

Interface Design Report

Group 8 | Human Computer Interaction

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Task 0

This app RentaSpace will be used to allow people to rent out space on their properties to other users who need parking spaces. The app will be localized to the United Kingdom and will be designed and available for phone devices only. Space owners can rent out driveways/garages/parking spaces and will be able to choose what periods of time their spaces are available for and for what price, and renters will choose from the available spaces and how long they want it for.

There will need to be some sort of verification to check the right renters are parked where they should be (e.g. number plate checks).

There may be additional functions that specific users may want, e.g. renters may want the ability to favourite certain spaces, or to have in-app communication between themselves and space owners to facilitate pre-booking or availability requests.

Task 1

User Description

Primary persona

Name: John Walker

Age: 54

Occupation: Operations Manager at Insurance company

Status: Married, with children who have left home

Quote: "I want to make use of my empty driveway."

John lives in a busy city center and is very environmentally conscious and likes to keep fit, which is why he cycles to work every day. He has no current use for his spare parking space on his drive as his wife's 5 seater vehicle is in their garage and suits their needs. At the moment he is only renting out his space to family and friends who ask about it as they know his situation, but he would like to advertise to more people and earn money from it. He's not very technologically savvy but has an iPhone he is comfortable using. John is often out of the house, either at work or on the golf course with his numerous friends and therefore will not be able to meet the renters in person often.



Goals:

- He would like an application that allows him to simply update and edit when the space is free and how much it will cost to rent
- He would like the payment to happen through the app rather than cash in hand.
- He's conscious that the space is right outside his home and therefore would like a form of verification for potential renters.

Primary persona

Name: Sara Roberts

Age: 26

Occupation: Data Analyst

Status: Engaged with no children and lives with her fiancé

Quote: "I am fed up of trains making me late for work, I would much rather drive!"

Sara lives an hour commute away from her office in the city centre. She used to commute on the train but is fed up of always being late due to the northern rail always having delays. As a result Sara has decided she would much rather drive into the city if she can find an affordable spare parking space that is not city prices. From there she would either walk or get the bus to complete her journey. Sara uses an iPhone and is great with technology and loves her job, she also loves visiting the city during her weekends to meet up with her city friends for coffee and shopping.



Goals:

- She would like an app that allows her to search by location so she can try to get a space as near to her office as possible.
- She would like to add favourite spaces to her account to make it quicker for future bookings
- She would like to view ratings/reviews of potential renters' spaces

Task 2

Task Analysis

a)

Use Case No: 1	Use Case Name: Offer Space	Rating: Primary
Purpose: The use case allows the Space Owner to make available their property, i.e. advertise a listing on the app.		
Main Actor: Space Owner	Secondary Actors: None	
Pre-conditions: Space Owner has logged into the system.		
Description: The actor chooses to list a new space. They input all the necessary information: precise location, availability times, description, photos upload. They confirm and list the space.		
Basic Flow:		

1. Actor chooses to list a new space in the Listings page.
2. System displays areas to input the location, availability times, description, photos.
3. Actor inputs the above details, order of input being irrelevant.
4. Actor chooses to save the listing.
5. System shows a short summary of listings (Listings page), including new listing.

Alternative Flows:

- 1-3.1 Actor chooses to abort creating new listing.
- 1-3.2 System goes back and shows Listings page.

Post-conditions: A space listing is advertised and available to rent out by Space Buyers.

Justification: Use case of offering a rental space isn't as frequently used as the act of searching for or renting a parking space. This is due to the offering of a space only being used by a smaller number of the applications users; however, it is still equally important to all users for the app to work as designed. From John Walkers point of view, the option to offer his parking space is highly necessary and the entire purpose he uses the app, therefore he will always be offering his space, and need this use case at all times. On the other hand, Sara Roberts only wants to rent a space and therefore doesn't care about offering a parking space to other users. In this way, she wouldn't ever use the offer function on the application, however in order to rent a space herself she does require the offer feature to be available and for another user to offer a space which she wishes to rent. As a result although it isn't of primary importance to her, it does have a secondary affect in that she needs other people to be able to offer parking spaces in areas she wishes to park.

Use Case No: 2	Use Case Name: Search for space	Rating: Primary
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Purpose: To allow a user to search for a space matching certain criterion

Main Actor: Renter	Secondary Actors: None
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Pre-conditions: None

Description:

The actor chooses to search available offers. They browse the provided map, having the option to narrow down their search, by specifying location, arrival and departure time. When viewing the map, they can expand/collapse a list view of the results. At the end, they select to view details about a space.

Basic Flow:

1. Actor navigates to the search page
2. System displays a map with all available parking spaces

3. Actor selects search field
4. Actor types in an address
5. Actor selects one of the suggested locations
6. System presents relevant parking spaces on the map
7. Actor selects one of the spaces

Alternative Flows:

3.1 - Actor selects one of all available parking spaces – The use case succeeds

(3-7).1 - Actor cancels/ returns to step 2 in the basic flow

7.2.i - Actor selects the pick time button

7.2.ii - Actor enters arrival time

7.2.iii - Actor enters leaving time

7.2.iv - Continue from step 6 in the basic flow

Post-conditions: User has selected a parking space.

Justification: The use case to search for a space is a core feature for users that are looking for parking spaces through the application. The ability to search by location, arrival and departure time gives the user the ability to narrow down their search and helps them to find the appropriate affordable parking space. Our first selected persona John Walker may not find this use case as useful since he uses the application primarily to renting out his own driveway as a parking space for other users of the application, but it indirectly affects him as users will be able to find John's driveway much more easily through this feature. On the other hand, our second persona Sara Roberts will find this feature very useful as she is primarily using the app to look for spaces in the near of her office and book them as soon as possible due to the likely high demand of places in the city centre. Sara could also utilize this feature for her free-time activities on the weekends, where she will be looking for parking spaces in specific areas.

Use Case No: 3	Use Case Name: Rent Space	Rating: Primary
Purpose: To allow a user to pay for and rent a space that has been advertised on the app		
Main Actor: Space Owner	Secondary Actors: None	
Pre-conditions: User is logged in and has selected a space		
Description:		

The actor chooses to list a new space. They input all the necessary information: precise location, availability times, description, photos upload. They confirm and list the space.

Basic Flow:

1. Actor selects “rent” on the given space.
2. System displays available slots to the user
3. Actor selects an available slot
4. System shows an interface for inputting payment details
5. Actor inputs details and selects “rent”
6. System checks payment details and asks the user to confirm payment
7. Actor Confirms payment
8. System displays payment confirmation and details of the space
9. System sends confirmation email to both renter and rentee
10. System marks slot as no longer available

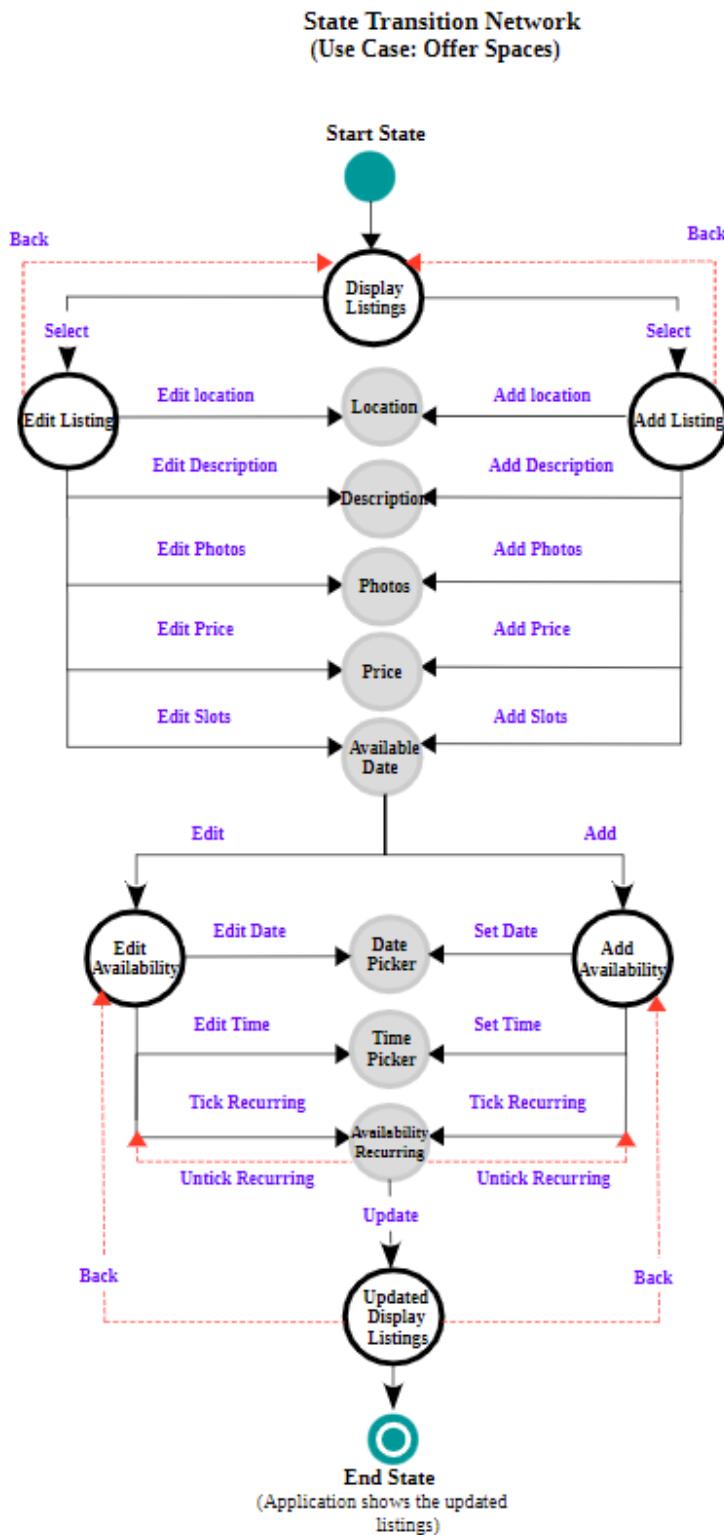
Alternative Flows:

- 3.1 - Actor exits as the slot they want is not available
- (4-7).1 - Actor cancels/ returns to previous step in the flow
- 6.2 - System finds payment details to be incorrect and asks user to re-enter payment details

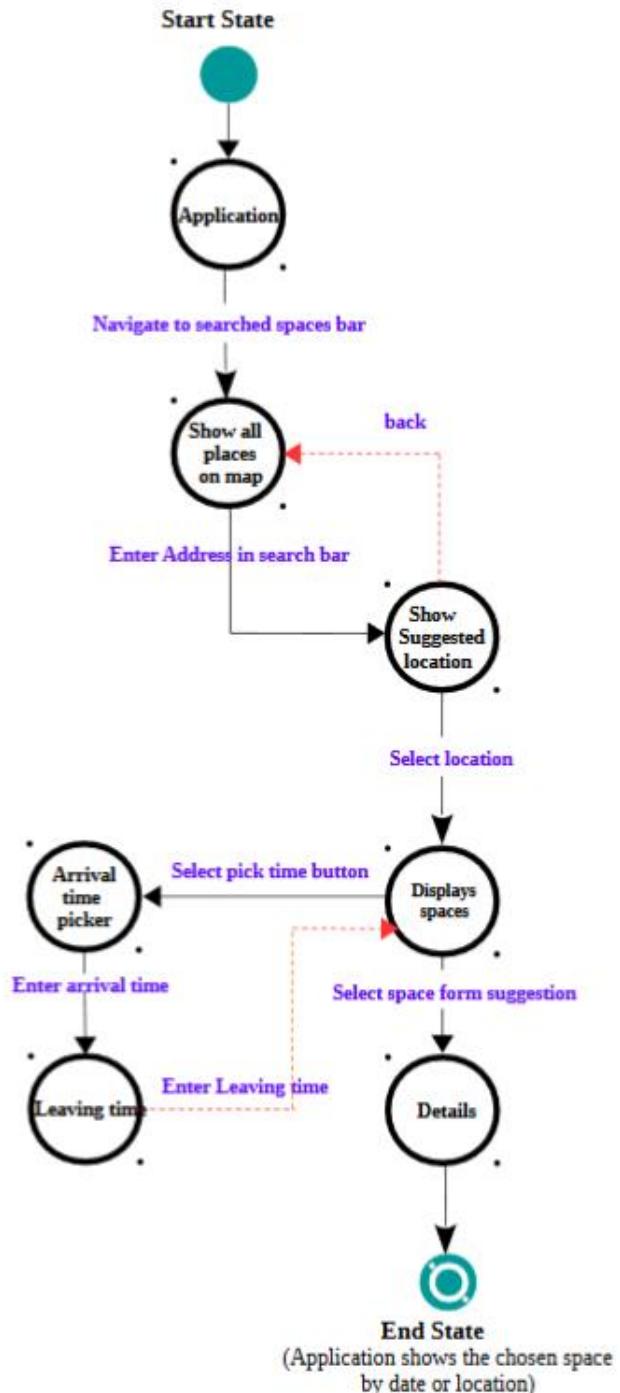
Post-conditions: An email is sent to both the owner of the space and the recipient confirming the payment. The space is marked as no longer available on the system.

Justification: This use case is arguably the most necessary as it allows the user to rent a parking space which is the main purpose of the application. Majority of users on the app will be there to find cheap and easily accessible parking spaces, and therefore the ability to rent the selected spaces is vital for the purpose of the app. In terms of our chosen personas the ability to rent spaces isn't so useful to John Walker as he is in fact renting his own driveway. However, this does mean he needs his customers to be able to rent his space and therefore is a secondary impact of the renting option as he doesn't necessarily want to rent spaces himself. Once his property is listed on the application, having other users find it and rent the space is exactly what he wants from the app and therefore both parties are happy. As for Sara Roberts as a renter, she would like to avoid using public transport and would much rather drive and park her own vehicle in a rented space at a reasonable price. Therefore, the option for Sara to park near work and the ability to rent parking spaces on the app is a must for her. In the case of both personas (John and Sara), being able to rent a parking space is frequently used and the reason they use the app in the first place.

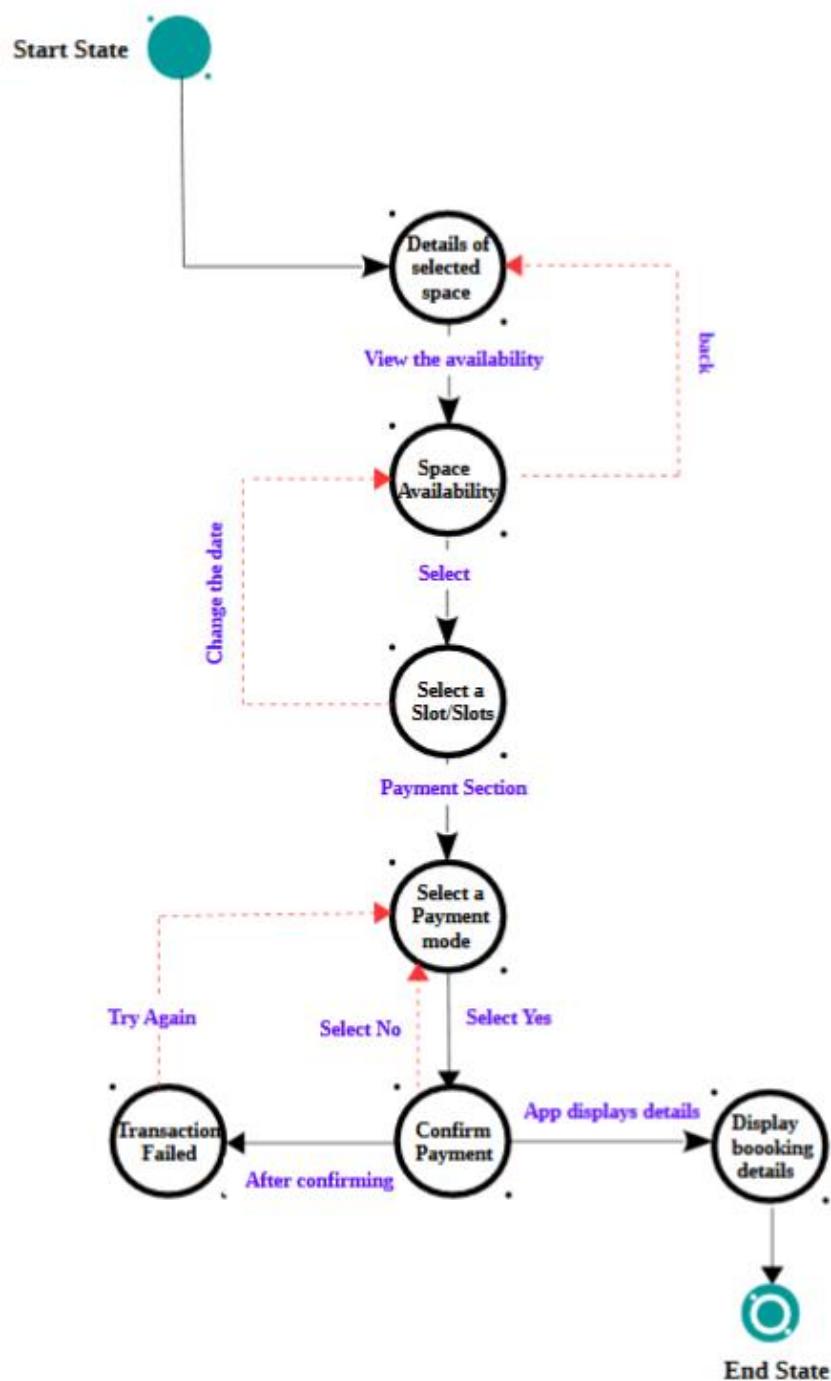
b) Offer Space STN



Search for Space STN



Rent Space STN



Task 3

Interface Prototype

a,b)

Offer Space Use Case: State 1: Screen 1 (Owner Listings)	Design Features	Description and Justification
	Interface metaphors Back button Navigation bar Colour scheme Aesthetic and minimalist design	<p>Interface metaphor – as the app is for iOS, users already know the meaning of the plus (+) symbol used in built-in Apple apps (e.g. alarm app) to create a new object to the objects listed. It is lightweight and as such uses space efficiently. The navigation bar at the bottom has also been designed to look similar to that of default Apple apps for the same purpose – user familiarity and ease of use.</p> <p>Navigation bar – needed to navigate between listing new spaces and searching for and booking new spaces to rent, as well as accessing the user's account to make any changes. Uses easily identifiable icons to make it clearer what screen each links to, and it is easily reached by the user's thumb.</p> <p>Colour scheme - We have chosen black font on a white</p>

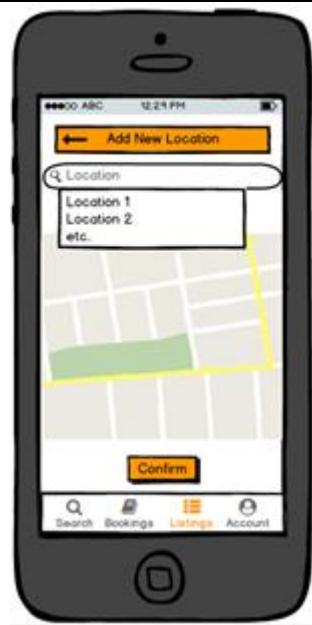
		<p>background for the most contrast and legibility and used only orange for simplicity.</p> <p>Nielsen's usability principle 9 – Aesthetic and minimalist design – Each blank listing is separated by a line, with simple details prompted, and appropriate colour scheme as mentioned.</p> <p>Nielsen's usability principle 3 – User control and freedom - the back button ensures a user can back out of the screen if needed and the navigation bar allows easy access to main topic screen from all screens.</p>
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Offer Space Use Case: State 2: Screen 1 (New Listing)

	<p>Back button Submit button Navigation bar Consistency</p>	<p>Clear details to be set by the user for the listing to go live. There is no hierarchy of links – they are all displayed with same visual weight as they have equal importance to the goal of the use case.</p> <p>Mapping of back/submit buttons – buttons follow common convention of “back” on the left side of the screen and Submit - “forward” - at the bottom of the screen, center stage, after the main details</p> <p>Nielsen's usability principle 4 – Consistency and standards – the navigation bar and back/submit buttons, colour</p>
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		scheme and general layout is the same on this screen as on the rest of the screens.
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Offer Space Use Case: State 2: Screen 2 (Listing Location)



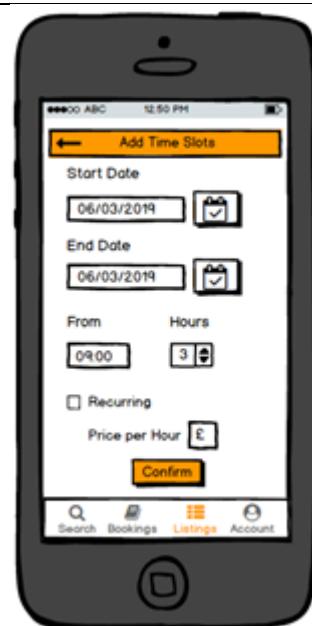
Back button
Confirm button
Navigation bar
Search bar
Map
Shneiderman's 1st golden rule of interface design – Strive for consistency

Search bar – necessary to allow the user to find their wanted location, rather than finding it manually on the map. Appears at the top of the screen as users generally will be used to this layout.

Map – visual cue to aid user in finding the exact location of their space.

Consistent commands are used throughout as outlined by Schneiderman in his first golden rule – we have used “Confirm” for every screen where an aspect of a listing is added.

Offer Space Use Case: State 2: Screen 3 (Listing Availability)



Date picker input field
Time picker input field
Hours spin box
Recurring
Checkbox(unticked)
Price per hour input field
Back button
Confirm button
Navigation bar

This screen allows the user to set all the details relating to when the space is available. It uses input fields for start date to end date as the user must advertise their space for solid blocks of time, and a spin box for number of hours for the same reason. There is a checkbox for whether the space is available for a recurring period e.g. weekly, monthly so the user doesn't have to relist a space each time.

Hours spin box – gives users flexibility in either typing in the number of hours or selecting the hours with the

		<p>arrows. It is lightweight, taking up little space on the screen, and allows only for discrete, valid values.</p> <p>Nielsen's usability principle 6 – Error prevention - the date and time picker pop up dialogs prevent user errors by restricting the user's input to valid inputs only.</p>
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Offer Space Use Case: State 2: Screen 4 (Error pop up)



Pop up box with button
Shneiderman's 8th golden rule of interface design – Reduce short-term memory load

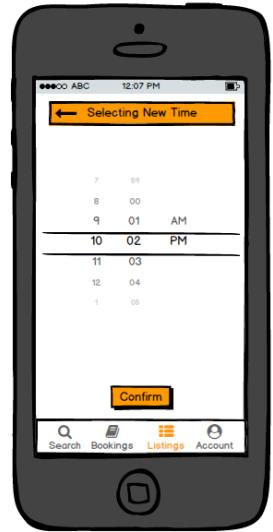
Pop up dialog box – error handling upon leaving an input field blank and clicking “confirm”. Informs the user that some information is still needed to confirm the availability of the listing in a positive manner. The rest of the screen is greyed out so that the user focuses on the error message and makes it obvious that in order to continue they must click OK and fill out all the fields – all fields are disabled from used until this occurs.

Greying out the rest of the current screen also serves Shneiderman's 8th golden rule to reduce short-term memory load, by allowing the user to still see in the background what screen they were on and what prompted this error message, but not to focus on it.

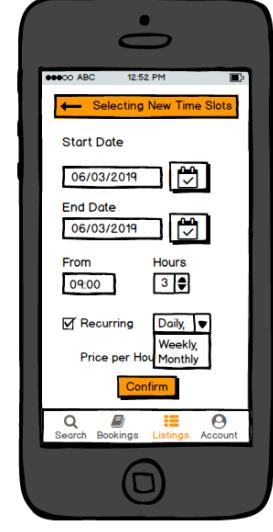
Offer Space Use Case: State 2: Screen 5 (Date Picker)

	Back button Confirm button Navigation bar	<p>Date picker – scrollable list of valid values for date of availability, logically ordered.</p> <p>The picker takes center stage as it is the only thing the user needs to focus on while choosing a date</p>
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Offer Space Use Case: State 2: Screen 6 (Time Picker)

	Back button Confirm button Navigation bar	<p>Time picker – scrollable list of valid values for start time of availability, logically ordered.</p> <p>The picker takes center stage as it is the only thing the user needs to focus on while choosing a time</p>
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Offer Space Use Case: State 2: Screen 7 (Listing Availability Recurring)

	Date picker input field Time picker input field Hours picker Checkbox(ticked) - dropdown list Back button Confirm button Navigation bar	<p>Dropdown list – upon ticking “Recurring” checkbox, a dropdown list is used to make selecting recurring periods easier. It gives a discrete set of values for the user to choose from, listed in a predictable way, reminding the user of the options available to them and reducing user error during input by not allowing other invalid answers.</p>
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		Usability principle 1 – Visibility of system status - Date and Time input fields now display user's input to keep them informed of current settings.
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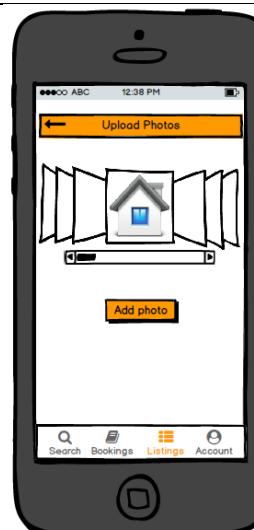
Offer Space Use Case: State 2: Screen 8 (Listing Description)



Back button
Confirm button
Navigation bar

Description box – users generally have prior knowledge of the phone keyboard “popping up” upon selecting input fields in order to type in the description box. The description box fills the screen to allow the user to see as much of what they have already written as possible.

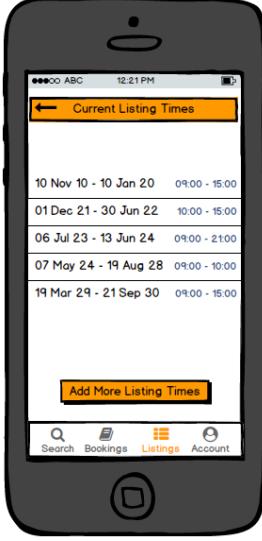
Offer Space Use Case: State 2: Screen 9 (Listing Photos)



Back button
Confirm button
Navigation bar
Photo viewer

Photo viewer – allows the user to quickly scroll through photos already added for ease of use and provides clear functionality for adding new photos.

Offer Space Use Case: State 3: Screen 10 (Filled Listings)

	Back button Confirm button Navigation bar	<p>No hierarchy of links – all displayed with same visual weight as they have equal importance to the goal of the use case.</p> <p>Each link displays the dates and times of each listing to make it easier for the user to know at a glance which refers to each listing. With photos uploaded the time would be replaced by the first photo for further recognizability.</p>
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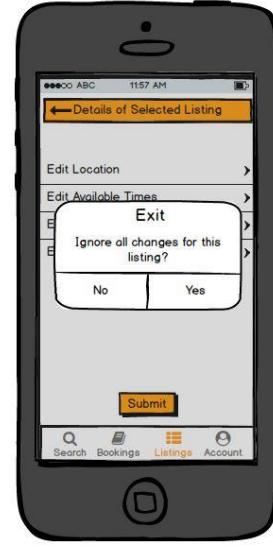
Offer Space Use Case: State 3: Screen 11 (Delete Listing)

	Pop up dialog box Shneiderman's 5th golden rule of interface design - Offer simple error handling Shneiderman's 8th golden rule of interface design – Reduce short-term memory load	<p>This pop up acts as error handling to ensure the user does not delete a listing by accident and potentially have to start over, as per both Nielsen's usability principle 6 (Error prevention) and Shneiderman's 5th golden rule to offer simple error handling. Greying out the rest of the current screen also serves his 8th rule to reduce short-term memory load, by allowing the user to still see in the background what screen they were on and what prompted this confirm message, but not to focus on it.</p>
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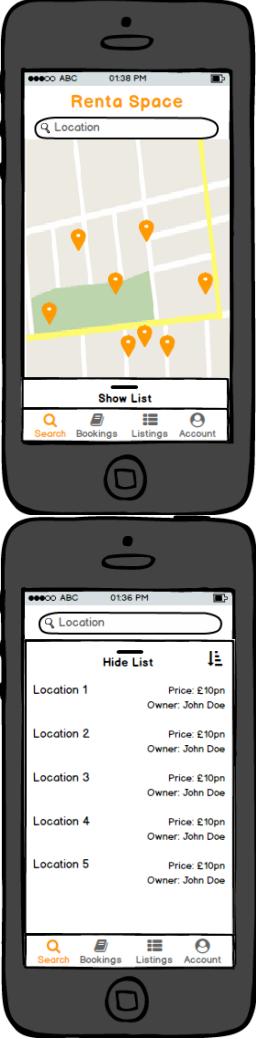
Offer Space Use Case: State 3: Screen 12 (Delete Listing)

	Back button Confirm button Navigation bar Shneiderman's 3rd golden rule of interface design - Offer informative feedback	Shneiderman's 3 rd rule is followed as the listing that the user has removed has disappeared from the list – the user has been given immediate feedback that their action was successful.
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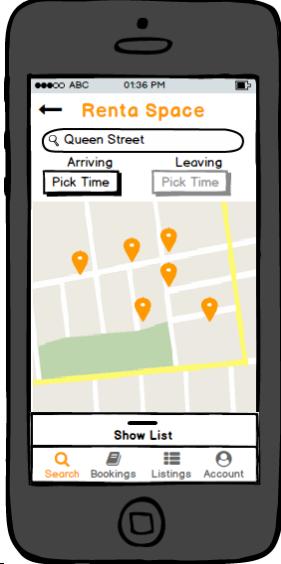
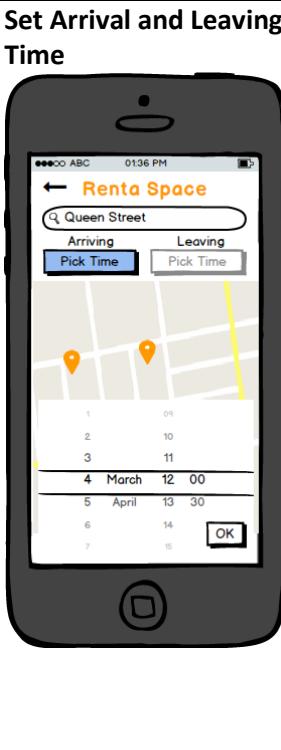
Offer Space Use Case: State 3: Screen 13 (Alternative flow – Exit From Add Listing)

	Pop up dialog box Shneiderman's 5th golden rule of interface design - Offer simple error handling Shneiderman's 8th golden rule of interface design – Reduce short-term memory load	As in the "Delete Listing" screen, this pop up serves as error handling to make sure a user who selects the back button after inputting information for a new space genuinely means to exit out of the screen without saving their changes.
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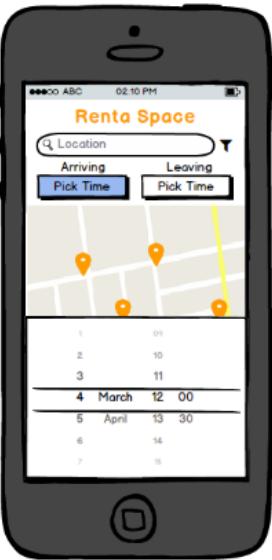
Search for Space

Page	Design features in place	Justification
Search Screen (Home) 	<p>Key interface elements: Search bar, list view, navigation bar.</p> <p>Clarity: All text and icons for available spaces are clear and not cluttered, creating a clear and understandable layout and usable interface. Use of orange against and background colour leaves minimal negative space, but not in a busy way.</p> <p>Metaphors and Consistency: Use of pins for points of interest on a map and the target symbol for getting current location are clear representation of where the user can click and use familiar standards and paradigms.</p> <p>Match between system and the real world: For the purpose of the map the design is simple and clear just like a common road map or satellite map that most users will be familiar with, with colours representing parks and built up areas.</p> <p>Flexibility and efficiency of use: User input is kept to a minimum and therefore the user interaction is efficient and convenient.</p> <p>Navigation: The main navigation buttons are placed with easy access for the thumb. The navigation bar always is present at the bottom. The accented orange button in the navigation bar ensures the user is aware of where in the app they are. It also provides quick and efficient navigation between the major parts of the app.</p>	<p>Map details were kept to a minimum and to a usable size so that all users could easily view and understand all information on display not dependant on age or ability.</p> <p>Using commonly understood icons to represent information on the screen to reduce the amount of unnecessary text.</p> <p>Error prevention is in place by only allowing pre-set choices from the user in terms of input (other than for the location).</p> <p>Drop-down menus and sliding lists are used to avoid always having the information on screen, this helps remove clutter and helps with performance of the application as well as the ease of use for the user.</p>

	<p>Direct Manipulation: The map can be panned and zoomed by the standard gestures. The list intuitively slides up when swiped up from, or when clicked on the descriptive label.</p>	
Enter Location 	<p>Key interface elements: Search bar, easy current location input, search suggestions, system keyboard.</p> <p>Feedback: The search bar is highlighted, showing it is in focus. As the user types into the search bar, they are presented with suggestions to their search.</p> <p>Clarity: Icons and labels have room to breathe. The use of clear separation and differentiation of the current location option highlights important functionality and interactivity.</p>	<p>The search suggestions allow for some level of error prevention – if the user types and sees no suggestions, it should make them likely to adjust their search term (e.g. spelling mistake), and then select a valid location from the list of suggestions.</p> <p>The current location option is prominent at the top as this option is likely to be used frequently.</p> <p>A back button ensures the user has control and freedom at all times.</p>
Search Result (location only)	<p>Key interface elements: Back button, list button, map with results, navigation bar, search bar, datetime button/field.</p> <p>System status: The search bar now displays what search term is being displayed on the map (and list).</p> <p>Feedback and clarity: The interface is the same as home before, but now only shows relevant location pins. More detailed relevant results in the list view.</p>	Error prevention As before, the user can only select from the visible locations.

	<p>The user now has an option to pick an arrival time (and then leaving time) as can be seen by the change in the look of the button.</p> <p>Navigation:</p> <p>As before, the persistent navigation bar ensures the user is aware of where in the app they are and can efficiently move in the app.</p>	
<p>Set Arrival and Leaving Time</p> 	<p>Key interface elements: Back button, arriving/leaving time buttons, datetime picker, confirmation button, alert pop-up.</p> <p>Consistency: The user is presented with the system datetime picker when they input the arriving/leaving date and time.</p> <p>Feedback and system status: The current field the user is inputting for is highlighted. Once a time has been entered, it is displayed in the field.</p> <p>Direct Manipulation: The user selects the date by swiping between the dates in a familiar way.</p>	<p>Error prevention: The datetime picker ensures that the user can only input valid dates and times. For the cases that they input a leaving time that occurs before the arriving time, they are notified and cannot proceed with until they choose a valid time (or choose to tap out of the picker - user control and freedom).</p> <p>Efficiency: The picker allows for the user to efficiently input the required information, by quick swipe action that they are used to, logically ordered.</p>





The search results (with time filters)

Key interface elements:
Back button, search bar, arriving/leaving time buttons/fields, map with results, list view and its button, navigation bar.

System status:
The search bar displays what search term is being displayed on the map (and list). The Arriving and Leaving times are now displayed in the appropriate fields.

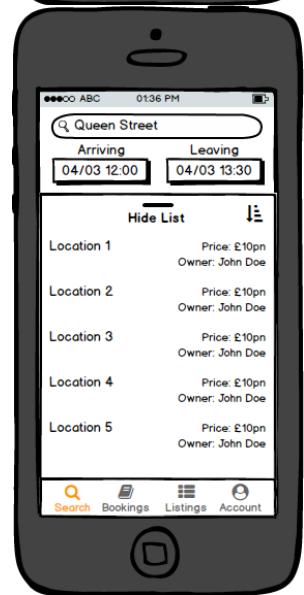
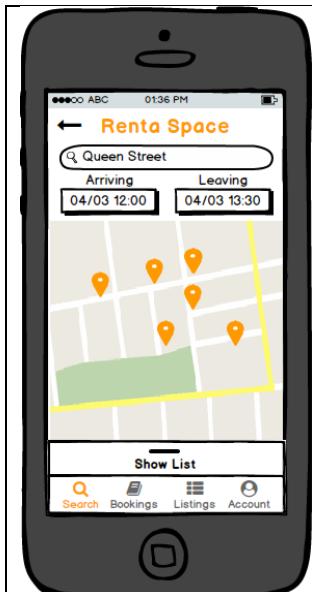
Feedback and clarity:
The map only shows relevant location pins on the map (and more detailed relevant results in the list view).

Navigation:
As before, the persistent navigation bar ensures the user is aware of where in the app they are and can efficiently move in the app.

Error prevention
As before, the user can only select from the visible locations.

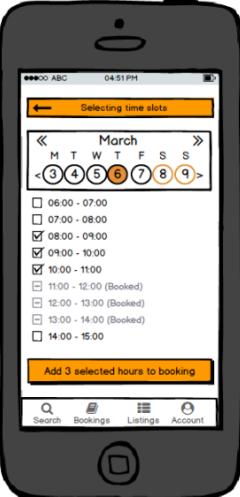
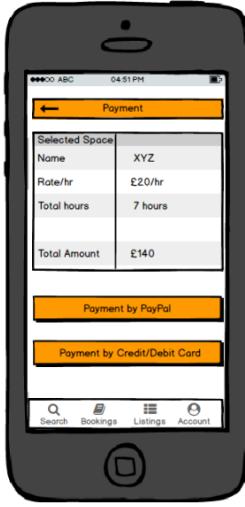
The back button again ensures user freedom and control.

The time fields also enable the user to adjust the filter times again.



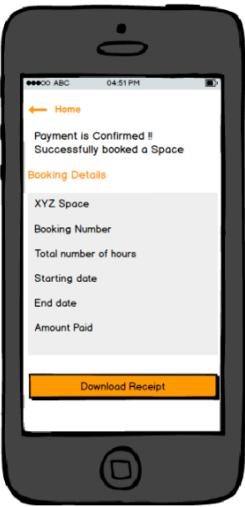
Rent Space

Page	Design Features in place	Justification
Booking details	<p>Consistency: All the colours and button shapes in use, are similar and share characteristics that make it obvious they are all the same app. Standard text styles and placement of aspects on the screen.</p> <p>Metaphors: The use of metaphors in the navigation bar link such images as the book, silhouette and magnifying glass with familiar in app experiences (in this case bookings, account and searching). These are all common place in technology and easy to understand even without the text to back-up.</p> <p>Navigation: All buttons are placed with easy location to the thumb, navigation bar always present at the bottom.</p> <p>Minimalist Design: Keeping content to a minimum, efficient and clear content layout that won't confuse the user. All necessary information is obvious and accessible.</p> 	<p>The page contains a number of interactive elements, all buttons are made obvious using orange colour (considered to be friendly) consistent throughout all pages, and the navigation bar is always in the same place and with easy access to the thumb on screen. Plain background colours allow for ease of use when reading text on screen.</p> <p>The application includes 'Error Prevention' (Nielsen and Molich's Interface Design Heuristics), in the form of the simple use of buttons. The user has little room for error and all actions are controlled by the app meaning the user can't input unknown data.</p> <p>In terms of the layout the application has been design for iOS, resulting in clarity of design with a hierarchy in content and obvious functionality of all features.</p>
Time/Date Selection	<p>Visibility of system status: User selection of dates and times is made clear via the colouring of the current selected date (again in orange to continue consistent design). Further feedback is provided through ticks on times that are chosen, with unavailable times being visible but greyed</p>	<p>Feedback from the application is always necessary and displayed in a reasonable amount of time, providing the assurance to the user that the action they did was successful.</p>

	<p>out to show they have been taken (but are usually available).</p> <p>Match Real World: In the displaying of dates and times, they are all shown in common format used in the real world, with the month written out and then dates and digital clocks for times written in a popular 24 hour format.</p> <p>Flexibility and Efficiency of use: Users are provided with the only the information they require, and input of times and dates are limited to that shown on screen already. Users aren't required to input exact times via drop down or entry (which would be fiddly and annoying).</p> <p>Navigation: All buttons are placed with easy location to the thumb, navigation bar always present at the bottom.</p>	<p>User control is offered through the option to select multiple dates and times, or if the availability doesn't match their needs they can go back and look elsewhere via the back button at the top of the page.</p> <p>Again error prevention is in place via the use of tick boxes and controlled buttons that only allow for certain user inputs.</p> <p>Continuation of the navigation bar location and page layout ensures the consistency of the application and as a result the user is familiar with every page as they come to it.</p>
<p>Payment Method</p> 	<p>Deference: The content fills the entire screen whilst using colours to highlight actionable elements, grey is used merely for the booking information whilst buttons remain consistent with orange colour.</p> <p>Navigation: All buttons are placed with easy location to the thumb, navigation bar always present at the bottom.</p> <p>Aesthetic and minimalist design: Only the necessary information is displayed on screen, with the choices yet to be made (payment method) shown as buttons. All elements are in line and consistent throughout page.</p> <p>User Control:</p>	<p>The use of colours to highlight the importance of different aspects on screen are used to show new information to the user and details they have already seen (the booking details).</p> <p>Consistency in design and colours are used for all the page designs and navigation bar at the bottom to keep the user in tune with the application.</p> <p>Payment methods are both shown as equal with colour, size and positioning on the page. Giving no suggestion of a preferred payment method by the application, this is important to give the user</p>

	<p>If the user wishes to cancel the payment they again have the choice to go back without any actions continuing. In terms of payment options the user is able to choose how they wish to carry out the booking (via PayPal or card payment).</p>	freedom of choice without influence.
Paying with PayPal 	<p>User Control and freedom: When faced with the payment screen for PayPal they are merely asked to login (so that PayPal can complete transaction with existing account). However, if the user wishes to change their mind on how to pay they can do so.</p> <p>Match between system and real world: The use of the PayPal logo provides clear assurance that they are paying with that method. Easy recognition and familiarity with the payment system inspires confidence in the user of the systems security and legitimacy.</p> <p>Clarity: Clear spacing between elements on screen with legible text and icons allows for easy payment and login onto the PayPal. Minimal content (subtle highlight importance of content on screen as desired by iOS design themes).</p> <p>Navigation: All buttons are placed with easy location to the thumb, navigation bar always present at the bottom.</p>	<p>The user must not feel as if they are being pressured into completing the transaction and therefore the freedom to change their mind is important.</p> <p>Colour scheme has changed to match that of the real-world PayPal company and how they are branded, adds consistency to the real world.</p> <p>The use of clarity on a login page is necessary to make it clear that only the login details are required, reduces possibility of confusion or distraction from the task at hand. This also meets the needs of the iOS Design theme which requires a clear and clean design layout which is both efficient and understandale.</p>
Paying with Card	<p>Visibility of system status: The user's inputs from drop-down menus and date selection are shown instantly and highlighted where necessary.</p> <p>Aesthetic and minimalist design: Only details asked for are the essential card details required to</p>	During a monetary transaction the user must always be fully informed in what is happening, therefore instant feedback on their inputs, clear and concise error messages when necessary as well as a clean

	<p>complete the transaction, no other information is displayed to avoid confusion at the checkout.</p> <p>Help users recognise:</p> <p>During the paying procedure, if there are any errors then the system will display a message in simple English explaining the issue (string does not match the required length or missing input etc).</p> <p>User Control and freedom:</p> <p>Again like with the PayPal payment method the user has the ability to return and change their method of payment should they wish.</p> <p>Navigation:</p> <p>All buttons are placed with easy location to the thumb, navigation bar always present at the bottom.</p>	<p>and minimalist design will greatly improve the user experience.</p> <p>Some error prevention is provided through the use of drop-down options and card expiry dates, however validation for other inputs is still necessary.</p> <p>The user must also feel in control and be able to back out of the payment or change their method of payment if they so wish.</p>
Confirming Payment 	<p>Visibility of system status:</p> <p>Obvious pop-up/new page that displays a warning message asking for confirmation appears. Double checking the user and their actions before committing the transaction</p> <p>Aesthetic and minimalist design:</p> <p>Not a great deal of user input required and therefore a simple message and 'yes' or 'no' entry.</p> <p>User Control and freedom:</p> <p>Two options with user freedom to cancel the payment or finally confirm it. Cancelling the payment will return to the previous screens.</p>	<p>Final confirmation required from the user that ensures they understand what is about to happen.</p> <p>Very basic layout that only requires a single button click input to confirm or deny the action of paying. No other content on the page to avoid distraction from the one important question the user must answer. With two options the user has freedom choice.</p>

Booking confirmation 	Visibility of system status: Obvious pop-up/new page that displays confirmation message of the booking in question. Informs the user the booking is complete, and transaction was approved and provides details of the booking. Also falls under the iOS Feedback design principle of acknowledging all actions by the user. Aesthetic and minimalist design: Minimal design and merely includes the details of the booking that has been placed.	The payment has been completed and the details are clearly displayed with and option to download the receipt for easier access later on. Continued use of consistency in design from start to finish of the booking process to keep with iOS design principles and Neilson and Molisch's design principles.
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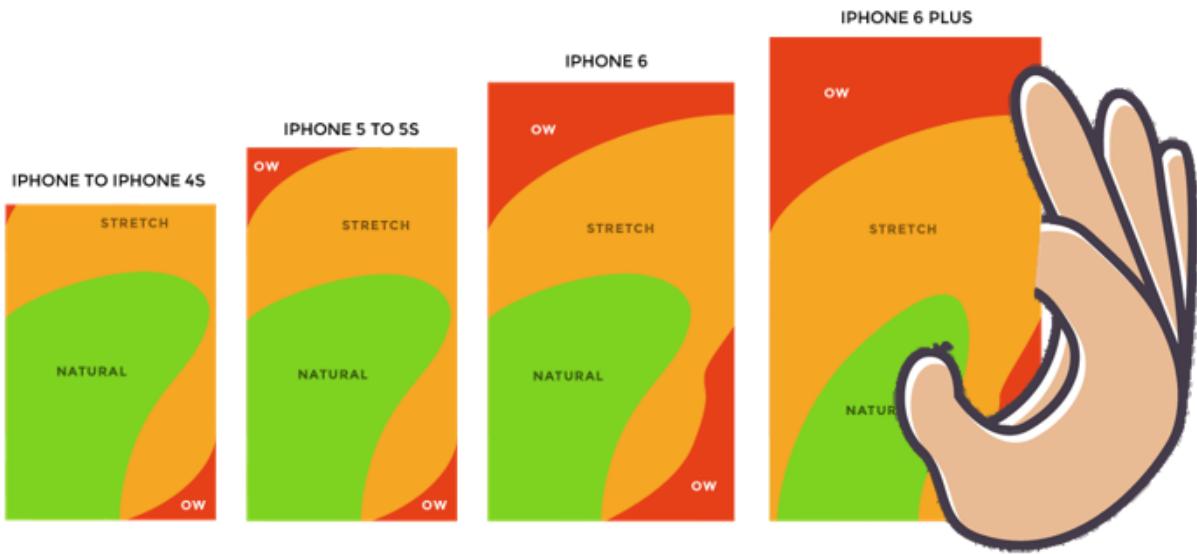


Image displaying the ideal locations of information on the screen and how the hand when casually placed interacts with screen areas. This helped us when designing the application by means of user action points being located in close range of the thumb.

Principles and Guidelines

When it came to designing our Renta Space we were sure to bare in mind that we were designing for the Apple operating system (or iOS meaning for iPhones), this was a design choice because we felt that the themes and principles laid out by the Apple Developer guide matched with our own ideals of how the application would look upon completion. This included the clarity, minimalist but concise design of all Apple products and applications whilst providing user freedom and feedback to a high standard. It is important when designing a product such as an app to make all user interactions, fluid, clear and easy to navigate for the mobile platform, and by using Apples Developer themes and principles it is easy to keep the application in a user friendly format. The design themes are as follows:

- Clarity
- Defence
- Depth

As well as these principles:

- Direct Manipulation
- Feedback
- Metaphors
- User Control
- Aesthetic Integrity
- Consistency

On top of using the design themes and principles laid out by Apple for the iOS platform we also ensure that we kept in tune with the principles set out in Nielson and Molich's 10 UI Design Guidelines. These are as follows:

- Visibility of system status
- Match between system and real world
- User control and freedom
- Consistency and standards
- Error Prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help users recognise, diagnose and recover from errors
- Help and documentation

When designing the Renta Space app, we wanted the design to be as smooth, clean, recognizable and error proof as possible, and therefore to do so it was necessary to implement the use of a second set of design principles. By doing this we were able to negate any missing principles/elements from one or the other guidelines in use, as the combination of both guidelines gave us a fuller and more defined set of rules to follow during all screen designs.

Our main objective for Renta Space was to offer a user friendly, responsive parking space rental service, and in order to do this we understood that feedback to the user from the application was of the highest necessity. In this way the use of both guidelines came into play a great deal as we designed all stages of the app with the idea of user control, freedom and feedback in mind, this meant all user actions was met with a response, whether that be a change in page, the highlighting of a element on screen or the ticking of a box. Both guidelines made it clear the importance of user understanding was, and the best way for the user to understand your system is to provide them with the best feedback as possible; especially during the potential for errors. We did our best to provide error prevention in the form of pre-set inputs for the user, as well as drop-down menus and the like, however where there are areas with possible errors we ensured everything was backed up by a pop-up/friendly message updating the user on what was required of them (this could be a text input error or missing input in a field).

To yet further reduce confusion when using the application all screen designs were made to give the appearance of consistency, with colours matching throughout the app, as well as the location of navigation bar and alignment of elements across all pages. By doing so we made sure that any user would be able to navigate the app without difficulty thanks to all the pages having the same layout. This aspect was further improved by the concise nature of the content and the use of white space to ensure the user was never overcrowded with information and had a clear picture of what the app was telling them. Both guidelines also recommended the use of metaphors/icons from the real world within the design, the benefit of this is that the user already has a pre-existing understanding of the images in use and can therefore already have an understanding of various on-screen elements. The navigation bar is a great example of this, where the bookings, searching and account icons are all displayed via relevant images (a book, a magnifying glass and silhouette respectively).

The final designs shown in this document, are a prime example of how the iOS and Nielson/Molich guidelines can be used to better an applications design. By improving the consistency and clarity of all designs for a more aesthetic appeal, error prevention and quality user feedback to reduce irritating situations and freedom to the user combines to create a flexible and efficient system to rent a parking space anywhere you please.

Appendices

Personas

<https://ako.picdn.net/shutterstock/videos/32995540/thumb/1.jpg>

<https://www.jpmorganchase.com/corporate/news/stories/speaking-up-stading-out-as-young-women-in-tech.htm>

Preece, P. Rogers, Y. Sharp, H. 2011 Interaction Design: Beyond Human-Computer Interaction. Chichester: Wiley

Shneiderman, B. (2013) Shneiderman's 'Eight Golden Rules of interface design'. Available at: <http://www.designprinciplesftw.com/collections/shneidermans-eight-golden-rules-of-interface-design> (Accessed: 10 March 2019).

Nielsen, J. Molich, R. (1994) 'Nielson and Molich's 10 User Interface Design Guidelines'. Available at: <https://www.interaction-design.org/literature/article/user-interface-design-guidelines-10-rules-of-thumb>

Apple Developer. 'iOS Design Themes' and 'Design Principles'. Available at:

<https://developer.apple.com/design/human-interface-guidelines/ios/overview/themes/>

Contribution table

Lucas Bradford	Task 2b, Task 3a
Caitlyn Powell	Task 1, Task 3b
Lyubomir Kyorovski	Task 2a,b, Task 3a,b
Alfie Rowett	Task 2a, Task 3b,c
Connor Potter	Task 2b, Task 3a
Lara Ashford	Task 1, Task 3c
Bartosz Borne	Task 2a, Task 3a,b

Luke Aitkens	Task 2a, Task 3a
Ondrej Romancov	Task 1, Task 3a
Harshit Verma	Task 2b, Task 3a

Please find attached below all screen designs produced by Group 8 for Renta Space:

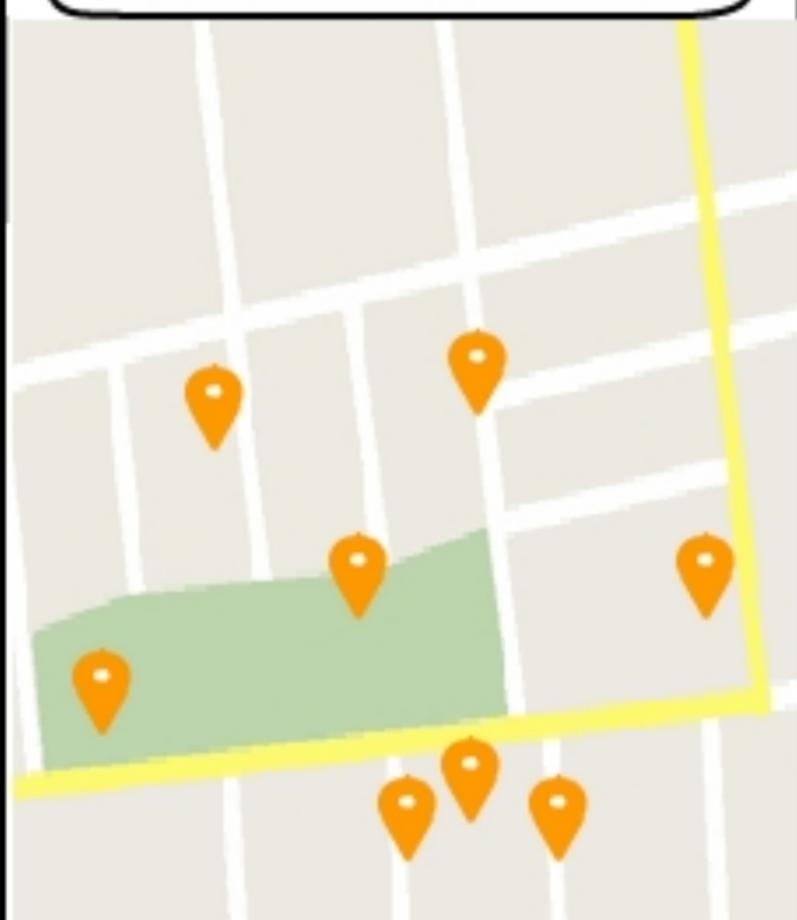
●●●● ABC

01:38 PM



Renta Space

Location



Show List

Search



Bookings



Listings



Account

●●●● ABC

01:37 PM



Renta Space

Quee



Current location

Queen Street

Queen's Castle

Q	W	E	R	T	Y	U	I	O	P
A	S	D	F	G	H	J	K	L	
	Z	X	C	V	B	N	M		
123			space	return					



●●●● ABC

01:36 PM



Renta Space

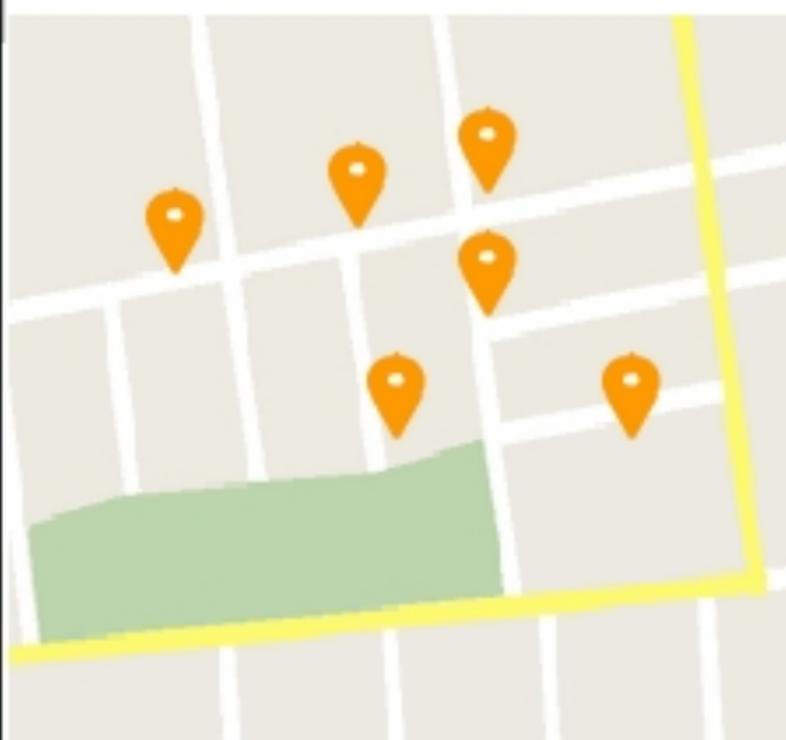
Queen Street

Arriving

Pick Time

Leaving

Pick Time



Show List



Search



Bookings



Listings



Account

●●●● ABC

01:36 PM



Renta Space

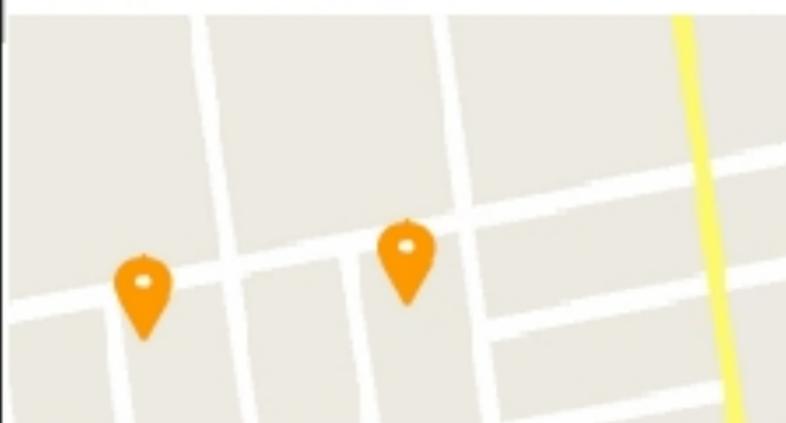
Queen Street

Arriving

Pick Time

Leaving

Pick Time



1

09

2

10

3

11

4 March 12 00

5 April

13 30

6

14

7

15

OK

●●●● ABC

01:36 PM



Renta Space

Queen Street

Arriving

04/03 12:00

Leaving

Pick Time



10

1

11

2

12 00

3 March 13 30

4 April 14

5 15

6 16

OK

●●●● ABC

01:36 PM



Renta Space

Queen Street

Arriving

04/03 12:00

Leaving

Pick Time

Alert

Leaving time cannot be
before arriving time.

OK

2

12 00

3

March

13 30

4

April

14

5

15

6

16

OK

●●●● ABC

01:36 PM



Renta Space

Queen Street

Arriving

04/03 12:00

Leaving

Pick Time



1

10

2

11

3

12 00

4 March 13 30

5 April

14

6

15

7

16

OK

●●●● ABC

01:36 PM



Renta Space



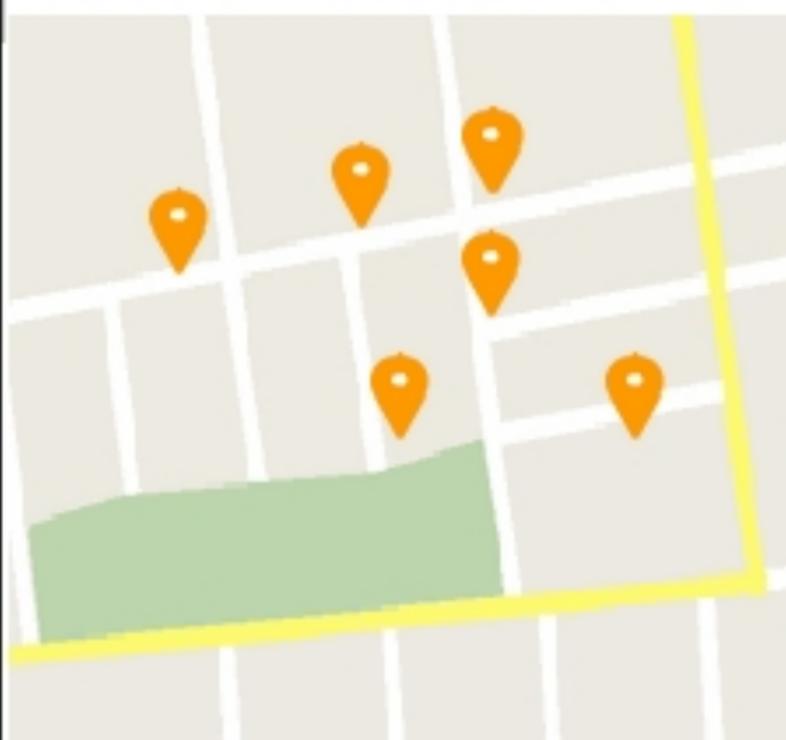
Queen Street

Arriving

04/03 12:00

Leaving

04/03 13:30



Show List



Search



Bookings



Listings



Account

●●●●● ABC

01:36 PM



Queen Street

Arriving

04/03 12:00

Leaving

04/03 13:30

Hide List



Location 1

Price: £10pn

Owner: John Doe

Location 2

Price: £10pn

Owner: John Doe

Location 3

Price: £10pn

Owner: John Doe

Location 4

Price: £10pn

Owner: John Doe

Location 5

Price: £10pn

Owner: John Doe



Search



Bookings



Listings



Account

●●●●● ABC

01:36 PM



Location

Hide List



Location 1

Price: £10pn

Owner: John Doe

Location 2

Price: £10pn

Owner: John Doe

Location 3

Price: £10pn

Owner: John Doe

Location 4

Price: £10pn

Owner: John Doe

Location 5

Price: £10pn

Owner: John Doe



Search



Bookings



Listings



Account

ABC

11:21 PM



Details of a Selected Space



Location - Cardiff

Owner - XYZ

Contact Number - 945191XXXXX

Price - £20/hr

Space Availability



Search



Bookings



Listings



Account

ABC

11:20 PM



Selecting time slots



- 06:00 - 07:00
- 07:00 - 08:00
- 08:00 - 09:00
- 09:00 - 10:00
- 10:00 - 11:00
- 11:00 - 12:00 (Booked)
- 12:00 - 13:00 (Booked)
- 13:00 - 14:00 (Booked)
- 14:00 - 15:00

Add 3 selected hours to booking



Search



Bookings



Listings



Account

ABC

11:20 PM



Home

Payment is Confirmed !!

Successfully booked a Space

A copy of confirmation has been sent to registered email.

Booking Details

XYZ Space

Booking Number

Total number of hours

Starting date

End date

Amount Paid

Download Confirmation



Search



Bookings



Listings



Account

ABC

11:21 PM



Payment

Selected Space	
Name	XYZ
Rate/hr	£20/hr
Total hours	7 hours
Total Amount	£140

Payment by PayPal

Payment by Credit/Debit Card



Search



Bookings



Listings



Account

ABC

11:20 PM



< Cancel



Log in to PayPal

Email Address

Password

Log In

OR

Pay by Credit or Debit Card



Search



Bookings



Listings



Account

ABC

11:21 PM



Saved Cards



Debit Card

Card Number - 1234 5678 9101 1123

Name on Card - XYZ

Validity - 03/20

Delete



Search



Bookings



Listings



Account

●●●●● ABC

11:20 PM



[◀ Change Payment Method](#)

Credit/Debit Card Details

Card type



Card Number

Expiry Date



CVV



First Name

Last Name

Save this Card

[Pay Now](#)



Search



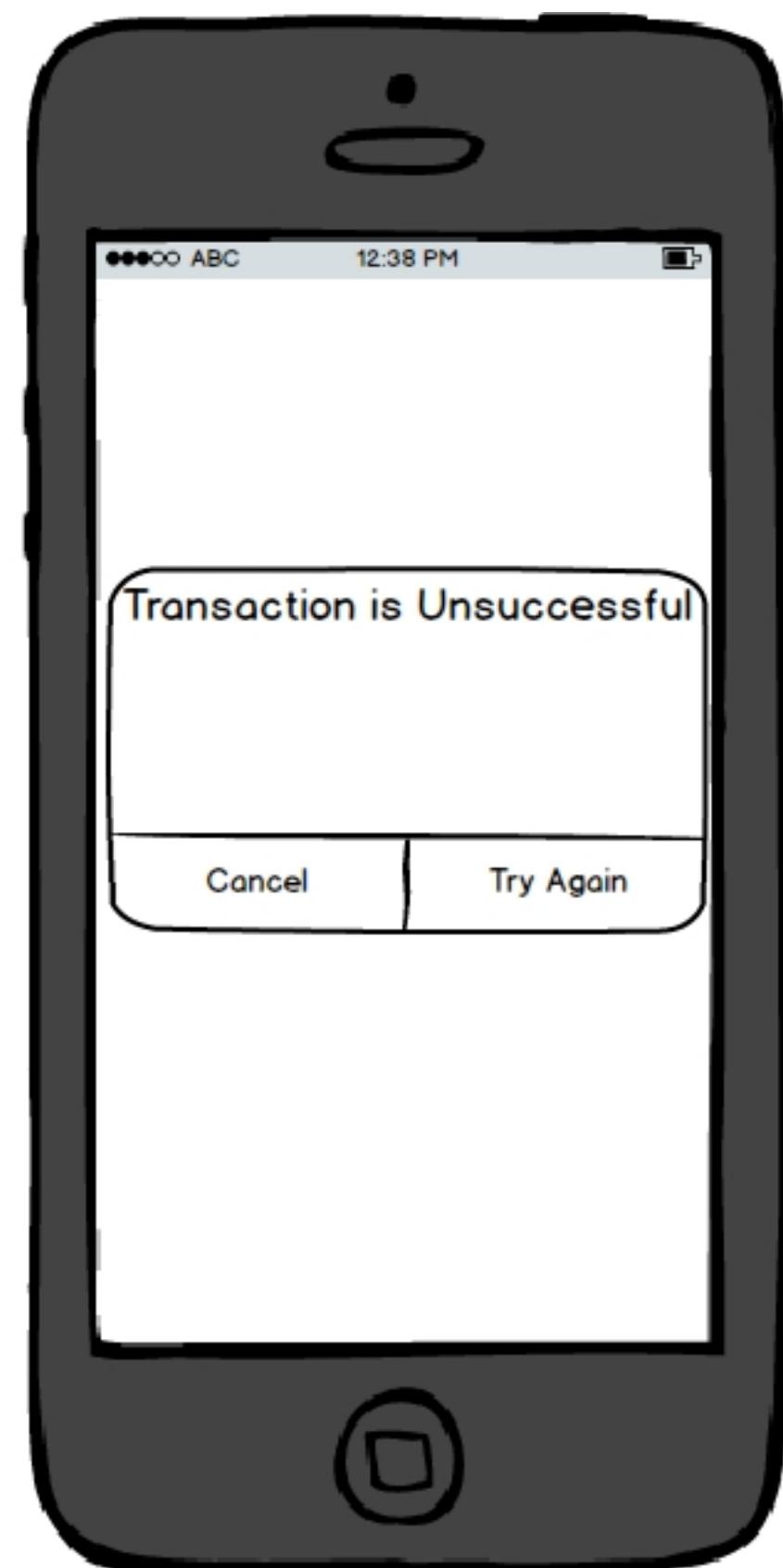
Bookings



Listings



Account



●●●●● ABC

12:39 PM



← Details of Selected Listing

Add Location >

Add Available Times >

Add Description >

Add Photos >

Submit



Search



Bookings



Listings



Account

●●●● ABC

11:21 PM



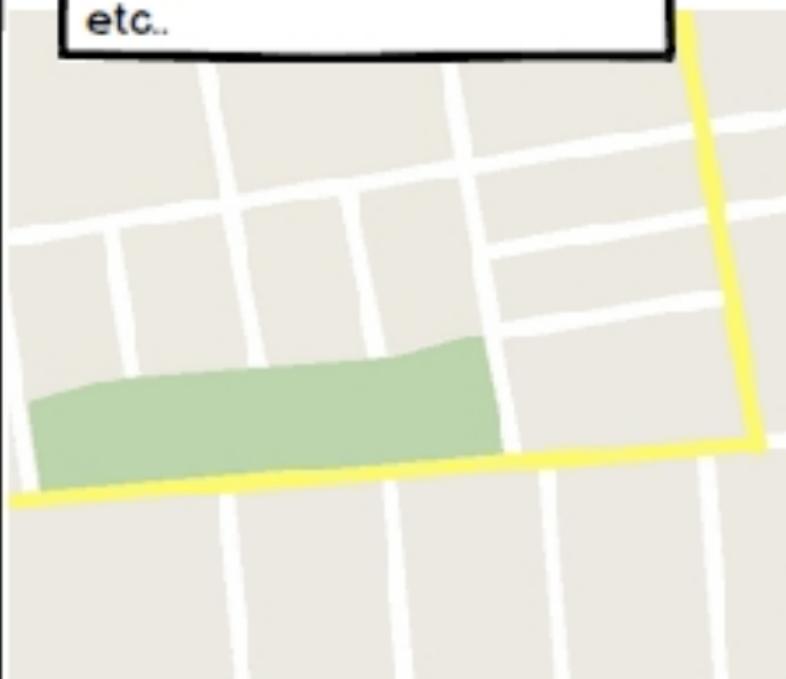
Add New Location

Q Location

Location 1

Location 2

etc..



Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Add Time Slots

Start Date

06/03/2019



End Date

06/03/2019



From

09:00

Hours

3



Recurring

Price per Hour

£

Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Add Description

Add description here!!!!



Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Upload Photos



Add photo



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Your Listings



Listing 1 (Location) (Image)  Remove

Listing 2 (Location) (Image)  Remove

Listing 3 (Location) (Image)  Remove

Listing 4 (Location) (Image)  Remove

Listing 5 (Location) (Image)  Remove



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Current Listing Times

10 Nov 10 - 10 Jan 20	09:00 - 15:00
01 Dec 21 - 30 Jun 22	10:00 - 15:00
06 Jul 23 - 13 Jun 24	09:00 - 21:00
07 May 24 - 19 Aug 28	09:00 - 10:00
19 Mar 29 - 21 Sep 30	09:00 - 15:00

Add More Listing Times



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Your Listings



Listing 2 (Location) (Image) ━ Remove

Listing 3 (Location) (Image) ━ Remove

Listing 4 (Location) (Image) ━ Remove

Listing 5 (Location) (Image) ━ Remove



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Selecting New Time

7 59

8 00

9 01 AM

10 02 PM

11 03

12 04

1 05

Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Selecting New Date

15	March	2010
16	April	2011
17	May	2012
18	June	2013
19	July	2014
20	August	2015
21	September	2016

Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



← Selecting New Location

Q Location

Location 1
Location 2
etc..



Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Edit Photos



Add photo



Search



Bookings



Listings



Account

●●●● ABC

11:20 PM



Editing Description

Lore ipsum dolor sit amet,
consectetur adipiscing elit.
Integer nec odio. Praesent libero.
Sed cursus ante dapibus diam.
Sed nisi. Nulla quis sem at nibh
elementum imperdiet. Duis
sagittis ipsum. Praesent mauris.
Fusce nec tellus sed augue
semper porta. Mauris massa.
Vestibulum lacinia arcu eget nulla.
Class aptent taciti sociosqu ad
litora torquent per conubia nostra,
per inceptos himenaeos.
Curabitur sodales ligula in libero.

Sed dignissim lacinia nunc.

Confirm



Search



Bookings



Listings



Account

ABC

11:21 PM

← Selecting New Time Slots

Start Date

06/03/2019



Error

Please make sure all fields
are filled out correctly

OK

Price per Hour Weekly, Monthly

Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:20 PM



← Selecting New Time Slots

Start Date

06/03/2019



End Date

06/03/2019



From

09:00

Hours

3



Recurring

Daily,



Weekly,

Monthly

Price per Hour

Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Selecting New Time Slots

Start Date

06/03/2019



End Date

06/03/2019



From

09:00

Hours

3



Recurring

Price per Hour

£20

Confirm



Search



Bookings



Listings



Account

●●●●● ABC

11:57 AM



← Details of Selected Listing

Edit Location >

Edit Available Times >

Edit Description >

Edit Photos >

Submit



Search



Bookings



Listings



Account

ABC

11:20 PM



Your Listings



Listing 1 (Location) (Image)

Listing 2 (Location) (Image)

Listing 3 (Location)

Remove Listing 1?

No

Yes



Search



Bookings



Listings



Account

●●●●● ABC

11:21 PM



Current Listing Times

Add More Listing Times



Search



Bookings



Listings



Account

●●●●● ABC

01:02 AM



Your bookings

10 Nov 10 - 10 Jan 20	09:00 - 15:00
01 Dec 21 - 30 Jun 22	10:00 - 15:00
06 Jul 23 - 13 Jun 24	09:00 - 21:00
07 May 24 - 19 Aug 28	09:00 - 10:00
19 Mar 29 - 21 Sep 30	09:00 - 15:00



Search



Bookings



Listings



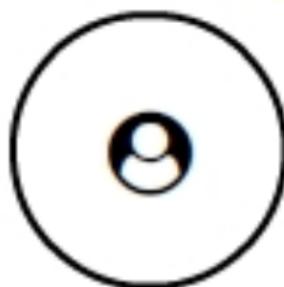
Account

●●●●● ABC

11:21 PM



Your Profile



Name:

John Doe

Email:

john.doe@rentaspace.com

Contact Number:

+44 20 7946 0018



Search



Bookings



Listings



Account

●●●● ABC

11:57 AM



← Details of Selected Listing

Edit Location >

Edit Available Times >

E >

E >

Exit

Ignore all changes for this
listing?

No

Yes

Submit



Search



Bookings



Listings



Account

●●●●● ABC

11:57 AM



← Details of Selected Listing

Add Location >

A

Exit

A

Remove all changes? >

A

No

Yes

Submit



Search



Bookings



Listings



Account