**8. Non-functional properties**

**8.1 Usability considerations**

When taking usability into consideration, although functionality may be optimal, priority is to be appointed to the aesthetic value of the interface. This is due to the fact that, although the system may perform all desired functions, any given user may still be unable to properly navigate the available features due to a poorly designed UI. The main goal therefore was to have a system that boasts ease of use and understandability. As a result, such a system may be correctly utilised a varying range of demographics, as the system would subsequently pertains to an appropriate construction, not requiring any prior knowledge to be properly utilised.

An important notion to be pushed forth with regards to colour scheme, is that apart from the evident similarity to the University of Malta colour scheme, the UI is kept consistent throughout. This ensures that styling employed does not result in any long period strain and is therefore sufficient for visual comfort. This results in the user focusing more on performing tasks, rather than being distracted by inconveniences.

Whenever the completion of a task is to be accompanied with redirection, the system is appropriately designed to perform such traversals. This is to avoid users being rendered confused as to a lack of changing data following any tasks performed.

By potentially logging in using the University of Malta credentials, in this instance being developmental seeds made to mimic such credentials. Data on the respective user can be provided, without the need for registration, due to each user already having an account by default upon enrolling at the University of Malta. Another important feature which is essential in the case of user entry validation, is that of correctly pointing out the mistake made during user entry. To establish such prompting of mistakes, a red mark is made visible near the field and a comment is added to notify the user of what change needs to take place. This validation drastically reduces the chances of potential errors occurring during allocation.

Wherever possible, text fields were replaced with dropdown menus or fields were automatically filled, as to reduce user input, and therefore eliminate trivial errors such as spelling mistakes. It is also to be noted, that the entry of date submitted is performed entirely by the backend, as a means of ensuring no malicious entry of incorrect dates as to manipulate the allocation system in the favour of a particular user.

**8.2 Performance considerations**

Performance of the system proves to be significant enough to be a preliminary requirement. In order to build an efficient system to allocate students to supervisors, performance is vital. Having a system that performs FYP Allocation after a significantly large timespan is far from optimal. As per previous discussions, performance is to be defined by execution and allocation occurring with seconds. This timespan has been ensured through testing that will be covered in a later section.

The performance of allocations must return consistent results. The main aim for the system was to deliver allocations in a more accurate manner, with less time spent than in the case of allocating manually. The definition of accurate in this case, would be a fair allocation that results in most students being assigned to top preferences. Another important performance factor would be that of having an algorithm that is deterministic, where each time the allocation is repeated with the same parameters, the result is always the same. Such consistency inspires confidence to all those affected by the system. Having many results for the same input would defeat the purpose and thus the allocation system would be rendered impractical for use.

**8.3 Security considerations**

Upon utilisation of the allocation system, all users must be ensured of security, especially due to the nature of the website being a university organization. Security was highly prioritized, taking the implantation of proper security into consideration at every stage of development. The main security issues to be considered were those that that any users might encounter when dealing with logging in and when preserving the data within the system following user entry. Any oversights may easily result in malicious use by users wishing to render the system irreparable.

During the login stage, security must be factored in when assigning users to roles in the system by means of email addresses. It was to be ensured that users are not able to switch between roles and role type is strictly dependent on database values. Not developing with this factor in mind, may result in an unauthorised user breaching an unassigned role, the malicious user may then manipulate allocation data and possibly, delete areas from supervisor profiles. As mentioned, this was prevented by means of ensuring that users have only one role that is defined from within the database.

As a measure of security, administrators are solely responsible for performing allocations. Student or lecturers are unable to access such features in order to maintain the integrity of results produced and prevent any malicious manipulation of data. Another measure was also implemented. Permanently disabling the ‘Perform Allocations’ button upon performing the initial allocation. This was to prevent any inaccurate data being produced, as following the primary allocation, quotas are updated to reflect new availabilities for any students who are yet to be submitted.

With regards to the student preferences submission form, being ‘FormA’, a security measure was implemented in the form of validation. This measure employed cascading stylesheets as to prevent students from matching supervisors with areas that are not appropriated towards them as the primary supervisors. This, therefore, ensure security through the integrity of data sent to the database in order to achieve performance of accurate allocations