# Requirements

## Functional Requirements

There are 4 levels of priority in the functional requirements:

* Priority level 1 – highest priority, critical (requirement must be completed at the early stages)
* Priority level 2 – high priority (requirement should be completed around the early stages)
* Priority level 3 – medium priority (requirement should be completed before the ending stages)
* Priority level 4 – lowest priority (requirement can be completed any time)

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| **Req Nr.** | **Requirement** | **Comments** | **Priority** | **Date** | **Reviewed/ Approved** |
| **FR\_01** | The software should provide different views for different access levels from users. | The user, agent and admin will have different views. | 1 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Daniel Figu |
| **FR\_02** | The passwords should be stored securely in the database. | The passwords will be hashed before being entered in the database. | 1 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Blerim Brahja |
| **FR\_03** | A normal user can change their username and password. | Users can change certain fields of information in their account without requesting access from the admin. | 2 | 15/04/2023 | Kevin Tervoli Vasian Demika Xhenis Osmani |
| **FR\_04** | Real Estate agents can change any field in their user accounts, besides deleting their accounts. | Just like normal users, real estate agents can change their account information. | 2 | 15/04/2023 | Eljo Muzhaka Marin Hoxha Daniel Figu |
| **FR\_05** | Any non-registered user can create their account themselves by using the sign-up form. | A sign-up form will be available for users to register. | 1 | 15/04/2023 | Eljo Muzhaka Marin Hoxha Xhenis Osmani |

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| **FR\_06** | Non-users cannot have access to some of the functionalities of the real estate website. | There are some features, like contacting an agent, that will not be available to non- registered users. | 2 | 15/04/2023 | Blerim Brahja Eljo Muzhaka Marin Hoxha |
| **FR\_07** | Any user (registered or not) can use the mortgage calculator to get a rough estimate of their payments. | A mortgage calculator page will be available. By just filling in the fields, you can get the | 3 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Vasian Demika |
| **FR\_08** | A user should be able to view all the available properties. | This feature is also available only to registered users. | 2 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Marin Hoxha |
| **FR\_09** | A user should be able to view all the available agents. | Another feature that is available only to registered users. | 2 | 15/04/2023 | Eljo Muzhaka Marin Hoxha Vasian Demika |
| **FR\_10** | A registered user can make an enquiry/request for a personal meeting with one of the available agents. | In case that a user wants to set up a meeting with an agent, they can make an inquiry on the website and then they will be waiting for an answer. | 2 | 15/04/2023 | Kevin Tervoli Vasian Demika Blerim Brahja |
| **FR\_11** | Users can choose to participate in auction or open house events. | For registered users, special events to attend will be available. | 3 | 15/04/2023 | Vasian Demika Xhenis Osmani Eljo Muzhaka |
| **FR\_12** | Agents must be able to add new properties to the database. | Agents must be allowed to access the properties in the database, by adding new ones. | 1 | 15/04/2023 | Daniel Avdiu Vasian Demika Blerim Brahja |
| **FR\_13** | Agents can delete properties from the database. | It is true that agents can delete properties, but they can still remain in the database. | 1 | 15/04/2023 | Vasian Demika Marin Hoxha Eljo Muzhaka |

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| **FR\_14** | Agents can create new events, which are available only to registered users. | Agents are responsible for creating events, such as auctions or open houses. | 2 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Blerim Brahja |
| **FR\_15** | Every user should be able to view the general information of the real estate website/brokerage | The general information of the real estate brokerage will be available to every user.  More specific information will be restricted from non- registered users. | 3 | 15/04/2023 | Daniel Figu Eljo Muzhaka Vasian Demika |
| **FR\_16** | Registered users can leave feedback for the agents. | This is another feature exclusive to registered users. They can leave feedback. | 3 | 15/04/2023 | Daniel Avdiu Daniel Figu Marin Hoxha |
| **FR\_17** | Registered users can leave feedback for the properties. | Exclusive feature to registered users. | 2 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Eljo Muzhaka |
| **FR\_18** | The admin can view the information of any user. | The admin is viewed as the entity that is responsible for the maintenance of the website (the IT professional), but also as someone who can assist the real estate brokerage. | 1 | 15/04/2023 | Kevin Tervoli Daniel Avdiu Blerim Brahja Vasian Demika |
| **FR\_19** | The admin can delete accounts of users any time. | The admin has full access to the database. The accounts are not really deleted. They are just not available any longer. | 1 | 15/04/2023 | Kevin Tervoli Daniel Avdiu Blerim Brahja Vasian Demika |
| **FR\_20** | The admin can delete properties in the database. | The admin can delete the properties. He can still access them, but to the other users, it will seem as if the deleted properties are no longer available. | 1 | 15/04/2023 | Kevin Tervoli Daniel Avdiu Blerim Brahja Vasian Demika |

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| **FR\_21** | The admin can view the statistics of the real estate brokerage. | The statistics of the brokerage are available to the admin. | 2 | 15/04/2023 | Kevin Tervoli Daniel Figu Eljo Muzhaka Xhenis Osmani |
| **FR\_22** | The instances in the database will not really be deleted. | As it is mentioned above, the entities in the database will not really be deleted, they are just not going to be available to a certain range of users. | 2 | 15/04/2023 | Daniel Figu Eljo Muzhaka Marin Hoxha |
| **FR\_23** | Agents cannot access the information of the users. | Agents do not have access to the information of the users in the database. | 2 | 15/04/2023 | Marin Hoxha Eljo Muzhaka Xhenis Osmani |
| **FR\_24** | The sign-up information provided by the user will be validated. | In order to prevent sql injection, the information coming from the sign-up form. | 1 | 15/04/2023 | Xhenis Osmani Vasian Demika Eljo Muzhaka |
| **FR\_25** | The information entered by the agents will be validated. | Every information provided by the agents will be validated and filtered to prevent sql injection. | 1 | 15/04/2023 | Xhenis Osmani Vasian Demika Eljo Muzhaka |
| **FR\_26** | The information coming from the sign-in form will be validated. | While logging in, the credentials will be validated and filtered. | 1 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Blerim Brahja |
| **FR\_27** | A simple integrated chat-bot | A simple interactive chat-bot will be available. Its structure is supposed to be simple. | 3 | 15/04/2023 | Daniel Avdiu Blerim Brahja Marin Hoxha |
| **FR\_28** | reCAPTCHA | It will be used to check if the one interacting with the website is a real human being. | 3 | 15/04/2023 | Daniel Avdiu Blerim Brahja Marin Hoxha |
| **FR\_29** | The website should be responsive. | A user should be able to open the website on different devices. | 1 | 15/04/2023 | Eljo Muzhaka Marin Hoxha Daniel Figu |

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| **FR\_30** | The website should be user-friendly in design and easy to learn. | The views for the users are supposed to be user-friendly in design. | 1 | 15/04/2023 | Eljo Muzhaka Marin Hoxha Daniel Figu |
| **FR\_31** | Frequently Asked Questions | This page has the frequently asked questions and the answers to them. It is available to all the users. | 4 | 15/04/2023 | Vasian Demika Xhenis Osmani Eljo Muzhaka |
| **FR\_32** | Filtering the search | When searching for properties, one can filter the search. This feature is typically available only for registered users. | 2 | 15/04/2023 | Vasian Demika Blerim Brahja Daniel Figu |
| **FR\_33** | Renting services | A user, besides buying and selling, can rent a property. | 2 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Blerim Brahja |
| **FR\_34** | Affordability Calculator | The affordability calculator can help users determine what they can afford in terms of buying. It is different from the mortgage calculator due to giving more general results. | 3 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Marin Hoxha |
| **FR\_35** | The Help page | In case a user is unfamiliar with the website and is finding it difficult to use it, they can use the HELP page to get a general idea of how the website works and the services they can get. | 4 | 15/04/2023 | Kevin Tervoli Eljo Muzhaka Marin Hoxha |
| **FR\_36** | Integrated map in the website | For better experience, an integrated map will be available on the website. | 3 | 15/04/2023 | Daniel Avdiu Kevin Tervoli Blerim Brahja |
| **FR\_37** | Loan Options | A user can open the “Loan Options” page to check the different loan lenders. | 2 | 15/04/2023 | Eljo Muzhaka Marin Hoxha Daniel Figu |

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| **FR\_38** | Printing the properties information in a PDF. | If a user wants to save a property’s information  locally, they can save it in PDF format. | 4 | 15/04/2023 | Daniel Avdiu Daniel Figu Eljo Muzhaka |

## Non-Functional Requirements

### Product Requirements

#### User Interface Requirements

The user interface for the web applications should be compatible with any browser in order for the user to access it from Desktop or Mobile. In addition to functions required, we are going to describe the characteristics of each interface. The User interface could be grouped in 5 main interfaces:

1. Log in/Sign up Interface

The “Log in” and “Sign up” interface has a completely different and simple design form the main page, with only the essential information needed in the center.

**The Log in** menu:

* + It requires only the “username/email” and “password” of the user in their respective fields.
  + Contains a link for if the user forgets the password labeled “Forgot Password?”.
  + Has a link for new users to sign up which redirects to the Sign up page.
  + Lastly we have the “Login” button that checks the validity of the username/email and password to then redirect to their designated pages(Client, Agent or Admin).

**The Sign up** menu: It has many fields to fill to have needed information of the user in a real estate website. The fields are :

* + “Name” requires the name of the user.
  + “Surname” requires the surname of the user.
  + “Email” requires a valid email from the user.
  + “Age” requires the age of the user ,since age is a big factor in the real estate agency. This is a much needed information also the form only allows numbers to be entered on this field.
  + “Address” requires the location of the user to understand more of the area that the user will need to search for a potential house.
  + “Username” requires a username from the user to make the login process a little easier.
  + “Password” Requires a password from the user to login to their account. It has specific requirements like it must be 8 characters long ,must contain at least one number and one letter and no symbols.

1. Main page Interface

The main page holds all of its information in one site.There’s no need to redirect to another site unless we go to the login interface. All the links present just scroll to their respective section on the main page.

These sections are:

“**HEADER**”-The header contains:

* + The logo of the website
  + Name of the website ”Patagonia Estate”
  + A navbar with the nav links HOME , ABOUT , SERVICE , PROPERTY ,BLOG, CONTACT that changes into a drop down menu in the mobile interface while in the desktop interface it’s just fully displayed in the header.
  + The login button that redirects to the login menu

“**HOME**”-It is the start of the page that contains a static image and a slogan to introduce newcomers to what this website is about

“**ABOUT**”-It contains some information and key points of the company, to give an idea of what the business offers to its buyers

“**SERVICE**”-Displays some of the services that the company has to offer.

“**PROPERTIES**” -On this section we have used php to load the images from the database and then display them on this file. This visualization is done by using a horizontal scrollbar which display each property , its image , its price , its agent that sells it and other features that are related to a building

“**BLOG**”- We have created a mini blog to show some recent feed about some properties.

“**CONTACT**”-We have a contact section, where we have used the input fields to crate a PDF from the website. The general description is shown below:

Contact section is a form, with the post method, where we get the contact information (name, email, number and the message). In the php file, pdf\_generator, we access the variables and perform validation with regex (also fulfilling another requirement in our project). In order to generate the pdf, we have used fpdf, which makes it simple to create a pdf file. The file is saved locally at a folder specified for the pdf files. The name of the file is defined by the time, so they are going to be unique. The file is generally simple, just the variable names and their values. You have to just fill in the fields and then click the button to write the message.

1. Client interface

**The header bar** containing:

* + The client profile picture ,
  + “Welcome Mr./Mrs. “*Client name”* text ,
  + “Log out” button that will terminate the current session and will resent the user to the main page.
  + A “Cart” button that displays all the products added to the cart by the client.

**The search bar** contains quick search options like: Location, Building Area, Agent Id. Then show the results containing one of these options that you choose.

**Main page** consists of listed houses for sale containing information like: pictures of the property that’s listed, Agent Id for the agent that’s responsible of the property and a Buy button that puts the property in the cart section.

1. Admin Interface:

The admin interface will have the superuser. The superuser is the only one with access to change everything , look up at every data , edit it and add new ones. This interface will have :

* + **A status bar** – this will show the amount of houses sold or rented
  + **A sales chart** – the sales chart will show data about the income and loss of the company
  + **A rank chart** – this will show the data about the agents with the highest number of selling and renting and therefore creating a leaderboard
  + **A user table** – This table will show the data for all the users from client to agent
  + **An edit button** – The admin is able to edit the data for the user since only the admin has the ability to

change the status of user for example from user to agent

* + **An add new button** – The admin can add a new user
  + **Delete** – The admin is able to delete all the data for the user
  + **A property table** – This table will show the data for all the properties listed for sell or rend
  + **Add new property** – Except for the agent or the user the admin is also able to add a new property listing
  + **Edit property** – The admin is able to edit the property data if some mistake is made during the listing of the property by some other user
  + **Delete property** – This will delete the property from the database
  + **A search bar** which will be able to show all the users or properties based on some filters
  + **The header** will have the name of the user and a profile picture.

#### Learnability

Because it affects how fast and easily visitors can learn to navigate and engage with the site, learnability is a crucial need for a website. A user-friendly website can result in a better user experience, greater user happiness, and higher levels of engagement.

* + - * + Agents should be able to master using the system within a few minutes.
        + The clients will know what they’re in for from the start since everything is explained in the main page.
        + In case of an error, a specific and detailed message will be shown to the user in order for him to understand what went wrong.
        + The buying process is easy and the agents will always be there for the clients to help them fill in any questions they have, be it for the property, the company or the website in general.

#### Accessibility

The accessibility features of the website are defined as shown below:

* + - * + Each user is provided with his/her username and password at the time they are registered at the system.
        + The agents have control on the clients they see fit for them by sorting age and location.
        + Admin can see which agent is selling the most and the current clients so they can manage the website more efficiently.
        + Main page has all the information in one page having everything easily accessible.

#### Efficiency

Because it affects how fast and easily users can complete tasks and access information on the site, efficiency is a crucial criteria for a website. An effective website can result in a better user experience, greater

user satisfaction, and higher levels of engagement. Below are some of the features that make our real estate website efficient.

* + - * + Admin can see the total earnings in real time.
        + Admin also has all the important stats grouped up on the dashboard
        + Clients have their age and location to find the best fit agents for them
        + The search bar helps clients sort out the property they want to buy.
        + No delay is supposed to occur when a user performs an operation.
        + Each operation will be completed within minutes of making the request.

#### Memorability

The memorability requirement for a website refers to how easily users can remember the website's content, design, and functionality after their initial visit. A memorable website is one that users can recall and return to with ease, without having to rely on external references like bookmarks or search engines. Below you can find some other memorability features:

* + - * + The website is intuitive hence, it is not a problem if you ‘vaguely remember’ how to use it.
        + The unique design makes it different and memorable from other sites.
        + The user interfaces are designed to be easy understandable by the user (pictures, icons, buttons, descriptions etc.)

#### Errors

It is important to prevent errors from happening in the website. Errors range from operation failure, sql injection, etc. In our website we have added the step of information validation and filtering in order to avoid sql injection and other errors. Below you can find other features mentioned:

* + - * + There are measures that keep everyone from entering wrong information in the database.
        + If an error occurs it can be edited and corrected immediately.
        + A validation process is followed for every information inserted in the website in order to prevent errors from happening in the database.

#### Satisfaction

* + - * + The system is user-friendly and it is very easy to use for newcomers, clients, agents and the admin.
        + The errors are minimized, so satisfaction in terms of operation completion is relatively high.

#### Capacity

The database will only have to hold important information so the size won't be affected by unnecessary stuff. Also we make sure that all the houses sold would have not much but enough pictures to show their worth and if the client is interested, he can contact the agent for more pictures, making the website less bloated with images. It is of importance to mention that when deleting instances from the database, they are not really going to be removed from the database, instead, they are not going to be available to the other users, except from the administrator. This can be said also for the agent, probably only for the properties.

### Organizational Requirements

#### Availability

Considering that it is a website application, it is supposed to be available throughout the day, 24/7. This can be achieved by buying the hosting service if you want to have access to a reliable service. Alternatively, there are websites that offer free hosting, which is a satisfactory solution for the initial stages of the deployment.

* + - * + The website will be available 24 hours per day.
        + Considering that the website is responsive, for most types of devices such as tablets, smartphones and computers, users can use almost any device to access the website.
        + The website may be prone to change with time in order to comply with the users’ preferences. This will not affect the performance of the website and neither will it interrupt any kind of service of the website.
        + Maintenance may be scheduled or not.

The website services will be available almost all of the time. Taking as an example the whatsapp mobile application, it performs any backup operation at the time it is least used in specific time-zones, which is a clever solution. This is the approach that can be followed for our website. Information will not be saved locally, so it introduces the challenge of finding the most appropriate time ‘globally’ to push or make any updates. This can be achieved also by making use of the DNS server features.

#### Latency

The latency of the Real Estate website does not really depend on factors other than the internet connection. Taking into account the structure of how API requests are performed, it may depend on the complexity of the

implementation of the API. Generally speaking, the database may enforce/introduce additional latency in the website’s services. This is supposed to happen in cases when the number of instances in the database is so large that it makes it difficult to go through every instance in a short time.

The factors that the latency of the website depends the most:

* + - * + Internet connection.
        + Database complexity and size.
        + Code implementation complexity.

#### Monitoring

The website has some features that will be monitored and changed periodically if necessary. In order to avoid any error-prone scenarios the implementation will be reviewed constantly by making efforts to make improvements in the code. The validation and authentication parts of the website are of utmost importance, meaning that the more emphasis is placed on the security measures.

* + - * + The system is built in such a way that the code can be tested continuously and changed if any error is encountered.
        + The validation is important and if more efficient ways are found, they are to be implemented and the website will be updated.

#### Maintenance

The website is based on simple technologies which makes it easier to maintain and incorporate changes. The user will be informed for any scheduled changes that may interfere with the website’s operation.

* + - * + The technologies used are relatively simple to grasp, making it easier to introduce change to the code.
        + In case of any error, the user is to be informed immediately for scheduled maintenance services.
        + Depending on how the website is hosted, for instance with remote servers, the database will be always accessible by the website’s requests and operations.

#### Operations

As it is already mentioned in the previous sections of the documentation, especially in the functional requirements. For transparency purposes some of the most important features and operations of the website are listed below:

1. User Registration: The website should allow users to register for an account by providing basic information such as name, email address, and password.
2. User Profile Management: The website should allow users to manage their profiles, update personal information, and change passwords.
3. Property Listings: The website should allow the real estate company to list properties for sale or rent, including images, descriptions, and other relevant details.
4. Property Search: The website should allow users to search for properties based on location, price range, size, and other relevant criteria.
5. Property Detail Pages: Each property should have a dedicated page that provides detailed information about the property, including images, floor plans, and other relevant details.
6. Contact Form: The website should have a contact form that allows users to send inquiries about properties they are interested in.
7. Newsletter Subscription: The website should allow users to subscribe to a newsletter to receive updates on new properties and other relevant news.
8. Account Management: The website should allow the real estate company to manage user accounts, including creating new accounts, editing user information, and deleting accounts if necessary.
9. Sales and Orders Management: The website should allow the real estate company to manage sales and orders, including generating invoices and entering payments.
10. Pricing Management: The website should allow the real estate company to set pricing levels for different consumer groups based on a set of parameters.
11. Credit Card Payment Processing: The website should allow users to make credit card payments and store credit card information securely.
12. Inventory Management: The website should allow the real estate company to manage inventory, including adding and removing products, recording supplier orders, and maintaining a list of suppliers.
13. Purchasing Management: The website should allow the real estate company to oversee the delivery of procurement orders and manage vendor partners.

#### Standards Compliance

Real Estate websites are not a new concept, however our product introduces some innovative features. Considering that the real estate market is a huge market, some pre-existing regulations have to be taken into consideration. Misinformation is one of the most problematic issues, which can result in serious penalties. The technologies used should be sufficient to prevent security breaches in the website. Regulations may be adapted from the room of commerce in Albania for the real estate market.

#### Portability

Our product is web based. In other words, there is no need to be concerned about the portability of our product since it is available online (being hosted on a server). The website is designed to be responsive to the device it is being accessed from. It can be opened from a smartphone, tablet or computer. What a user migh need to access the website are:

* + - * + Internet connection.
        + A device such as a smartphone, tablet or computer.

The website will operate the same regardless of the device it is being accessed from.

### External Requirements

#### Security

***Regulatory Requirements:***

1. The website must comply with all relevant regulations and industry standards.
2. Personal data entered/generated by users must be kept safe and secure in compliance with privacy and personal data regulations, such as GDPR.
3. The website must notify users in the event of a data breach and have a data protection officer (DPO) in accordance with GDPR regulations.

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1. The website must comply with all relevant regulations and industry standards.
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***Security Requirements for Patagonia Real Estate Website:***

1. Browser Support: The website should support the latest versions of popular browsers.
2. Server Technologies: The website should be developed using standard server technologies that are supported by most platforms.
3. Language and Frameworks: The website should be developed using PHP for the back-end and HTML, CSS, and JavaScript for the front-end.
4. Mobile Accessibility: The website should be accessible from any browser with an internet connection, including computers, laptops, and mobile devices.
5. Access Control: The website should have role-based access control to ensure that only authorized users can access sensitive information.
6. Data Encryption: The website should use data encryption to protect sensitive information such as credit card details and user passwords.
7. Regular Updates: The website should be regularly updated to ensure that it is secure and free of vulnerabilities.
8. Backup and Recovery: The website should have a backup and recovery plan to ensure that data is not lost in the event of a system failure or other disaster.

#### Protection

In order to protect the website from security breaches, some of the features have validation incorporated as a utility function. Information entered by the user is checked first so as to prevent sql injection, one of the most prevalent cases of security issues. The measures that have been taken to ensure the protection of the website are:

* + - * + Hashing of the passwords. The passwords entered by the users while signing up are hashed and saved as such in the database. No plain-text password will be shown in the database.
        + Validation of the information entered from the user. The website offers services that require the user to enter information in specific fields. If validation was not used, then sql injection could happen.

#### Authorization and Authentication

The services that the website offers are not accessible by everyone. The authentication uses the username and the hashing of the password. Authorization checks the level of access that the user has and gives access to certain actions for the user if they are authorized to perform them.

* + - * + Authenticating the user by checking the username and the password (with hashing).
        + Authorization occurs by checking the access of the user, there are several ways this can be implemented.

## Domain Requirements

In order for the website to exist and to be up and running, a remote server is used, making the website available and accessible. There are no specific requirements for the user to access the website, besides having an account. The technologies used in this product are HTML, CSS, JAVASCRIPT, PHP, SPRING BOOT, meaning that the

user need not worry about any technical requirements. Some of the services/features are available only for registered users. This measure makes sure that only the registered users can enter information. If it was different, then the website would be prone to more security issues.