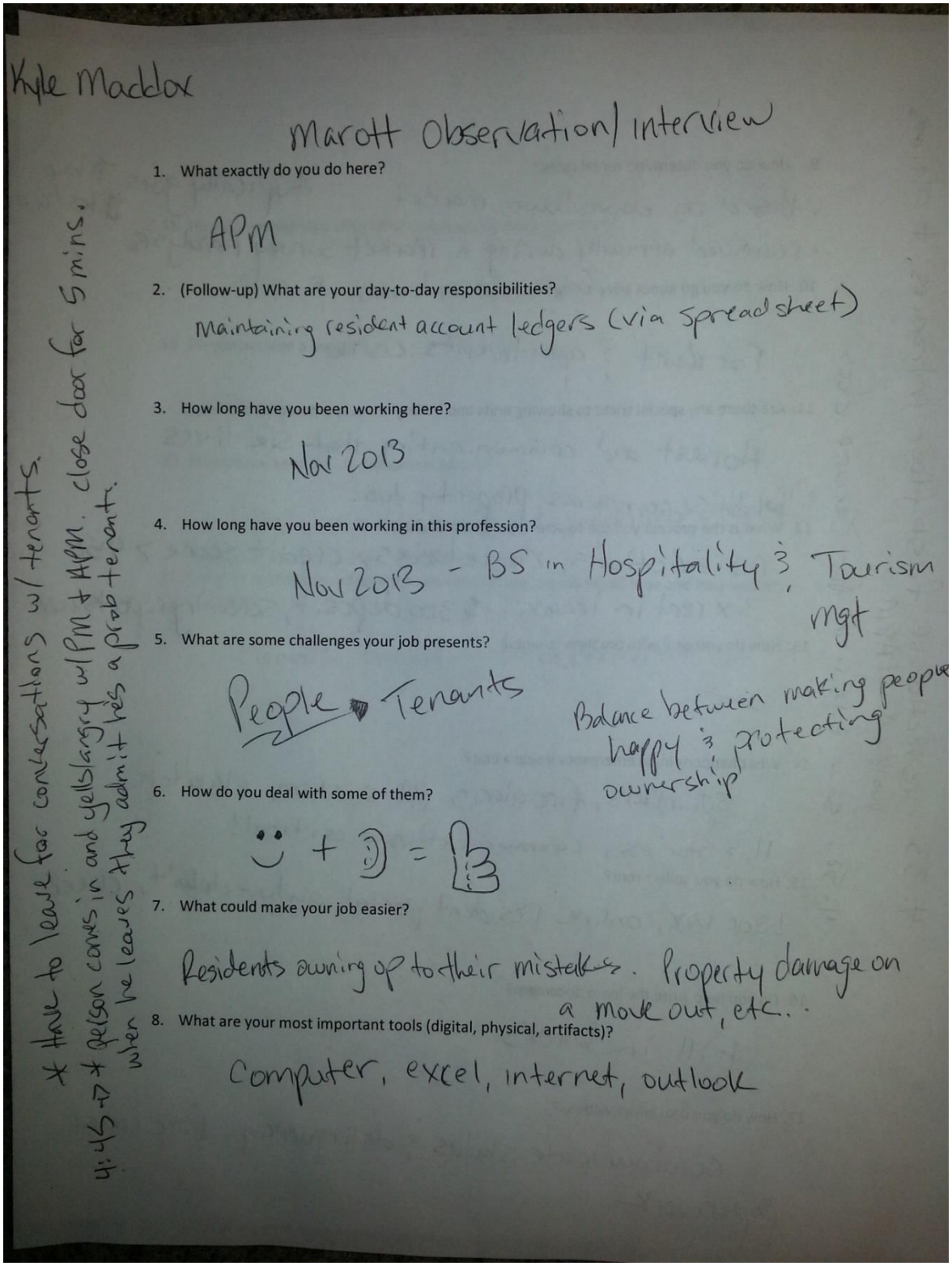
Leasing office customer service is vast domain to explore, we interviewed and observed only few of them, if we were going to continue gathering data out next strategy would be to interview the different roles in the domain and to conduct a diary study. If we could provide the better designs to the problem we addressed, we will be able to cover more than half of the daily pain points of representatives.

Observations

The observations were made at three different rental offices. The properties we observed are:

1. Marott Apartments
2. Canal Square Apartments
3. Canal Overlook Apartments

Field Notes
Marrott Apartments


Kyle Maddox

Marott Observation/ interview

1. What exactly do you do here?

APM

2. (Follow-up) What are your day-to-day responsibilities?

Maintaining resident account ledgers (via spreadsheet)

3. How long have you been working here?

Nov 2013

4. How long have you been working in this profession?

Nov 2013 - BS in Hospitality & Tourism mgt

5. What are some challenges your job presents?

People ♥ Tenants

Balance between making people happy & protecting ownership

6. How do you deal with some of them?

☺ + :) = 👍

7. What could make your job easier?

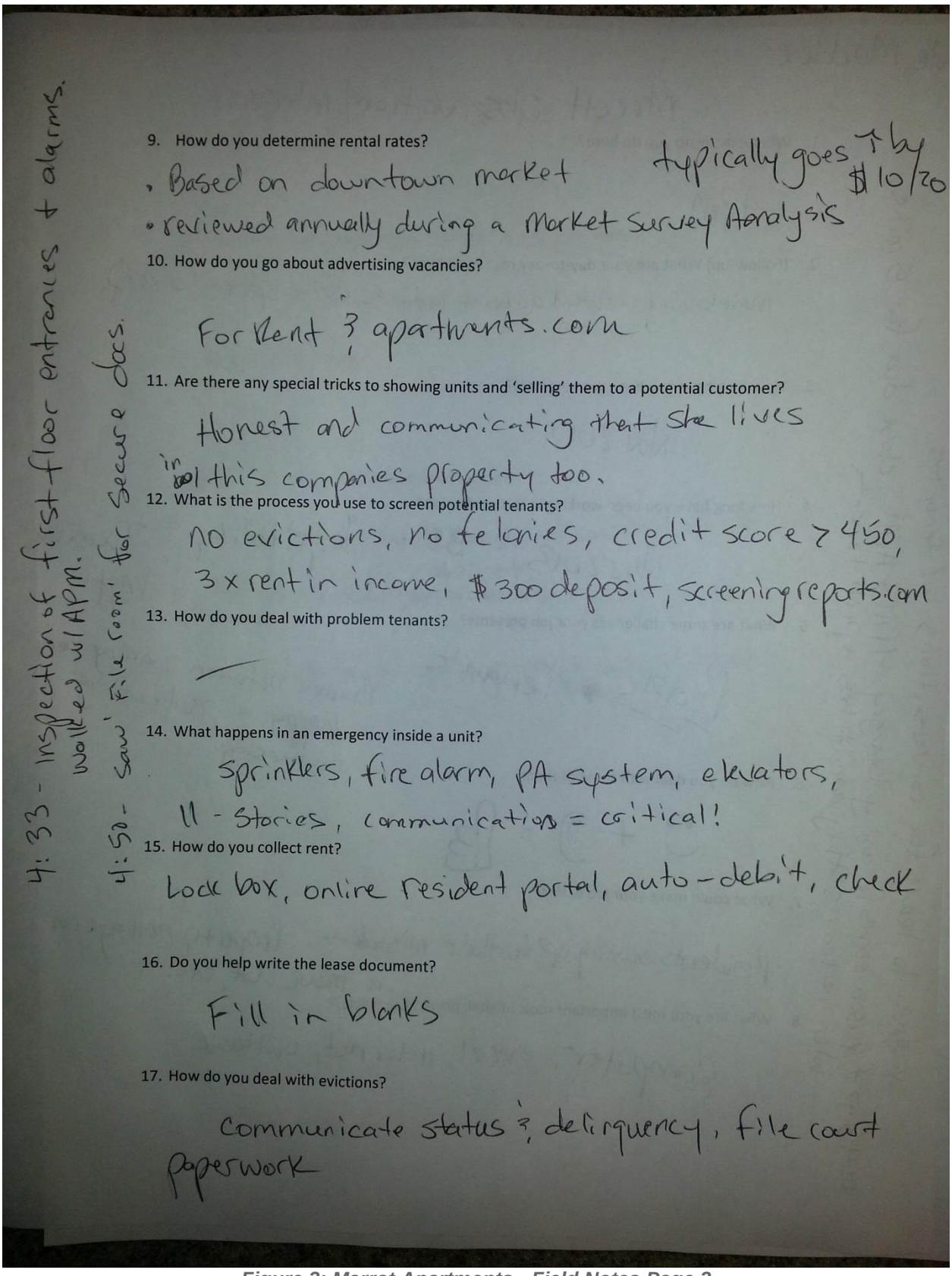
Residents owning up to their mistakes. Property damage on a move out, etc..

8. What are your most important tools (digital, physical, artifacts)?

Computer, excel, internet, outlook

* have to leave for conversations w/ tenants.
4:45-7 * person comes in and yells/angry w/ PM + APM. close door for 5 mins. when he leaves they admit he's a prob tenant.

Figure 1: Marrot Apartments - Field Notes Page 1



4:33 - Inspection of first floor entrances + alarms. walked w/ APM.

4:50 - Saw 'File room' for secure docs.

9. How do you determine rental rates?

- Based on downtown market typically goes ↑ by $10/20
- reviewed annually during a market survey Analysis

10. How do you go about advertising vacancies?

For Rent ? apartments.com

11. Are there any special tricks to showing units and 'selling' them to a potential customer?

Honest and communicating that she lives in this companies property too.

12. What is the process you use to screen potential tenants?

no evictions, no felonies, credit score > 450, 3 x rent in income, $300 deposit, screeningreports.com

13. How do you deal with problem tenants?

14. What happens in an emergency inside a unit?

sprinklers, fire alarm, PA system, elevators, 11 - Stories, communications = critical!

15. How do you collect rent?

Lock box, online resident portal, auto-debit, check

16. Do you help write the lease document?

Fill in blanks

17. How do you deal with evictions?

Communicate status ? delinquency, file court paperwork

Figure 2: Marrot Apartments - Field Notes Page 2

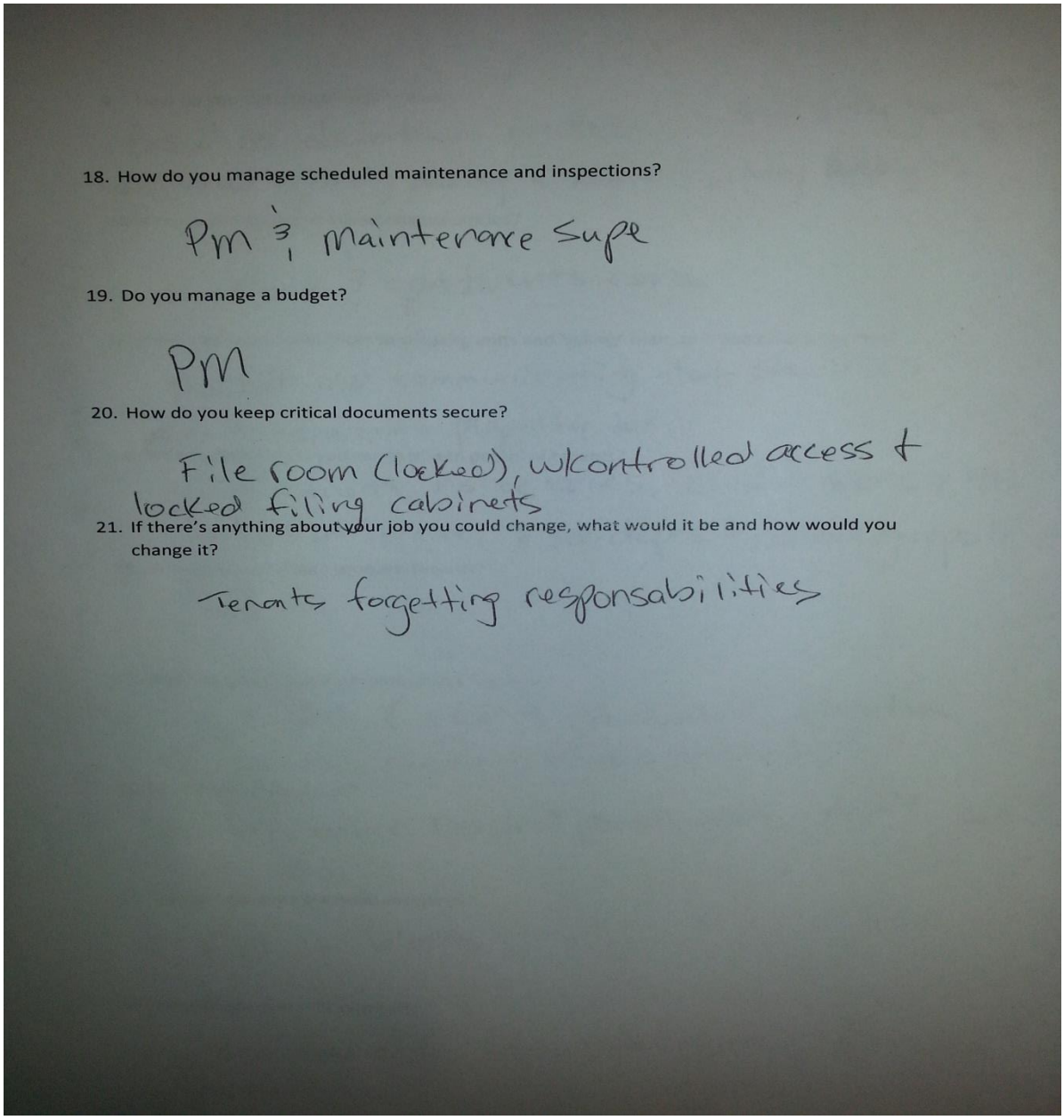


Figure 3: Marrot Apartments - Field Notes Page 3

Canal Square Apartments

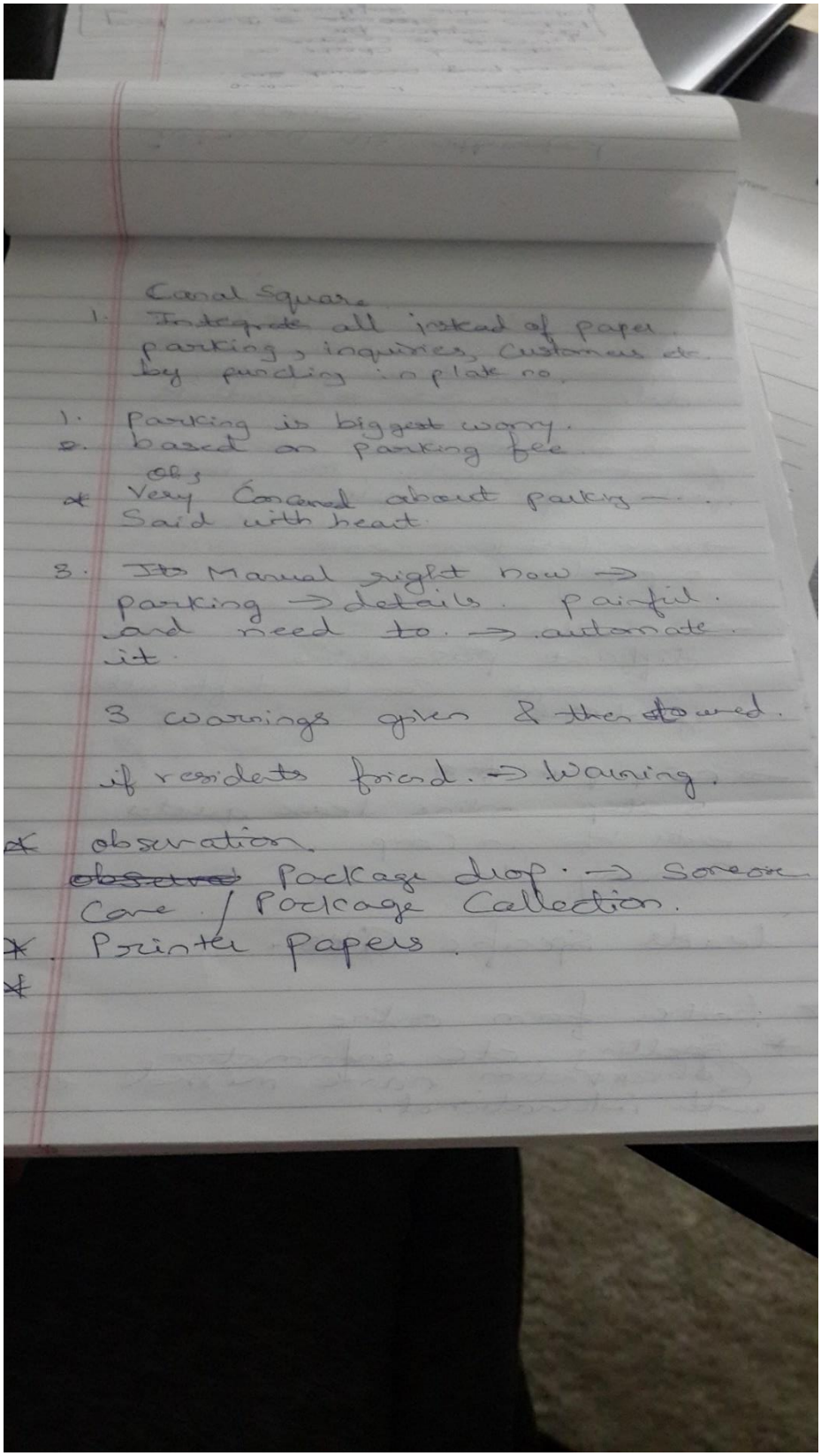


Figure 4: Canal Square Apartments - Field Notes Page 1

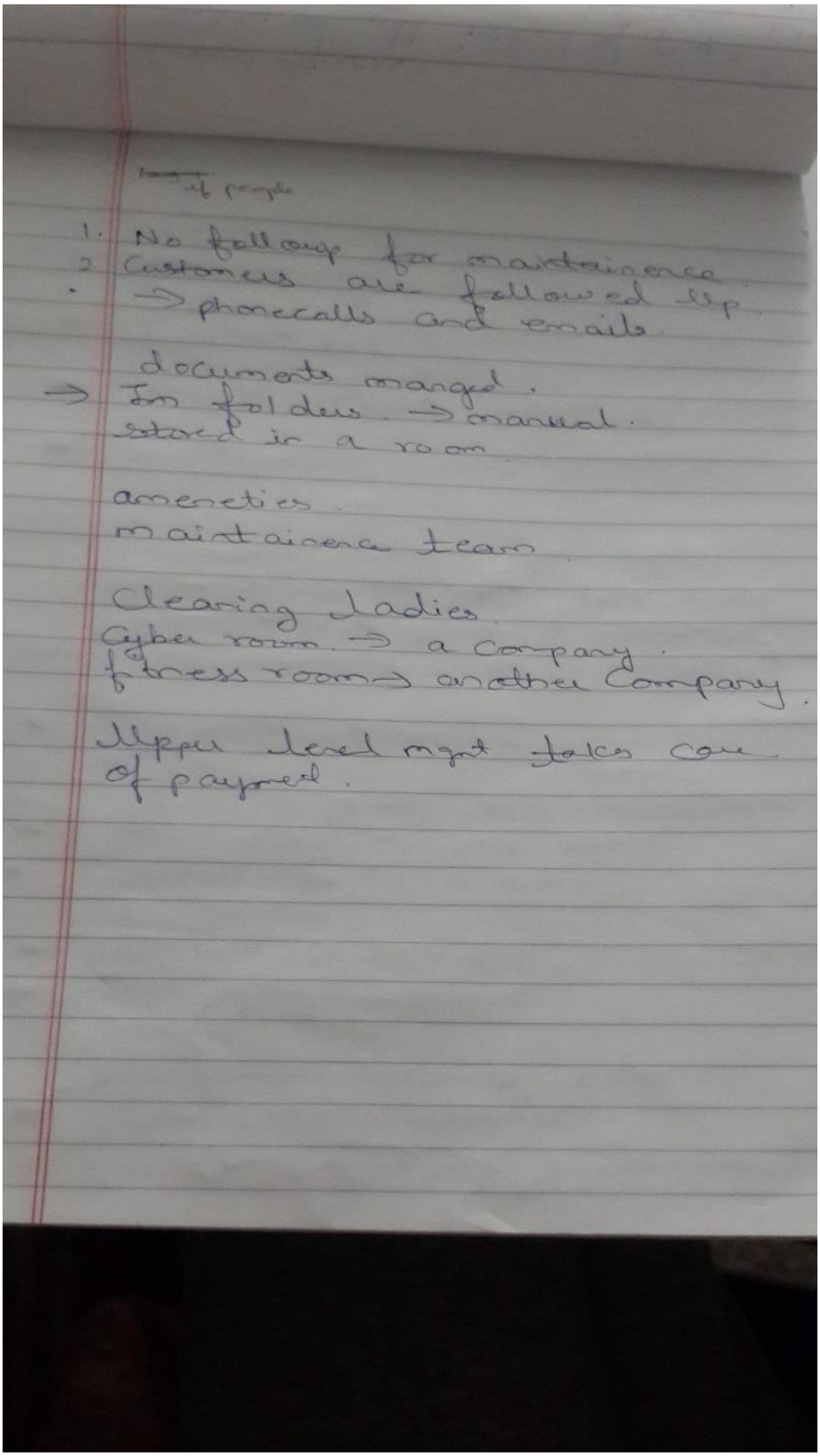


Figure 5: Canal Square Apartments - Field Notes Page 2

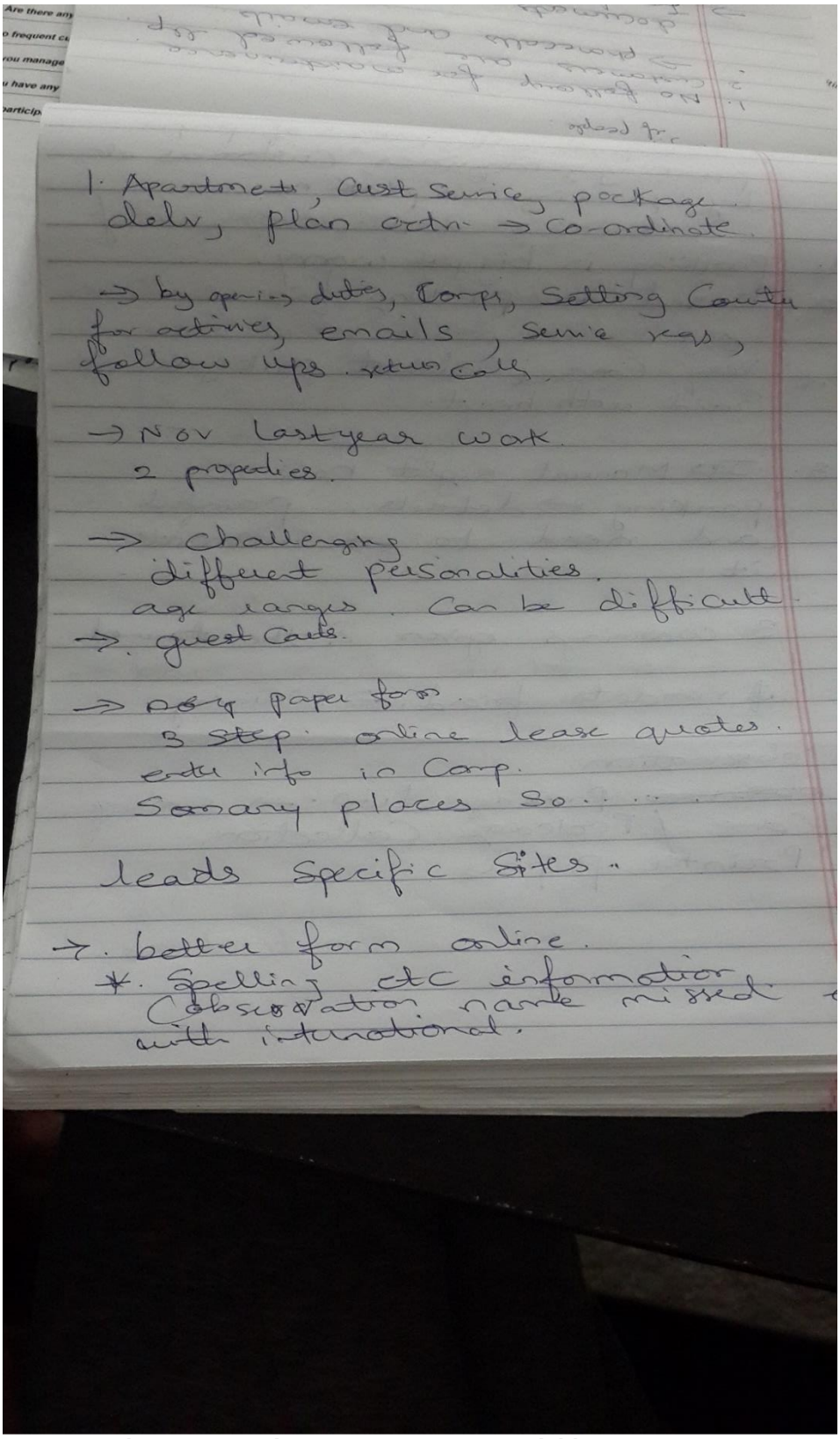


Figure 6: Canal Square Apartments - Field Notes Page 3

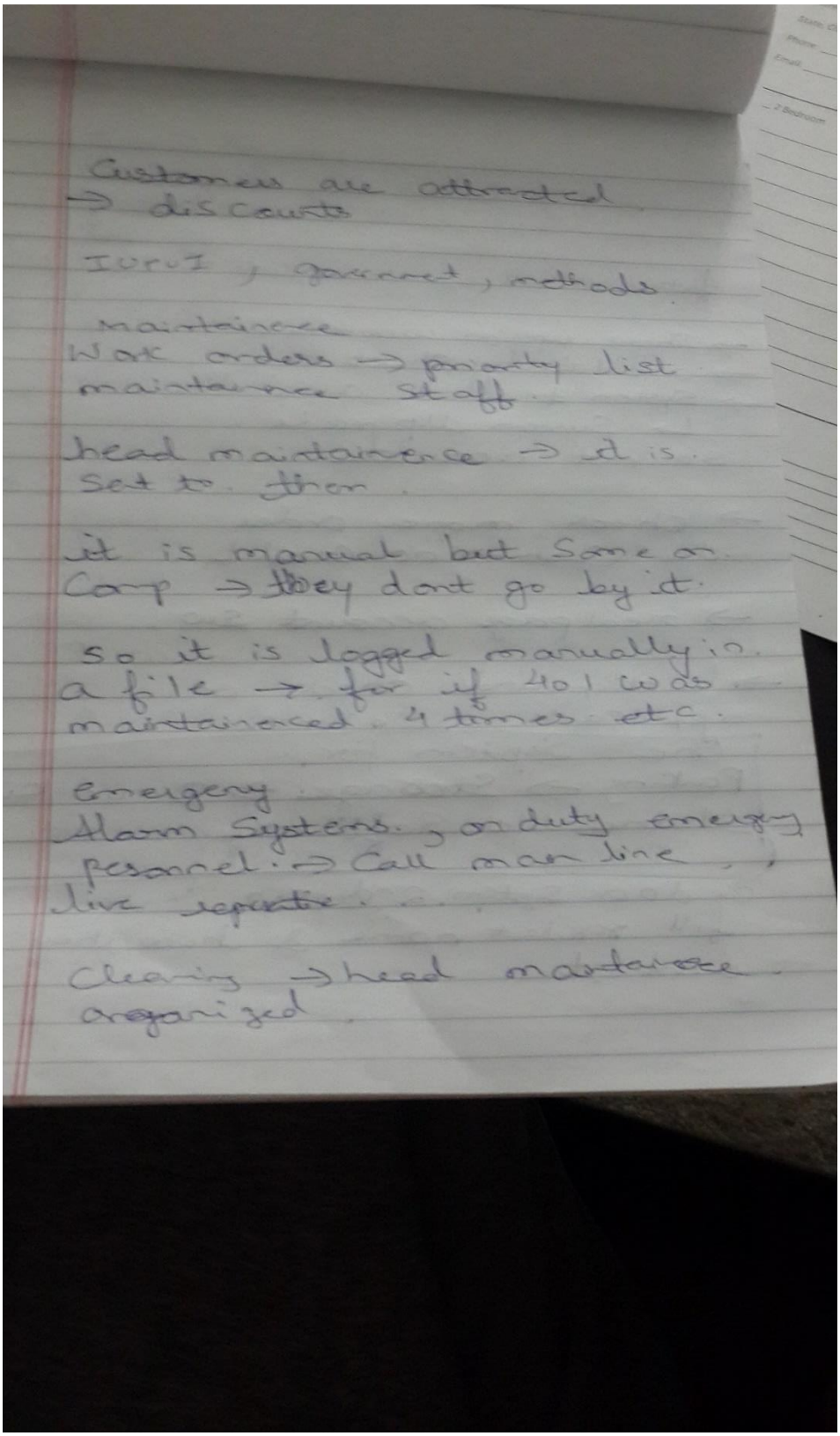


Figure 7: Canal Square Apartments - Field Notes Page 4

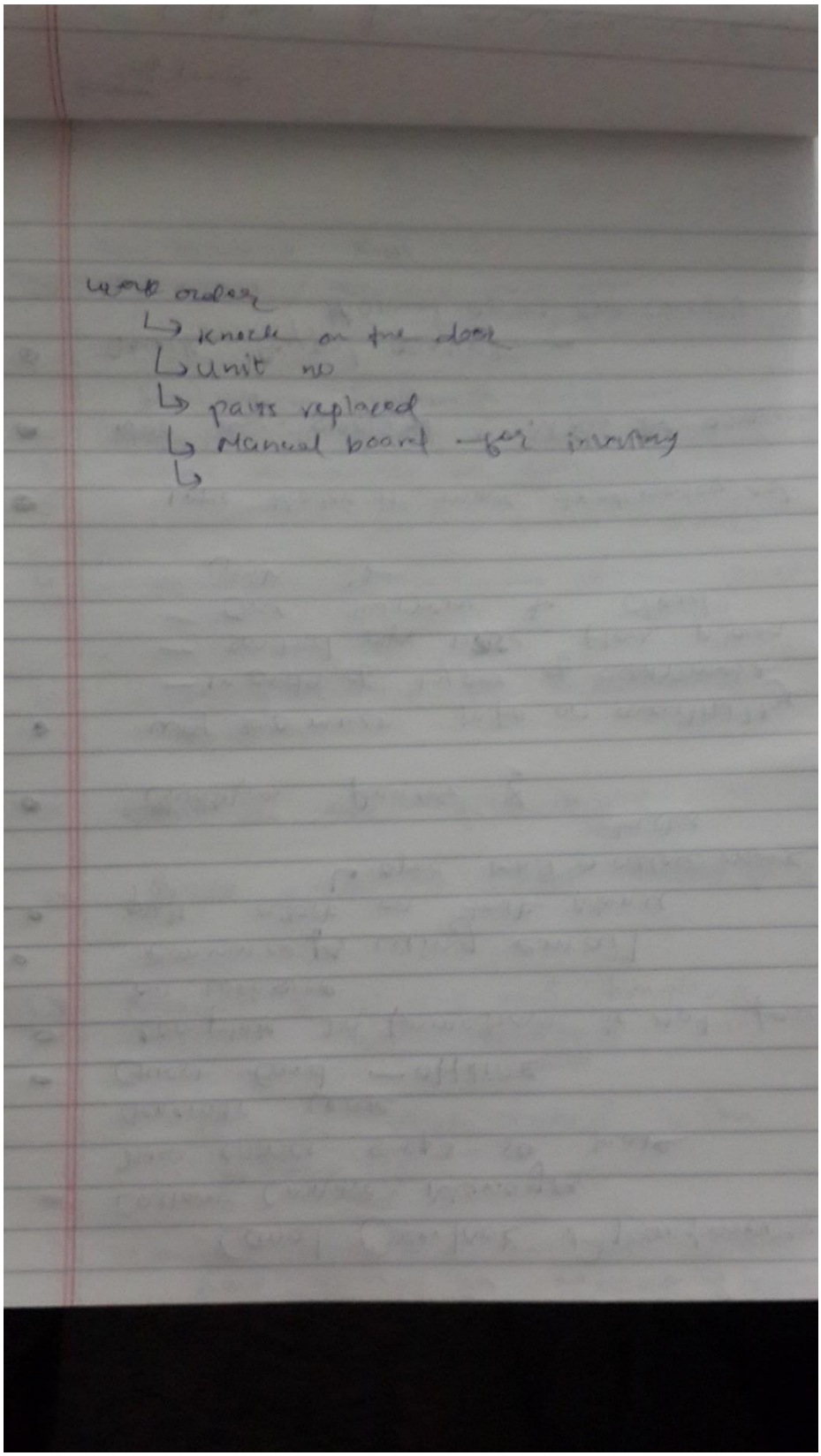
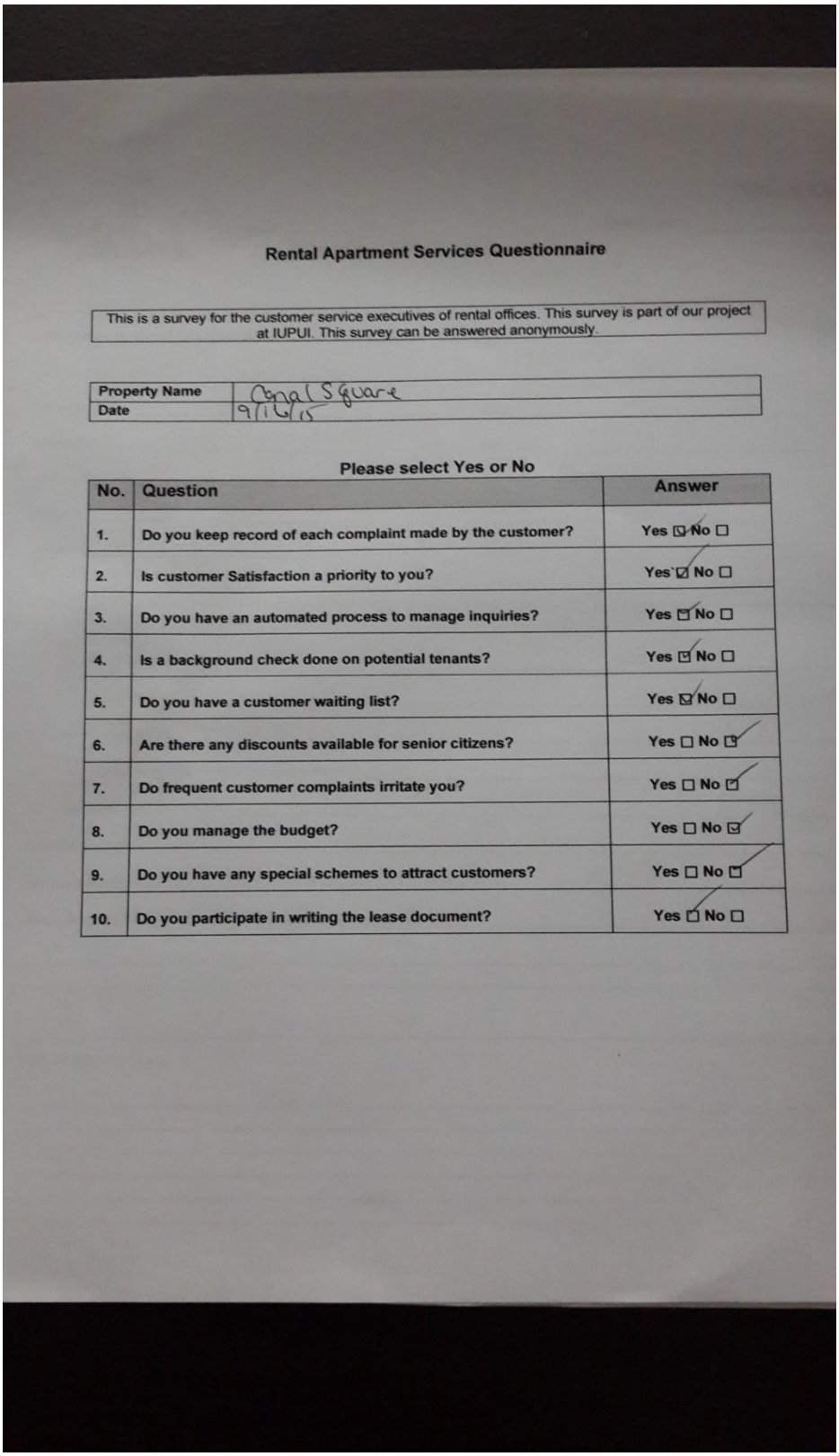


Figure 8: Canal Square Apartments - Field Notes Page 5



Rental Apartment Services Questionnaire

This is a survey for the customer service executives of rental offices. This survey is part of our project at IUPUI. This survey can be answered anonymously.

Property Name	Canal Square
Date	9/16/15

Please select Yes or No

No.	Question	Answer
1.	Do you keep record of each complaint made by the customer?	Yes ☑ No ☐
2.	Is customer Satisfaction a priority to you?	Yes ☑ No ☐
3.	Do you have an automated process to manage inquiries?	Yes ☑ No ☐
4.	Is a background check done on potential tenants?	Yes ☑ No ☐
5.	Do you have a customer waiting list?	Yes ☑ No ☐
6.	Are there any discounts available for senior citizens?	Yes ☐ No ☑
7.	Do frequent customer complaints irritate you?	Yes ☐ No ☑
8.	Do you manage the budget?	Yes ☐ No ☑
9.	Do you have any special schemes to attract customers?	Yes ☐ No ☑
10.	Do you participate in writing the lease document?	Yes ☐ No ☐

Figure 9: Canal Square Apartments – Questionnaire (Closed Questions)

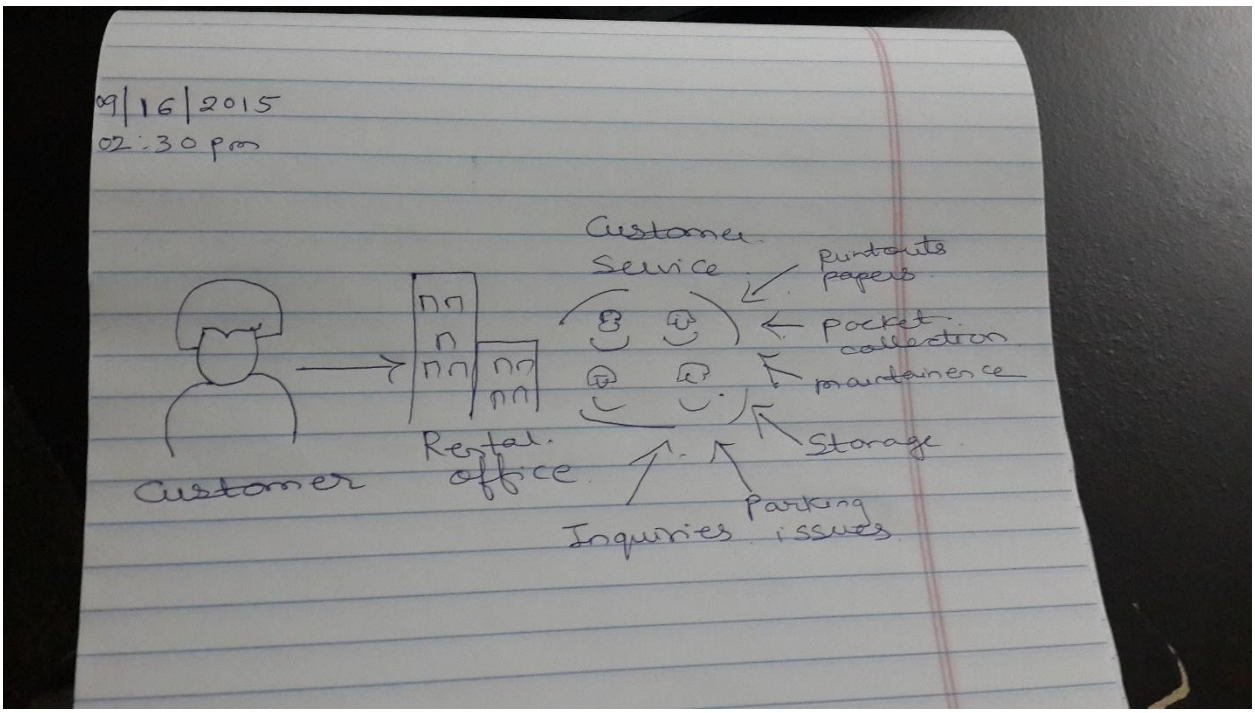


Figure 11: Canal Square Apartments – Field Notes Sketch 1

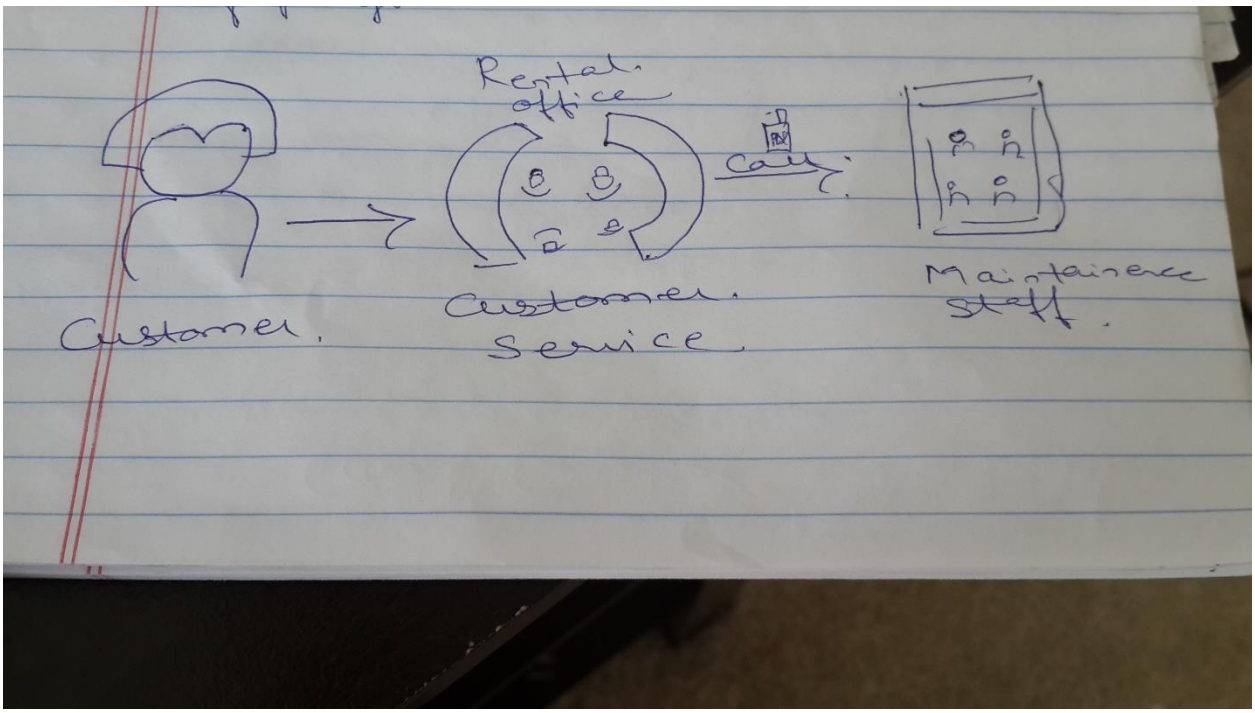


Figure 12: Canal Square Apartments – Field Notes Sketch 2

Canal Overlook Apartments

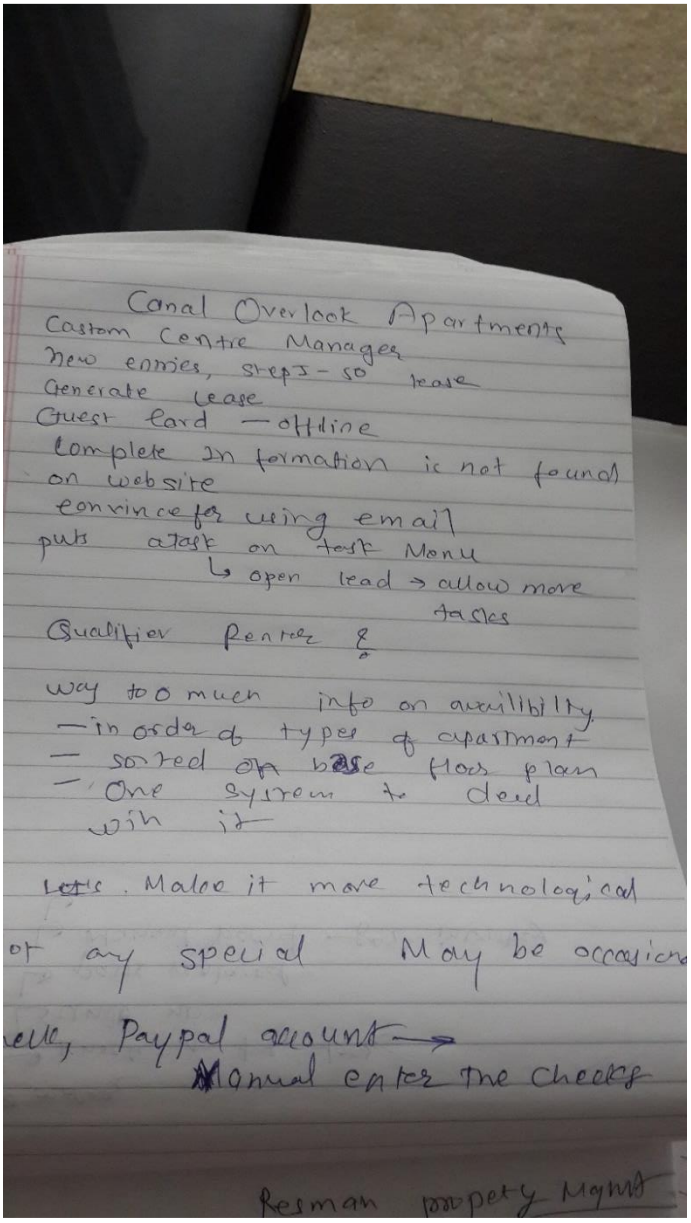


Figure 13: Canal Square Apartments – Field Notes Page 1

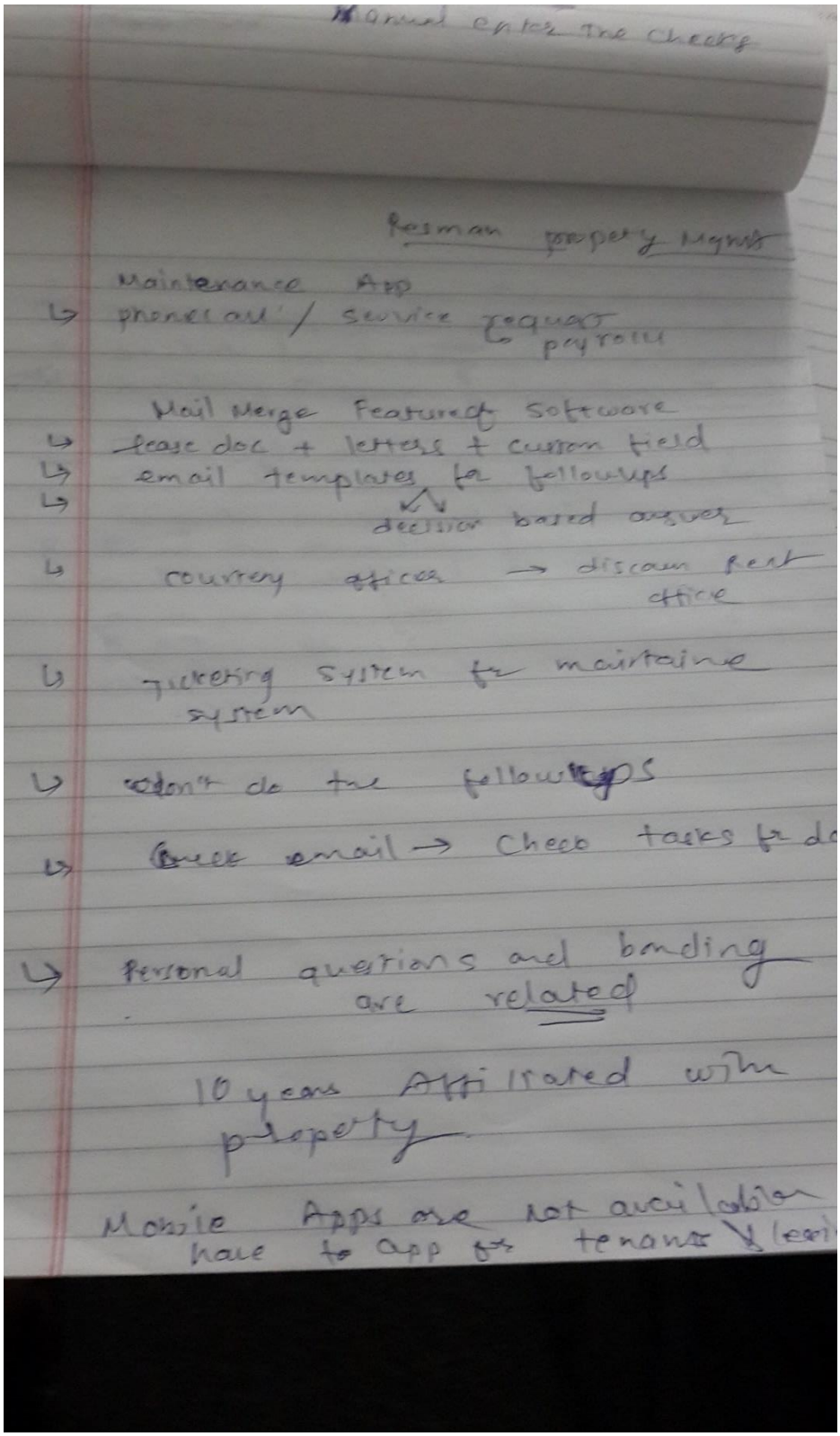


Figure 14: Canal Square Apartments – Field Notes Page 2

Observation Summary 1

In the first location we stayed in the Business Office of the Marott Apartments after our interview. We also roamed out of the room, into the lobby and watched tenants. We went to the building on Tuesday September 15, 2015 from 4:00 to 5:30pm. While we were walking there I saw the Concierge, Security Guard, two Maintenance personnel, 17 tenants, the Property Manager and the Assistant Property Manager. The first thing we noticed from the observation is that most of the Property Manager's interaction with tenants was via the phone. For context, the building is eleven stories tall so perhaps that plays a factor. They spent approximately 20 minutes generating a letter to three tenants who were delinquent on their rent. One of the tenants was apparently a repeat offender and they told us I was going to need to step out of the office when he showed up to discuss his situation. After he left (he stayed for five minutes or so) they told us that they reiterated to him that there are several ways to pay; via a lockbox, check, auto-debit or via a secure resident portal online.

Observation Reflection 1

We think the value added from the observation is really in the interaction between the Property Managers we were able to observe we might otherwise have missed out on. When speaking about a difficult tenant they shared a look that said, "This is so frustrating". They spend a lot of time printing and storing hard copies of documents; maintenance requests, leases, copies of agreements, pet vaccination records, etc. If they had an intranet portal they could store this information electronically and offer their tenants a more convenient way to submit their documentation. The most challenging portion of the observation, similar to the interview, is that I had to leave the office whenever a tenant would show up or call to discuss anything remotely personal.

Observation Summary 2

The second location that we visited was Canal Square apartments. There we sat in the lobby for a very long time. This gave us an opportunity to observe the people who came in for inquiries, where they parked the vehicles and their access to entry. In the Canal Square lobby we met many of our friends who live there. We managed to ask questions to them too. We went to the building on Wednesday September 16th, 2015 from 02:30PM to 04:00PM. When we entered the rental office, we saw two customer service executives in the office. They were very cordial and cooperative. They treated all their customers really well and with a smile on their face, even if the customers asked them many questions. We observed that the one tenant came up with a complaint that someone else has parked in his spot. The leasing office lady went to check the problem. She came back with a picture of the license plate and started looking for the car owner by searching for the vehicle number manually in a paper register. We observed that this was a very tedious process and was tiring for her. This documentation process was manual and the customer service executives had a very tough time figuring out things.

Our next visit to the building was on the same day from 05:30PM to 06:00PM. This time around we happened to spot a maintenance staff there. He gave us a lot of information about how they manage the maintenance issues there. What was really amazing was that the maintenance staff was available 24/7. We also observed the few IT service folks walk into the office for computer repairs. While we were leaving from the building we observed that the gates in this building were locked after 06:00PM. to ensure the security of tenants. Only the people who had the access code could enter into the building.
At this time many people came in for package collection. The executives got really busy handing over packages to people. We got a chance to have a look at the storage area. There were many packages in the storage area and they were arranged in shelf floor wise. Helping the tenants with the packages was again a very tiring task.

Observation Reflection 2

This observation helped us get deep insights of the day to day work of customer service executives at the rental office. It was a great experience to see the work that they do so closely. It gave us a better understanding of their processes and requirements. It helped us understand the actual working, problems faced and the required solutions which did not come to my mind when we first thought about this concept. Many important tasks were being handled manually and a lot of efforts were required by the customer service executives. The most painful task of them all was the parking issues. When the executive conveyed about the parking issue to us, we could see the pain that they have to go through. It was surprising that there was no centralized system available to handle all these tasks. Most of the process was manual and the system that they use currently was not intelligent enough to meet their needs. Many of their tasks that are currently done manually there can be automated. They were very surprised and also happy to hear this as it would help them manage their work easily without any problem. Developing one central system that manages customers, their issues, documentation, storage and so on is definitely a requirement that we felt was needed. The next time we do the observations we would like to spend some more time with maintenance staff and the other third party staff. This will help us understand their relationship better to develop systems with effective coordination between them. It was easy to get the basic background information from them but when it came to technology they wouldn't understand

certain things easily. For few of our questions they went on talking, moving away from the point. It was challenging to extract the main points from these answers as it was important not to collect too much of irrelevant information. We enjoyed this observation a lot and did not get bored at all. It was a fun experience and now we feel confident to observe and gather information from people.

Observation Summary 3

The third location that we went**,** we went to Canal Overlook Apartment and took permission to observe. We went there in the morning and in the evening. There were two employee handling all the operations including the customer inquiries. In the morning we observed three people came for the inquiry. All they did is picked up the guest form and started filling it. Then leasing office manager politely told them that she will help them fill up the form. While in the discussion with first person, second customer entered the office for inquiry. Second employee took care of that person's inquiry.

Meanwhile one of the tenants came to complain about broken washer, as all the employees were busy he had to wait. One of the customer service representative attended him, we observed that she apologized for the delay. She took a complaint form and wrote his problems on some form. Then she gave him receipt to follow up. Interesting thing I observed is after all the customers went and they collected all the information written on the papers such as guest card and maintenance card they started entering it on computers assigned to them. In the evening we observed that there was less rush in the office as compared to the morning. Most of the times they got inquiry or maintenance request over the phone. Then we interviewed one of the employee, she was property manager there for last 10 years. She was friendly and charming and also seemed to like the idea of college project. She helped us a lot and tried to explain all the details she possibly could.

Observation Reflection 3

We observed that property managers don't like dealing with paper either. They need to make an extra effort to write information on the guest card, maintenance card to the application installed on the computer. They said that "Our company is an old school" to Convey that they could have more gadgets so that inquiries and maintenance activities could be documented more fast and accurate. We think digital guest cards can make more sense to both party's customers and property managers. We were surprised that even they have a website to do all things; we observed that people are calling them or coming personally to leasing offices to report the issues. We think sites are not designed that good because people were not using it. Maybe they are expecting an app that will be native, faster and easy to use and manage. We met a nice person at the leasing office; it seemed she was jubilant with her job and tried to give us all the details she possibly could. The hardest part was to listen to the conversations, to take notes about how exactly the situation is being handled. We loved the whole experience of observations and interviews at Canal Overlook Apartments.

Interview Summaries

Interview 1 Summary

Participant 1 - Marott Property Manager

The apartment complex we went to was the Marott where I spoke with the Property Manager. My brother lives in this building and after trying to set up two other interviews elsewhere I thought to reach out to them. I would estimate this woman to be approximately 39 years young. She has worked in the hospitality and residential management industry for 10 years and graduated from Ball State University with a degree in Business Administration with a Minor in Hospitality. She has worked for the Van Rooy Property Group (Marott ownership group) for 3 years. At her invitation we conducted the interview in her office which lasted 15 minutes. The first key insight I gathered from the Property Manager is that she is responsible for managing security, maintenance, and administration personnel. This includes hiring, firing, performance reviews, setting salaries, determining (along with regional management) promotions and training. This responsibility consumes an estimated 40% of her time, which is why she is a firm believer in good training.
The second key insight I gained from this interview is that the Marott had an IT person try to create a SharePoint intranet site for internal use but he quit before the work was completed. They have since abandoned the project and process pay with time cards and an external payroll management organization.
The third insight is that in her experience some residents view rules enforcement as personal attacks. This makes satisfying these people difficult and retention very challenging. She identified her role as property manager as being a "steward for ownerships money".

Participant 2 - Marott Assistant Property Manager

The second person I interviewed is the Assistant Property Manager for the Marott apartments. This woman seemed to be in her early thirties and told me she earned a bachelor's degree in Hospitality and Tourism Management from San Diego State University. She mentioned that she currently lives in a Van Rooy property but did not say whether it was specifically the Marott. She has worked in industry for two years, all of which has been with the Van Rooy Property Group.
The first insight from this interview is that they determine rental costs by conducting an annual 'Market Survey Analysis' with consideration for the downtown, up-scale housing market trends. She estimates that, on average, rental rates rise approximately $10-20 per month.
Next, she is primarily responsible for dealing with rent payment, late payment and bi-monthly account tracking reports. She also sends out lease renew reminders (kept track of via a spreadsheet and mentioned this is very time consuming and requires 3 or 4 follow-ups). She places ads on rental websites (but insists they get as much business from word-of-mouth and people just driving by the building and being curious about living there).
The third insight from this participant is that the leasing document is generated by 'corporate' and their (property manager's) role is to fill in the 'blanks' in the document. For example, they list the number of tenants, their pertinent information, rental rate and the exact dates of the lease. When they are convicting a tenant it is a long process because the person must default on paying their rent for three months. The property managers communicate their status with the tenant and inform them that legal documents will be filed if payment is not upcoming.
Finally, both participants seemed particularly exacerbated with tenants who 'forget' the terms of their lease, especially when admitting that they caused a maintenance issue or property damage.

Interview 1 Reflection

The interview process is something I personally enjoy, I really like meeting new people and learning new things. The most surprising thing I learned during the interview was that the company did not have an intranet site. Something I did not previously know was that the leasing document was pre-written. I assumed that the property manager wrote the document in a template format, but I thought they authored it themselves. I think that the next time I interview someone I will ask ahead of time if it will be a problem for me to record. The participants informed me that the nature of their work prevented me from recording anything (to protect tenant personal information). Both participants were very helpful and enthusiastic and very generous with their time. The most challenging part of the interview process was having to stop so they could interact with a client (they asked me to leave while they were having any one-on-one time). The interviews were different because of the two perspectives and unique roles within the Management Office. If I were going to continue gathering data, my next interview would be the Maintenance Supervisor who has to work and coordinate with both of the Property Managers, without a digital tool like an intranet site.

Interview 2 Summary

Participant 1 - Canal Square Leasing Consultant

The second apartment complex that we went to was Canal Square where we spoke with the leasing consultant. We have many friends at Canal Square who know the customer service executives there so it was easy to reach out to them. The woman that we interviewed was approximately 37 years old. She was working here since November last year. Though she wasn't a very old employee of Canal Square she had a lot of experience as a leasing consultant. She had worked at multiple places in the same field for a long time so interview with her was very informatory as she had many different situations to discuss about. The interview was conducted at the customer service office. The interview lasted for 43:00 minutes. It was interrupted multiple times because many customers walked in for some service or the other. The actual interview time around 20 minutes.
The first key finding that we found in this interview was that though so many customers were arriving at the office, there were only two executives to manage them. With so much demand in services that were needed by the customers we believe it was important to automate some tasks and develop a central system. This can help them manage all the tasks easily even with limited manpower.
The second key finding was that they had a lot of paperwork. All their processes involved paperwork work. It was very tedious for them to manage the data on paper. This would also lead to data loss at times. All these documents were placed in big files and kept in a storage area.
The third key finding was that they had employed third party employees for managing the amenities, cleaning the property surroundings and so on. Because so many of their processes are manual, it was not possible for them to manage the other services that were needed in the housing complex.

Participant 2 - Canal Square Maintenance Staff

While we were interviewing the leasing consultant at Canal Square we spotted a maintenance person who had come there for some repair. He was approximately 50 years old. He was working here since 2 years. The interview was conducted at the customer service office. The interview lasted for 15:00 minutes.

The first key finding that we found in this interview was that they would be contacted over phone by the customer service executive if any issue was reported by the tenant. It was a manual process again.
The second key finding was that the maintenance staff would just knock at the apartment from which a complaint was reported. There was no process to manage the tenant's availability, setting up a time for maintenance staff arrival and so on.
The third key finding was that the log for the services provided to the tenants we maintained manually. The tenant would fill a slip with apartment number, issue details etc. and once the issue was solved comments were written on the same and placed in a paper register.

Interview 2 Reflection

All of us have always enjoyed effective communication and information gathering. We like meeting new people and talking to them. It was a great experience conducting these interviews. The most surprising things that we learned in both these interviews was that there was so much to manage in the apartment complex both in the front office department and in the maintenance department, still everything was managed manually.
We didn't have a big picture in mind before conducting these interviews. Once we started talking to them and getting to know about a few things we had more questions in mind. This gave us a deep knowledge of each the processes there. We got to know that they function very differently than it seemed to us before we interviewed them.
The next time we interview them we want to go for an observation before we conduct an interview. This will give more time for observing. Observing and interviewing at the same time is a bit challenging but it can be overcome with experience. Even though we go as a team of one observer and one interviewer. It is helpful if the interviewer has also observed the working. It was easy to get the right information from both the interviews as we had prepared very specific questions and added them in different categories. The two interviews were very different because one was with the customer service executive and the other one was with the maintenance staff. Though there is some coordination between them, both deal with a different set of tasks. We would love to interview both the customer service executive and the maintenance staff together the next time.

Interview 3 Summary

Participant 1 - Canal Overlook Property Manager

The apartment complex we went to was the Canal Overlook where we spoke with the Property Manager. The reason for selecting this property was it is near from school, and they allowed us for observations and interview session. We think that lady was in her late 40s. She has worked in the same apartments leasing office for nearly ten years. Apart from this company she is having five years of experience in the same domain. As she had a real experience in leasing office customer service, she exactly knew the procedures and problems the face in their day to day life.
The first critical insight we gathered from the Property Manager is that there are only two people working in the leasing office to handle inquiries, security, maintenance, and administration personnel. This responsibility includes taking follow up with leads, tenants, and maintenance personnel. Most of their job is to handle all this thing using a single software and sometimes using paper based resources.
We observed that they did not outsource any of the leasing customer service related work. They are having in house maintenance and repair teams. And the Property Manager handles keeping track of all the salaries of employees and invoices for the inventory.
From this interview, a most interesting insight we gathered is that she was making a perfect use of guest card to get familiar with the person coming for the inquiry. She said it was happy to know them and make them feel privileged by filling up their forms and getting to know them. This property is near the school, and down-town they have high demands for their apartments. So generally they don't offer any discount unless the enrollment is low.

Participant 2 - Canal Overlook Tenant

We interviewed one of the tenants of Canal Overlook. He came there to complain about his broken closet door. He was around 25 years of age and he was an international student. He was staying there for last 9 months. He was in hurry so he just gave answers to few of our questions.
The first insight we gathered is having a mobile app could have made his life easier for doing all sort of activities including rent payment, maintenance issue.
The second and most important we insight we got is that he needed something to track the status of the all the leasing office related activities such what is the possible time my washer gets fixed, did my rent get approved.

Interview 3 Reflection

It was overall a good experience with all the friendly people we met. They gave us ample of time to observe and interview. They introduced us with their day at job. We asked them whether they are ready for diary study they positively replied. Even though they did not have digital system for all of their task, they seemed to know the way of getting things done.

By looking at their daily pain points we can say that either they are understaffed or they need better automated tool to ease their job. They tried sharing all the information they possibly could including the artifacts they gave. We were not allowed to see the software they are using but the property manager told us the name of the software to look up to the internet.

Next time if we want to more interview session it will be great to conduct diary studies, because in 15 minutes of time there are things which we might not caught. We will be more happy if we could appreciate their time by giving them something useful that they can make use to cover their daily pain points and with enjoying the work.

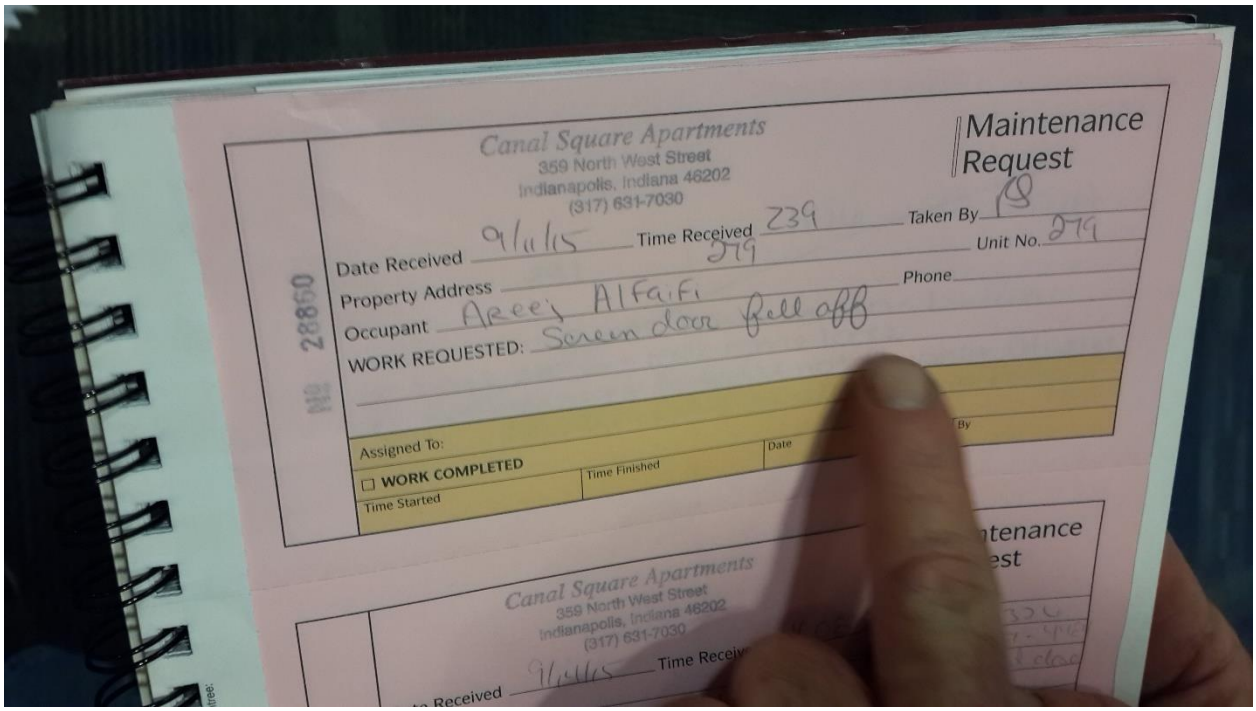


Figure 15: Canal Square Apartments – Maintenance Request Form

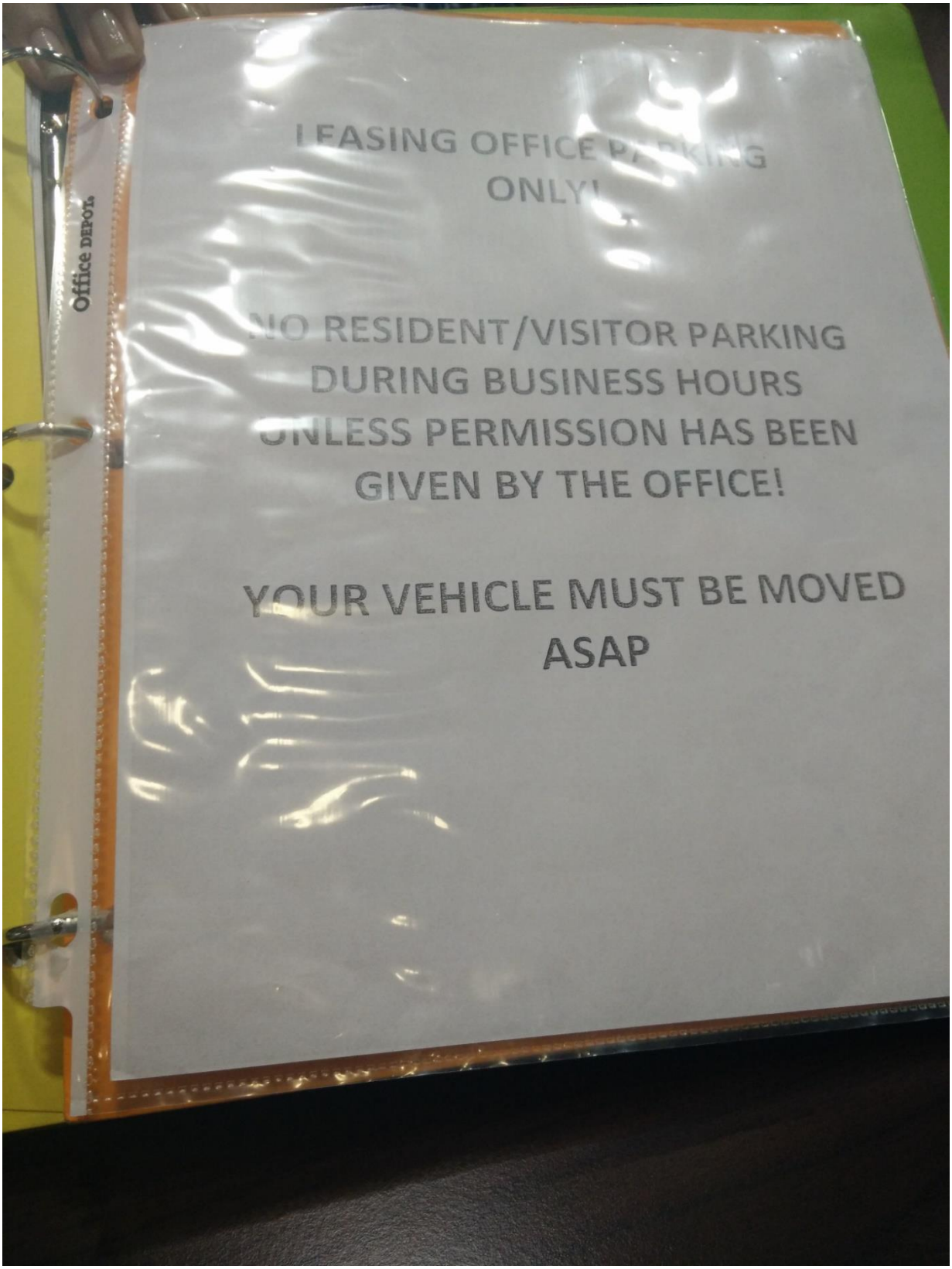


Figure 16: Canal Square Apartments – Parking Information Register - 1

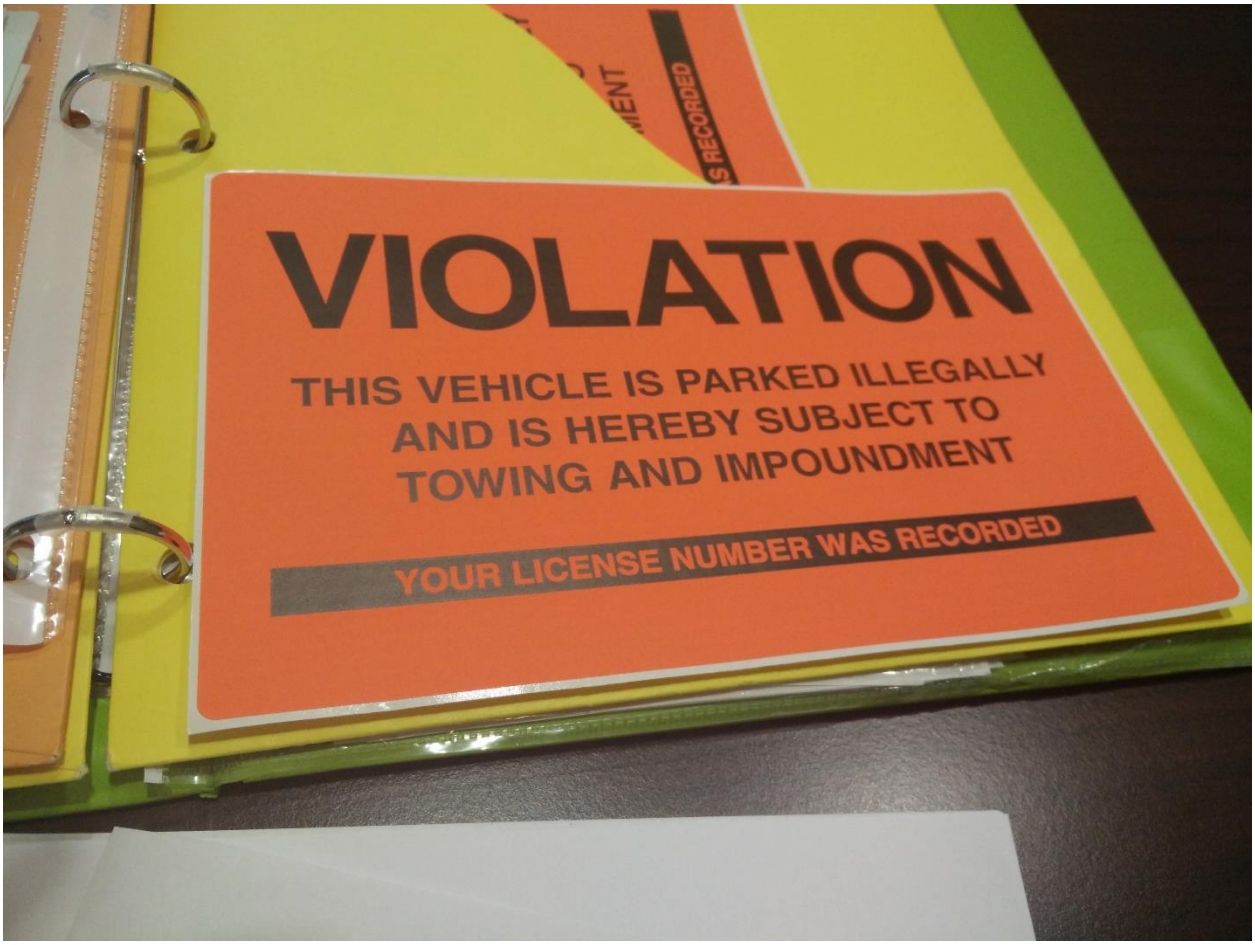
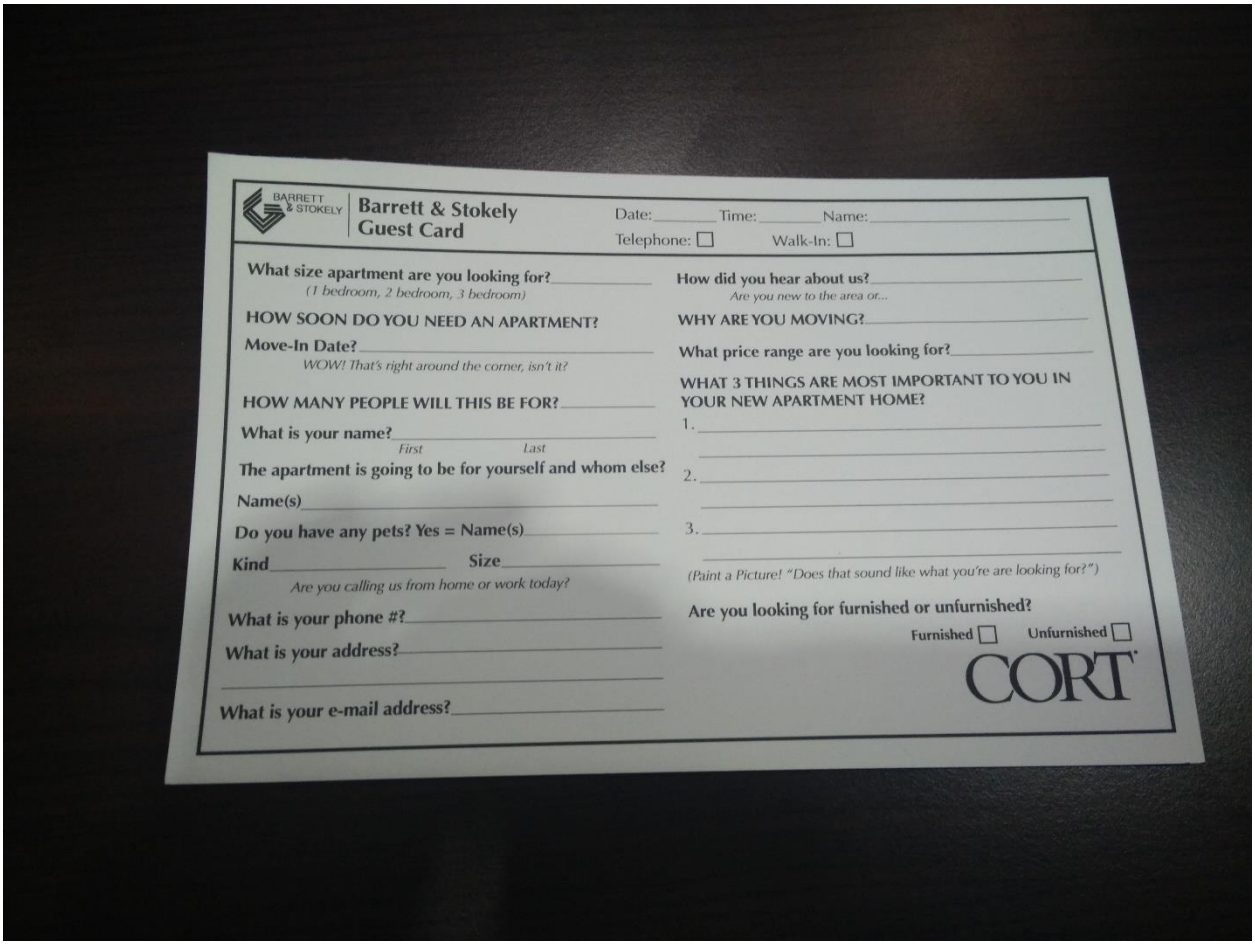


Figure 17: Canal Square Apartments – Parking Information Register - 2



BARRETT & STOKELY

Barrett & Stokely Guest Card

Date:_____ Time:_____ Name:_____

Telephone: ☐ Walk-In: ☐

What size apartment are you looking for?_____

(1 bedroom, 2 bedroom, 3 bedroom)

HOW SOON DO YOU NEED AN APARTMENT?

Move-In Date?_____

WOW! That's right around the corner, isn't it?

HOW MANY PEOPLE WILL THIS BE FOR?_____

What is your name?_____

First Last

The apartment is going to be for yourself and whom else?

Name(s)_____

Do you have any pets? Yes = Name(s)_____

Kind_____ Size_____

Are you calling us from home or work today?

What is your phone #?_____

What is your address?_____

What is your e-mail address?_____

How did you hear about us?_____

Are you new to the area or...

WHY ARE YOU MOVING?_____

What price range are you looking for?_____

WHAT 3 THINGS ARE MOST IMPORTANT TO YOU IN YOUR NEW APARTMENT HOME?

1._____

2._____

3._____

(Paint a Picture! "Does that sound like what you're are looking for?")

Are you looking for furnished or unfurnished?

Furnished ☐ Unfurnished ☐

CORT

Figure 18: Guest Card

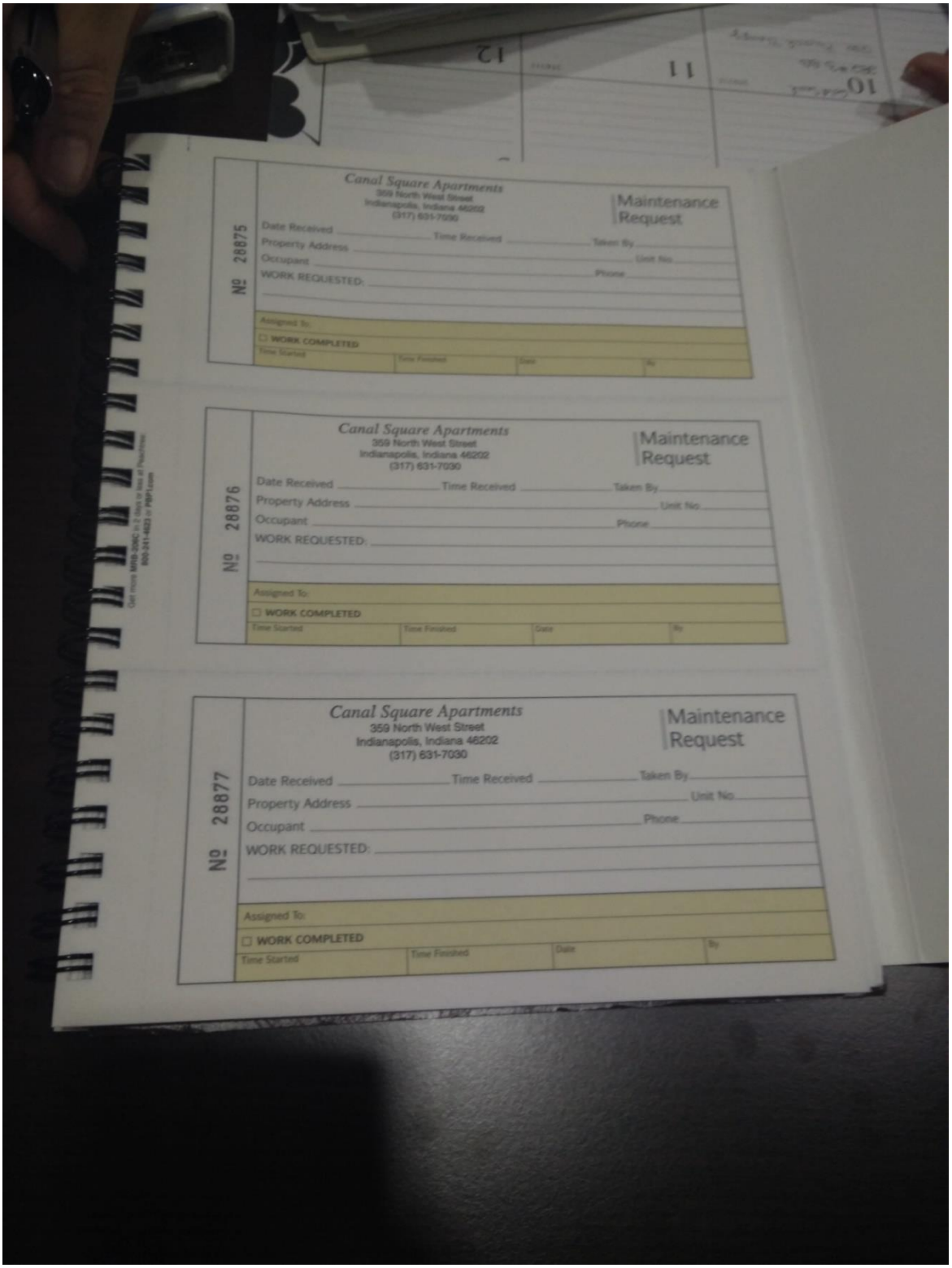


Figure 19: Canal Square Apartments – Maintenance Request Form

Figure 20: Canal Square Apartments – Package Storage

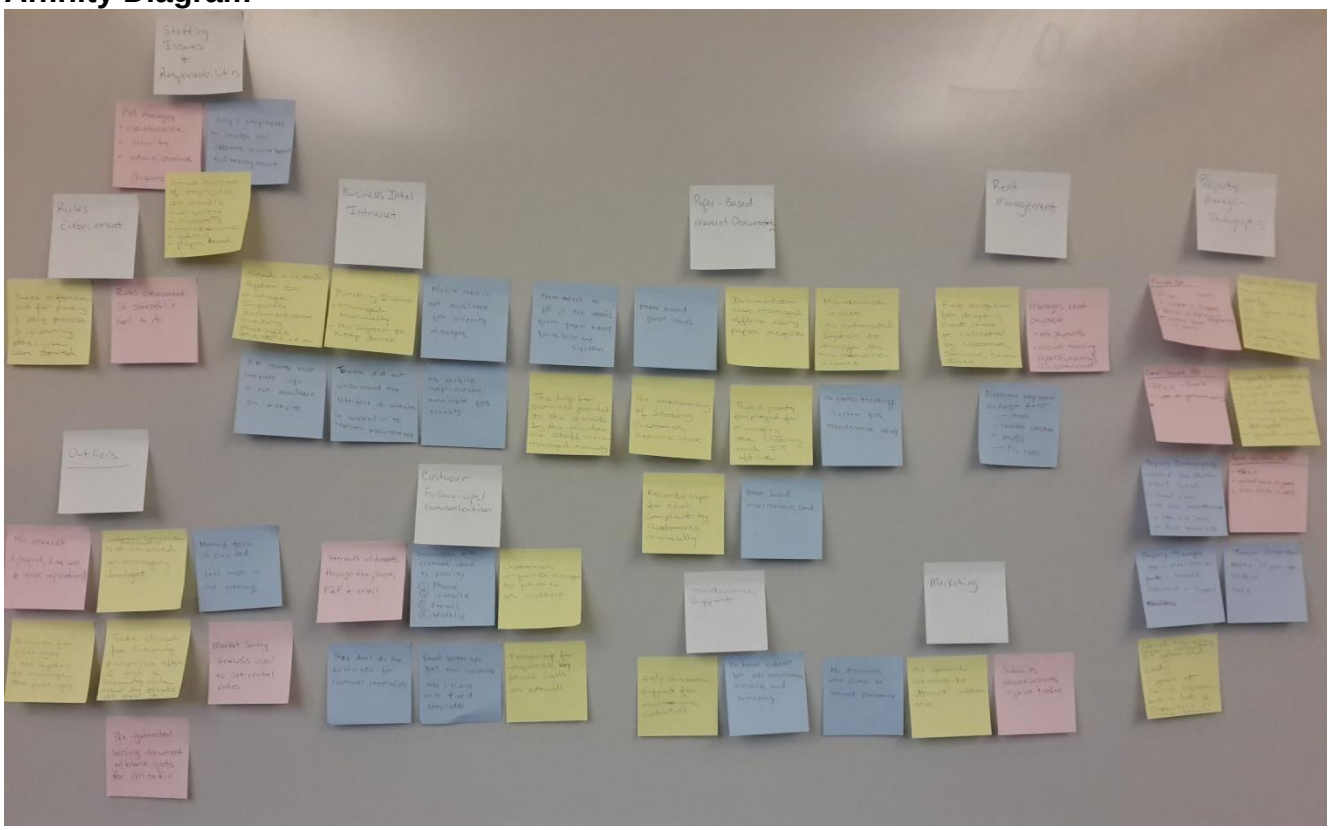
Figure 21: Rent Drop-box

Click **Back** to go back to the **Activities Performed** section**.**

Making Sense of the Data Report

Diagrams

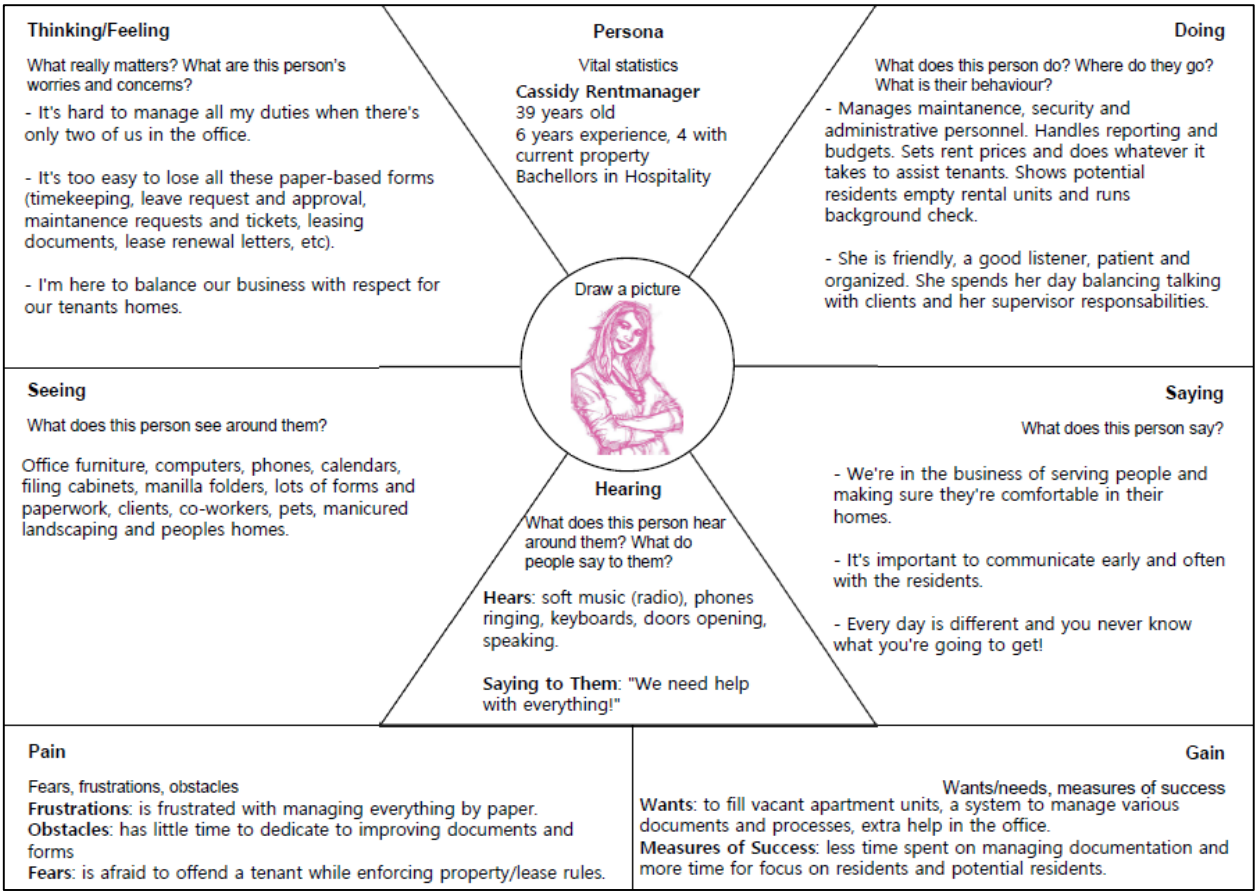
Affinity Diagram



Affinity Diagram – Rental Office Customer Service

Empathy Map

Our team created the empathy diagram. The assignment called for us to map the insights we gathered together from the affinity diagram. The empathy map is an attempt to use a persona to express their (property managers) feelings and needs.



Empathy Map

Problem Statement

We gathered a lot of information and identified the pain points of leasing office management employees and tenants. To investigate the more novel design strategies we identified the key steps causing a pain in daily activity.

4. Paperless System: During our observation we identified three situations where they used paper system including (a) Guest Card: Guests are supposed to fill the cards if they come for the inquiries (b) Maintenance team expects a paper card to address the complaints from tenants (c) And all the parking violation related entries are kept in separate register. There is scope to design an automated system such that leasing office employees' intervention in these cases could be reduced substantially.
5. Centralized System: To achieve the paperless system design aspects could be discovered in order to deploy centralized system approach to take care of keeping all the logs and generating related reports.
6. Mobile application: If mobile user friendly interface made available to tenants, employees, guest and maintenance people that is going to cover more than half of the daily pain points of the leasing of office customer service personnel.
7. Parking Issues: Design could be explored around the parking spot problem by providing a simple mobile application with a design to report violations. There is scope for investigation design strategies for easy reporting and notification to the owner or towing party. The design strategies will include thing like scanning a license plate to report the violation at the same to issue the notice to customer. Another strategy is to explore the tag-based entries and exit to the vehicles to generate automated parking log of the vehicles with respect to the assigned spot.

Leasing office customer service is a vast domain to explore. If we could provide the better designs to the problem we addressed, we will be able to cover more than half of the daily pain points of representatives.

Personas

Persona 1: Michelle, User Group: Leasing Consultant

Michelle

"I am here to help"

Background

- Age: 37
- Work/Role Leasing Consultant
- Education: Bachelors
- Interests: Customer Relationship, Talking to people

Michelle has been working at this apartment complex since last one year but she has a total work experience of around 10 years in the same field. Her experience is reflected in the patience she shows while dealing with issues and constant inquiries from people. As she has worked at multiple places she is aware of many situations and their possible solutions. She likes sharing her knowledge and also encourages the younger staff working with her. She is enthusiastic, energetic and always willing to help.

Goals

- Use minimum paper work
- Simplify Inquiries
- Simplify rent payment
- Resolve parking Issue
- Easy coordination with maintenance staff
- Easy coordination with third party staff
- Simplify follow ups
- To be able to manage everything from one location

Frustrations

- Managing the Parking Issue
- Managing heaps of paper work
- Manual Work
- Few employees and more work

Scenario

Michelle works from morning 09:00AM to 06:00PM. The first thing that she does when she reaches the office is, switch on her computer and check emails. Though she is very patient the only thing that frustrates her is the parking issues at the apartment complex. She has to walk to and fro to the parking to see the car blocks and then manually search for the car owner, using a paper register. She tries her best to hide this grief in front of the customers with her smile. She is always on her toes and stops everything to help the customers who arrive at the customer service desk. She does not like to keep them waiting for long. She even escorts the customers who come to collect their package, to the storage area. She does not want the customers to wait at all when they come for package collection. She wishes that this process is automated in order to save customer time and unnecessary efforts. She also has a very good relation with the maintenance staff. The maintenance staff always cooperate with her. When she receives a complaint from the customer for maintenance issues, she immediately passes on the message to the maintenance staff. She faces a lot of problem to maintain the logs for such issues as it requires a lot of paper work. Michelle is not very tech savvy but she is aware of how technology can help ease the current problems that she faces at the customer service. She wants all her tasks to be managed with the help of one centralized system. Though she does not complain she definitely believes that with only few employees working at the customer service there is a need for an automated systems at her workplace.

Persona 2 – Leonard, User Group: Tenant

Photo

Leonard

"I want to get my issues fixed"

Background

- Age - 25
- Work/Role - Tenant
- Education – Persuing Masters
- Interests – Gadgets – Electronic Devices

Leonard has been staying at this apartment complex since last nine months. He is an international student who loves to play with gadgets. He is doing master and having stayed at multiple apartment complex near the school for past two years.

Goals

- Automated payments and tracking of approvals
- Track Details of maintenance issues status
- Schedule maintenance using digital application
- Easy to use mobile application

Frustrations

- Visit the leasing office for every small task. (Rent/complaints)
- Absence of status tracking system to track the status of task
- No mobile application.

Scenario

Leonard came there to complain about his broken closet door. He was around 25 years of age and he was an international student. He was staying there for last 9 months. He was in hurry so he somehow talked with leasing customer service employee. He helped them to fill up the paper-based card for maintenance. He was also frustrated with rent and utilities payment and follow-ups regarding the same.

Click **Back** to go back to the **Activities Performed** section.

Brainstorming & Storyboarding Report

Brainstorming

Brainstorming Photos and Ideas

Potential Requirements

Identified around 24 user requirements/ needs.

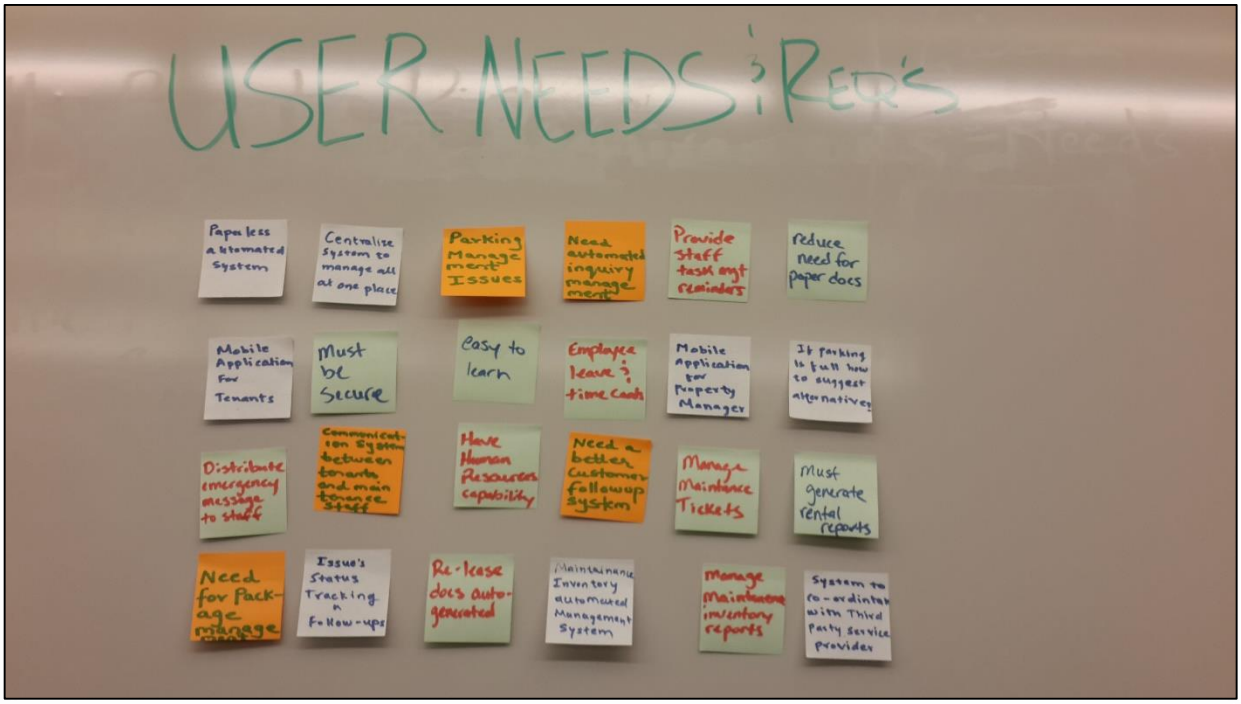


Figure 1: Potential Requirements

Key Requirements

Identified 4 key requirements.

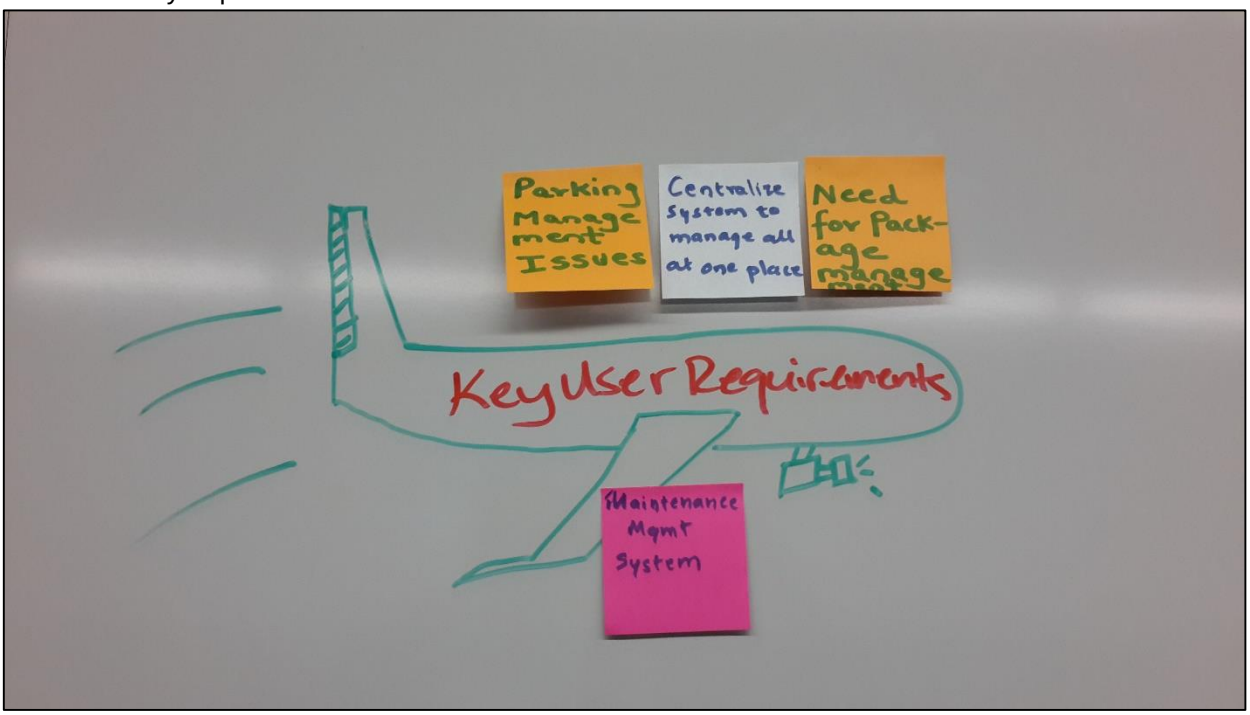


Figure 2: Key Requirements

Brainstorming 1

35 potential design solutions or innovations.

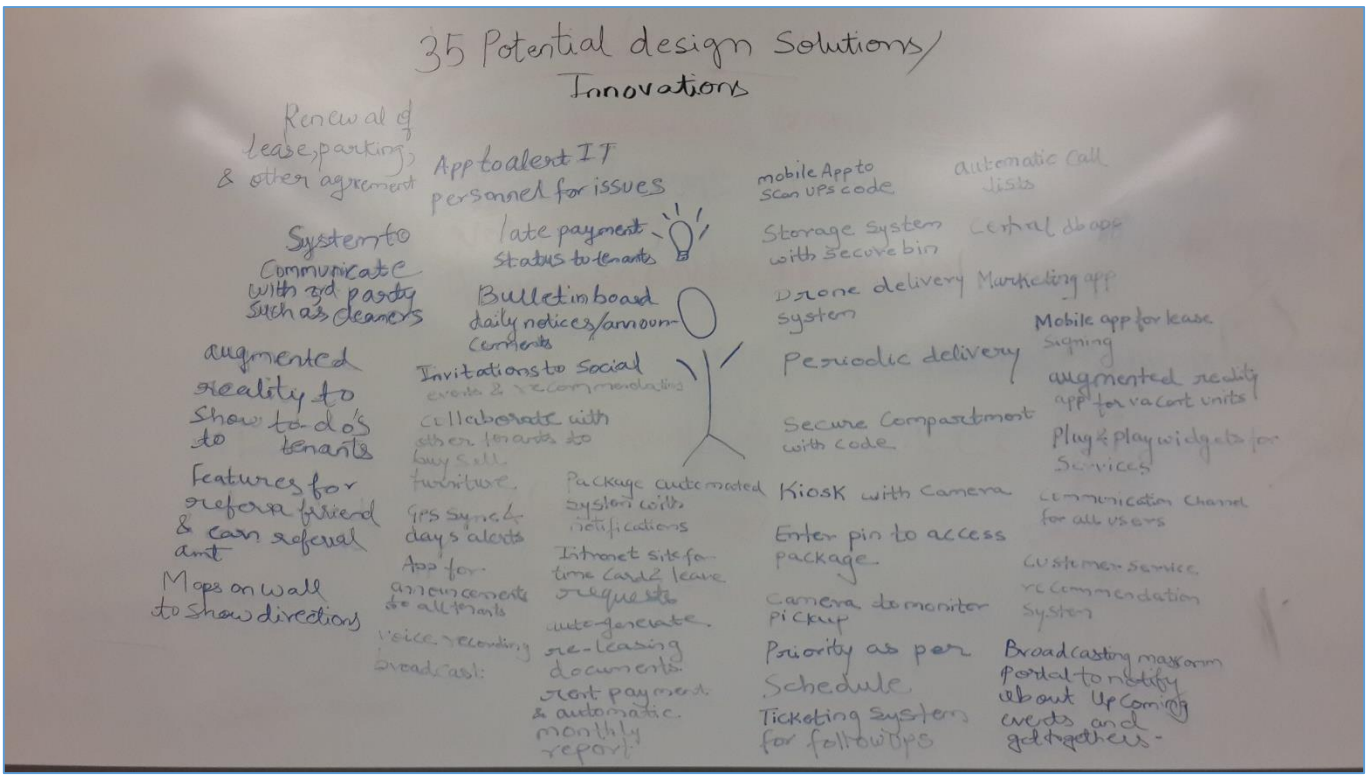


Figure 3: Brainstorming 1

Package Management:

1. Mobile app to scan UPC code in order to send an email to tenant that it has arrived/waiting.
2. Organize a storage system with a secure bin assigned to each address.
3. Drone delivery system.
4. Maintenance guy delivers packages periodically (2/day).
5. Secure compartment with randomly generated code, emailed to tenant for afterhours pickup.
6. Kiosk with a camera that allows access to package storage area that requires tenant name, address and unique identification number (last four of social).
7. Enter pin to access package - system generates an email to inform tenant package has been picked up.
8. Camera is installed and connected to system to take a photo of the person picking up the package which could be included in an email to tenant.
9. Ask tenant's schedule for package pickup and decide the priority the package as per schedule.
10. Ticketing system for tenants to take the follow up for packages in store room.
11. Package automated system to trigger notification to pick up package in 1 month if not picked up return the package and close the tickets.

Central System:

12. Intranet site allows employee to manage time card and leave requests.
13. Intranet site auto-generates re-leasing documents (reminder letters) so that the APM doesn't need to spend so much of their time concentrating on menial tasks like this.
14. Intranet site will keep track of overall rent payment status for community (187/200 units paid on time, etc.) and automatically generate the monthly rental report for upper management.
15. System will keep track of payment/late payment status for tenants.
16. Bulletin board of daily notices (e.g. pool closures, crime alerts, new office hours, parking announcements, etc.)
17. Managers could send out invitations to social events or make recommendations about local restaurants and retail shops.
18. Tenants could use it to meet other residents, post event announcements or buy and sell furniture.
19. Allow residents to opt in to a GPS sync. When they arrive at the property, their smartphone will recognize the location and load up any of the day's alerts.
20. App to send announcements to all tenants. Allows you to create a voice recording and broadcast it to all tenants. (Security alerts etc.)
21. App could automatically create and dial call lists for you. For example, the app could identify tenants who haven't paid rent, build a call list, then send your standard "overdue rent" message.
22. Central database application which will handle all the functions with different roles and all the functions including in house maintenance , payments of employees and billing of inventory
23. A marketing app to perform a credit and background check from your phone.
24. Mobile/desktop application for tenants to review and sign the lease electronically .This will save time, a lot of paper and any associated costs (purchasing, printing and archiving).
25. Augmented reality app include things like vacant units, tenants with overdue rent etc. Switch on your smartphone camera and point it to the property and the details will appear accordingly.
26. Plug and play widgets to provide access to the particular services depending on the user’s role
27. Communication channel connecting all users in the system to update periodically.
28. Customer service recommendation system to identify the regular problems and to post the warnings, notification in advance.
29. App to alert the IT personnel in case of technical issues with computer hardware and software’s.
30. System to communicate with the third party such as the cleaners. Maintain the information such as the payments etc.
31. Augmented reality app for tenants including the to-do’s for tenants. Things like package arrived, mails present etc. Switch on your smartphone camera and point it to the property and the details will appear accordingly.
32. Feature to refer your friend and earn referral amount.
33. Maps on wall showing directions to both internal and external locations. Gym, business center, conference room etc. and also to nearby locations such as malls, eat outs etc.
34. Renewal of lease, parking and other agreements via central system.
35. Broadcasting/Mass communication portal to notify about upcoming events, get together etc.

Brainstorming 2

Potential design solutions from a brainstorming session with people who are not our team members.

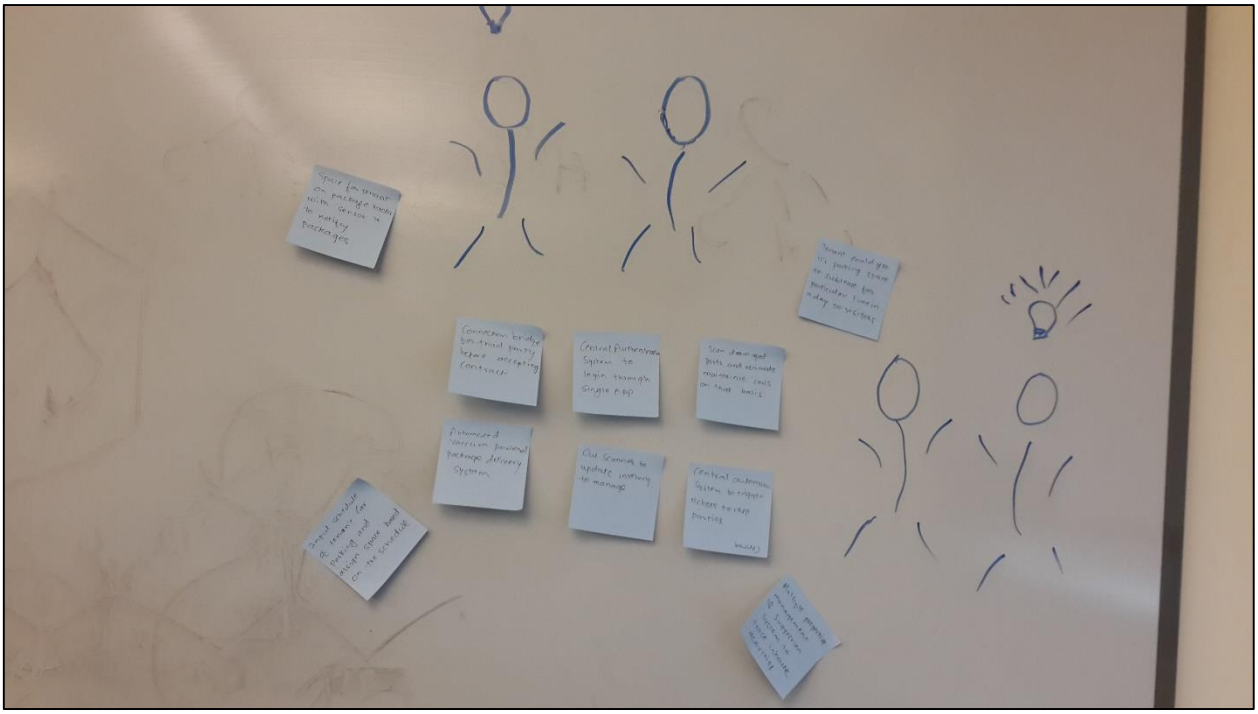


Figure 4: Brainstorming 2

1. Automated vacuum powered package delivery system, which will drop the package automatically in the doors of tenants.
2. For central authentication system , different application could be combined based on the central authentication system (CAS)
3. Central automated management system will trigger email to all the people who are concerned with particular activity. e.g. maintenance tickets
4. Third party management employee will have Connection Bridge to connect to the rental office's subsystem.
5. Dedicated space on the racks of the storage room for tenants. This space will have sensors to notify about the new package placed on it.
6. Parking space could be more effectively used as per schedule of the tenants. E.g. If a person is working at night this space can be allocated to other tenant for night.
7. Facility for tenant to notify if he is going out for some time frame. This time frame could be used as visitor parking or other tenant can park their car for the time frame mentioned by the owner of the parking spot.
8. For maintenance user will scan the damaged parts picture via application and it will notify rental office and maintenance staff at the same time. This picture will also help generating the estimate about the service and the parts.
9. Whenever some maintenance personnel takes anything out of the inventory for service request, the out scanners will detect that and update the inventory
10. If rental office has a another property located nearby, then for the inventory update the app will suggest the recommendation about the availability of parts in the closest inventory.

Brainstorming 3

Another 35 potential solutions.

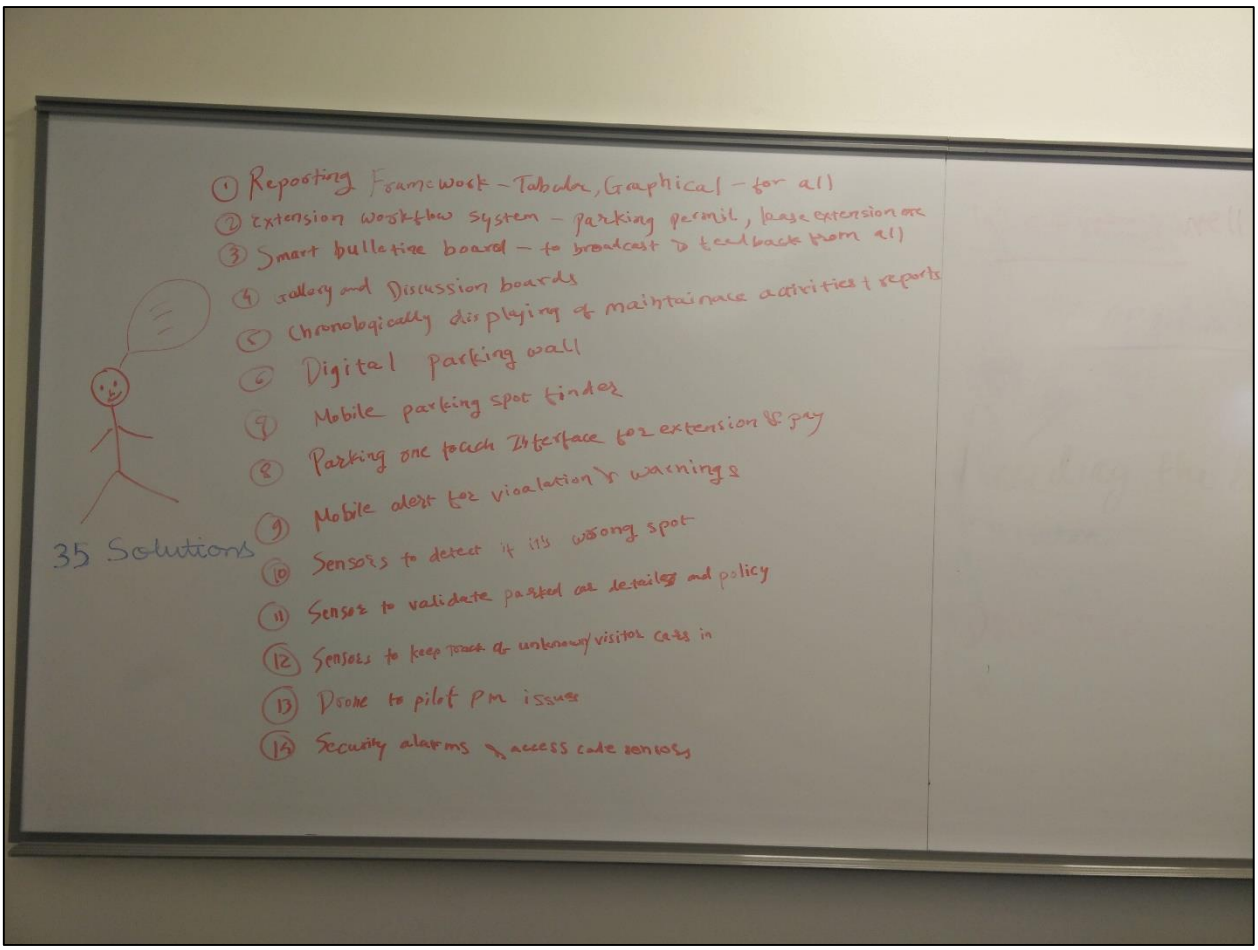


Figure 5: Brainstorming 3a

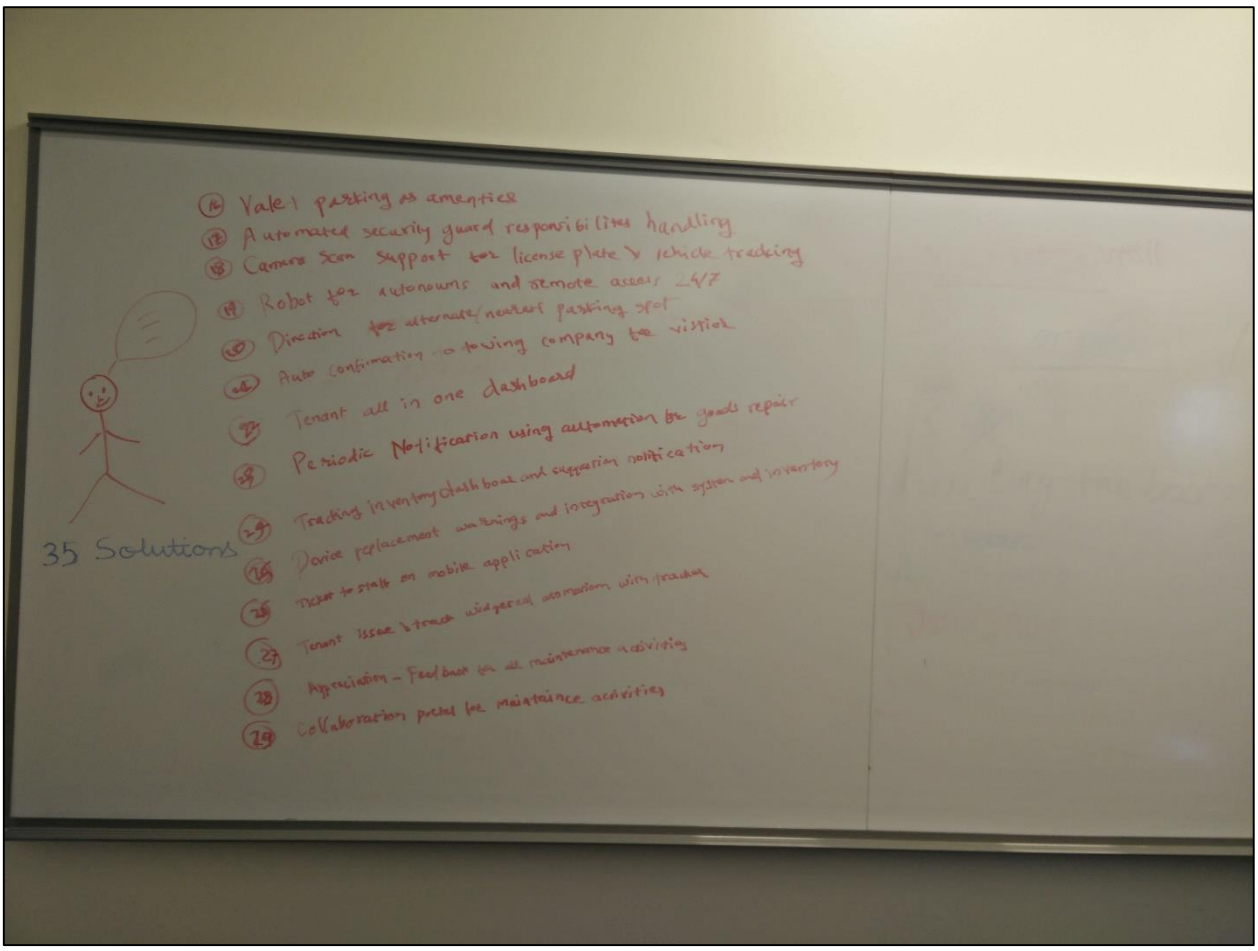


Figure 5: Brainstorming 3b

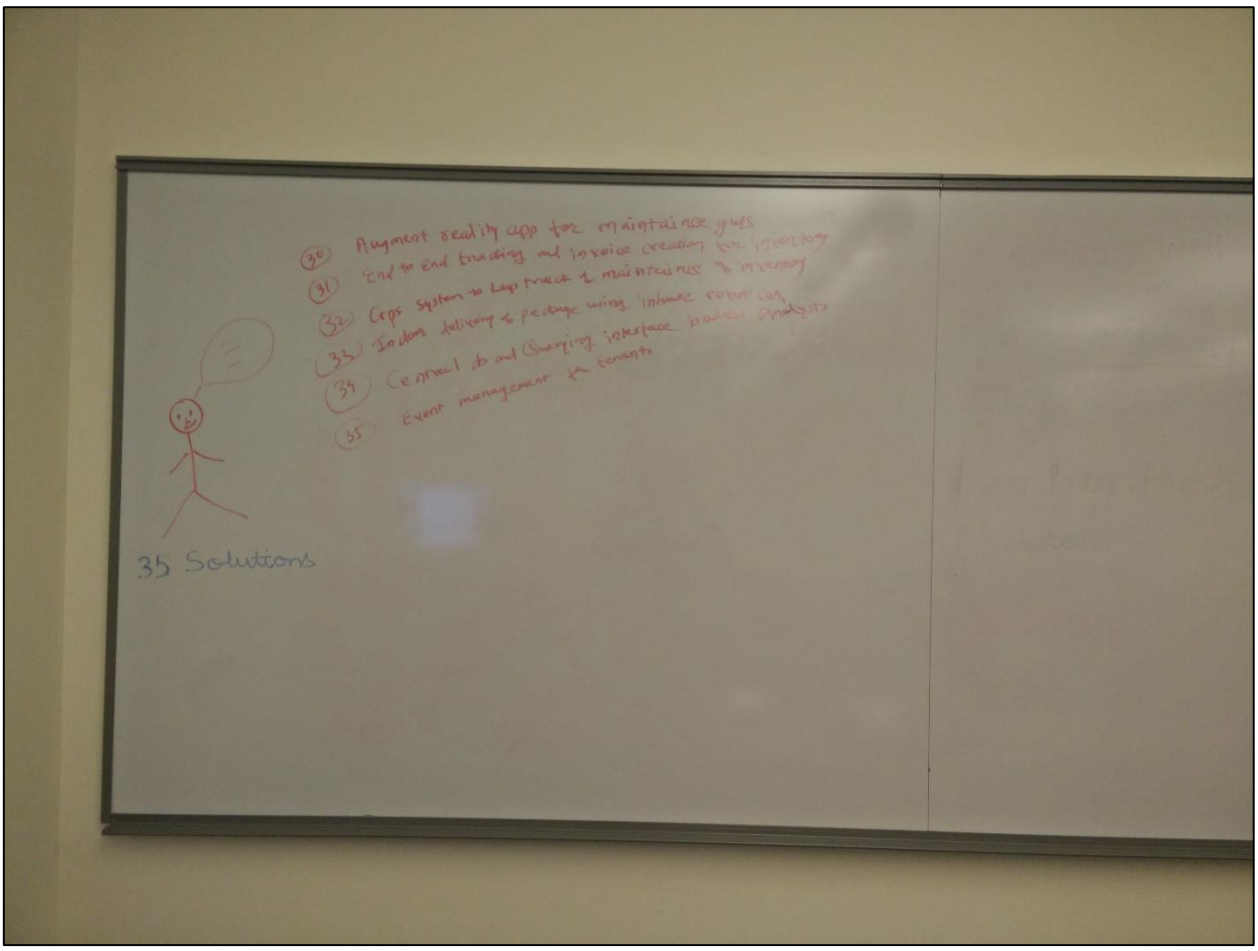


Figure 5: Brainstorming 3c

Central System:

1. Reporting System - Graphical chart/Tabular reports to take overview of the activities across all the level including, amenities, rent, parking and other management services.
2. Workflow based including features such as approving requests for extension in rent payment, parking extension etc.
3. A smart bulletin board that allows you to write suggestions. Displays suggestions by others. Displays announcements.
4. A bulletin board to display the customer reviews and feedback at the lobby along with the pictures of beautiful locations around the property.

Maintenance System:

5. A maintenance schedule dashboard for employees to organize and display all daily/weekly/monthly scheduled maintenance.
6. A Tenant portal to access maintenance schedule and select convenient appointments.
7. System auto-generates periodic scheduled maintenance notifications (every October they check the air filter and smoke detectors, etc.).
8. Dashboard for maintenance inventory to keep track of supplies on hand.
9. Each apartment-unit has an inventory (inside the system) detailing its maintenance schedule and the inventory of the unit and its wear and tear (carpet: 1 year old; stove: 5 years old, etc.).
10. When tenant submits a maintenance ticket request the system generates an email to appropriate staff and to tenant.
11. System could push tickets to staff on mobile system.
12. Portal for tenants to leave comments for cleaning crew, place requests for repairs, etc.
13. Maintenance complaint acceptance feature. Whichever maintenance staff is close to the property accepts the request and

goes to provide service immediately.
14. Maintenance staff coordinating with other maintenance staff required to provide service. App for the collaboration and coordination between them.
15. Augmented reality app for maintenance staff include things like which unit requires repairs, the materials needed for same etc. Switch on your smartphone camera and point it to the property and the details will appear accordingly.
16. System to send out a work order to maintenance staff, the maintenance visits the apartment, fills in the details on the online form with the list of raw material needed, fixes the issue, marks it resolved and maintains the document history.
17. App for tenants where they can raise a ticket for their issue. Once the issue is raised it will be automatically assigned to the respective maintenance staff.
18. After completion of maintenance activity closing the tickets and integrate the workflow to get the feedback from tenants
19. System to keep track of the materials needed in maintenance. Their life cycle, cost etc.

Parking:

20. Any parking announcements appear on the wall.
21. Detect/find your spot by mobile app and sensor at the parking spot.
22. Time extension for visitor parking (a button to extend the time on mobile app)
23. Alerts on mobile for violations and towing warning.
24. Smart sensor to detect if user has parked in a wrong spot.
25. Sensor to measure time parked at guest spot.
26. Sensor to measure no. and time unknown car is parked in visitor parking. More than 3 times notify towing company.
27. Drone for pm to pilot.
28. Parking alarm secured w/a code.
29. Camera app to send tix or warning to cited tenant.
30. Valet parking service as part of apartment amenities
31. Security guard responsibilities include validating parking spots to passes
32. System allowing security personnel to take a picture of a license to validate parking and have a generated warning email or ticketing system.
33. Robot to manage the parking.
34. Visitors shown directions to alternate parking spots in the nearby locality on a screen.
35. If the visitor car is parked for more than 30 mins an automatic ticket will be generated for some amount to be paid.

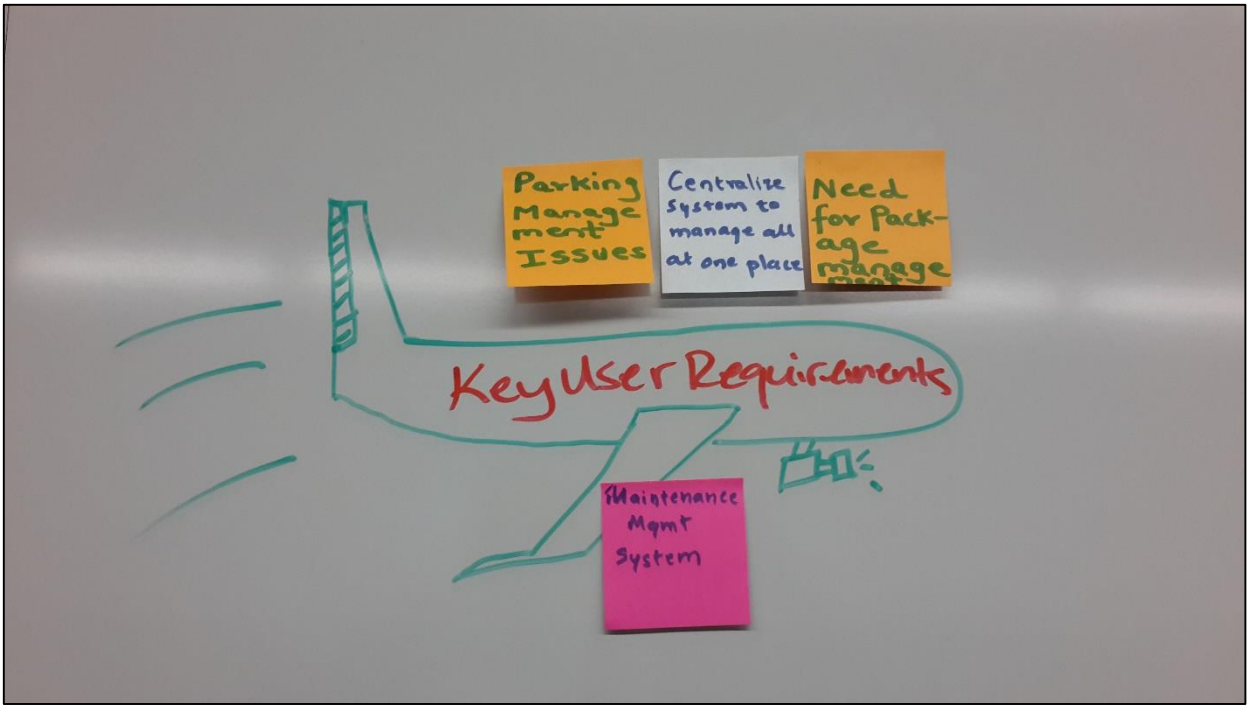
Brainstorming Sessions 2 and 3 Reflection

The first brainstorming session revolved around identifying exactly what the user needs. Once we found the critical requirements we wanted to address we moved on to our second brainstorming session. We involved outside opinions, giving us a new perspective and widening the scope of our ideas significantly. The third session was liberating, it allowed us to lose some of our design inhibitions and really explore some unique and fun solutions. We realize that most apartments are not going to implement a drone system to deliver packages, but it really gets the creative juices flowing to talk about it!

We chose ideas identified during the second and third brainstorming sessions. The team could certainly see the value added from both the outside perspective to our design challenge and the freedom to think outside the box when approaching the problem. We would continue to approach brainstorming sessions in the method used for this project with one exception, we would not feel married to generating a specific number of design solutions. We would also use the storyboard tool for some of our solutions, which are not necessarily traditional desktop applications.

Key user needs/ requirements

We chose the following key user needs/ requirements.



1. The system must manage the assigned parking issue.
2. The system must securely manage delivered packages that residents need to claim.
3. The system must be 'centralized', eliminating the need to manage multiple paper documents.
4. Maintenance management including tickets follow-up and inventory

Throughout the course of six interviews and two hours of observation we identified many unique challenges amongst the three communities we visited. When we began affinity diagramming our insights we discovered there were three themes that emerged from each community. These are the critical requirements to address because they are consistent problems that both take up a significant amount of the property manager's time and degrade the resident's services from staff and quality of living in their community.

The first is that managing parking in a 'near-campus' and 'downtown' environment is very time consuming and challenging. The second theme was that tenants are consistently unhappy with the inconvenience surrounding packages delivered to the office because they were not home. A key frustration is that the rental office might close around the time most tenants are arriving home from work, leaving their package stranded in the rental office. Finally, all the communities we visited struggled to manage the various aspects of the community; maintenance, security, parking, leasing, administrative duties, and an overwhelming amount of paper artifacts.

Three Design Alternatives to Pursue Further

The design alternative that we chose to pursue further are.

- Package delivery and access system.
- Rent payment tracking system.
- Interactive parking alert and towing system.

The team generated as many design solutions as humanly possible and then proceeded to understand what we had put together. We then used a voting system to determine our favorite solutions. This required some compromise as we needed to ensure we included solutions to address our user requirements and needs.

The rental office is secured with a pin-entry system that is connected to the community internet site. Once a package is delivered

to the office a pin is randomly generated and emailed to the appropriate tenant. That tenant may then use the pin to access the clubhouse at their convenience and then use their personal password to access their package delivery bin. Once they enter the building and access the package the system will then generate another email to the tenant notifying them of the package pickup. This will allow staff to concentrate on more important duties and give residents a sense of ownership and flexibility in how they receive their mail.

The community system will allow residents to make secure payments online as well as provide residents and staff with alerts of upcoming rent payment period, late account payments, and will automatically generate system emails to residents and document the number of times a resident has been late (for eviction purposes). This significantly reduces the amount of paperwork the office staff has to generate and manage, allowing them to concentrate on other duties.

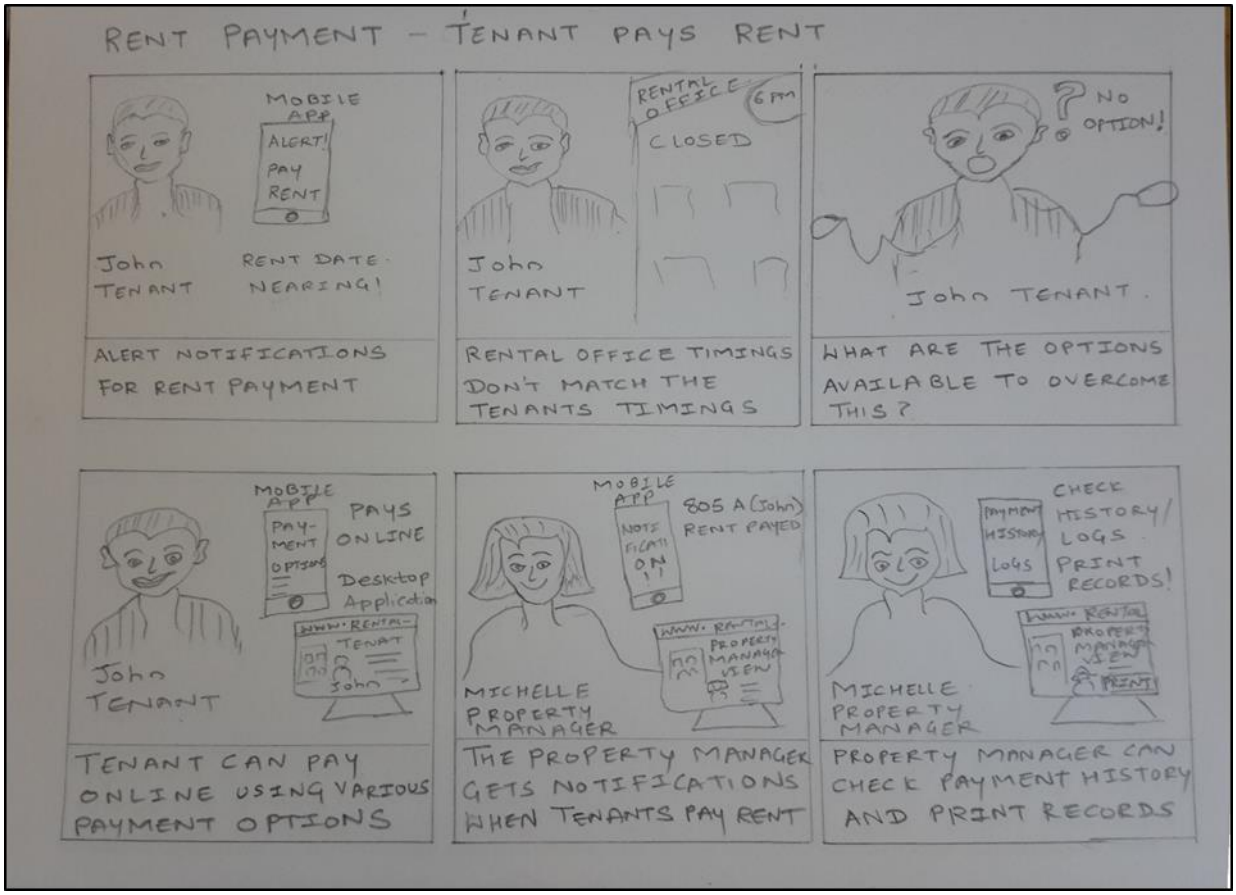
The proposed parking system will provide residents with up-to-date parking information including mobile phone alerts when they have committed a community parking violation (namely parking outside of their assigned parking space) or when they are being towed (when they have violated the agreement too often or for too long). This system will automatically send an alert to a contracted towing company as well. This eliminates a huge problem for staff while freeing up a large amount of their time while also improving resident's quality of living and security.

Storyboards

Brainstorming Photos and Ideas

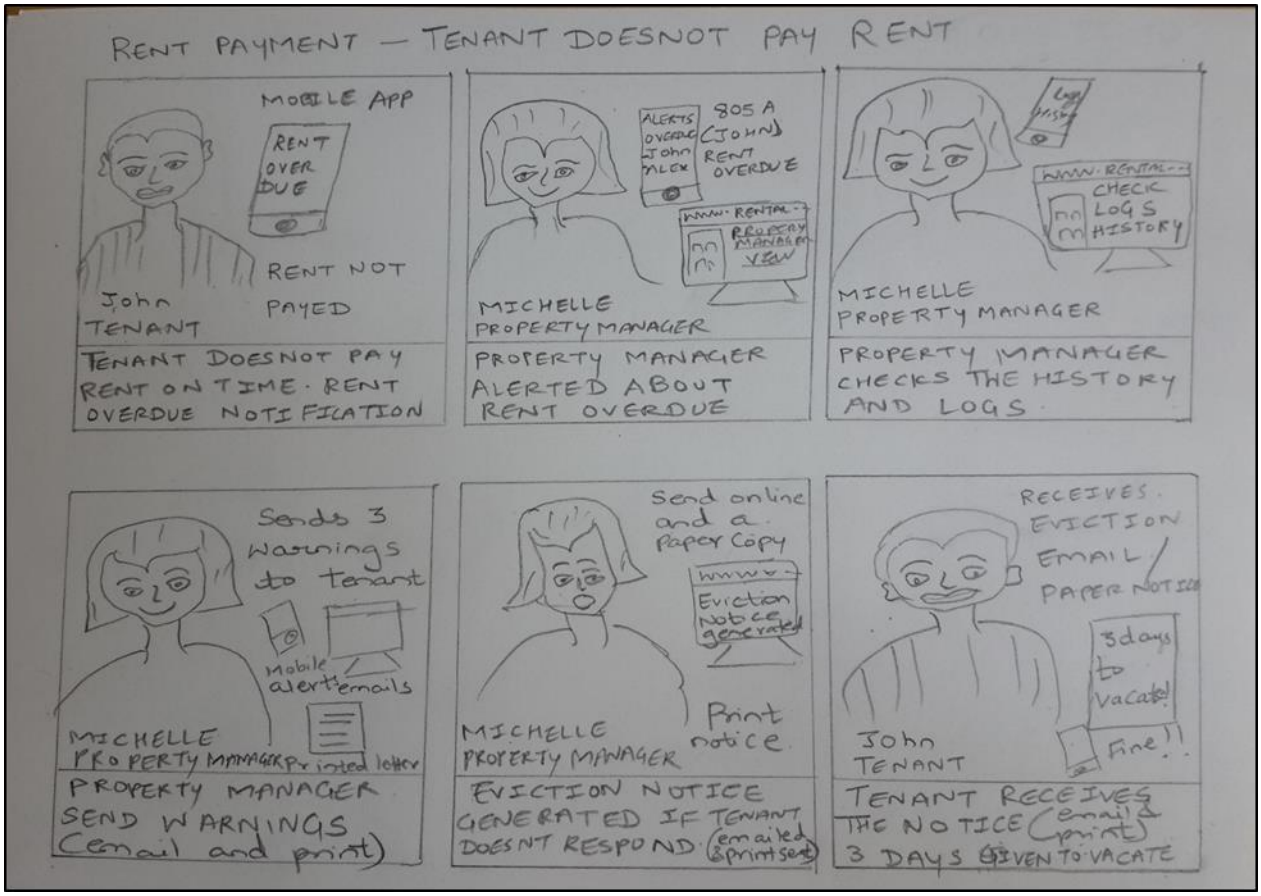
The storyboards are based on our three design solutions and two personas, the tenant and the property manager.

Design Solution 1: Rent payment tracking system



Storyboard 1 – Rent payment tracking system

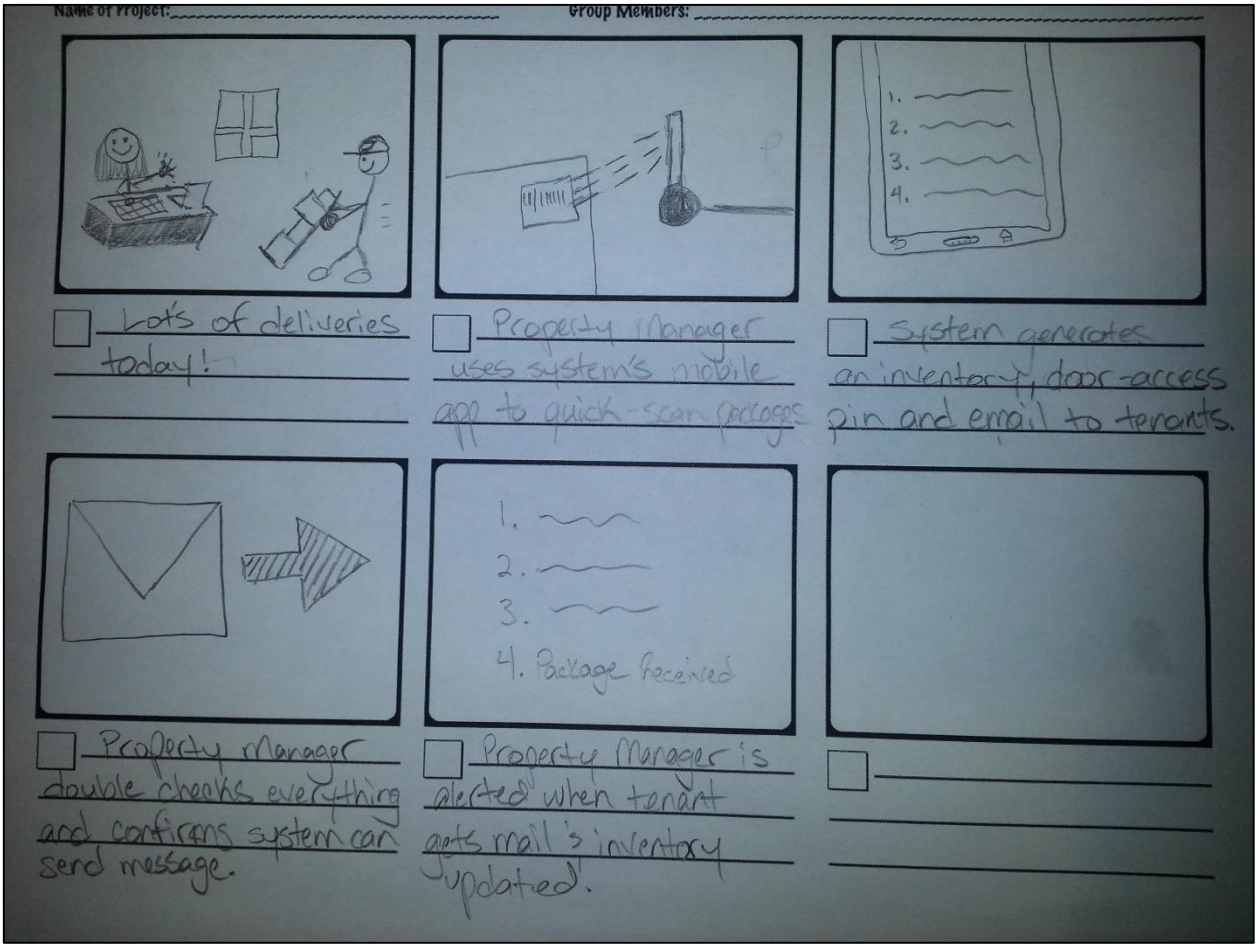
In the Storyboard 1, the alert system for rent payment is demonstrated. As depicted in the storyboard, alerts will be sent on the mobile device to the tenants to pay the rent. If the tenants cannot pay the rent at rental office they can pay their rent online though the rent payment feature in the online application. Various payment options will be available to the tenant online. Once the tenant pays the rent, the property manager will be notified both in the mobile application and desktop application. This update will also be reflected in the tenant's profile in both desktop and mobile application. The property manager will be able to view the history of payments and related records of each tenant. The system will also allow them to print these records. Adding this solution to a centralized system will make it easy to manage all the activities easily.



Storyboard 2 – Rent payment tracking system

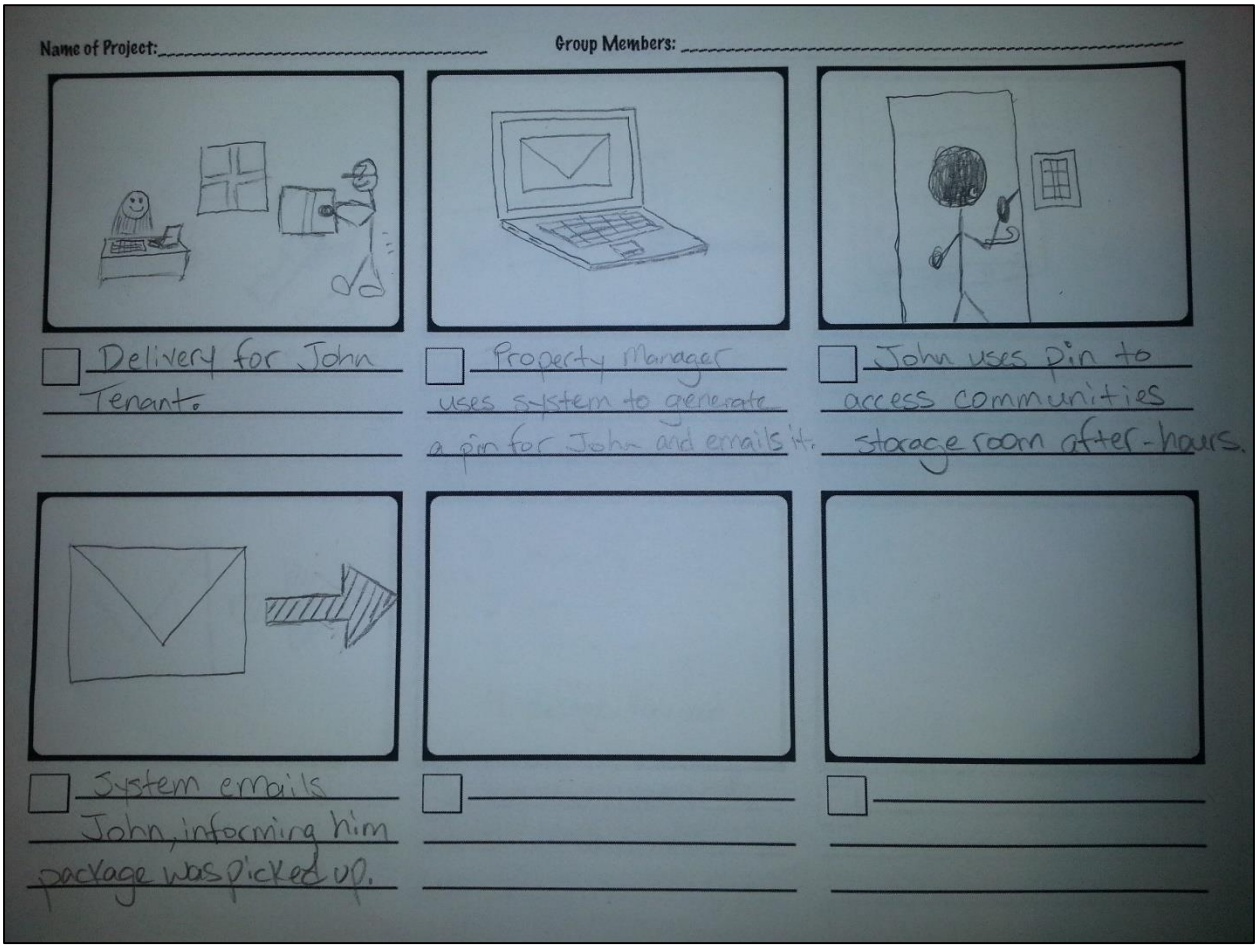
In the Storyboard 2, a system for the tenants who do not pay rent on time has been demonstrated. As depicted in the storyboard, a rent overdue notification will be sent to the tenant on the mobile device. The property manager will also be notified about the rent overdue both on mobile and desktop application. The property manager will be able to view the history of payments and related records of each tenant. The system will also allow them to print these records. Based on these records the property manager will be able to send warning emails and printed warnings to the tenants. If the tenant does not respond to the same, a notice to vacate the apartment will be sent to the tenant online and in print. Tenant will be given three days to vacate the apartment. Adding this solution to a centralized system will make it easy to manage all the activities easily.

Design Solution 2: Package delivery and access system



Storyboard 3 – Package delivery and access system

Storyboard 3 showcases the interaction between the Property Manager and the proposed centralized-system. This storyboard specifically details the solution for handling delivered resident packages to the rental office and need to be picked up after-hours when the office is locked. In this scenario the Property Manager is very busy, fortunately for her, the community is using a system that mitigates some of the minutia involved with busy-work. She scans the UPC code of the package, which the system uses to generate a security pin and an email to the appropriate resident. It also generates an inventory which is updated automatically.



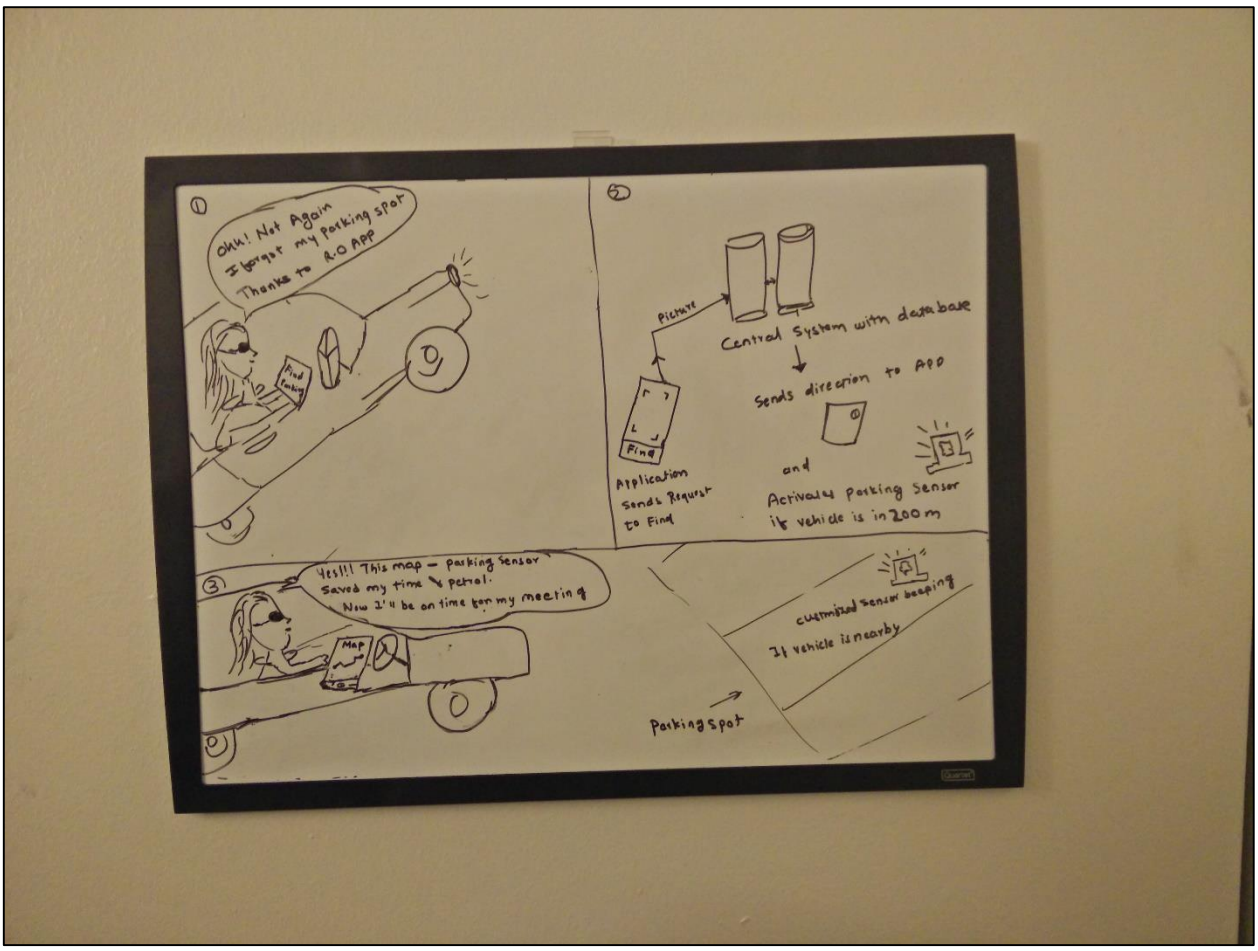
Storyboard 4 – Package delivery and access system

Storyboard 4 showcases the use case from a resident's perspective. One insight we gathered during the interview-process is that residents are frustrated with the small time-frame they have in-between getting off work and collecting their packages from the rental office before it closes for the day. Our solution involves a cipher lock system. The resident will be sent an automatically generated email that contains a security pin to access the rental office. Once inside, the resident will have a key to access a storage locker that is assigned to their apartment unit. When the resident arrives and enters the pre-generated pin to access their package, the system sends a second email to the resident to inform them that their package has been received.

Design Solution 3: Interactive parking alert and towing system

Storyboard 5 – Interactive parking alert and towing system

Storyboard 5 showcases the interaction between the Property Manager, tenant and the proposed centralized-system. This storyboard specifically details the solution for handling parking violations. In this scenario the Property Manager found a car in visitor parking. She scans registration and searches for the owner in database. She found that the car owner is one of the tenant, so she immediately notifies the tenant with the first warning of violation. Tenant also receives the notification and realizing his mistake he takes an action immediately by moving his car.



Storyboard 6 – Interactive parking alert and towing system

Storyboard 6 showcases the interaction between the Tenant and the proposed centralized-system. This storyboard specifically details the solution for finding the allotted parking spot. In this scenario the tenant requests a centralized system to locate. This activates the sensor deployed at parking spot and centralized system also sends the direction map to tenant's mobile application. Tenant follows the map and when she reaches in the vicinity of parking spot (nearly about 200 meters), sensor starts beeping to indicate her about the exact spot location.

Design Solution Choice

We have decided that the best solution to implement moving forward is a centralized system that accommodates all of the proposed solutions. This system will be accessible by all staff, residents, and managers, with a role-based permissions system. This way we restrict access to the appropriate modules; ensuring that the maintenance staff has access to maintenance tickets but not resident personal information, such as social security numbers, is critical. We intend for this system to be used on both PC and mobile platforms, which allows the Property Manager, residents, and staff more flexibility.

This centralized system will work as the backbone of the system. The solution is deployed with multiplatform apps, which will take care of most of daily pain points of all the users involved in the rental office ecosystem. The designs around the centralized system will restrict the user at as per its role in the system. However, it will also provide mobility and freedom wherever required. We aim to design for the three important use personas in a system, which will include property manager, maintenance staff, and tenants.

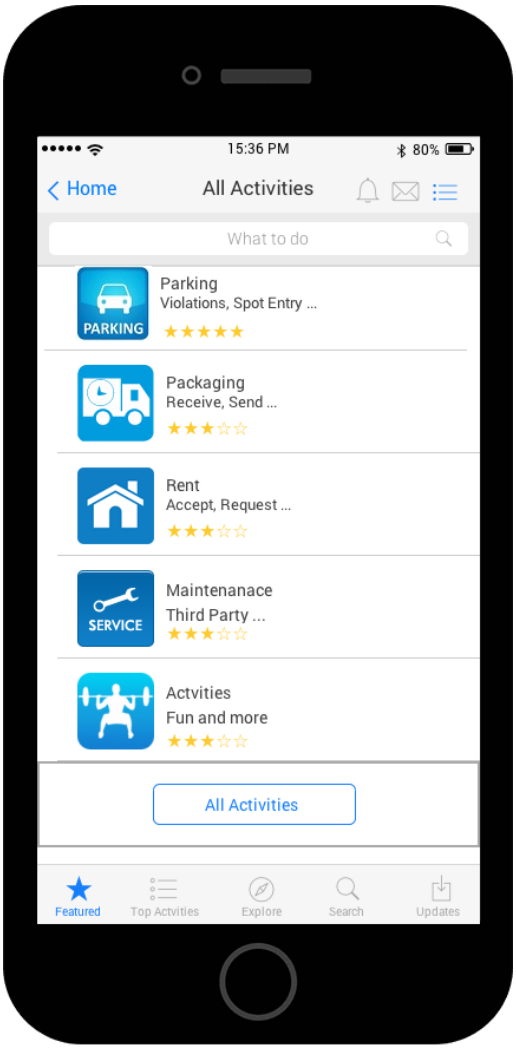
The proposed system will reduce overall manual paperwork, allowing Property Managers more time to focus on the big problems they have to deal with instead of the minutia of mailing re-leasing reminder letters or late payment notices. The system allows residents the freedom to access their packages after-hours while keeping the peace-of-mind that their property is safe. Finally, the system allows Property Managers and security personnel to manage an extremely difficult parking situation in an organized, efficient and fair way.

Click **Back** to go back to the **Activities Performed** section**.**

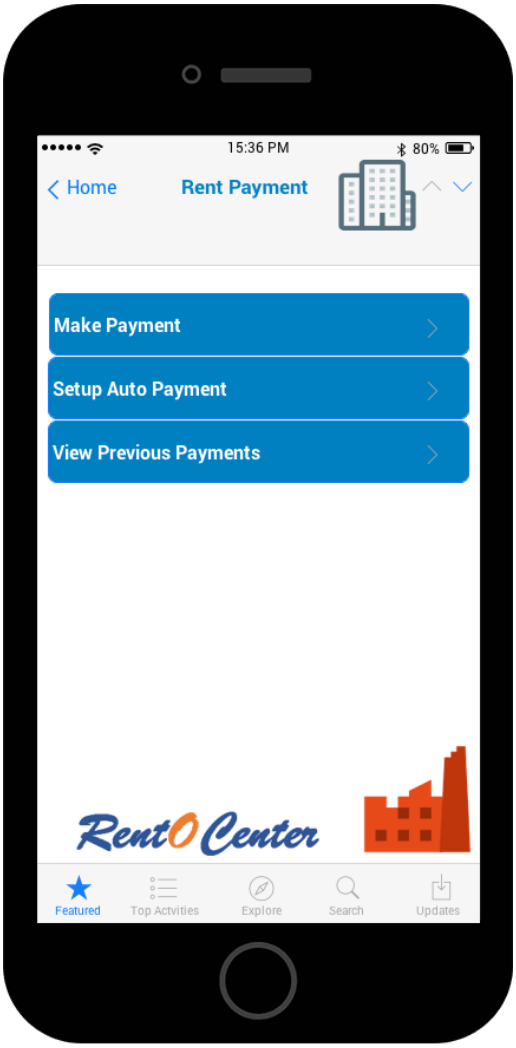
Prototypes and Evaluations

Prototypes

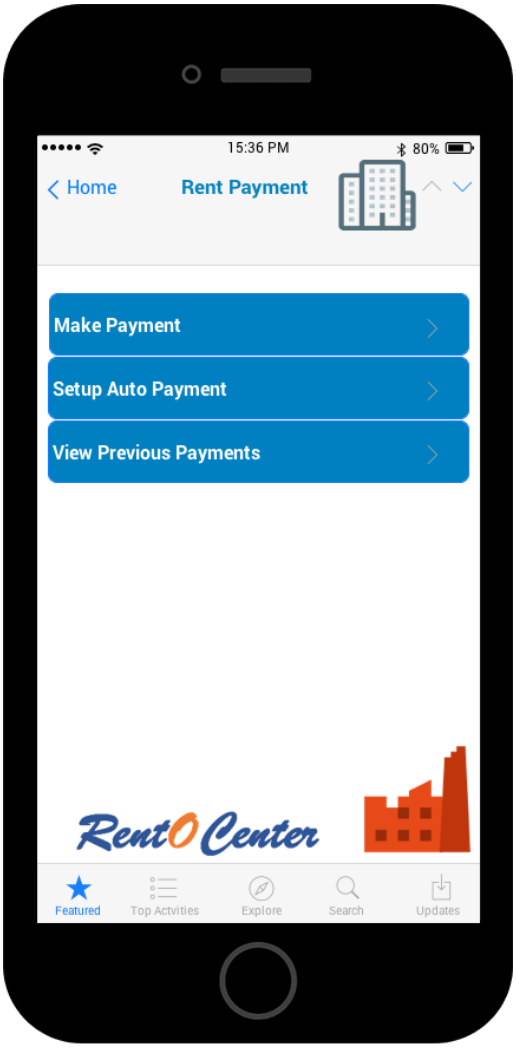
Prototype Screens



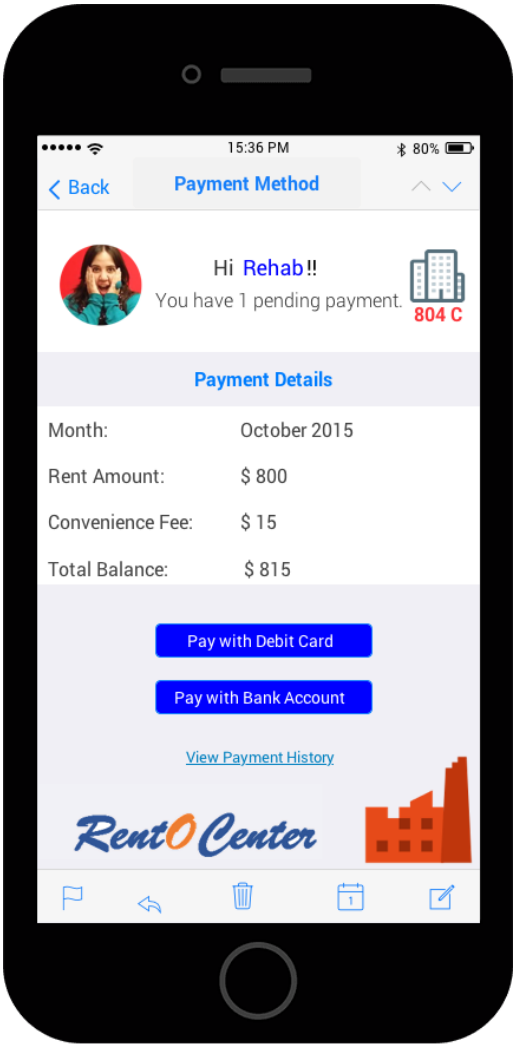
Prototype Screen 1 – Home Screen



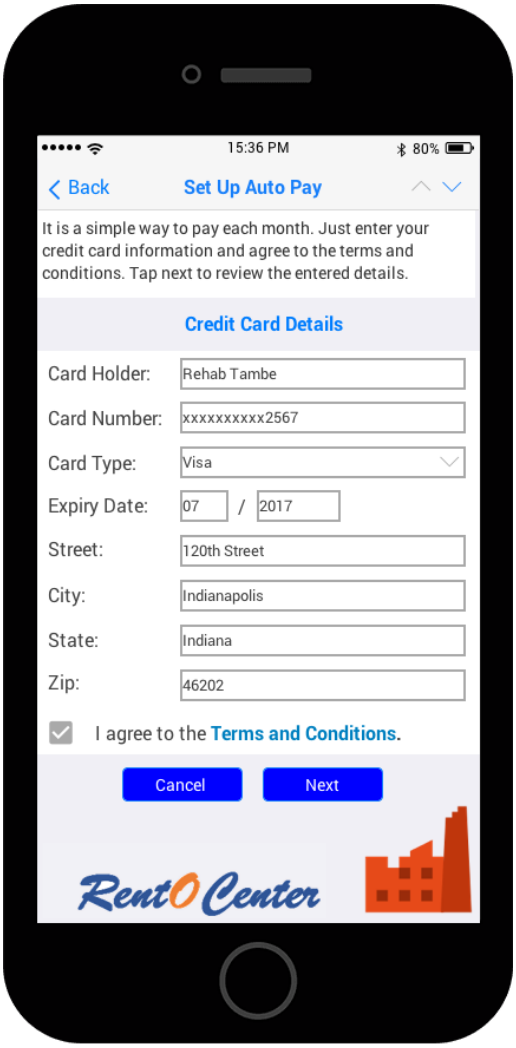
Prototype Screen 2 – Rent Payment Main Screen



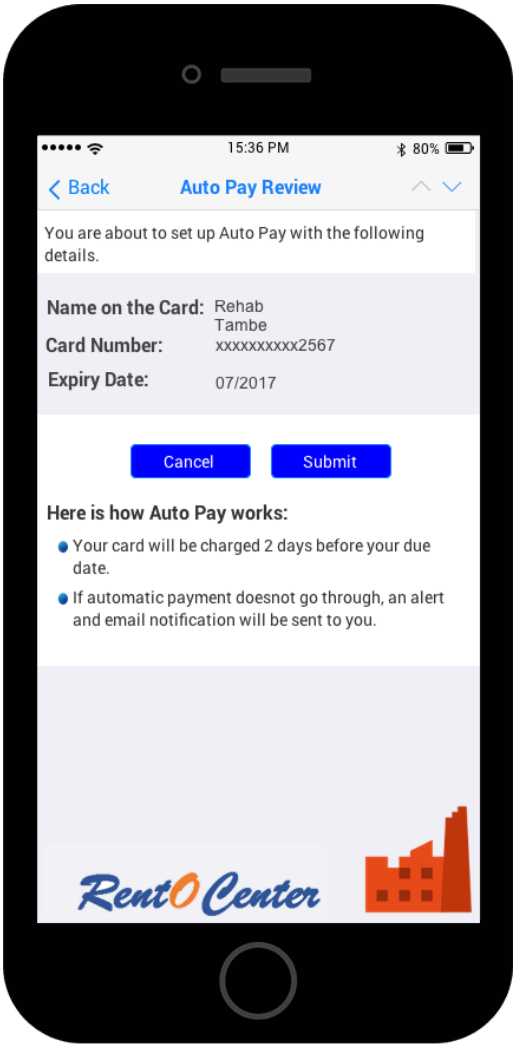
Prototype Screen 2 – Rent Payment Main Screen



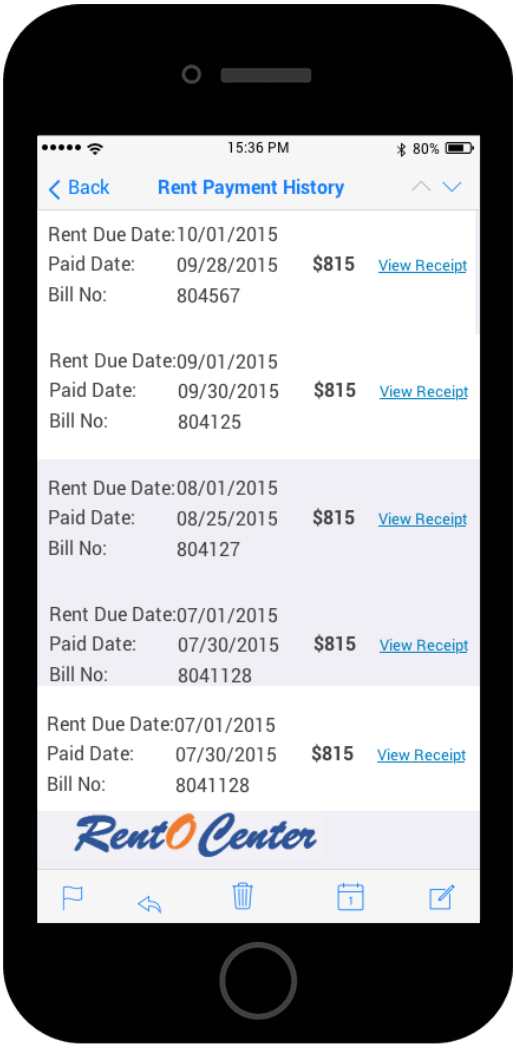
Prototype Screen 3 – Rent Payment – Payment Method



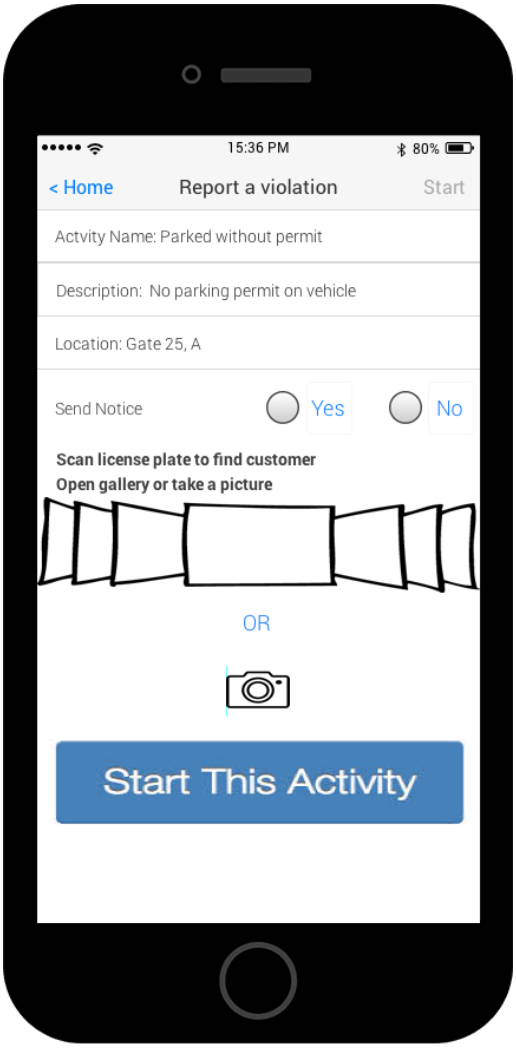
Prototype Screen 4 – Rent Payment – Setup Autopay



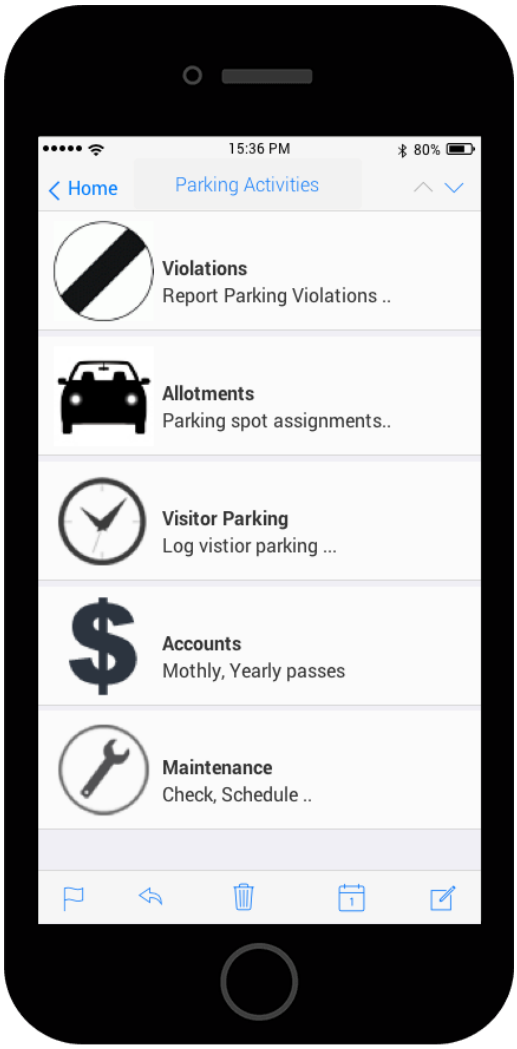
Prototype Screen 5 – Rent Payment – Autopay Review



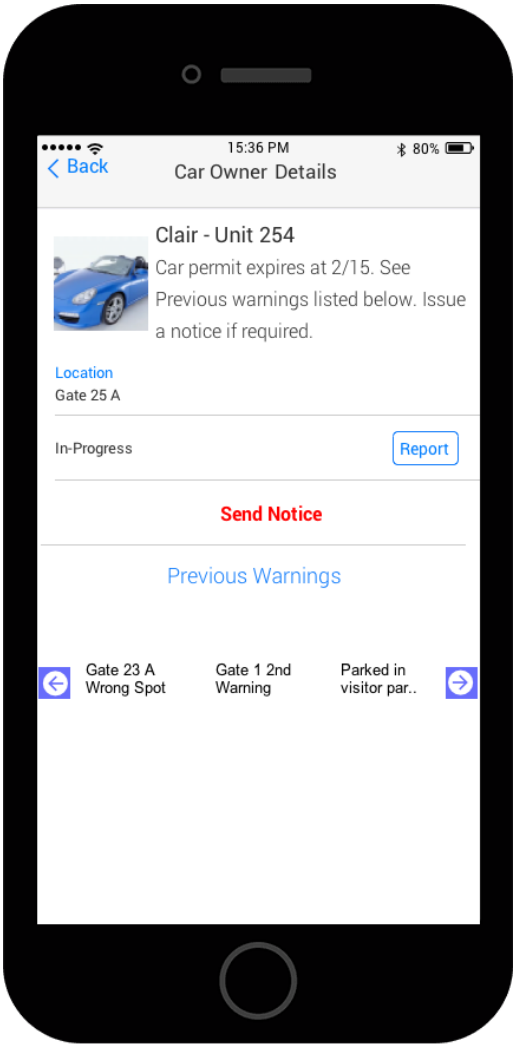
Prototype Screen 6 – Rent Payment – Payment History



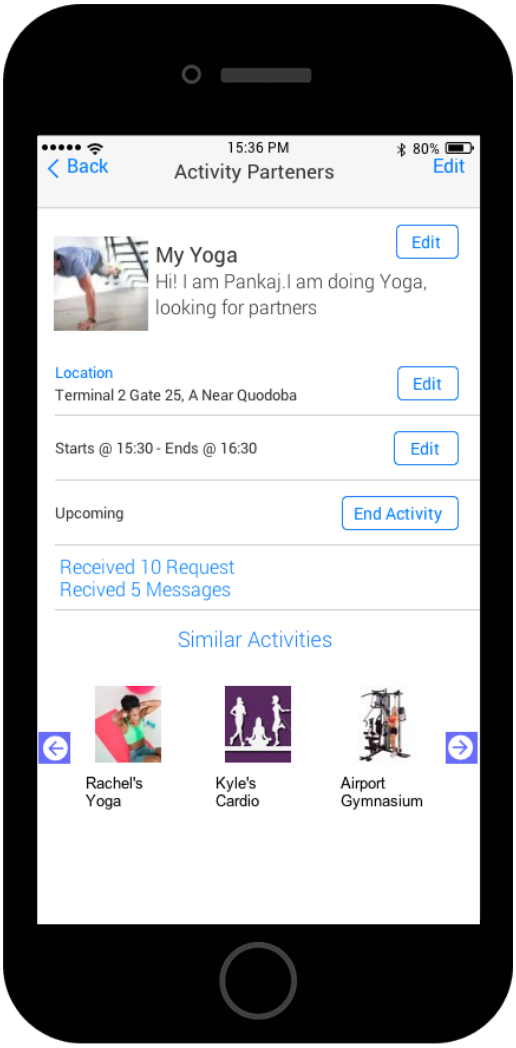
Prototype Screen 7 – Parking – Report a Violation



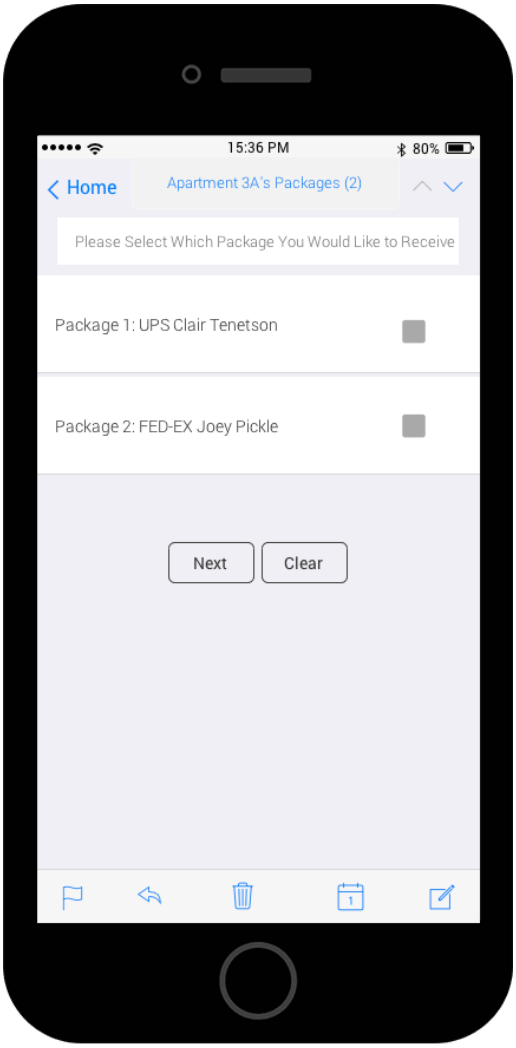
Prototype Screen 8 – Parking– Parking Activities



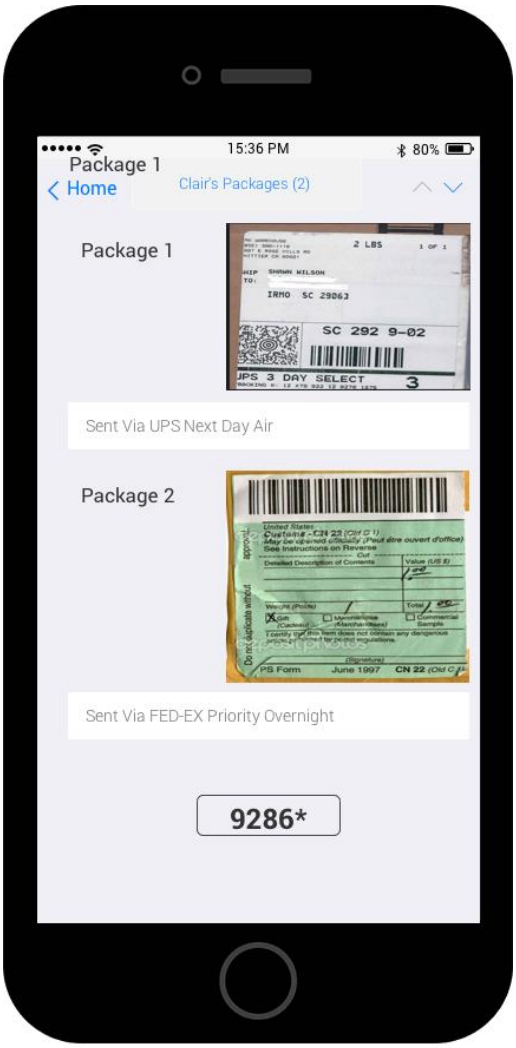
Prototype Screen 9 – Parking – Car Owner Details



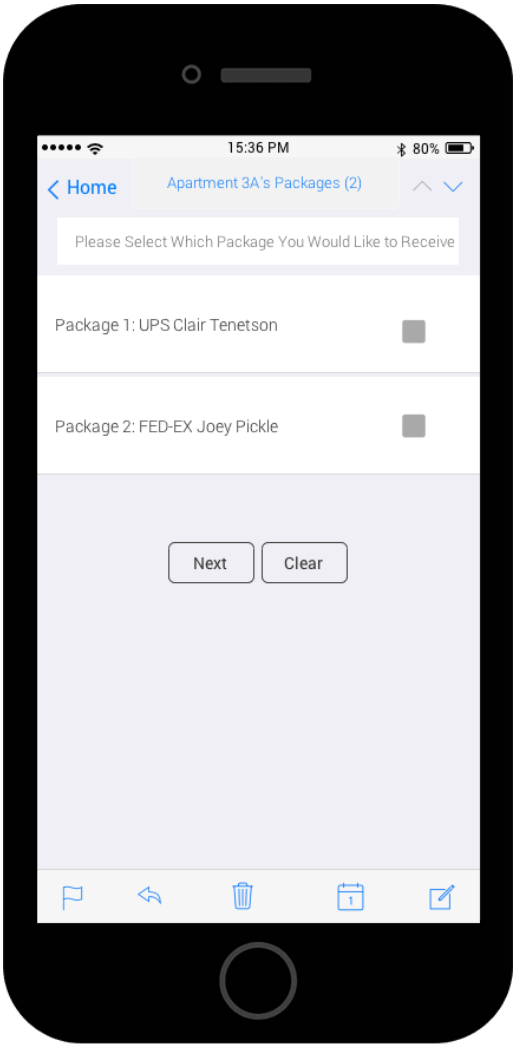
Prototype Screen 10 – Others – Activity Partners



Prototype Screen 11 – Packages – Home



Prototype Screen 12 – Packages



Prototype Screen 13 – Packages

We primarily focused on solving three main issues – Parking Management, Packaging Management and Rent. We decided to evaluate the solutions with real users in context. We decided to create high-fidelity interactive prototype because more interactive you can make them, the easier it is to create the evaluation versions of your apps. Interactivity also helped in eliminating the need of the wizard while evaluating in context with the target audience. High fidelity prototypes are computer-based and allow natural user interactions. High-fidelity prototypes imitate an accurate representation of the user interface. High-fidelity prototypes are much more efficient in collecting precise human performance data (e.g., time to complete a task, error count), and in demonstrating near actual products feel to stakeholders.

Parking Management and Packaging management needed physical presence of the users at multiple locations. Therefore we decided to go with mobile app solution first using JustInMind. It is an incredibly powerful prototyping app that provides all the functionality you want in an application prototyping solution, for all mobile devices, the web, or even desktop environments. It works for website prototyping, too! JustInMind is easy to use and intuitive. We also did some research about the JustInMind on the web, and we found that is has notable advantages over the similar products in the market (Refer Figure – JustInMind Prototype)
http://www.uxmatters.com/mt/archives/2010/01/product-review-justinmind-prototyper.php

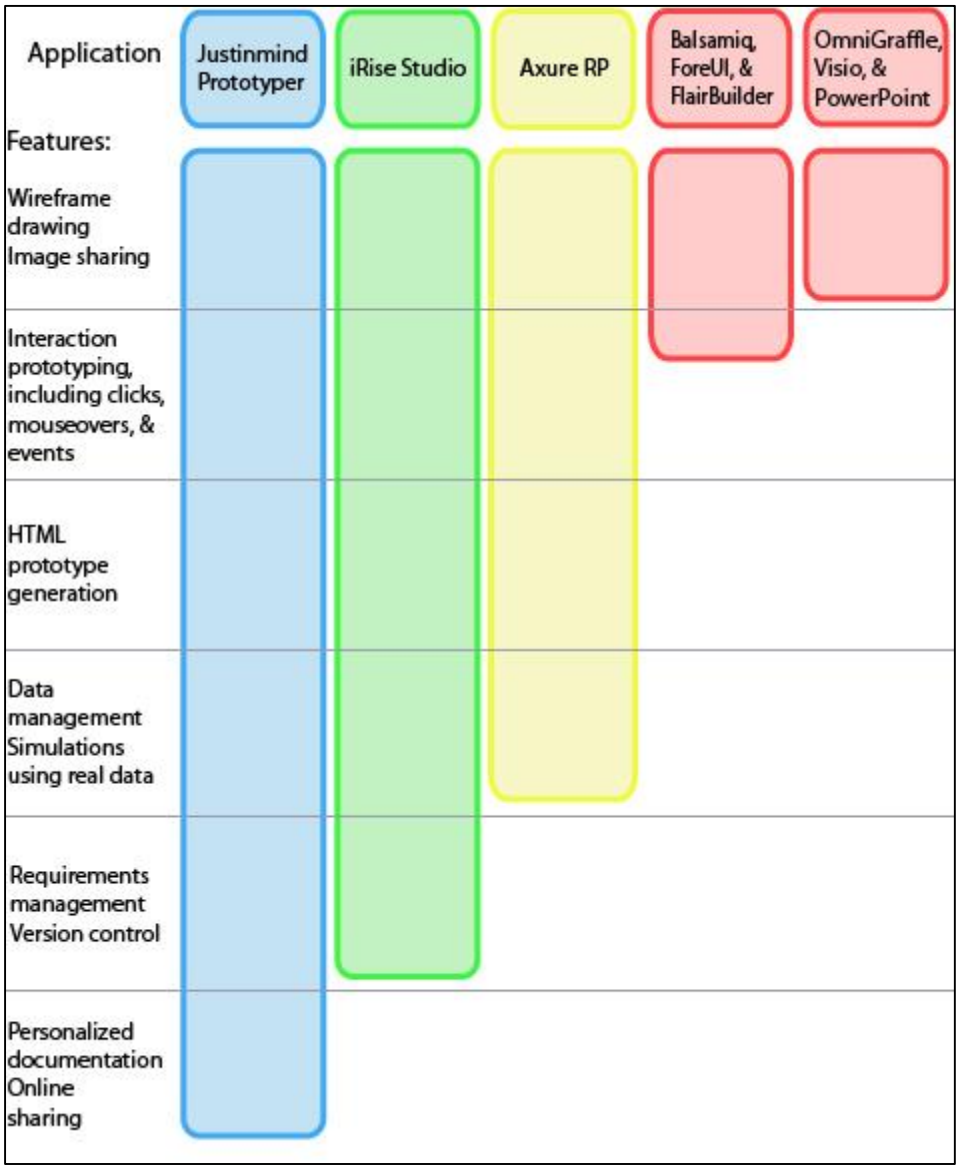


Figure – JustInMind Prototype

Justinmind supports development of prototypes with good learning resources to help you get started, including great video tutorials and PDF tutorials and a user guide. You can download widget libraries for mobile and web apps, sketches and desktop apps, speeding up your prototyping process.

JustInMind prototype helped us to observe the users in context and evaluate our design thoroughly. Apart from the fact that there is a learning curve if you aren't use to this type of prototyping layout and the tools that come with it. Plus the Free version is very limiting which is a bummer considering it promotes itself as "*The Best 100% Free Wireframe Tool for Mobile and Web*". We really liked overall experience of prototyping with JustInMind. If we were provided with extension of free version with premium features we would love to create more finished prototype and present it to the stakeholders.

Evaluations

Summary

The evaluation process, both self-reflective and the user driven think-aloud methods, were eye opening to the team in several ways. We were able to identify several usability issues and gain a concrete understanding of what our next steps should be, thanks in large part to the evaluations. For the think-aloud we selected two apartment property managers and had them use the application. The walkthrough and follow-up questioning took approximately 30-mintues and had the user's complete three tasks:

1. Pick up a package from the rental office after-hours
2. Report a parking violation
3. Review and pay rent

The most valuable input we received from these participants was that our idea was solid and that it could address a lot of their day-to-day needs. However, they identified several usability issues, some of which were rather severe. Interestingly, the heuristic review and cognitive walkthrough both identified similar issues to the think-aloud protocol which suggests to us that the issues are systemic and should be addressed with a high priority and then retested.

Next Steps

Some of the critical usability issues we identified included semiotics concerns with button labeling conventions. Users were particularly concerned with the ambiguously labeled 'Activity' button. The packaging system suffers from a lack of affordance for users and provides them with few clues as to how to apply the pin and physically retrieve their packages. The interface design must be rethought, with a focus placed on the personas we created and their needs and concerns. We should include a visual and accompanying directions to demonstrate the process; perhaps the next iteration can have a one-time overlay, tutorial. Provided enough time with this project we would first conduct a card-sorting exercise with potential users to determine a better flow for our navigation and labeling conventions. We would then redesign the packaging system to include the above-mentioned tutorial with a visual example. This would need to include some better instructions and labeling on the interface. We would then retest this version of the prototype to determine how our initial design works.

Reflection

The heuristic review, user-driven think aloud and cognitive walkthrough each identified both unique and similar issues. Starting with the heuristic review, it allowed the team to provide a critical, expert view on the prototype with a focus on best practice. This helped us understand that we were not following some basic design criteria, like speaking the users language concerning labeling. The user-drive evaluations were critical, they helped us understand that the target user demographic (tenants and property managers) really valued and approved of our application and its intent.

They also provided us with the critical knowledge of where we need to regroup and focus on the application moving forward. The importance of this versus the heuristic is that, largely, the expert-driven, self-reflective evaluation identified minor problems that would have been addressed prior to a final rollout of the product in any case; such as the application was not fully developed. Finally the cognitive walkthrough helped us understand that our links were not correct and confirmed our participants in the think-aloud that the naming convention of the button labels need to be addressed.

The most helpful evaluation in our opinion is the user-focused think aloud. While we have best practices to reference when designing and reviewing the interface, we are simply not our users – no matter how empathetic we feel towards them. If we could only choose one evaluation method moving forward it would be the user-driven ones. They confirm our design strategy, focus our future efforts, and provide us context to the problem space; all of which is critical and cannot be easily replicated.

All the evaluation techniques utilized in this project are viable and helpful in their own way. That is because each is a tool, and tools are designed for specific tasks. Just because one might be preferred for this particular problem space and project does not invalidate or disregard the other methods.

Usability Aspect Report – Think A Loud Evaluation

The System	The entire team was eager to get a chance to conduct self-reflexive evaluations of our prototype, the community integration application. The application was designed to be used primarily by anyone who is a resident at an apartment community or who is a staff member of that community; be they administrative, maintenance or security. This application is a mobile-based system that integrates the various disparate administrative, maintenance and parking protocols into one comprehensive tool.
The Evaluation	Team members were determined to exercise the application under rigorous usability testing conditions, including a two user walkthrough's, a heuristic evaluation (summarized in this report) and a cognitive walkthrough.

Issue ID	Good Feature	Usability Issue
HE1: Application incomplete; no formative exploration possible.		X
HE2: Semiotics issues concerning navigation naming conventions.		X
HE3: 'Activity' button has incorrect navigation.		X
HE4: 'Sent Warning' button missing from Violation dialog.		X
HE5: Concept of application addresses needs, user requirements were spot on.	X	

HE1	Problem
Name: Application incomplete; no formative exploration possible.	
Observation: Users wanted to review community activities and were excited for the options presented. Interface aspect: None	
Interpretation: User is only able to follow task-specific steps and navigation.	
Severity/Benefit: **3** – Major usability problem (fix with high priority) **Frequency:** chronic **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic	
Solution/tradeoff: **Solution:** Finish prototype and retest. **Tradeoff:** None.	
Comments: Several screens need to be addressed.	

HE2	Problem
Name: Semiotics issues concerning navigation naming conventions.	
Observation: Users do not like the violation button label, 'Start This Activity'. **Interface aspect:** Button labels.	
Interpretation: Several times user had to 'guess' the meaning of a button (Action button for example) and then recall what it did later.	
Severity/Benefit: **3** – Major usability problem (fix with high priority) **Frequency**: chronic **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic	
Solution/tradeoff: **Solution:** Consider a card sort session to identify a better naming convention. **Tradeoff:** Time and money.	
Comments: Several button labels need to be addressed.	

HE3	Problem
Name: 'Activity' button has incorrect navigation.	
Observation: The 'Activity' button takes users to the wrong screen rather than the community hosted activities pages as intended. **Interface aspect**: Buttons and navigation.	
Interpretation: Caused lots of confusion but is a pretty simple fix.	
Severity/Benefit: **3 –** Major usability problem (fix with high priority) **Frequency:** intermittent; not every page suffers this issue. **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic	
Solution/tradeoff: **Solution:** Fix links according to site design and retest. **Tradeoff:** None.	
Comments: Several buttons need to be addressed.	

HE4	Problem
Name: 'Sent Warning' button missing from Violation dialog.	
Observation: Users were struggling to understand how to send the violator a warning as opposed to reporting the issue to the Property Manager. **Interface aspect**: Parking Violation Reporting dialog.	
Interpretation: Development team did not provide enough context for users to match their mental model.	
Severity/Benefit: **3 – Major usability problem (fix with high priority)** **Frequency:** chronic. **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic.	
Solution/tradeoff: Solution: reconsider interface design with a re-focus on user needs, review persona; redesign and retest. Tradeoff: None.	
Comments:	

HE5	Good Aspect
Name: Concept of application addresses needs, user requirements were spot on.	
Observation: Users (who we interviewed during data gathering) were impressed with our solution and felt like we did a good job representing their needs. **Interface aspect**: Application concept of operations.	
Interpretation: Application addresses several high-priority issues for Property Managers, Maintenance staff and Residents.	
Severity/Benefit: **0 – Not a usability issue.** **Frequency:** chronic. **Impact:** Users are excited to exercise and contribute to the application. **Persistence:** chronic.	
Solution/tradeoff: Solution: reconsider trouble interface design spots with a focus on what can make this aspect of the workflow more effective. Tradeoff: None.	
Comments:	

Appendix

Severity Scale: http://www.nngroup.com/articles/how-to-rate-the-severity-of-usability-problems/

Severity	Description
0	I don't agree this is a usability problem.
1	Cosmetic problem only; need not be fixed unless extra time is available on project.
2	Minor usability problem; fixing this should be given low priority.
3	Major usability problem; important to fix, so should be given high priority.
4	Usability catastrophe; imperative to fix this before product can be released.

Usability Aspect Report - Heuristic Evaluation

The System	The entire team was eager to get a chance to conduct self-reflexive evaluations of our prototype, the community integration application. The application was designed to be used primarily by anyone who is a resident at an apartment community or who is a staff member of that community; be they administrative, maintenance or security. This application is a mobile-based system that integrates the various disparate administrative, maintenance and parking protocols into one comprehensive tool.
The Evaluation	Team members were determined to exercise the application under rigorous usability testing conditions, including a two user walkthrough's, a heuristic evaluation (summarized in this report) and a cognitive walkthrough.

Issue ID	Good Feature	Usability Issue
HE1: Application incomplete; no formative exploration possible.		X
HE2: Semiotics issues concerning navigation naming conventions.		X
HE3: Not all pages have correct navigation.		X
HE4: Packaging system difficult for users to understand and thus use.		X
HE5: Rent payment has very simple interface.	X	

HE1	Problem
Name: Application incomplete; no formative exploration possible.	
Observation: At this stage of development the prototype was not fully finalized. **Heuristic**: User control and freedom **Interface aspect**: None	
Interpretation: User is only able to follow task-specific steps and navigation.	
Severity/Benefit: **3 –** Major usability problem (fix with high priority) **Frequency:** chronic **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic	
Solution/tradeoff: Solution: Finish prototype and retest. Tradeoff: None.	
Comments: Several screens need to be addressed.	

HE2	Problem
Name: Semiotics issues concerning navigation naming conventions.	

Observation: Some button names are not expressly communicating their intent well; poor affordance. **Heuristic**: Recognition Rather Than Recall **Interface aspect**: Button labels.
Interpretation: Several times user had to ‘guess’ the meaning of a button (Action button for example) and then recall what it did later.
Severity/Benefit: **3 – Major usability problem (fix with high priority)** **Frequency:** chronic **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic
Solution/tradeoff: Solution: Consider a card sort session to identify a better naming convention. Tradeoff: Time and money.
Comments: Several button labels need to be addressed.

HE3	**Problem**
Name: Not all pages have correct navigation.	
Observation: Some pages did not link to the correct page in the sequence they were supposed to take users to. The ‘Activity’ button takes users to the wrong screen rather than the community hosted activities pages as intended. **Heuristic**: Consistency and Standards **Interface aspect**: Buttons and navigation.	
Interpretation: Caused lots of confusion but is a pretty simple fix.	
Severity/Benefit: **3 – Major usability problem (fix with high priority)** **Frequency:** intermittent; not every page suffers this issue. **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic	
Solution/tradeoff: Solution: Fix links according to site design and retest. Tradeoff: None.	
Comments: Several buttons need to be addressed.	

HE4	**Problem**
Name: Packaging system difficult for users to understand and thus use.	

Observation: The packaging system needs to be redesigned as it currently does not communicate to users how and why it is supposed to work. The intention was to let users access the rental office after hours with a randomly-generated pin. Users did not understand the pin was for an external door. **Heuristic**: Match between System and Real World **Interface aspect**: Packaging system and workflow.
Interpretation: Development team did not provide enough context for users to match their mental model.
Severity/Benefit: **3 – Major usability problem (fix with high priority)** **Frequency:** chronic. **Impact:** User cannot complete task or takes more time to do it. **Persistence:** chronic.
Solution/tradeoff: Solution: reconsider interface design with a re-focus on user needs, review persona; redesign and retest. Tradeoff: None.
Comments:

HE5	**Good Aspect**
Name: Rent payment has very simple interface.	
Observation: Rent payment features was very simple to use. **Heuristic**: Match between System and Real World **Interface aspect**: Rent management and payment.	
Interpretation: Dialog was simple and effective allowing users to pick it up on the first try.	
Severity/Benefit: **0 – Not a usability issue.** **Frequency:** chronic. **Impact:** User easily completes task in an effective manner. **Persistence:** chronic.	
Solution/tradeoff: Solution: reconsider trouble interface design spots with a focus on what makes this aspect of the workflow so effective. Tradeoff: None.	
Comments:	

Appendix

Heuristic's Utilized: Jakob Nielsen's 10 General Principles for Interaction Design

Heuristic	Description
Visibility of System Status	System should keep users informed about what is going on, through feedback.
Match Between System and Real World	System should speak user's language, rather than system-oriented terms.
User Control and Freedom	Users choose functions by mistake and need a clearly defined 'emergency exit'.
Consistency and Standards	Users should not have to wonder whether words, situations or actions mean the same thing.
Error Prevention	Eliminate error-prone conditions and present users with a confirmation option before they commit to an action.
Recognition Rather Than Recall	Minimize user's memory load by making objects, actions and options visible.
Flexibility and Efficiency of Use	Allow users to tailor frequent actions.
Aesthetic and Minimalist Design	Dialogues should not contain information which is irrelevant or rarely needed.
Help Users Recognize, Diagnose and Recover from Errors	Error messages should be expressed in plain language, precisely indicate the problem and constructively suggest a solution.
Help and Documentation	Should be easy to search, focused on the user's tasks, not be too large, and list concrete steps.

Severity Scale: http://www.nngroup.com/articles/how-to-rate-the-severity-of-usability-problems/

Severity	Description
0	I don't agree this is a usability problem.
1	Cosmetic problem only; need not be fixed unless extra time is available on project.
2	Minor usability problem; fixing this should be given low priority.
3	Major usability problem; important to fix, so should be given high priority.
4	Usability catastrophe; imperative to fix this before product can be released.

Cognitive Walkthrough Report (CWR)

CWR Number: A1-10-20-2015
Product Name: RentO Center
Task Name: Report a parking violation.
Date and Time of Study: 10-20-2015; 1425 – 1457
Experimenters' Names: Kyle Maddox

Task Description:

As you come home for the evening you see that someone has parked in your assigned spot! After finding a temporary place to park, you decide to report the violation.
Task Action Sequence:

User: Open application.
System: display homepage
User: Select 'Parking'.
System: links to parking dialog
User: selects 'Violations'.
System: links to violation reporting dialog
User: enter the following information:
Activity Name: Parked in wrong spot.
Description: I cannot park in my spot, 25-A.
Location: parking spot 25-A.

System: [n/a]
User: selects 'Send Notice'.
System: [n/a]
User: selects camera icon option.
System: [n/a]
User: selects 'Start This Activity'.
System: opens camera to allow user to take picture, then displays sent violation report

Interface/tool/system description:

The application is utilized on a mobile phone in this instance. There is a dialog users must follow to report the violation which requires seven steps.
Streamlined cognitive walkthrough (Spencer et al, 2000):

User: Open application.
System: display homepage

CW Question	Issue?	Notes
Will the user know what to do at this step?	NO	No issues.
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?	NO	No issues.

User: Selects 'Parking'

System: links to parking dialog

CW Question	Issue?	Notes
Will the user know what to do at this step?	YES	At this point our user is trying to report a parking violation. They are irritated that someone has parked in their spot. The first option in the application is 'Parking'.
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?	YES	Once selected the user selects parking they are presented a number of parking-related options, confirming they made the right choice.

User: Selects 'Violations'
System: links to violations dialog

CW Question	Issue?	Notes
Will the user know what to do at this step?	YES	The first option in the parking dialog is 'Violations'.
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?	YES	Once selected the user will see the violations dialog where they can start to report the issue.

User: enter the following information:
Activity Name: Parked in wrong spot.
Description: I cannot park in my spot, 25-A.
Location: parking spot 25-A.

System: [n/a]

CW Question	Issue?	Notes
Will the user know what to do at this step?	YES	The dialog is fairly simple and self-explanatory.
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?	YES	The user is entering information so the system's only response is to display that info.

User: selects 'Sent Notice'.
System: [n/a]

CW Question	Issue?	Notes
Will the user know what to do at this step?	NO	This seems rather ambiguous, are we saying send the notice now or rather that we want to send a notice once finished?
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?	YES	If the user expects to finish the dialog before sending the notice then they should see they are making progress.

User: selects camera icon.
System: [n/a]

CW Question	Issue?	Notes
Will the user know what to do at this step?	YES	User selects their preferred method of capturing the license plate of the violating car.

If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?	NO	Need to provide a visual indicating selection has been made.

User: selects ‘Start This Activity’.
System: opens camera to allow user to take picture, then displays sent violation report

CW Question	Issue?	Notes
Will the user know what to do at this step?	YES	Camera opens and user simply takes a picture.
If the user does the right thing, will they know that they did the right thing and that they are making progress towards their goal?	YES	Once the picture of the license plate is taken the application displays the completed violation and notice which are sent automatically.

Potential fixes for discovered problems:

The option to ‘send notification’ is rather ambiguous. Am I sending notice of the violation to the resident who parked in my spot or to the management staff? If I don’t select this option does that mean I cannot report the violation? This issue may be fixed in one of two ways:
Eliminate the option to choose and simply tell users that the notification will be sent once the violation report is complete
Provide a definition of what the selection means and what the user can expect from that
The best choice in our opinion is to simply remove the option and inform users that a notification has been sent. This has the beneficial effect of minimizing cognitive load for users and streamlining the violations dialog.
The second issue discovered in this task is the labeling ‘Start This Activity’ which is not very descriptive. We have proposed conducting a card sorting session in the heuristic and user-driven walkthrough reports and would add this naming convention to that activity to provide user-preference. Something that is more direct is probably needed.

Click **Back** to go back to the **Activities Performed** section.