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*I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.*

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**Abstract**

Sound strong is music institute that provides musical instruments training and recording service. They have the difficulty with phone call-based booking, so they are looking for online system for hiring processes. So, in this work we must develop the online booking system to solve the problems faced by the institution. All the Users are by staff recruited by staff and staffs are recruited by admin. Now the User can register here through online and can book any room and instrument. He/she can take membership also. Those Users who takes membership will get some amount of discount also. All the registration, booking, etc. are managed by the staffs. User can make the payment through online system like e-sewa, mobile banking, etc. In this coursework, we must make different analysis and designs. Here I have developed the designs like use-case diagram, class diagram, sequence diagram, collaboration/ communication diagram and Gantt chart. Also, we must develop the prototype of the whole system showing the working of the system.

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# Introduction

“Sound Strong” is a music institute that has been providing musical instruments training and recording service for a decade. It also provides practice room rental service for musicians. Its practice rooms hiring service has been in demand lately with the quality of rooms and instruments they provide. It is looking for an online system for practice rooms/instruments hiring related processes to minimize the heavy influx of Users and the difficulty with phone call-based booking.

Sound strong music institute does not have online system, so it is facing a lot of problems to keep record of Users and staffs. So, to minimize the problems they need online system to be developed. A fully functional system where user can register and log-in to the system. The customer can seek for services by connecting into the system. After he/she enters the system, he /she can choose the services like booking, taking membership, etc. After that customer can make the payment through online and is seen and verified by the staff. The staff maintains the details of customer and similarly, admin maintains the details of staff. The customer books the rooms and is managed by staff. The customer information is generated by staff and sends to the admin for further processing. If the customer wants to leave the institute, then he/she is de-registered by staff and if the staff wants to leave the institute, then he/she is de-registered by admin.

The aim of this institute is to develop an online system which helps to maintain records, payment details, register and de-register customer, etc. in a well-mannered, efficient, and easier way.

The objective of this institute is to make the online system which includes registration, booking, de-registration and many more.

# Gantt chart:

A picture containing chart

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Figure : Gantt chart

Gantt chart is the most popular way of showing activities such as tasks or events displayed against time. On the left-hand side, the name of tasks, duration to do a particular task along with start date and end date is mentioned whereas on the right-hand side, each activity done is reflected by bar. The length of the bar indicates the start date and end date of a particular activity. The first Gantt chart was invented by Karol Adamiecki in mid 1890s. Later, this idea was taken by henry Gantt and made in his own version of chart which became popular in western countries. It is mostly used for tracking project schedules. We can know the progress of the tasks through this chart. (Grant, 2021)

Here we are asked to use USDP or RUP process to show the tasks done. So, Rational Unified Process (RUP) have been used to make this Gantt chart. Here all the phases of work done is showed. Some of the works are done in parallel way. Here total days required is estimated and work is separated and done accordingly. In the left-hand side, the work done and total days to finish a particular task is shown following RUP practice. In the right-hand side, work done in days is shown using graph.

# Use-case diagram:

Diagram

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Figure : Use case diagram

The process of summarizing details of a system and the users (actors) within that system. It represents goals if a particular system, specifies system requirements, provides an outside view of a system, etc. so many organizations use use-case diagram. Use-case shows the flow of the event in a system but not its implementation. It shows the modeling of real-world objects and systems. (Tech Target Contributor, 2021)

Here we have primary actors (user and member) and secondary actors (staff and admin). Staff registers in the system which is checked by admin and de-register them. User register in the system which is checked by the staff and de-register them. Staff generates report and is viewed by the admin. User makes the payment and is maintained by staff. User books room and instrument for music classes. User also pays for membership and if he/she takes membership then some discount is given. If User wants to cancel or update booking, then it is managed by staff. The admin notifies the expiry of membership and booking confirmation and many more.

## High level use-case description:

|  |  |
| --- | --- |
| Use-case | Online registration of User |
| Actor | User |
| Description | The User registers online in Sound strong musical institute. Then it is verified by the staff and the User should login into the system. After the registration, the detail of User is saved in personal information database. |

Table : High level use case table 1

|  |  |
| --- | --- |
| Use-case | Payment |
| Actor | User/member |
| Description | The User pays the staff, and it is stored in payment details which remains in the system. If the User wants the membership and pays for it, then he/she is given some amount of discount. |

Table : High level use case table 2

|  |  |
| --- | --- |
| Use-case | Membership details |
| Actor | User/member |
| Description | The User who takes the membership can have some amount of discount. |

Table : High level use case table 3

|  |  |
| --- | --- |
| Use-case | Booking |
| Actor | User |
| Description | The User can book the book the room for certain time and can practice in allocated time. He/she also can book for their preferred musical instruments. This is stored in booking details where staff can know about booking. |

Table : High level use case table 4

|  |  |
| --- | --- |
| Use-case | Update booking |
| Actor | User/member |
| Description | If the User wants to update the booking like booking cancellation and many others, then he/she can give message to the staff. |

Table : High level use case table 5

|  |  |
| --- | --- |
| Use-case | Online registration of Staff |
| Actor | Staff |
| Description | The staff registers online in Sound strong musical institute. Then it is verified by the admin and the staff should login into the system. |

Table : High level use case table 6

|  |  |
| --- | --- |
| Use-case | Maintain user/payment details |
| Actor | Staff |
| Description | The User makes the payment and is stored in payment details and the staff maintains the payment details of the User. |

Table : High level use case table 7

|  |  |
| --- | --- |
| Use-case | Generate report |
| Actor | Staff |
| Description | The staff generates the report of the User from their personal information. |

Table : High level use case table 8

|  |  |
| --- | --- |
| Use-case | De-register User |
| Actor | Staff |
| Description | If the User wants to leave the music institute, then the staff de-registers the User from the system. |

Table : High level use case table 9

|  |  |
| --- | --- |
| Use-case | Manage bookings |
| Actor | Admin |
| Description | The admin manages the booking where all the boking information is stored in booking details. The User can update or cancel the booking if he/she wants to do it. |

Table : High level use case table 10

|  |  |
| --- | --- |
| Use-case | Notify User |
| Actor | Admin |
| Description | The User is notified if the booking is confirmed or not. The membership expiry is notified by admin and User may or may not take membership according to their wish. |

Table : High level use case table 11

|  |  |
| --- | --- |
| Use-case | View report |
| Actor | Admin |
| Description | The report is sent by the User to the staff. Staff generates and forwards it to the admin for final review. |

Table : High level use case table 12

|  |  |
| --- | --- |
| Use-case | De-register User |
| Actor | Admin |
| Description | If the staff wants to leave/quit the music institute, then the admin de-registers the staff from the system. |

Table : High level use case table 13

## Expanded level use-case description:

Online registration of User

|  |  |
| --- | --- |
| Use-case | Online registration of User |
| Actor | User/Member |
| Description | The User registers online in Sound strong musical institute. Then it is verified by the staff and the User should login into the system. After the registration, the detail of User is saved in personal information database. |

Table :Expanded level use case table 1

Typical course of Events:

|  |  |
| --- | --- |
| Actor’s action | System Response |
| 1. Firstly, the User opens the UI and looks for it. |  |
| 1. The User finds two buttons on the page. They are register and login. If the User is new, he/she clicks on register otherwise directly login to the page. |  |
| 1. The User clicks on register and registers by providing some information. | 1. The system stores the information provided by the User and is verified. |
|  | 1. Then the system provides the valid user id and password to the User. |
| 1. Then the User inputs the provided user id and password and login to the system. | 1. The system shows all the information about music institute. |
| 1. Then the User checks and gives the necessary input to the system. | 1. Then the system gives the valid output to the User. |
|  | 1. All the information of the User is saved in personal information database. |

Table :Expanded level use case table 1.1

Alternative course of events:

1. If a new User directly logs in to the system, then he/she is prohibited to enter the system. The system asks to register first.
2. If the User inputs the wrong user id and password, then the system asks for valid input. The use case ends.
3. If the old User again registers by giving same old information, then system notifies that you are already into the system.

Payment

|  |  |
| --- | --- |
| Use-case | Payment |
| Actor | User/Member |
| Description | The User pays the staff, and it is stored in payment details which remains in the system. If the User wants the membership and pays for it, then he/she is given some amount of discount. |

Table :Expanded level use case table 2

|  |  |
| --- | --- |
| Actor’s action | Systems response |
|  | 1. The system checks whether booking can be done or not. If booking is available, then the system sends about available rooms and instruments. And informs about membership also. |
| 1. The User checks the quality of room and instruments and books preferred room and instruments. And takes the membership also. | 1. The system checks about booked information and sends the notifications to the User. |
| 1. The User makes the payment according to booked room or instruments. The User also makes the payment if he/she has taken membership. | 1. The system checks the payment details and sends the paid bill to the User. If the User has taken the membership, then he/she is given some discount. |
|  | 1. The payment made by the User is stored in payment details and is checked by the staff. |

Table :Expanded level use case table 2.1

Alternative course of events:

1. If the user cancels while paying, use case ends.
2. If a User cancels the booking after payment, 75% of total money is only returned.

# Communication and sequence diagram:

## Communication diagram:

Diagram

Description automatically generated

Figure : Communication/ collaboration diagram

The extension of object diagram that shows the objects along with messages that travel from one object to another is known as communication/ collaboration diagram. It mainly focuses on objects relationships. It is a cyclic process as it begins with the sender and ends with the sender in the form of feedback. Objects are shown with association connectors between them. Messages are added to the associations and show as short arrows pointing in the direction of the message flow. The sequence of messages is shown through a numbering scheme. (Fergusson, 2019)

Here I have explained the registration of a User. It contains actor, methods, and objects. Here, user interface is shown where user insert his/her personal data and is recorded on user’s database. The rectangular box is known as objects, text with arrowhead is called methods and sticky image is called as actor. Here I have made the name of same objects as of method in user and registration as they are connected from beginning but facilities objects are different and is not dependent from beginning. After registration, service details are shown and user chooses the services as their choices and is recorded in the database.

## Sequence diagram:

Diagram

Description automatically generated

Figure : Sequence diagram

The process of illustrating how the different parts of a system interact with each other to carry out a particular function, and the order in which the interactions occur when a particular use case is executed is known as sequence diagram. It is also known as event diagrams or scenarios. It shows different parts of a system work in a sequence to complete a task. The components we use in sequence diagram are class roles, activation bar, lifeline, different messages like synchronous, asynchronous, self, etc. (GeeksforGeeks, 2018)

Firstly, personal information is inserted by user in UI. After that personal information of user is recorded in database. Then the user is registered in the system and he/she can login into the system by providing valid user-Id and password. After entering the system, the user can choose the services provided by the institute. They should choose at least on facilities for further processing. After choosing facilities it is recorded and stored in database.

# Class diagram:

Diagram, engineering drawing

Description automatically generated

Figure : Class diagram

Class diagram are the main building block of the object orient-oriented modeling. It is also known as a structural diagram. It is used to show different objects, their attributes, methods, and relation between them in a system. It can also be used for data modeling. It represents the static view of an application. It shows a collection of classes, interfaces, associations, collaborations, and constraints. It can be directly mapped with object-oriented languages, so it is widely used at the time of construction. (tutorialspoint, 2020)

Here all the class diagram of respective use cases were made. In class diagram, respective attributes and methods are written. The type of attributes (data types like int string, etc. and visibility like private, public, etc.) are described with their respective data types and methods are also described with respective data types and visibility. It contains different type of relations like composition, multiplicity, aggregation, etc. and domain classes also.

# Further Development process

The aim of this institute is to develop an online system which helps to maintain records, payment details, register and de-register customer, etc. in a well-mannered, efficient, and easier way. They want to solve the problem of collecting information of customers and staffs in hardcopy format. Previously different designs such as Gantt chart, use-case diagram, communication diagram, sequence diagram and class diagram were made to develop an application. The application used to make these design is draw.io. Gantt chart helps us to manage time for a particular task, use-case defines the whole system and so on. These designs help us to understand the problems deeply and makes easier to develop an application.

Here we have done various works such as inception, elaboration, construction, and transition. But the work left here are coding part and testing part. So we have to perform the tasks like coding ,testing and other remaining works in development process.

To develop an application, we have to write many codes and have to perform many testing to make sure that there won’t be any issues while using an application. Firstly, we must make an attractive and eye-catching application so that we can increase our customers. For this the developer must make a perfect user interface. The UI only works if we add the proper code so that it can operate smoothly without any side-effects and errors. For the further development of the application testing should be done perfectly. The used to develop the prototype is figma, where we can develop the prototype of our desire for the application. We can find much more software to perform testing and coding and we can check the functionality of a particular thing that we use in our application. It can solve all the problems faced by this institute. The products made after doing all the coding and testing will be very helpful for this institute.

We can face some errors in this application in case we didn’t perform all types of testing like unit testing, component testing, smoke testing, integration testing, regression testing and many more. We can solve errors by performing these testing.

We can also use these types of techniques, feature, etc to make other application in different fields like in company, schools, hospitals, ets so that we it will be easier to perform our tasks.

# Prototype

The prototype for Sound Strong application with features which are listed in detailed specification are listed below:

A picture containing text, clock

Description automatically generated

Figure 6:Home page

Graphical user interface, application

Description automatically generated

Figure 7: Registration

A close-up of a cell phone

Description automatically generated with medium confidence

Figure 8: Log-in Page

Graphical user interface, text, application

Description automatically generated

Figure 9: Generate Report

A picture containing text, monitor

Description automatically generated

Figure 10: Booking page

A screenshot of a bedroom

Description automatically generated with low confidence

Figure 11: Book Rooms

Graphical user interface, application

Description automatically generated

Figure 12: Book instrument

Graphical user interface, application

Description automatically generated

Figure 13: Payment

A picture containing text, phone, monitor, cellphone

Description automatically generated

Figure 14: Membership registration

A picture containing text, screenshot, electronics

Description automatically generated

Figure 15: Manage bookings

A close-up of a cell phone

Description automatically generated with medium confidence

Figure 16: Notify Customers.

A close-up of a cell phone

Description automatically generated with medium confidence

Figure 17: De-register Customer

A screenshot of a cell phone

Description automatically generated with medium confidence

Figure 18: De-register Staff

# Conclusion

In this coursework, an online system for sound strong music institute was developed. It helps the User to book room and instruments, pay online, take membership and many others. So, they should not visit the institute physically and it also solves the problem of heavy influx of Users.

Different sorts of works were given in this coursework like planning requirements modelling and analysis. Firstly, Gantt chart was developed which shows the completion of work done according to time. Then use case shows how shows the flow of the event in a system but not its implementation and connects with real world objects. In use-case, high level and expanded level use case was described. Similarly, one of the expanded level use case was designed to show both sequence as well as communication diagram. And the class diagram was developed of the whole system from the use-case diagram. Finally, according to the question, a prototype was developed for “Sound Strong” application which includes the features that are listed in detailed specification. In this way the whole system was developed, and the problems faced by sound strong institute was solved. This system helps the institute for keeping the record information of the Users and their payment details, booking, membership, etc. Due to this system, it becomes more easier, and less effort was needed.

I believe in “Practice makes man perfect”. Many obstacles may come in our way, but we have to learn to solve those obstacles and move on. Slowly progressing is better than not progressing at all.

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