LONDON METROPOLITAN UNIVERSITY

islington college
(इस्लिङ्टन कलेज)

Module Code & Module Title

CS5002NI Software Engineering

Assessment Weightage & Type

20% Group Coursework

Year and Semester

2018-19 Autumn

Group Name:			
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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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1. Introduction

The following coursework is for the module ‘Software Engineering’ ‘CS5002’. The following coursework is a group coursework. In the following coursework, demonstration of the ‘Structured Software Engineering’ (Yourdon) of a Fitness GYM is to be shown.

The following GYM has many problems maintaining the customer report with their payment details. In the following coursework a system is to be developed which is given the name as ‘Fitness Application’. The development of the system helps in reducing the problem in maintaining customer records with their payment details. The fitness application also maintains record of all its user.

As the following coursework is a group coursework, all the task was individually divided amongst four group members. The given functions of the Fitness GYM Application were individually chosen by the group members and complete and later on combined to create the system.

In the following task, specification of the group task is shown where a number of analysis and design specifications of an overall system is produced. Another task is Environmental model specification which is context diagram (Level 0) is shown, in internal model specification for the fitness application system ERD diagram, data dictionary of major data flows and definitions of data stores and entities of the system is shown, process specification, design specification i.e., structure chart for the whole fitness application system is also shown. Assignment diary for the document is also to be mentioned where all the made assumption on the fitness application system, all the responsibilities handled by the group members and all the group meetings are to be stated. Detailed analysis of the individual task is also shown where it also contains Environmental model specification, internal model specification and design specification.

2. Detail Specification of the Group Task

2.1. Environmental Model Specification

2.1.1. Context level diagram (Level 0 Data Flow Diagram)

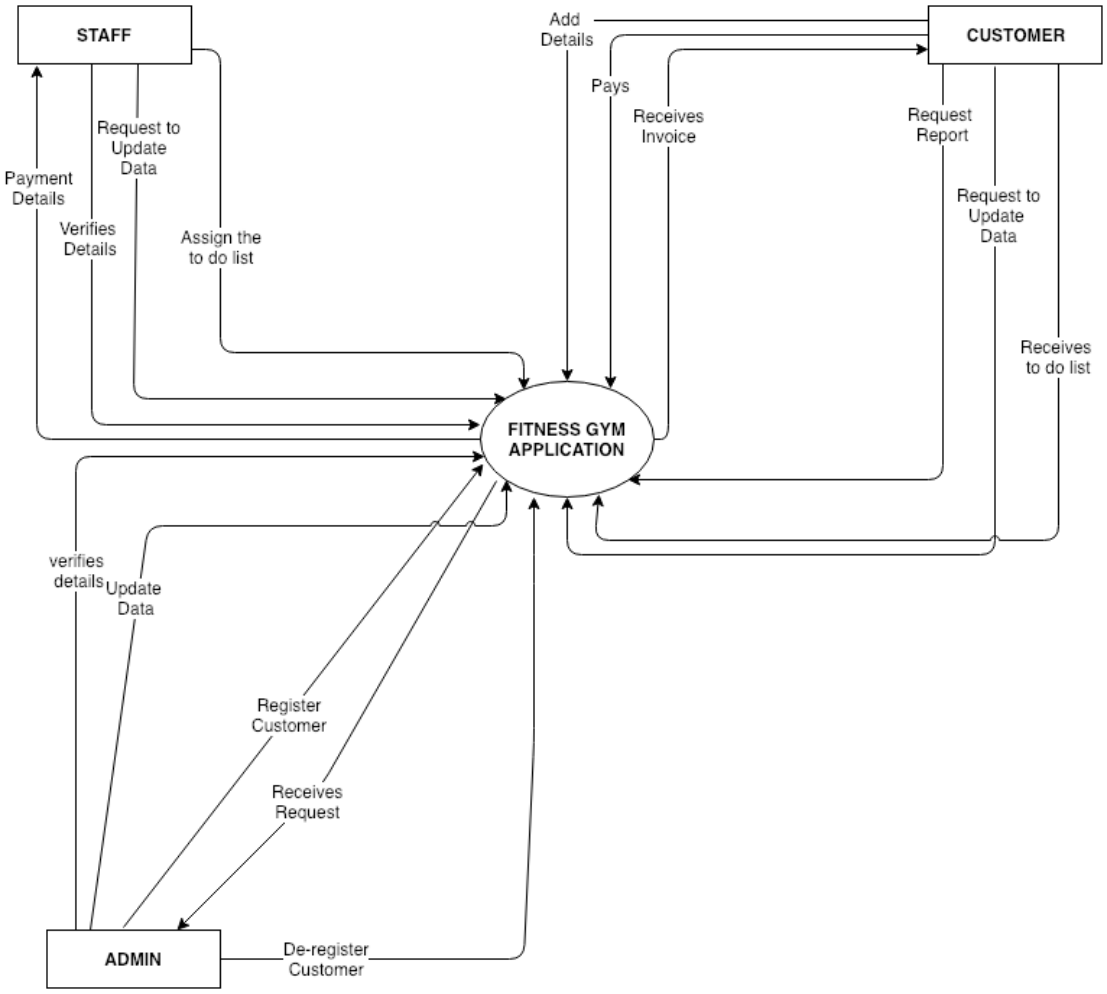

Figure 1: Context Level Diagram (level 0)

The customer is registered in the system by the admin and the first payment is done by the customer while being registered in the system. The customer receives the invoice of the payment done in every month. The staff and customer both can request the admin to update their data in the database. The staff from the gym assigns the to do list to the customer. The customer is deactivated from the system when the payment is not done from in time.

Event List

- Admin register customer in the system.
- Customer pays the fees which is verified by the staff.
- The payment invoice is sent to the customer.
- The progression report is requested to generate through the approval of the admin.
- The progression report is received by the customer after the approval of admin.
- The staff from the gym assign the to do list of the customer which is to be performed by the customer in the given time or date.
- The customer is automatically de-registered from the system after the inactivity for a month.

(Lucidchart, 2018)

2.2. Internal Model Specification for the System

2.2.1. Context Level Diagram (Level 1 data flow diagram)

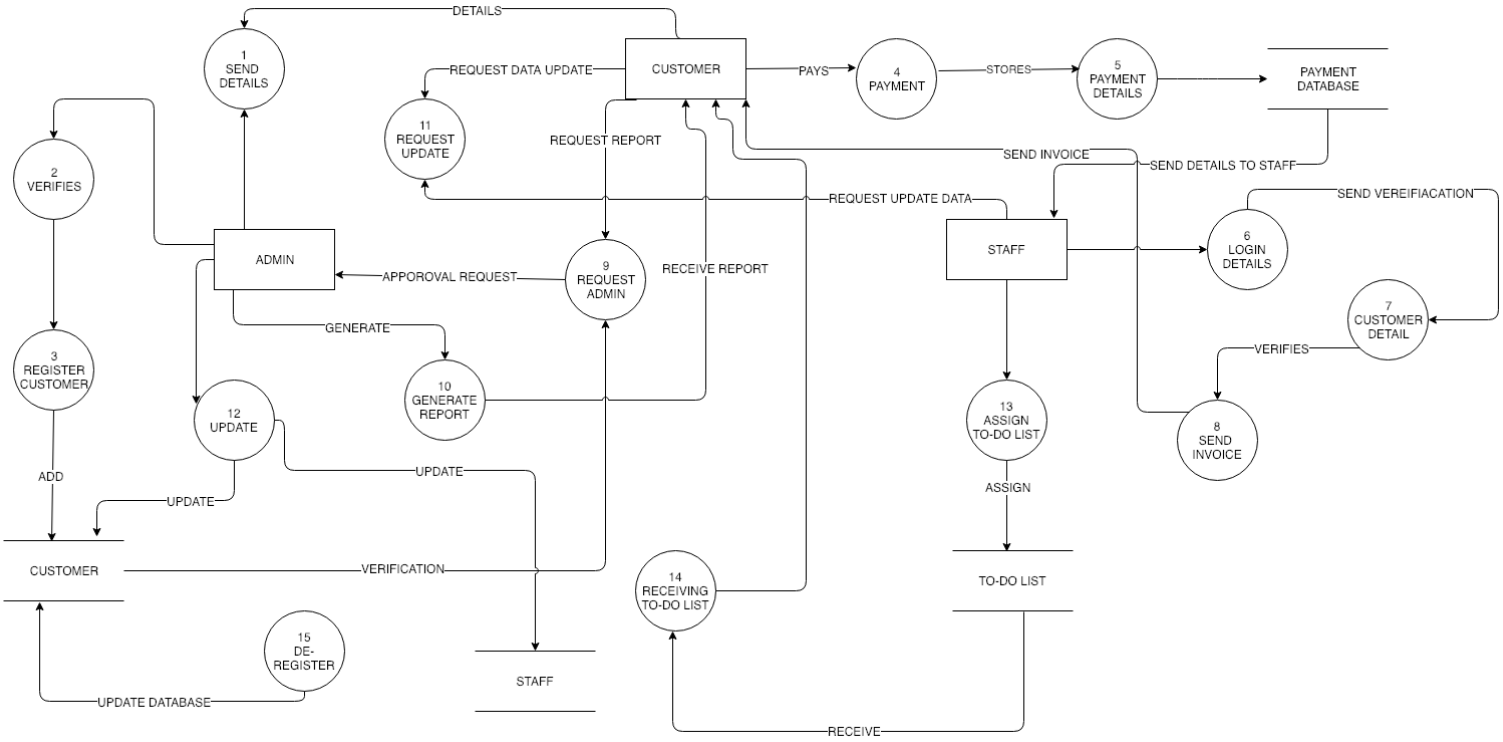

Figure 2: Context Level Diagram (Level 1)

The customer sends their details where the admin verifies the details and register the customer, after the registration is done, the data is added to customer database. After the customer is registered, the customer pays and the payment detail is stored to payment database. After the payment is made, the staff sends verification of customers details and the invoice of the payment is sent to customer. On the next process the customer request admin to generate report. The admin generates customers report. After the report is generated the admin updates the record and stores the updates detail of customer on customer database. Now the staff assigns to-do list to the customer, and customer can access to to-do list through database. Finally, when customer completes the task the customer request admin to de-register the details and after update the details are stored in customer database.

2.2.2. Context Diagram Level 2

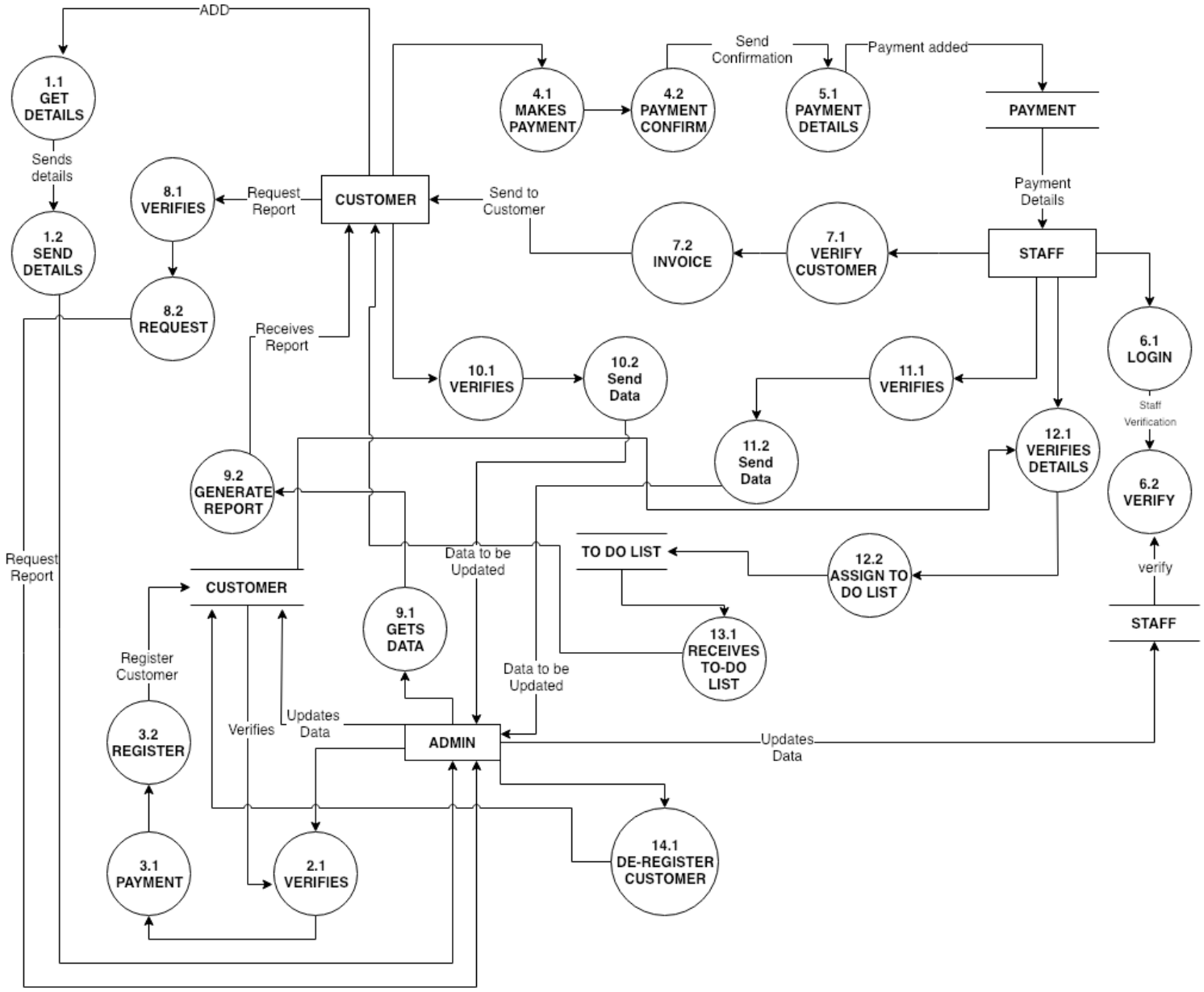

Figure 3: Context Diagram - Level 2

The customer is registered in the system by sending the details to the admin which is verified and the new is compared to the database and if the verification is done then the data is successfully added to the customer database. The payment of the customer is also taken while registering the customer in the system. When the customer is registered in the database the customer makes payment in every end of the month. The payment

invoice is sent to the customer through the system when the staff verifies the payment details of the customer through the database. The staff and the customer request admin to update their data in their respective databases. The data can be only updated by the admin. After the payment is done by the customer the customer can request the admin to generate the progression report of the month. The staff assign the customer there to do list which is to be done on the given specific date or time. The to do list of the customer in the database and the customer can access the to do list. The customer request admin for the progression report at the end of the month which is sent by the admin when all the details of the customers are verified by the admin. The system disables all the inactive customer after inactivity for a month in the gym. And only re-activated the customer after the admin approves it.

(Modern Analyst, 2016)

2.2.3. Entity Relationship diagram

Entity relationship diagram (ERD) shows entity relationships in database sets. In this context, an entity is an object and a data component. Collection of similar entities is an entity set. These entities may have characteristics that define their properties. (smartdraw, 2019)

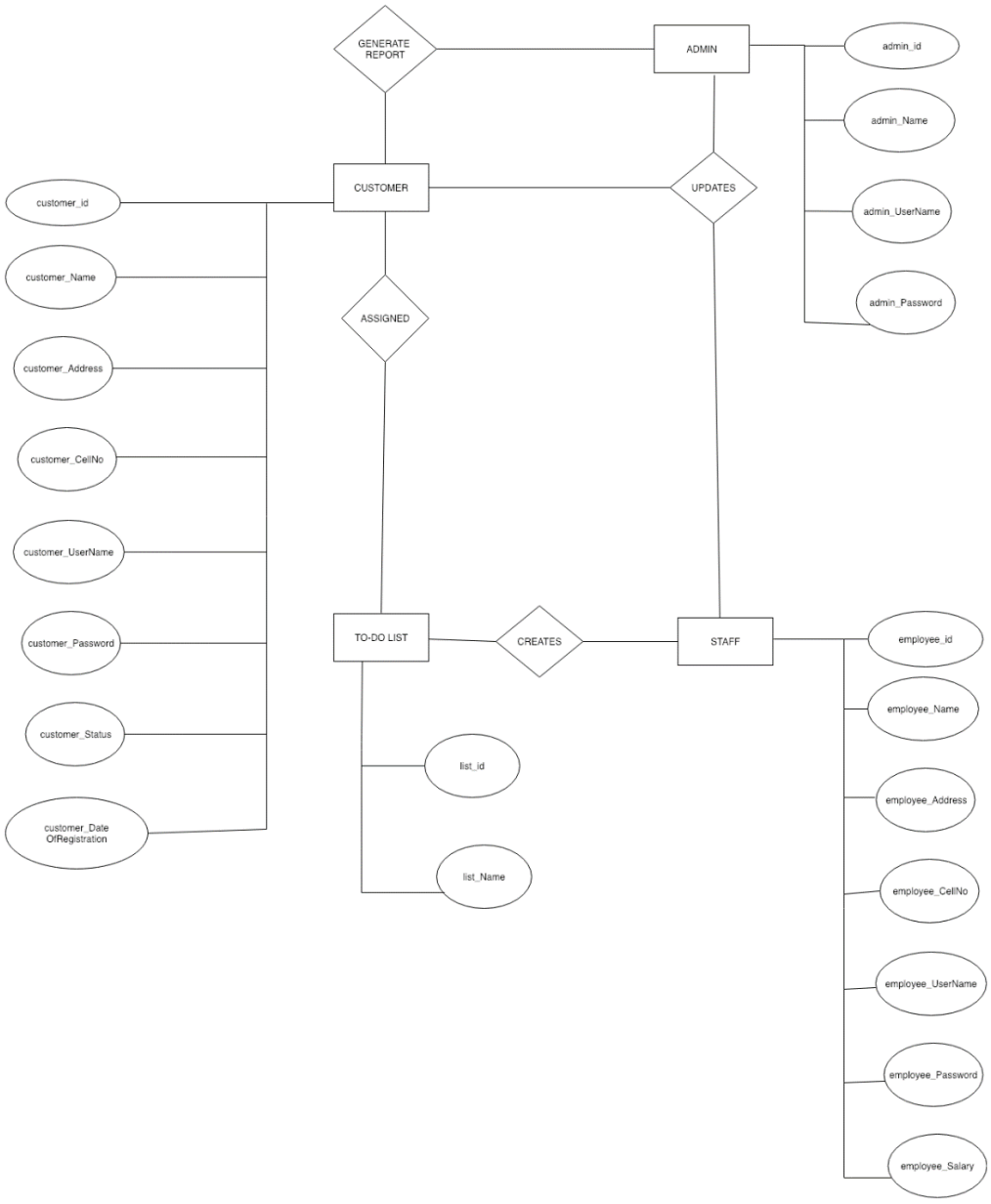

Figure 4: Entity Relationship Diagram

2.2.4. Data Dictionary

"'Data dictionary is a collection of data object descriptions or items in a data model for the benefit of programmers and others." (searchmicroservices.techtarget, 2019)

The following tables below show the Fitness Application database dictionary. The tables below show the detailed information about the various attributes and their data types. All the tables below contain entity names, attributes, field description, datatype, length, null value and weather if it's a primary key or a foreign key or is null.

Entity Name	Attributes	Field Description	DataType	Length	Null	Key
Customer	customer_id	Unique identification code for the customer	INT	11	None	Primary
	customer_Name	Name of the customer	VARCHAR	255	YES	NULL
	customer_Address	Address of the customer	VARCHAR	255	YES	NULL
	customer_CellNo	Mobile number of the customer	INT	11	YES	NULL
	customer_UserName	Username of the customer to login in the system	VARCHAR	255	YES	NULL
	customer_Password	Password of the customer to login to the system	VARCHAR	255	YES	NULL
	customer_status	Status to show if the customer is active or not	BIT	1	YES	NULL
	customer_DateOfRegistration	Registration date of the customer	VARCHAR	255	YES	NULL

Table 1-Data Dictionary for Customer table

Entity Name	Attributes	Field Description	DataType	Length	Null	Key
Employee	employee_id	Unique identification code for the employee	INT	11	None	Primary
	employee_Name	Name of the employee	VARCHAR	255	YES	NULL
	employee_address	Address of the employee	VARCHAR	255	YES	NULL
	employee_cellNo	Mobile number of the employee	INT	11	YES	NULL
	employee_UserName	Username of the employee to login in the system	VARCHAR	255	YES	NULL
	employee_Password	Password of the employee to login to the system	VARCHAR	255	YES	NULL
	employee_salary	Salary of the employee	INT	11	YES	NULL

Table 2-Data Dictionary for employee table

Entity Name	Attributes	Field Description	DataType	Length	Null	Key
Payment	payment_id	Unique identification code for the payment	INT	11	None	Primary
	customer_id	Unique identification code for the payment	INT	11	None	Foreign
	paymxent_type	Payment type done by the customer	VARCHAR	255	YES	NULL
	payment_Amount	Mobile number of the employee	INT	11	YES	NULL

Table 3-Data Dictionary for Payment table

Entity Name	Attributes	Field Description	DataType	Length	Null	Key
Admin	admin_id	Unique identification code for the admin	INT	11	None	Primary
	admin_Name	Name of the admin for the system	VARCHAR	255	YES	NULL
	admin_UserName	Username of the admin to login into the system	VARCHAR	255	YES	NULL
	admin_Password	Password of the admin to login to the system	VARCHAR	255	YES	NULL

Table 4-Data Dictionary for admin table

Entity Name	Attributes	Field Description	DataType	Length	Null	Key
To do list	list_id	Unique identification code for the task	INT	11	None	Primary
	list_Name	Name of the task to be performed by the customer	VARCHAR	255	YES	NULL

Table 5-Data Dictionary for to do list table

2.3. Design specification

2.3.1. Structure Chart

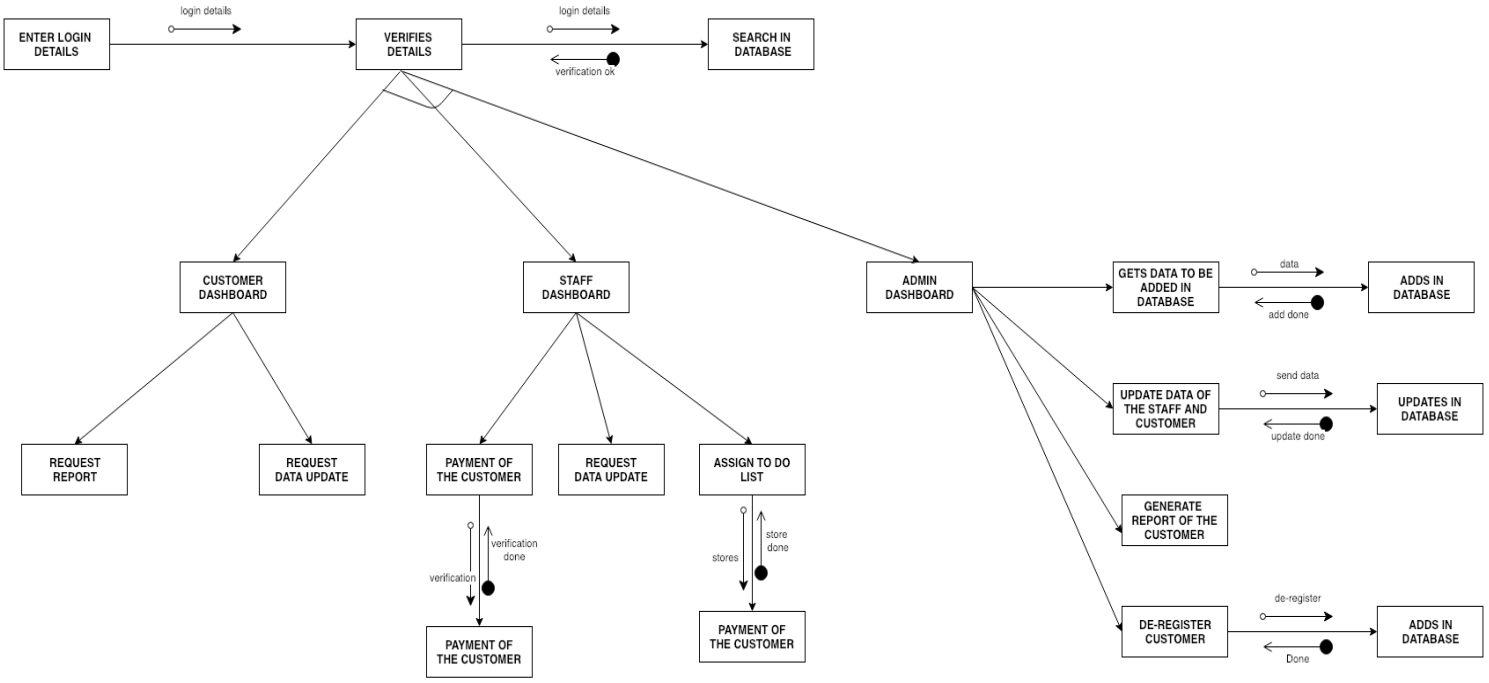

Figure 5: Structure Chart

At first the login page is shown in the app then the login details is inserted then it is checked in the database if it is admin, customer or staff.

If the customer has logged in customer dashboard is shown and the customer can request the report to the admin and also can request the data update.

If the staff logs in then the customer dash board is shown and the staff can verify the payment details of the customer by accessing the customer details. The staff can request the data update for the admin to update in database. The staff also update the to do list database for the customer to perform the specific task.

If the admin logs in the admin dashboard is shown. The admin can register new customer to the system. The admin can also update the data of the existing customer and staff in the database. The admin also can generate report of the customer and send it to the customer. The admin also approves the de registration of the customer from the system. (Revolvy, 2019)

2.4. Assignment diary

2.4.1. Assumptions

During the following coursework, while creating the system of the Fitness Application, various assumptions were made which considered the flow of the data in the context diagram. All the assumptions were made by the group members considering how the information flows in the application system. The assumptions that were made during the coursework are listed below:

- The customer is registered and de registered through the admin.
- The customer does the payment and receives the invoice from the staff.
- The report of the customer is generated by the admin at the end of the month by the admin when the payment is done by the customer.
- The staff assign to do list to the customer which is to be performed by the customer in the given time or date.

2.4.2. Group meetings

The following coursework given for the module ‘Software Engineering ‘ is a group coursework. All the task was equally divided amongst the group members. As the task was a group project, regular group meetings were held to analyse the progress and the task completion of the coursework. The following coursework was given on the 2nd week of the semester and the submission week is on the 11th week. The following table below shows the group meeting details and progress report of the task weekly.

Week No.	Weekly Report Timeline
2	In this following week the coursework was given out, after which the group was created of four members. All the members in this week, took time understand the and analyse it.
3	The coursework consists of various task, which were divided equally among the group members and individual task were assigned.
4	Environmental Model specification (Level 0) DFD Diagram was designed individually as the assigned task and was later discussed with all the group members
5	Level 1 context diagram and level 2 context diagram were designed by the group members for the individual task which was discussed with all the group members.
6	All the individual DFD diagrams were combined and the main application DFD diagram was designed in the software together by the group members
7	Structure chart and the ERD diagram was designed and completed.
8	Data dictionary was discussed for the Fitness Application. Starting of the Documentation.
9	Describing the diagrams in the report., understanding task of the individuals by all the group members.
10	Putting together all the individual work, concluding the report.
11	Finalizing the documentation.

2.4.3. Group Member responsibilities

The following coursework for the module 'Software Engineering" is a group coursework. In the following coursework there were various task which was equally divided amongst the group members. The given task was divided by analysing the strength of the individual group members. There are four group members in this following coursework. The following table below shows the responsibilities of the group members in this coursework.

TASK	Member 1: Ashutosh Basnyat	Member 2: Prashansa Thapa	Member 3: Sulav Thapa	Member 4: Sushil Bhandari
Environmental Model Specification (Level 0 DFD)	Context Level Diagram (level 0)	Context Level Diagram (level 0)	Context Level Diagram (level 0)	Context Level Diagram (level 0)
Internal Model Specification	Context Level 1, Context Level 2	Context Level 1, Context Level 2 ERD	Context Level 1, Context Level 2, Data Dictionary	Context Level 1, Context Level 2
Detailed Specification	Designing the structure chart	Assignment Dairy	Structure chart for the application	Structure chart for the application
Individual Task	Registration of the customer	Payment of the customer	Generate report of the customer	To – Do List of the customer

Documentation	Final Management of the report	Conclusion of the project	Introduction of the project	Final Management of the report

3. Individual Task

Name: Ashutosh Basnyat

Student ID: 17031264

Function: Registration of the customer

Introduction

In the software created by our group, there are numerous facilities provided by the gym application. Among numerous facilities provided by our application, one of the facilities provided by our gym application is registration of the customer.

The given coursework had five tasks to be completed. All the tasks were equally divided among the group members. But the coursework had two parts individual work and groupwork.

In my individual work, I had to make the model of registration of the customer. In groupwork, other member was doing tasks assigned to them and waterfall model was used by group.

Environmental Model Specification

Context Level diagram (Level 0): Registration of the customer

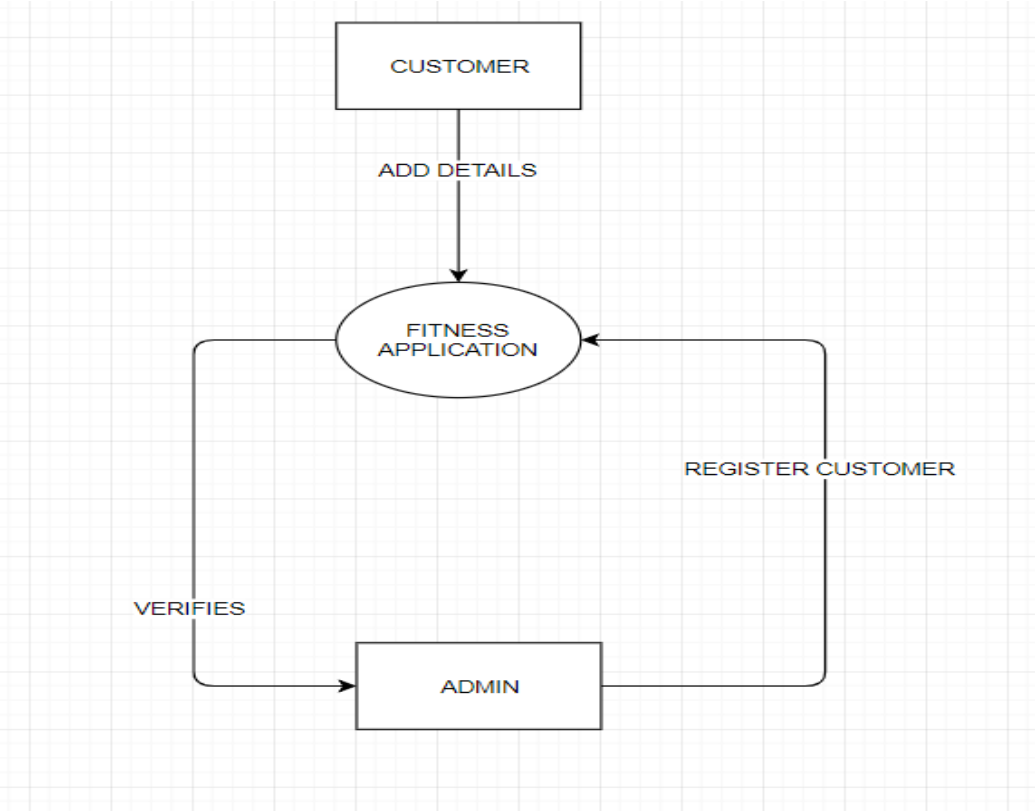

Figure 6: Context Level 0 diagram - Registration of the Customer

- **Event List**

The above figure is the DFD Level 0 for registration of the customer. Customer and user are requested to follow the instruction by the admin, where the admin will perform the task according to the system.

In the above figure user adds the details of new customer after the details are added the system verifies the details. After the details are verified the customer is registered by the admin in the system. That way a new member is registered.

Internal Model Specification for the System

Context Level Diagram (Level 1): Registration of the Customer

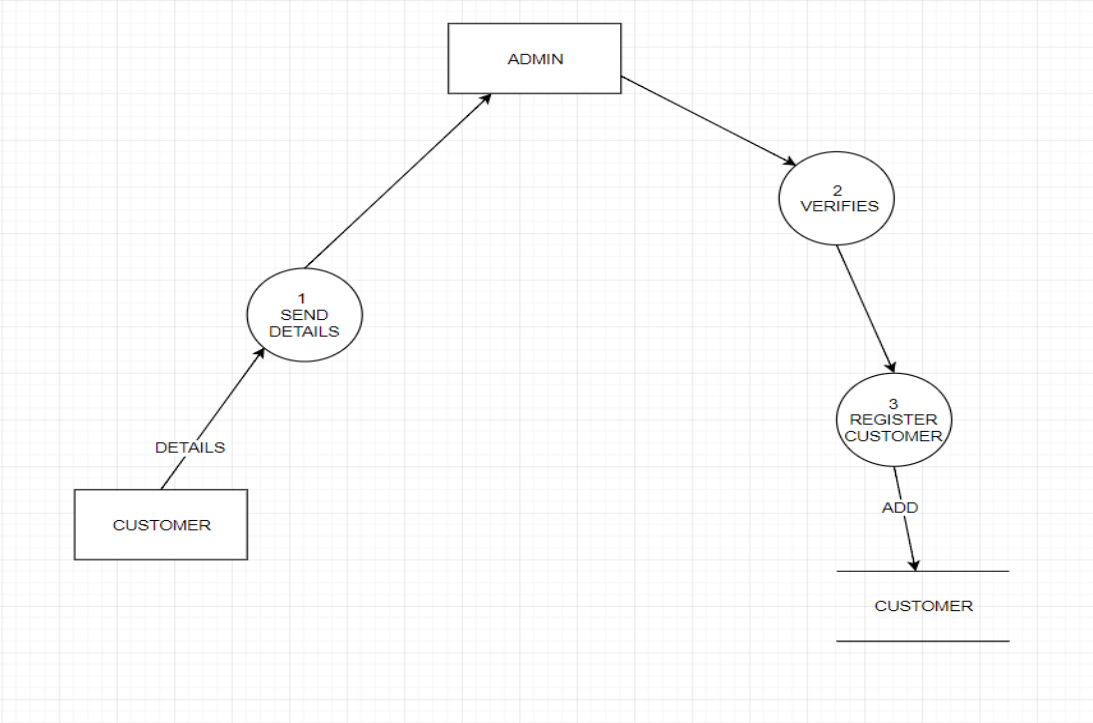

Figure 7:Context Level 1 diagram - Registration of the Customer

The above figure is the DFD level 1 for the registration of the customer. The above figure explains the model in more detail way. After the customer sends the details to the admin, admin verifies the details and it goes for the registration process. After the registration process is completed the information is stored in database.

Context Level Diagram (Level 2): Registration of the Customer

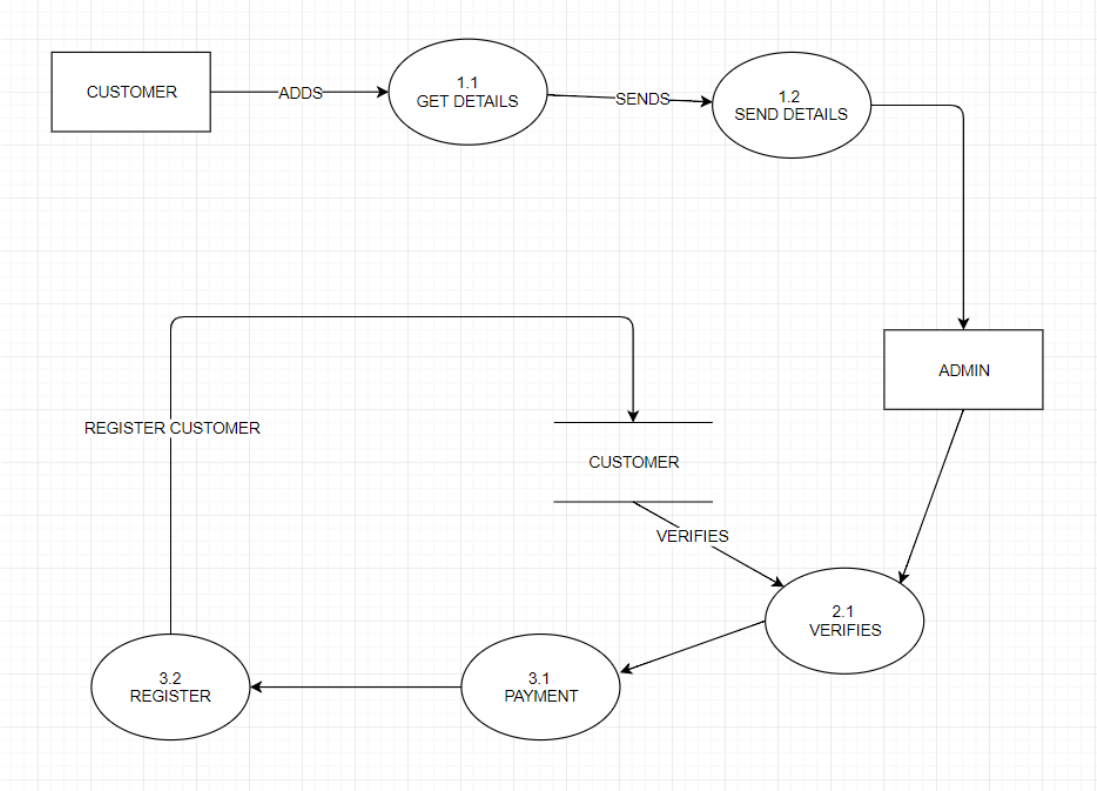

Figure 8: Context Level 2 diagram - Registration of the Customer

This is DFD level 2 for the report generation of the customer. In level 2 DFD the process is expanded so it would be more detailed and the system would be more efficient to use.

The customer adds their details in the system where the details goes to admin for verification. After the details are verified, the system goes to next process which is payment. After the payment is done, the customers are registered and the detail is stored in the database.

Design Specification

Structure Chart:

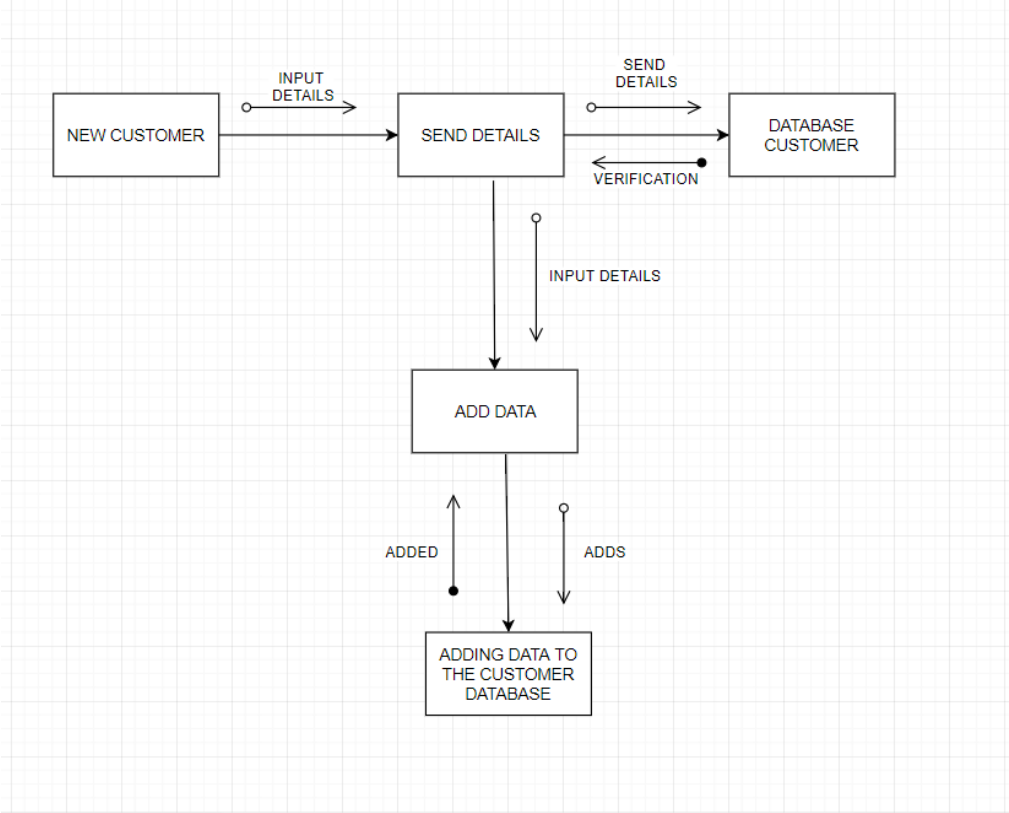

Figure 9: Structure Diagram - Registration of the Customer

The above figure is the brief structure chart of DFD Level 0, DFD Level 1 and DFD Level 2 diagram. The figure gives short description on how the customer registration process works.

The registration of the customer works as the customer adds their details in the system and how the system verifies the details. After the details are added the system updates the detail. All the verified details are updated in customer data.

Module specification

Module Name: Registration of the customer

In this module, the customer adds it detail to the application, where the admin verifies the details and if the details are according to the requirement the admin registers the new customer.

Pseudocode

GET customer details

VERIFY customer details

IF not registered

“Register Customer”

END

Calls and Called By: -

- getmembership(); is called by customer

Conclusion

In the individual task among the five tasks, I choose registration of the customer. In the above task I have made DFD Level 0, DFD Level 1 and DFD Level 2 and the structure chart for the system. All the figure made above are described in simplest way possible which can be understood by normal user also. I have also written Pseudo code for easy understanding of the system and few of the methods are also mentioned.

All the task assigned to me were completed. The task was not easy as thought but, after numerous sleepless nights and hard work, I have successfully completed the task. I would like to thank my lecture for the support and most of all I would like to thank my group member for their endless support and motivating me.

Name: Prashansa Thapa

Student ID: 17030911

Function: Payment of the Fitness GYM Application

Introduction

In the following system development, lots of problem was faced in maintaining the records of the customer's payment details. Hence, a system is developed which is named as the Fitness Application. The application provides various function, from which the chosen function is Payment of the Fitness GYM Application. One of the function in the system was the payment of the customer. The payment of the customer in the application system is to be recorded.

Environmental model specification

Context Level diagram (Level 0): Payment of customer

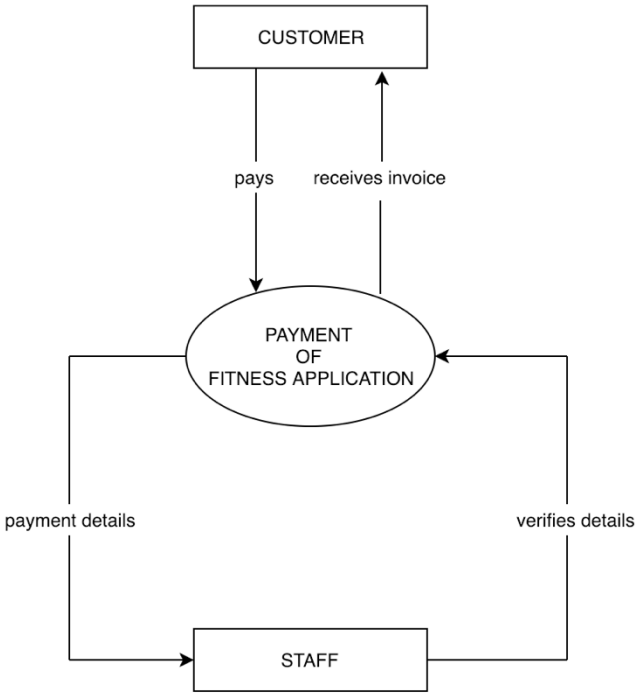

Figure 10: Context Level 0 Diagram - Payment of the Customer

Event list:

- The customer pays online which is send to system through which the staff views the payment details and verifies the details after which the customer receives an invoice.

The following above diagram is the context level diagram of the payment of customer in the Fitness Application. The following figure is also known as Level 0 DFD. In the following diagram, the system is named as the payment of the fitness application, where the customer and staff are the entities. According to the diagram, the customer pays online which is send to system through which the staff views the payment details and verifies the details after which the customer receives an invoice.

Internal Model Specification for the System

Context Level Diagram (Level 1): Payment of Customer

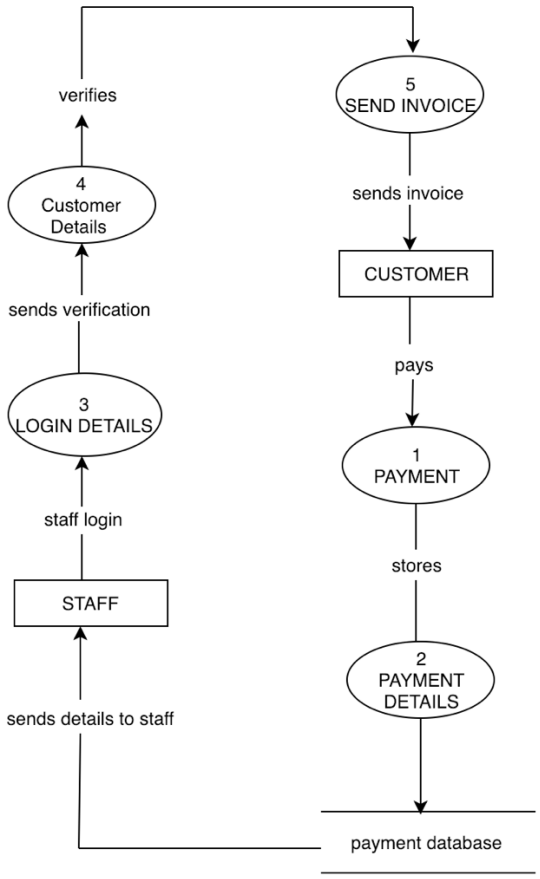

Figure 11: Context Level 1 Diagram - Payment of the Customer

The following above figure shows the Level 1 DFD diagram for the payment of the customer. The level 1 DFD shows the overview of the full payment system of the fitness application. In the level 1 DFD diagram, database is also included in which the data are stored.

In the system, when customer pays the bill online the payment details are stored in the database which sends the details to the staff. The staff than login to its details and sends verification to the customer details, which is verified and the invoice is send to the customer.

Context Level Diagram (Level 2): Payment of Customer

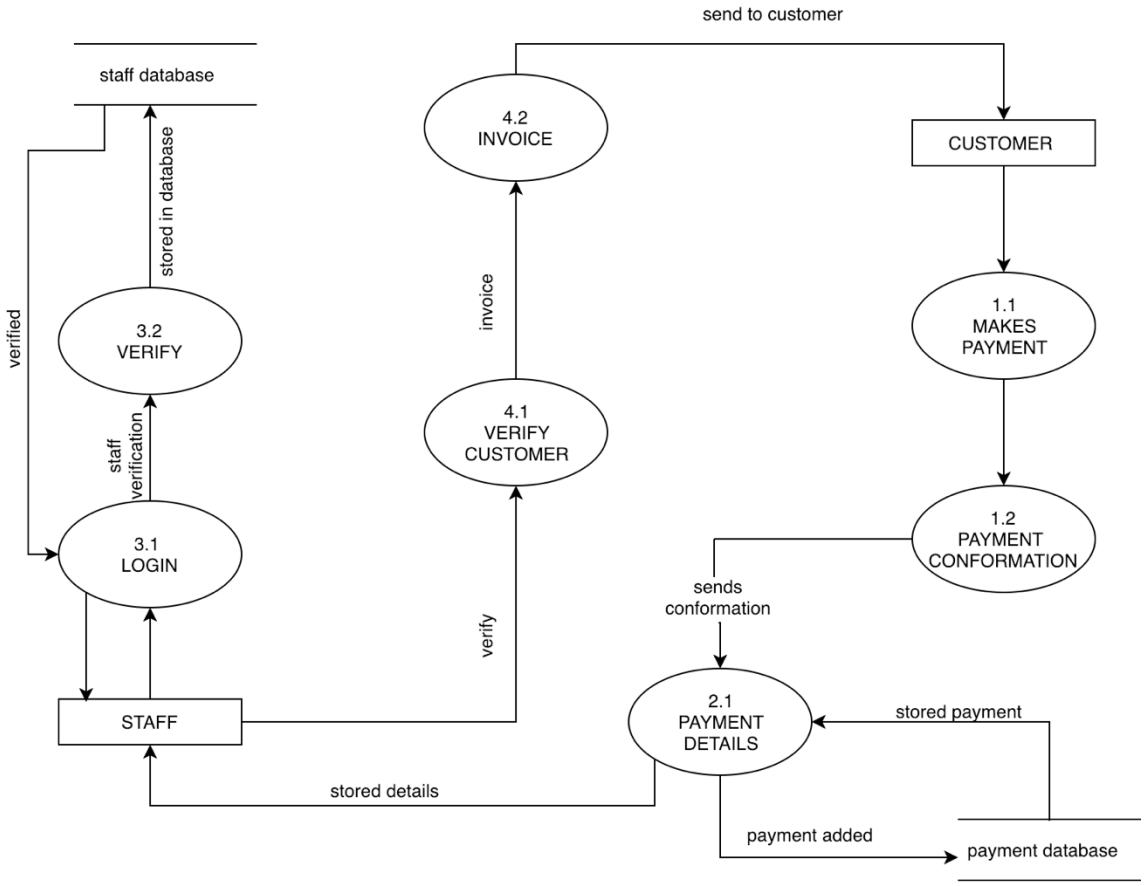

Figure 12: Context Level 2 Diagram - Payment of the Customer

The above following diagram shows the Level 2 DFD diagram for the payment of the customer. The level 2 DFD diagram shows the expanded and more explained version of the Level 1 DFD diagram.

In the system, the customer makes the payment in process 1.1 which is conformed in the 1.2 payment conformation process. The conformation is sent to the payment details process in 2.1 which is add in the payment database. The payment database sends the stored payment information to the 2.1 payment detail process which later sends the details to the staff. The staff logs in, in the process 3.1 which is verified and stored in the verified database. The staff database sends the login verification. After the staff is verified, the staff verifies the customer in the process 4.1 which sends the process invoice 4.2 to the customer.

Design Specification

Structure Chart:

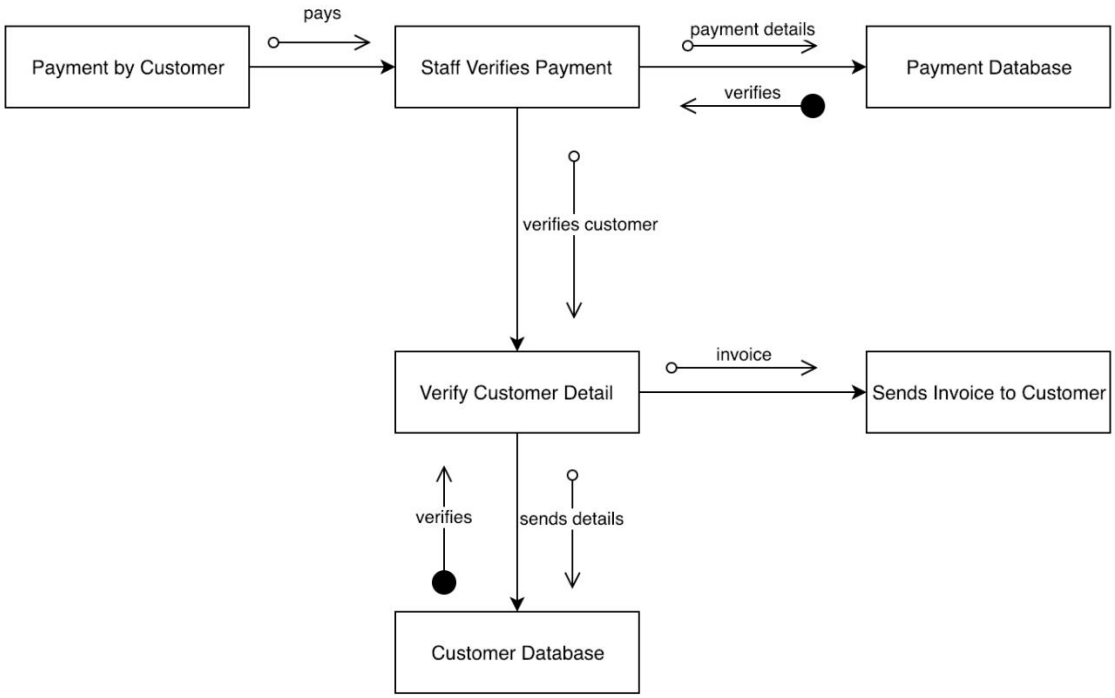

Figure 13: Structure Chart - Payment of the Customer

The above following figure shows the structure chart diagram of the payment system of the fitness application in more detailed form which shows how the process and system works.

In the structure chart of the payment of the customer, when the payment is made by the customer it is verified by the staff after which the payment details are stored in the payment database which returns the verification. After the payment verification, the staff verifies the customer details in the customer database. The customer database sends verification after the customer detail is verified an invoice is send to the customer.

Module specification

Model Name: Payment of Customer

In this following module, all the payments are made digitally. The customer makes the payment digitally in the system, which is verified by the staff and an digital invoice is sent back to the customer.

Pseudocode

WHEN payment done

"Stores in data base"

GET payment details by staff

"Log in to system"

"Verifies customer details"

"Sends invoice to the customer"

END

Conclusion

The following conclusion is for the individual task report, in which the payment system of the Fitness Application is developed. The following individual report shows the Environmental model specification Context Level diagram (Level 0), Internal model specification for the system Level 1 and 2 Data flow diagram, structural char, the design structure and module specification of the selected system application. All the structures that are shown above are drawn using the online software draw.io.

Name: Sulav Thapa

Student ID: 17031233

Function: Report generation of the Customer

Introduction

There are many services provided by the gym application. One of the service provided by the fitness application is to generate the report of the customer and update the data of the customers and staff in the database through admin.

This coursework has total five task to be done which is divided among the group member and the coursework is to be from both individual and group work. As all the requirements was fixed. Our group used waterfall model to do this coursework.

Environmental Model Specification

Context Level diagram (Level 0): Generate report of the customer

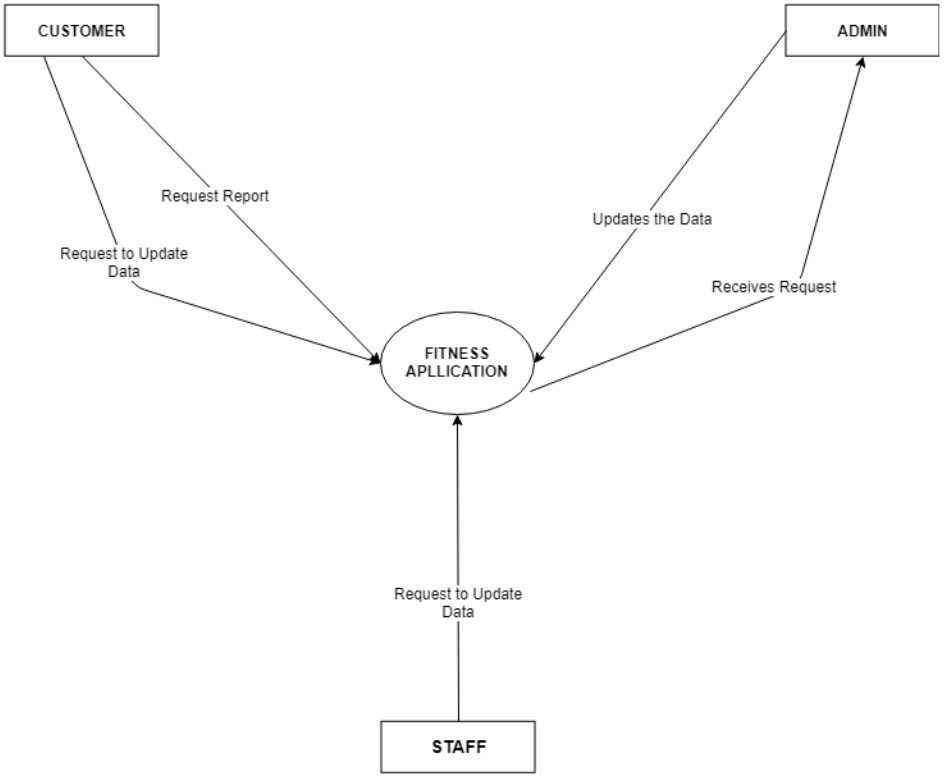

Figure 14: Context Level 0 Diagram - Generate Report of the Customer

- **Event List**
  - Customer and staff request admin to perform the task from the system.

Customer and staff requests admin for the generation of the report and the data update in the database which is only performed by the system when the admin approves the request.

Internal Model Specification for the System

Context Level Diagram (Level 1): Report of the customer

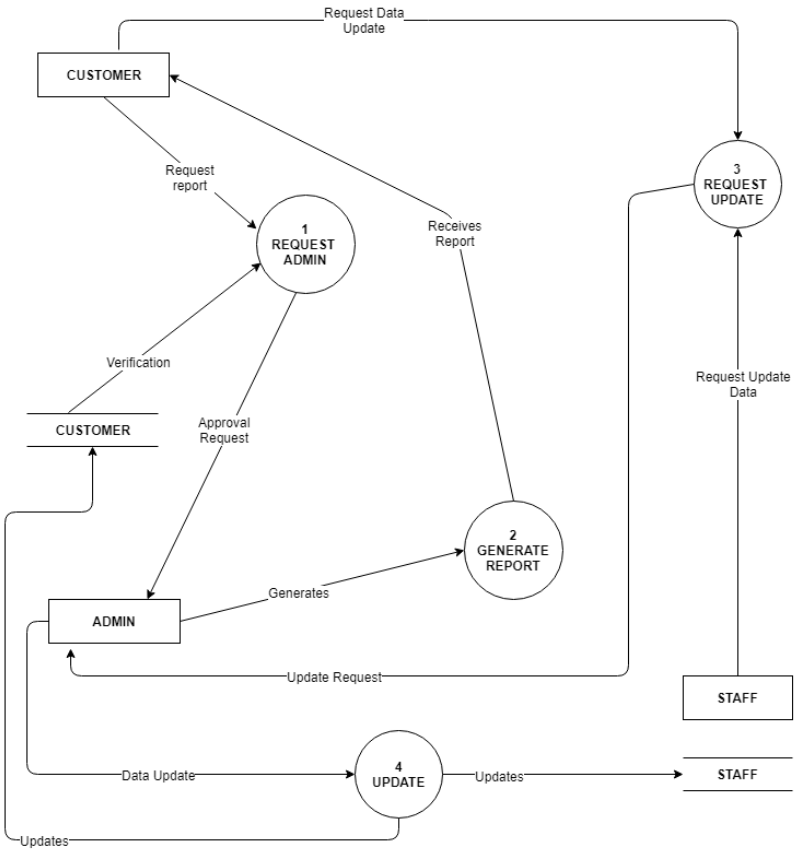

Figure 15: Context Level 1 Diagram- Generate Report of the Customer

This is the DFD level 1 for the report generation of the customer. In DFD level 1 the system in explained in more details and the database are also included so that the data can be stored.

The customer requests admin for the report and when in it approved the report is generated by the system and given to the user. And when the customer and the staff wants to update their data request should be sent to the admin with the details to be updates which is verified by the admin and then updated in the database.

Context Level Diagram (Level 2): Generate Report of the customer

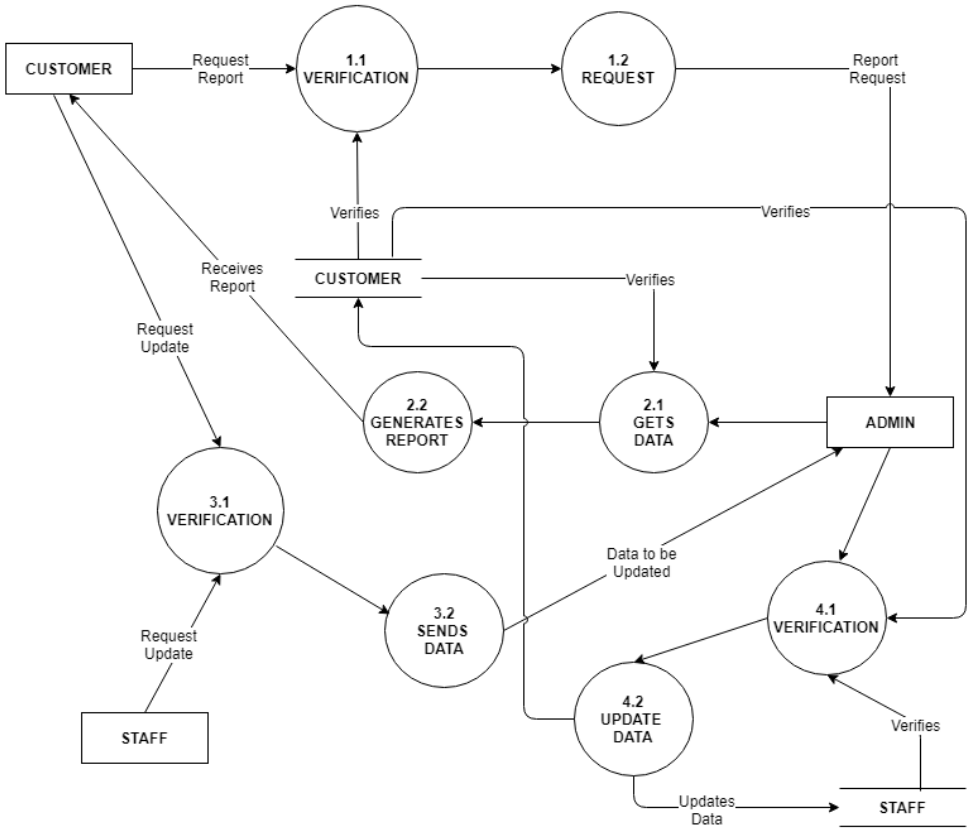

Figure 16: Context Level 2 Diagram- Generate Report of the Customer

This is DFD level 2 for the report generation of the customer. In level 2 DFD the process are expanded so it would be more detailed and the system would be more efficient to use.

In level 2 the report send by the customer is verified from the database then the request is sent to the admin. When the request is received by the admin the data is taken from the database and the report is generated which is given to the customer in a digital form.

Design specification

Structure Chart:

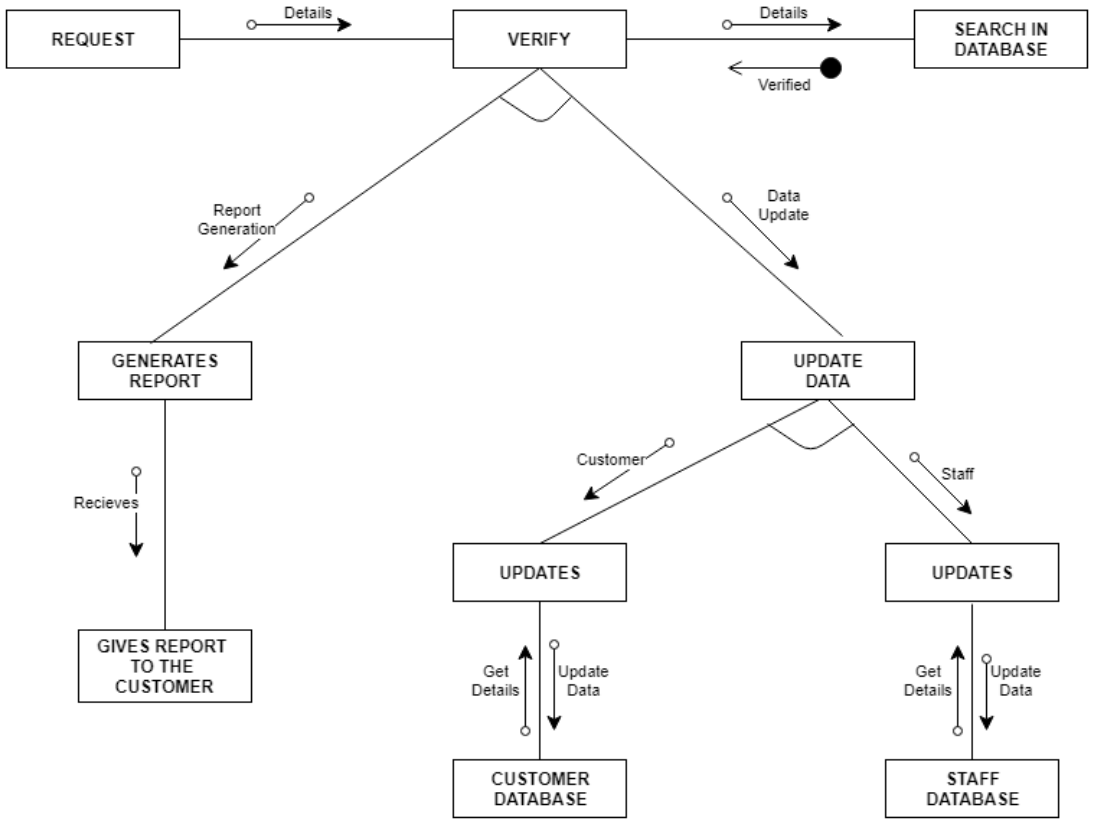

Figure 17: Structure Chart - Generate Report of the Customer

The structure chart gives more details about the processes and how the system works in overall. In structure chart, decision, conditions, parameters are included.

The report generation system works as, the request is sent by the customer or the staff and when it is verified from the database. If condition applies whether to generate the report of to update data. If the report is to be generated the then system generates the report and sends it to the system. And if the data is to be updates the it again checks whether it is customer or staff after verifying the update process gets the details to be updated in the database and updates it and insert it on the database again.

Module Specification

Module Name: Generate report of the customer

In this century even, one wants the final report or the progression report the people have done in a month. The first process is to verify the customer and also verify all the details of the customers. After verifying the customer report is sent by the admin in a digital form.

Pseudocode

```
GET customer details

VERIFY customer details

IF report generation

    “Generate Report”

ELSE

    “Update data”

    IF update customer details

        “Update customer”

    ELSE

        “Update staff”

END
```

Calls and Called By:-

- generateReport(); is called by customer
- updateData(); is called by both customer and staff

Conclusion

The individual task report should be given upon the task we performed for the module we picked up. For the individual task I picked up the report generation of the customer. For this individual task we should make the DFD level 0, 1 and 2 and the structure chart for the system. All the diagrams are described in very simple way that every normal user can easily understand. Pseudo code is also written and some of the methods are also mentioned.

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Student ID: 17031188

Function: To-Do List of Customer

Introduction

A gym application provides many features and services. One of the most common features is about to update about the gym things and customer details. And all the information the gym, instructors and customers are recorded in a database.

This is the group coursework which has been divided into 5 different part of tasks. This coursework includes half of the group work and half of the individual task. The diagrams in this coursework are all of waterfall model.

Environmental Model Specification

Context Level diagram (Level 0): To – Do List of the Customer

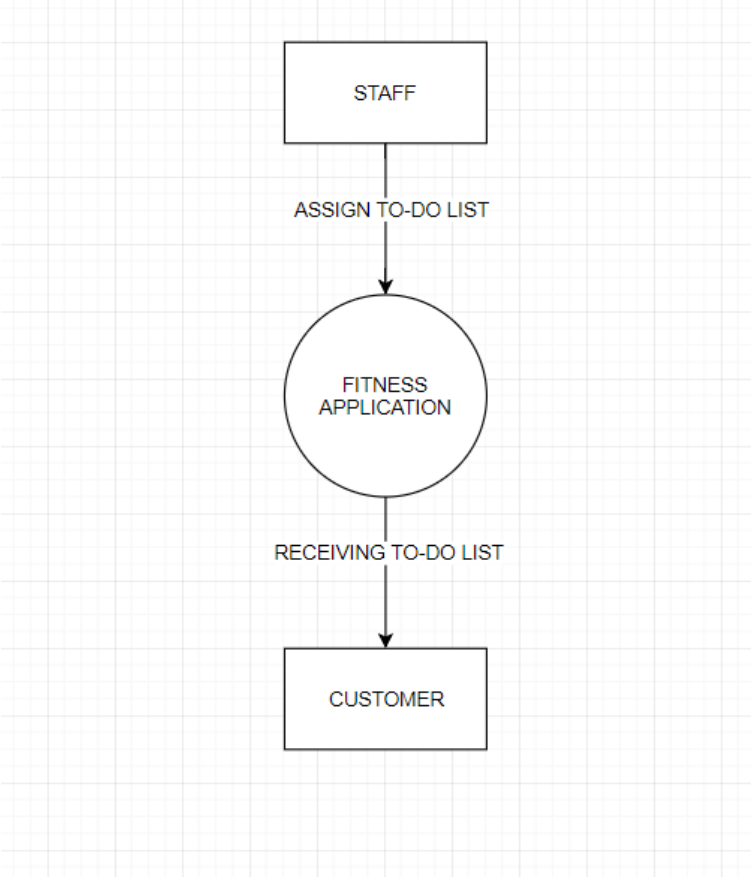

Figure 18: Context Level 0 Diagram - To-Do List of the Customer

In the above DFD Level 0 diagram, the diagram explains how the staff assigns the to-do list to the customer through fitness application and the customer receives the to-do list through the fitness application

Internal Model Specification for the System

Context Level Diagram (Level 1): To – Do List of Customer

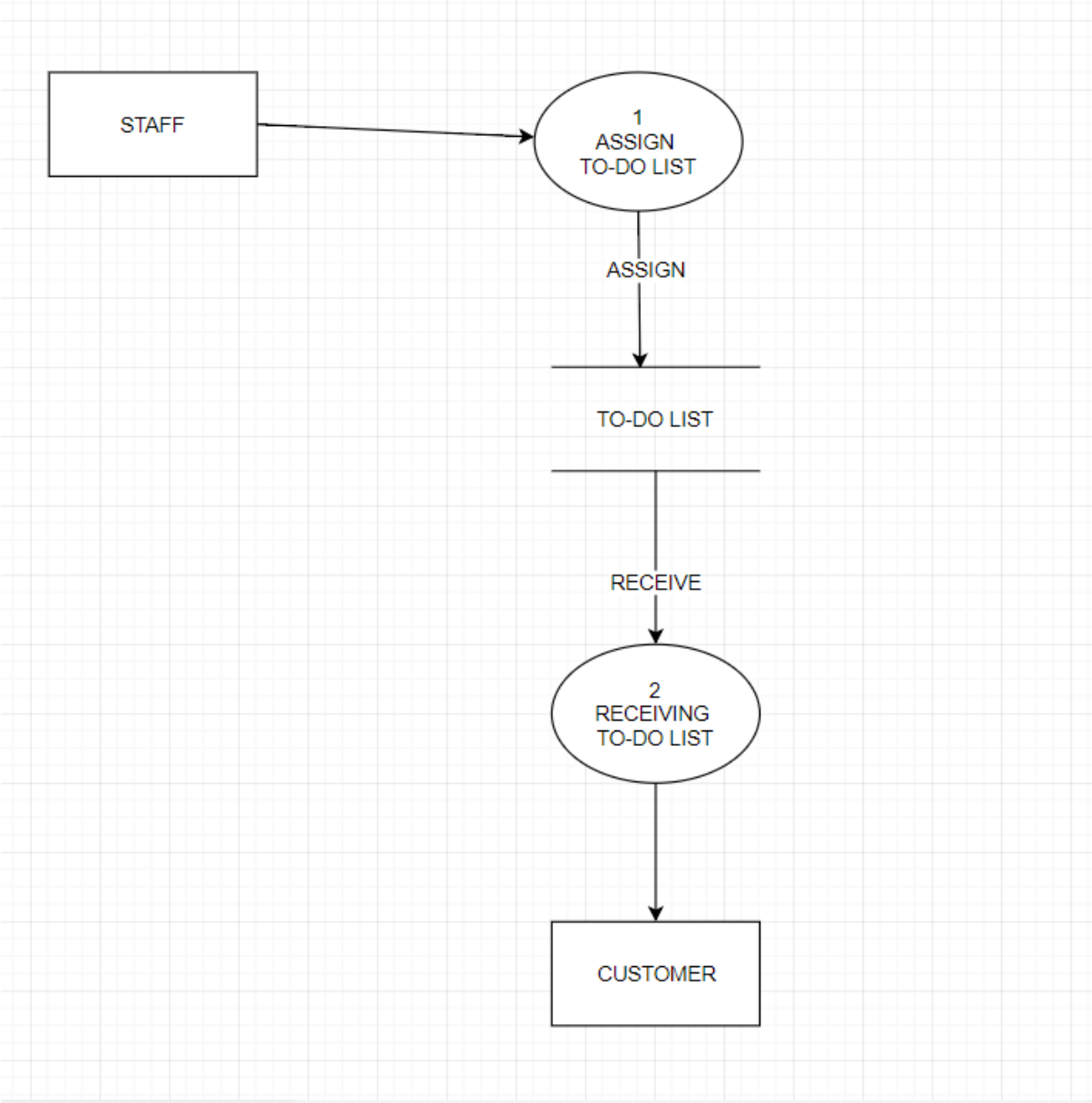

Figure 19: Context Level 1 Diagram - To-Do List of the Customer

The figure is the DFD level 1 of the customer to do list. It is the more expanded and more explained version than the DFD level 0 of the customer to do list. In the above diagram, staffs assign to-do list to the customer which gets stored in database. After to-do list is store in the database, customer can receive the to-do list through database.

Context Level Diagram (Level 2): To – Do List of Customer

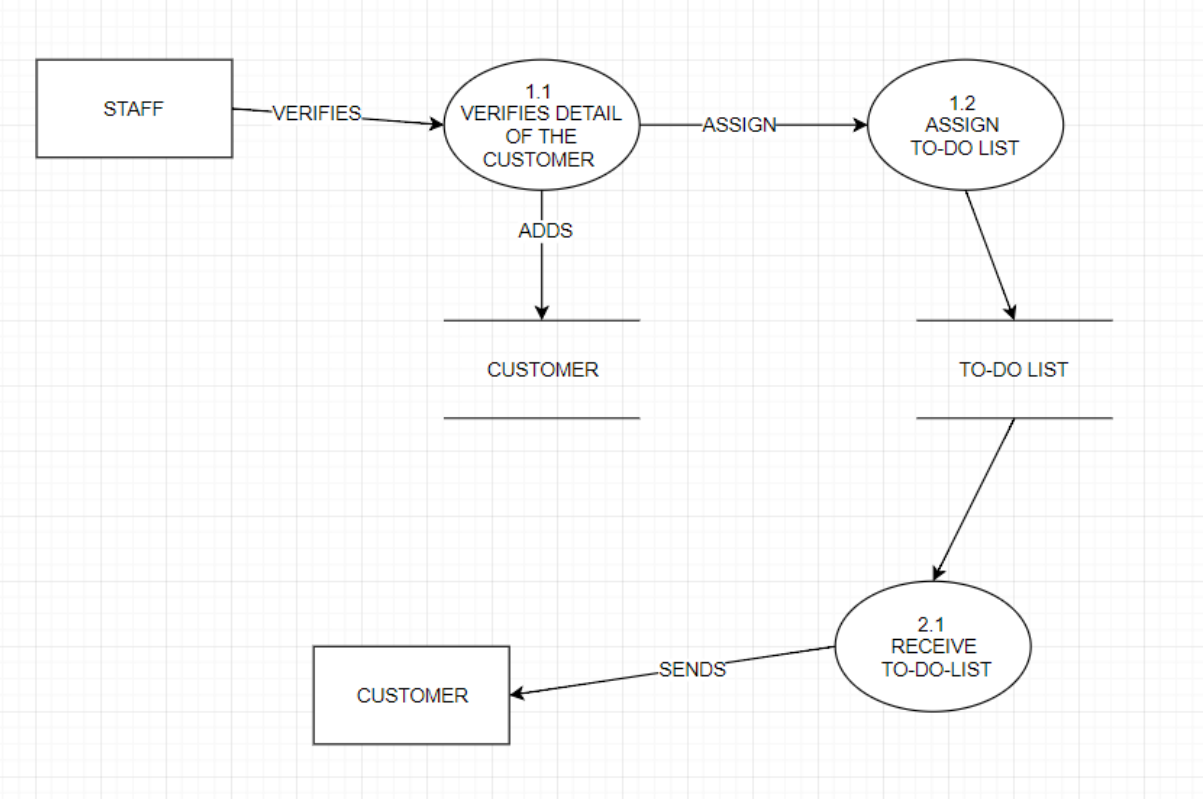

Figure 20: Context Level 2 Diagram - To-Do List of the Customer

The above diagram is the level 2 DFD of the customer to do list. This is the more explained and expanded data flow diagram of the level 1 DFD of the customer to do list. The level 2 DFD diagram states the customer's processing in the gym management system. Staff verifies the detail of the customer and the verified data is stored in customer database.

After Staff verifies the detail of the customer, to-do list is assigned to the customer according to their detail. The assigned to-do-list is stored to the to-do list database and the database sends customer their to-do list which has been assign to them through the staff.

Design Specification

Structure Chart:

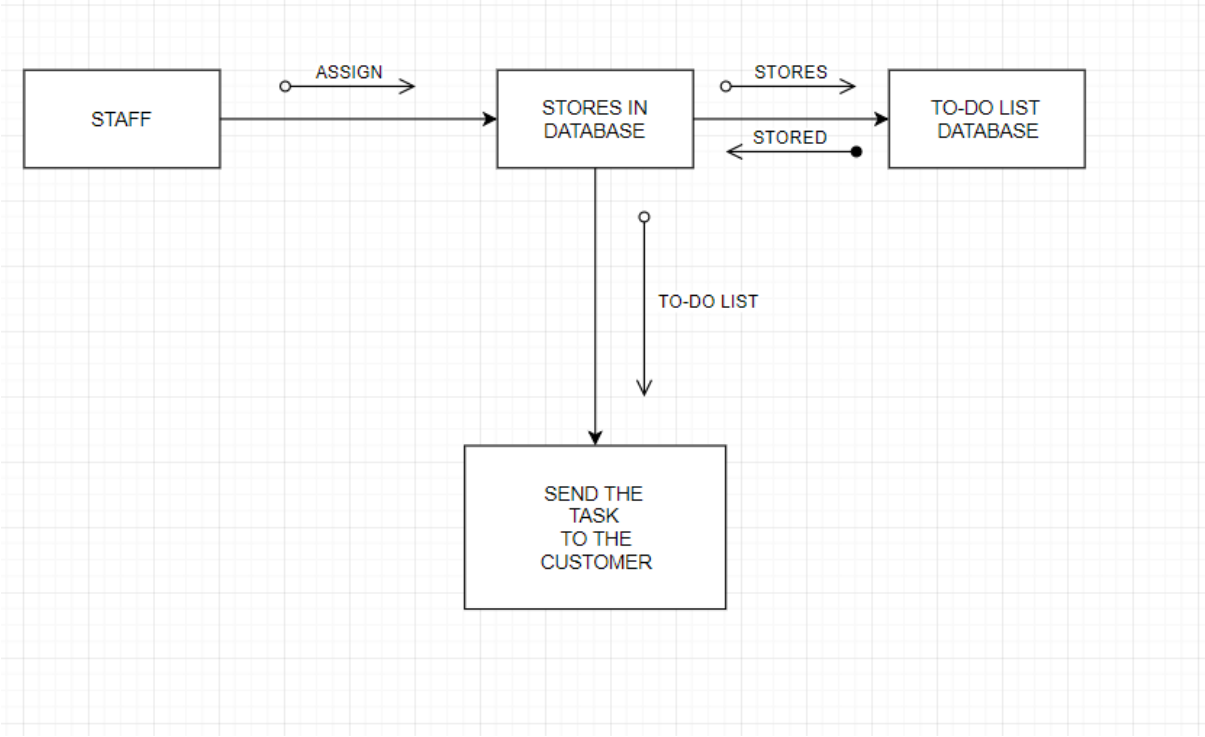

Figure 21: Structure Chart - To-Do List of the Customer

The above diagram is the structure chart of the customer to do list. This is the brief structure about the customers to do list. The above diagram explains how the staff assigns the to-do list to the customer and the assigned to-do list is stored in database and how the database sends the assigned to-do-list to the customer.

Module specification

Module Name: To-Do List of the customer

The staff assigns the to-do list to the customer according to the customers details. The assigned to-do list is stored in database and the database sends the customer their to-do list according to their details.

Pseudocode

GET customer details

ASSIGN to do list

“Stores in database”

WHEN stored in database

“Received by customer”

END

Conclusion

The individual task report is written of the model which we had to do individually assigned to us. The tasked assigned to me was To-Do List of the customer. In above task I have tried to explain DFD level 0, 1 and 2 and the structure chart for the system in very simple way according to my understanding. I also have written a short Pseudo code for more clear understanding of normal user, and few methods were also mentioned.

4. Conclusion

The following coursework was done for the module ‘Software Engineering’ ‘CS5002’. The following module carried 20% of the overall module marks. in the following coursework, a system is developed which is given the name as ‘Fitness Application’.

The following system is developed to maintain the record of the customer and their payment details. The application also maintains the record of all its users. The following system provides various services through which the fitness gym application functions. The task assigned was massive, but since the coursework was a group task, each task was assigned equally to the group members which made the completion of the task easier. All the individual task that were assigned to the group member was put together and all the functions were completed.

A lot of difficulties were faced during the coursework, such as managing group meetings, difficulties in the DFD and structure diagram and many other difficulties which were solved gradually. Any members who missed the group meetings or the discussion over the coursework were informed and updated.

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