Assignment Group

1. Identify QA(s) for your proposed system

    i)   Performance
    ii)   Modifiability
    iii)   Security
    iv)   Usability
    v)   Availibility

2. Suggest and describe tactic(s) to achieve the QA

    i)   Performance

Source	Users
Stimulus	Search desired room to reserve based on date entered
Artifact	System, databases
Environment	Under normal operation when users use the system
Response	The system will retrieve data from the database
Response Measure	The system will retrieve data from the database within 5 seconds

Tactics

- Increase computational efficiency.
    - one step in the processing of an event or a message is applying some algorithm. Improving the algorithm used in critical areas will decrease latency. The algorithm to select from database is improved to become more efficient.
    - Technology used: Eager Loading in laravel Framework.
      Laravel provide a method called Eager Loading which fetch everything that is related to search result in one fetch, instead of looping and make multiple fetches for the result.

- Increase available resources.
    - Faster processors, additional processors, additional memory, and faster networks all have the potential for reducing latency.
    - Processor used: AMD EPYC.
      Can compute intensive tasks.

ii) Modifiability

Source	Hasan, one of the developer of the Hotel Reservation System
Stimulus	He wishes to add payment using e-Wallet upon payment to increase the user experience using the system and to increase the ease of use of the system.
Artifact	Database, User Interface, Payment module
Environment	Normal operation
Response	e-Wallet type of payment implemented, tested and deployed
Response Measure	• Time and cost to implement, test and deploy the e-Wallet functions within budget allocated to the system • The effects of the implementing a new payment method to other module

Tactics

1.Localize modification by maintaining semantic coherence. Common services in modules in Hotel Reservation System should be abstracted so that adding a e Wallet payment function would only require modifications be made once to the payment module.

2.Prevent Ripple Effects by hiding information to ensure that adding e Wallet functions would not require any changes be made to other modules in the system such as Reservation or Searching for Room

iii) Security

Source	Individual of unknown identity who is external and not authorized with access to limited/vast resources
Stimulus	Tries to access system services using another person's credentials
Artifact	System services and data within system
Environment	Online, connected and firewalled
Response	Block access to data and/or services
Response Measure	- Effort and resources required to circumvent security measures with probability of success - Storing the passwords in encrypted format. Encrypted password are hashed.

Tactics

The MD5 message-digest hashing algorithm processes data in 512-bit strings, broken down into 16 words composed of 32 bits each. The output from MD5 is a 128-bit message-digest value. Hash function used converts an arbitrary-length input (a.k.a. "password") into a fixed-length output (a.k.a. "5f4dcc3b5aa765d61d8327deb882cf99").

The hash function used meets two requirements:

1) It is impossible for an attacker to generate a password matching a specific hash value.

2) It is impossible for an attacker to crack the password because it will require them a lot time and also money.

iv)   Usability

Source	First time customer who wants to reserve a room
Stimulus	Customers did not understand the FAQ provided in the system
Artifact	System
Environment	Runtime
Response	Provides a live chat function
Response Measure	Customers can directly communicate with a hotel staff to ask any question Operates 24/7

Tactics

LiveAgent (a live chat software provider) is implemented which include features that is needed in the hotel management system. If the customer have any queries or in need of the staff assistance, they can just click the live chat icon to communicate directly with the hotel staff.

Features includes:

1) Customization options where you can adjust the live chat widget according to your website design

2) Reporting and analytics functions where you can study a large amount of data like chat history, agent performance, visitor details, average time spent on chats

3) Chatbots which can answers simple customer queries. AI-powered chatbot can also be implemented to assist customer using natural processing language.

4) Multilingual chat widget in which staff can customize their chat widget and select customers' primary language.

  v)   Availibility

Source	Relational database management system fails.
Stimulus	Customer wishes to search for available rooms.
Artifact	Persistent storage.
Environment	Normal operation
Response	Use redundant spare to execute standby version of failed component.
Response Measure	No downtime.

Tactics

Active Redundancy (Hot Spare)

1. The system implements a 1+1 Redundancy features one backup system for every primary system.
2. All the databases in a protection group receive and process identical inputs in parallel, allowing the redundant spare to maintain synchronous state with active node.
3. The redundant spare has an identical state to the active component.
4. It can take over from the failed component in milliseconds when the system executes a rollback.
5. The redundant spare act as a checkpoint that is a standby version of the failed component in a good state.