FASTGRASP

Project report submitted in partial fulfillment of the requirement for the degree of

Bachelor of Technology

By

Abhishek Kumar (Roll No.: 10300114007)

Amay Mishra (Roll No.: 1030114012)

Debargha Bhattacharjee (Roll No.: 10300114030)

Hariom (Roll No.: 10300114035)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

HALDIA INSTITUTE OF TECHNOLOGY

November 2017

CERTIFICATE

It is certified that the work contained in the project report titled **"Fastgrasp"**, by **Abhishek Kumar**, **Amay Mishra**, **Debargha Bhattacharjee** and **Hariom** has been carried out under my/our supervision and that this work has not been submitted elsewhere for a degree.

Nazir Hussain
WEBTEK LABS
November, 2017

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Abhishek Kumar
Roll No.: 10300114007
24 November, 2017

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Amay Mishra
Roll No.: 103001140312
24 November, 2017

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Debargha Bhattacharjee
Roll No.: 10300114030
24 November, 2017

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Hariom
Roll No.: 10300114035
24 November, 2017

INTRODUCTION

The project titled **"Fastgrasp"** is e-portal where students can undertake online courses provided by reliable and trained faculties. This project is designed & coded in **NetBeans 8.1** & database management is handled by **MySQL 5.7**. This is a web application that mainly focuses on creating a virtual classroom where students and teachers can come together to exchange knowledge. "Fastgrasp" is a java application written on 64-bit**,** Windows 10 operating system, designed to help students and teachers enjoy the facilities of a virtual classroom. It features a simple and well thought-out attractive user interface, combined with facilities that duplicate an actual classroom. The application also allows users to take tests upon completion of the individual courses and certificates are provided upon successfully passing the tests.

There are several problems with the traditional system of education. First of all, you need to pay thousands of dollars per term to attend a prestigious school. With all those budget cuts, busy classrooms, and course shortages, you won't always get the chance to study exactly what you want. Online learning has to be the greatest revolution in contemporary education. It made a huge change in the system and opened great opportunities for everyone who wants to learn something.

Some of the salient features a platform like ours provides:

- **Online courses look great on a resume**
  It will show potential employers that you're committed to learning and you're eager to obtain more knowledge and new skills.

- **You can learn whatever you want!**
  You can pick the program of your dreams in traditional education, too, but that would involve traveling away from home, living in a completely unknown city, and struggling in an extremely competitive learning environment.

- **Self-paced learning**
  Self-paced learning means that the students can start completing the targets at any time, and he can arrange a learning schedule that meets his individual needs.

- **Lower costs**
  The fact that online programs are cheaper when compared to the ones held in a traditional campus setting is enough to convince you to consider them.

- **Comfort**
  You will not be bound to physical class session when you opt for online education. All lectures and needed materials are provided via online platforms, so you'll easily access them from the comfort of your home.

SYSTEM ANALYSIS

EXISTING SYSTEM:

System Analysis is a detailed study of the various operations performed by a system and their relationships within and outside of the system. Here the key question is what all problems exist in the present system? What must be done to solve the problem? Analysis begins when a user or manager begins a study of the program using existing system. During analysis, data collected on the various files, decision points and transactions handled by the present system. Training, experience and common sense are required for collection of relevant information needed to develop the system. The success of the system depends largely on how clearly the problem is defined, thoroughly investigated and properly carried out through the choice of solution. A good analysis model should provide not only the mechanisms of problem understanding but also the frame work of the solution. Thus, it should be studied thoroughly by collecting data about the system. Then the proposed system should be analyzed thoroughly in accordance with the needs.

System analysis can be categorized into five parts:

- System planning and initial investigation
- Information Gathering
- Applying analysis tools for structured analysis
- Feasibility study
- Cost/ Benefit analysis

PROPOSED SYSTEM:

Proposed system is an e-portal providing online courses on wide range of topics. Through our software users can take courses, complete assignments, take tests and do various other things that are available in real classrooms. Our proposed system has the following advantages:

- User friendly interface
- Robust UI
- Progress tracking
- Look and Feel Environment
- Quick transaction

Using **"Fastgrasp"**, we have created a virtual classroom which replicates an actual classroom scenario, i.e., trained and reliable faculties provide lectures on courses undertaken by large number of students.

Project Objective:

Developing a virtual classroom system to promote a greater count of students to splurge into the field of Education. It integrates the benefits of a physical classroom with the convenience of a 'no-physical-bar' virtual learning environment, minus the commuting hazards and expenses. It will usher in the immense flexibility and sophistication in the existing learning platform structures, with the perfect blend of synchronous and asynchronous interaction. It provides a means of collaborative learning for the students.

Functional Requirements:

(i) Students can choose courses
(ii) Registration for Multiple Courses
(iii) Attend lectures either at the scheduled time or on request view lecture at a later time.
(iv) Faculties can take lectures, upload assignments, announcements, evaluate answer sheets and also can upload lectures and other discussions in various formats as in videos, power point presentation etc.
(v) Upload and Download of various assignments, college notices, Student's notices, journals, videos.
(vi) Real Time collaboration among – A/B via mails, shared and interactive whiteboards
(vii) Asynchronous communication in the form of Emails, discussion boards that enable communication to occur at "convenient-times" that suit student schedules and are not accessed at simultaneous or prearranged times.
(viii) There can be forums, blogs etc to discuss various queries and to put up suggestions posted both by students and teachers
(ix) Administrator can generate reports
(x) Shared documents and media library that can help in active learning of a student
(xi) Users must have valid User ID and password to login thus creating their individual profiles.

Non Functional Requirements:

1 Secure access of confidential data (User's details). SSL can be used.
2 24 x 7 availability
3 Better component design to get better performance at peak time
4 Flexible service based architecture will be highly desirable for future extension

FEASIBILITY ANALYSIS

Whatever we think need not be feasible. It is wise to think about the feasibility of any problem we undertake. Feasibility is the study of impact, which happens in the organization by the development of a system. The impact can be either positive or negative. When the positives nominate the negatives, then the system is considered feasible. Here the feasibility study can be performed in two ways such as technical feasibility and Economical Feasibility.

- **Technical Feasibility:** We can strongly say that it is technically feasible, since there will not be much difficulty in getting required resources for the development and maintaining the system as well. All the resources needed for the development of the software as well as the maintenance of the same is available in the organization here we are utilizing the resources which are available already.

- **Economic Feasibility:** Development of this application is highly economically feasible. The organization needed not spend much money for the development of the system already available. The only thing is to be done is making an environment for the development with an effective supervision. If we are doing so, we can attain the maximum usability of the corresponding resources. Even after the development, the organization will not be in a condition to invest more in the organization. Therefore, the system is economically feasible.

Project Modules

The system after careful analysis has been identified to be presented with the following modules:

1. Administrators /Managers
2. Faculties
3. Students
4. Web Registration
5. Virtual Training
6. Exam Conducting
7. Search
8. Reports
9. Authentication

Actors

- Admin (Secondary)
- Faculty (Primary)
- Student (Primary)

KEYWORDS

Generic Technology Keywords: Database, User Interface, Programming

Specific Technology Keywords: JSP, Servlet, MySQL, Glassfish App Server, EJB

Project Keywords: Presentation, Business Object, Data Access Layer

SDLC Keywords: Analysis, Design, Implementation, Testing

ENVIRONMENT

Software Specification:

Operating System: Windows XP or later, Linux

Database: MySQL 5.7

Client: Microsoft Internet Explorer, Google Chrome

Tools: Netbeans 8.1 IDE, MySQL Workbench, Glassfish Server 4.1.0

User Interface: JSP

Code Behind: Java 1.8

Hardware Specification:

Processor: Intel Pentium or More
RAM: 2 GB
Hard Disk: 80 GB
Bandwidth: 20 Kbps

Determining the Architecture

When you work with JSP technologies, you can code all of your business logic into JSP pages using scriptlets. Scriptlets are snippets of Java code enclosed in <% %> tags. As you may already be aware, JSP pages are compiled into servlets before they are run, so Java code is perfectly valid in JSP pages. However, there are several reasons why this practice should be avoided, especially when working in large projects. Some reasons are as follows:

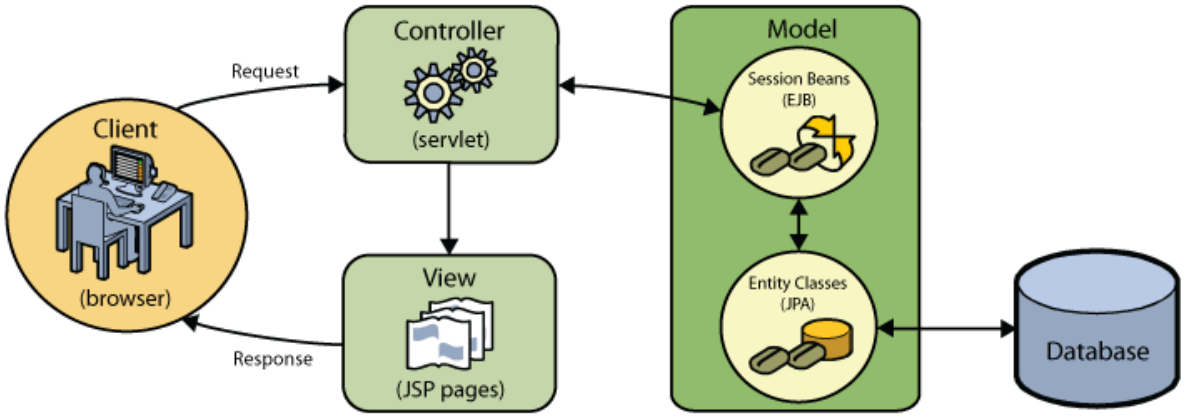
- **Scriptlet code is not reusable:** Scriptlet code appears in exactly one place: the JSP page that defines it. If the same logic is needed elsewhere, it must be either included (decreasing readability) or copied and pasted into the new context.
- **Scriptlets mix logic with presentation:** Scriptlets are islands of program code in a sea of presentation code. Changing either requires some understanding of what the other is doing to avoid breaking the relationship between the two. Scriptlets can easily confuse the intent of a JSP page by expressing program logic within the presentation.
- **Scriptlets break developer role separation:** Because scriptlets mingle programming and Web content, Web page designers need to know either how to program or which parts of their pages to avoid modifying.
- **Scriptlets make JSP pages difficult to read and to maintain:** JSP pages with scriptlets mix structured tags with JSP page delimiters and Java language code.
- **Scriptlet code is difficult to test:** Unit testing of scriptlet code is virtually impossible. Because scriptlets are embedded in JSP pages, the only way to execute them is to execute the page and test the results.

There are various design patterns already in existence which provide considerable benefits when applied. One such pattern is the MVC (Model-View-Controller) paradigm, which divides your application into three interoperable components.

- **Model:** Represents the business data and any business logic that govern access to and modification of the data. The model notifies views when it changes and lets the view query the model about its state. It also lets the controller access application functionality encapsulated by the model.
- **View:** The view renders the contents of a model. It gets data from the model and specifies how that data should be presented. It updates data presentation when the model changes. A view also forwards user input to a controller.
- **Controller:** The controller defines application behaviour. It dispatches user requests and selects views for presentation. It interprets user inputs and maps them into actions to be performed by the model. In a web application, user inputs are HTTP GET and POST requests. A controller selects the next view to display based on the user interactions and the outcome of the model operations.

Adhering to the MVC design pattern provides numerous benefits:

- **Separation of design concerns:** Because of the decoupling of presentation, control, and data persistence and behaviour, the application becomes more flexible; modifications to one component have minimal impact on other components. You can, for example, create new views without needing to rewrite the model.
- **More easily maintainable and extensible:** Good structure can reduce code complexity. As such, code duplication is minimized.
- **Promotes division of labour:** Developers with different skill sets are able to focus on their core skills and collaborate through clearly defined interfaces.



1. MVC model

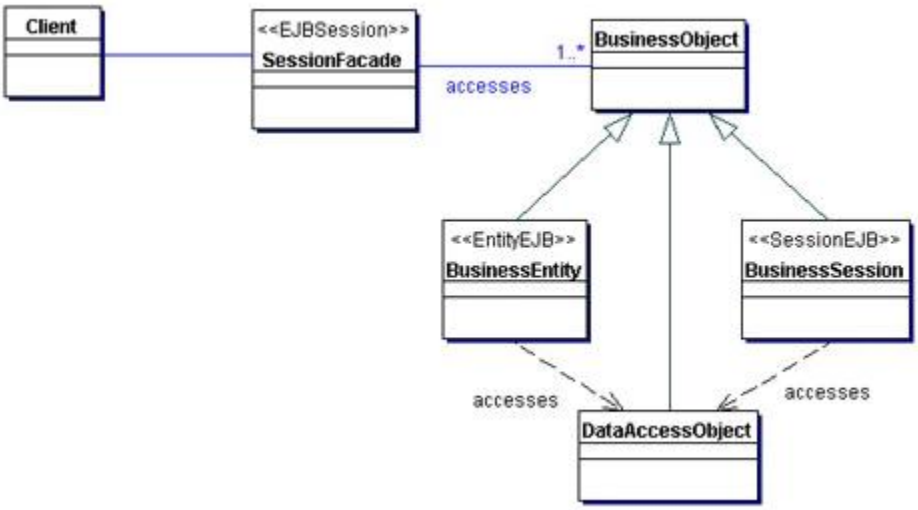
In a multitiered Java 2 Platform, Enterprise Edition (J2EE) application environment, the following problems arise:

- Tight coupling, which leads to direct dependence between clients and business objects;
- Too many method invocations between client and server, leading to network performance problems;
- Lack of a uniform client access strategy, exposing business objects to misuse.

A multitiered J2EE application has numerous server-side objects that are implemented as enterprise beans. In addition, some other arbitrary objects may provide services, data, or both. These objects are collectively referred to as business objects, since they encapsulate business data and business logic.

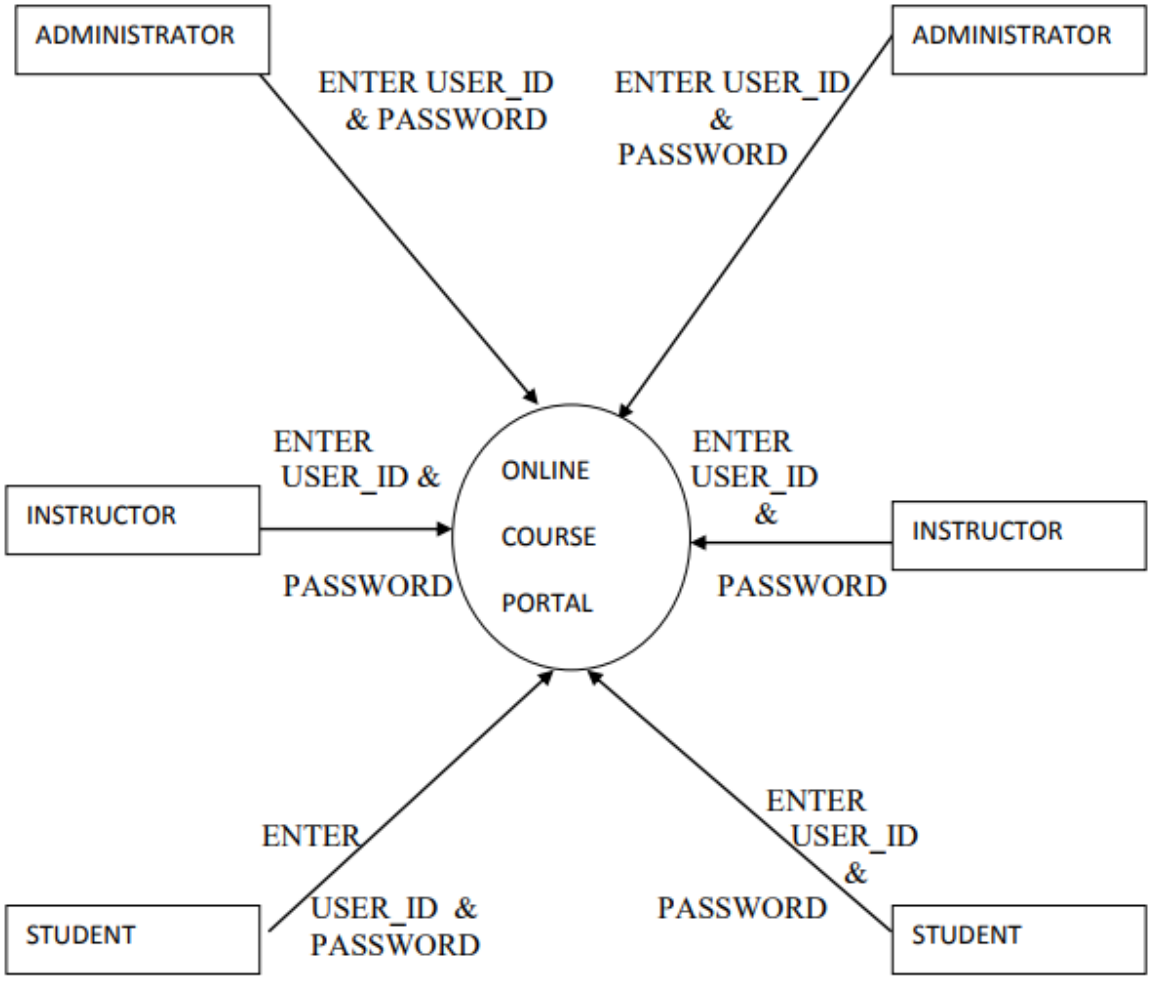
A problem also arises when a client interacts directly with the business objects. Since the business objects are directly exposed to the clients, there is no unified strategy for accessing the business objects. Without such a uniform client access strategy, the business objects are exposed to clients and may reduce consistent usage.

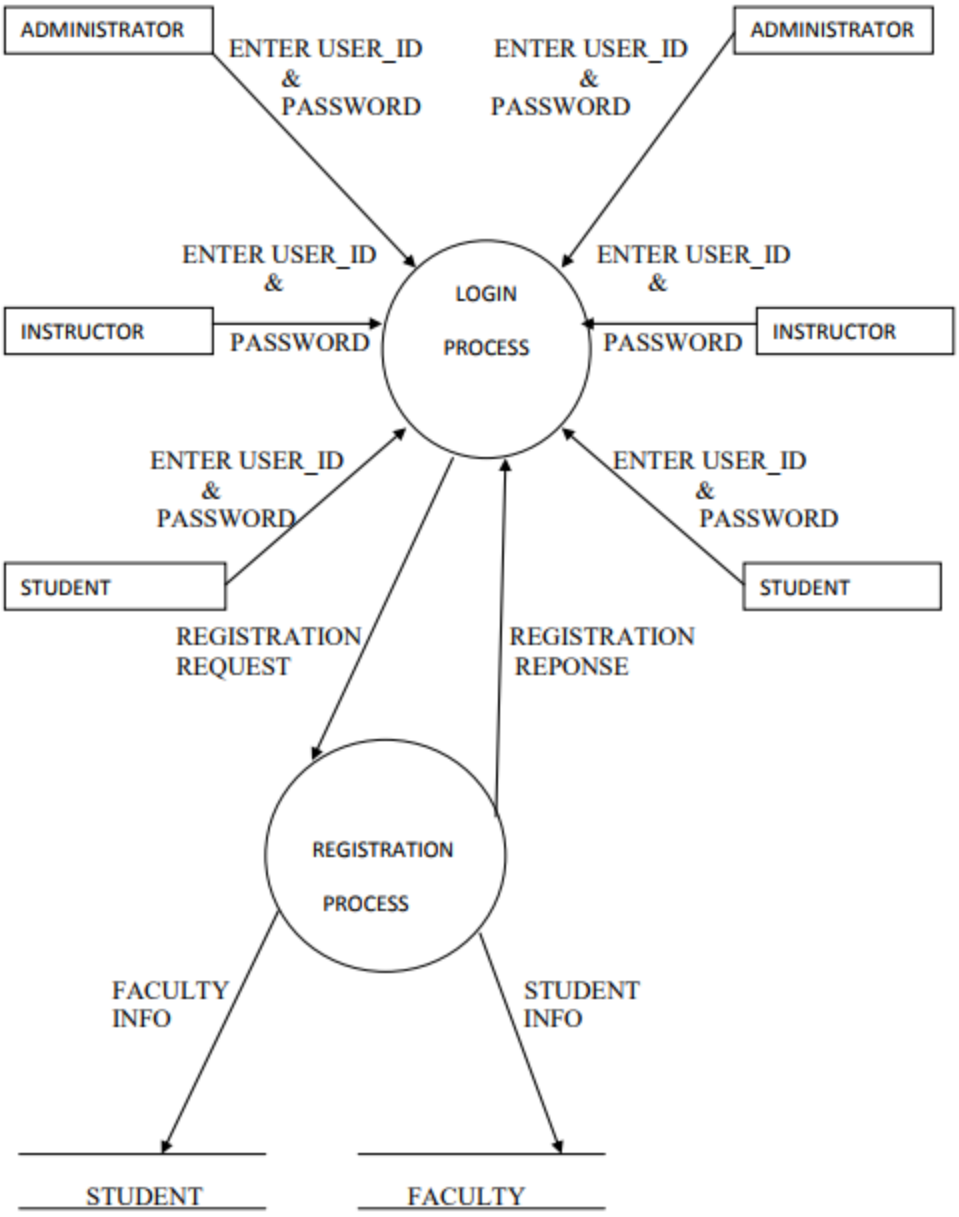
To circumvent this, we use a session bean as a facade to encapsulate the complexity of interactions between the business objects participating in a workflow. The Session Facade manages the business objects, and provides a uniform coarse-grained service access layer to clients.
The Session Facade abstracts the underlying business object interactions and provides a service layer that exposes only the required interfaces. Thus, it hides from the client's view the complex interactions between the participants. The Session Facade manages the interactions between the business data and business service objects that participate in the workflow, and it encapsulates the business logic associated with the requirements. Thus, the session bean (representing the Session Facade) manages the relationships between business objects. The session bean also manages the life cycle of these participants by creating, locating (looking up), modifying, and deleting them as required by the workflow.

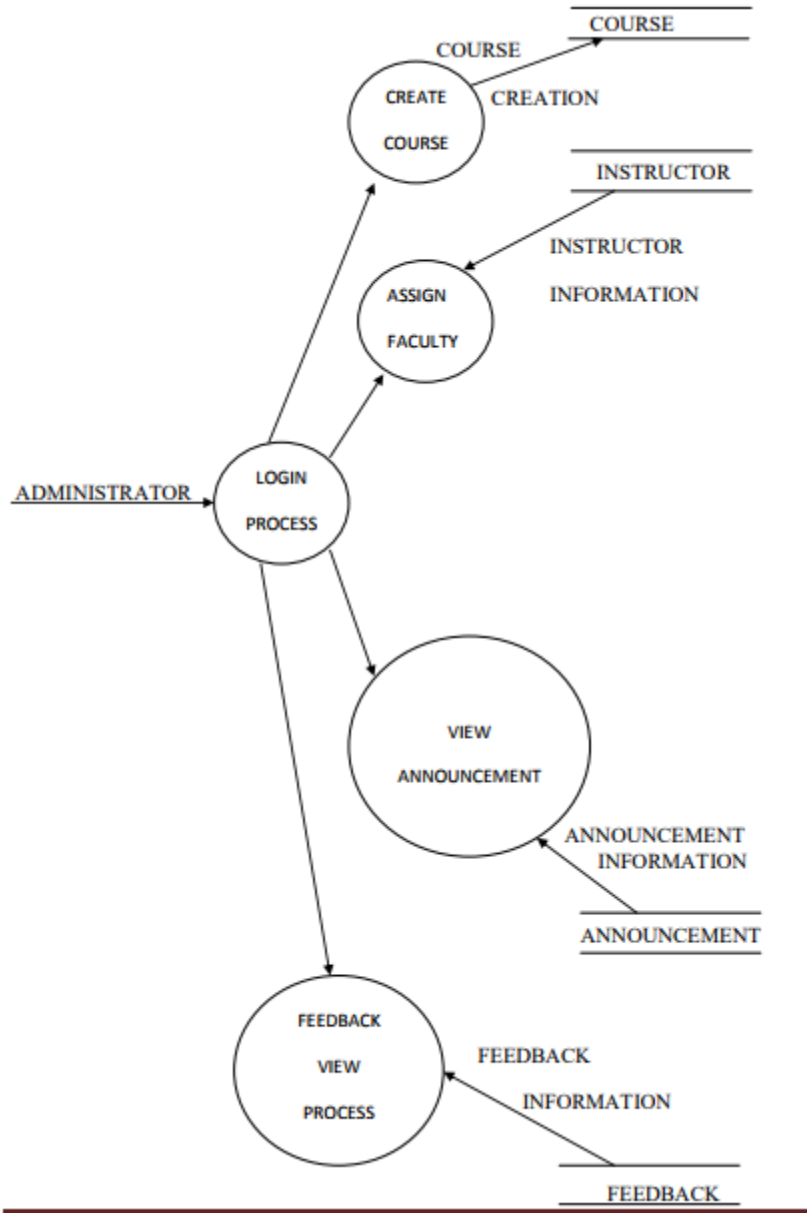


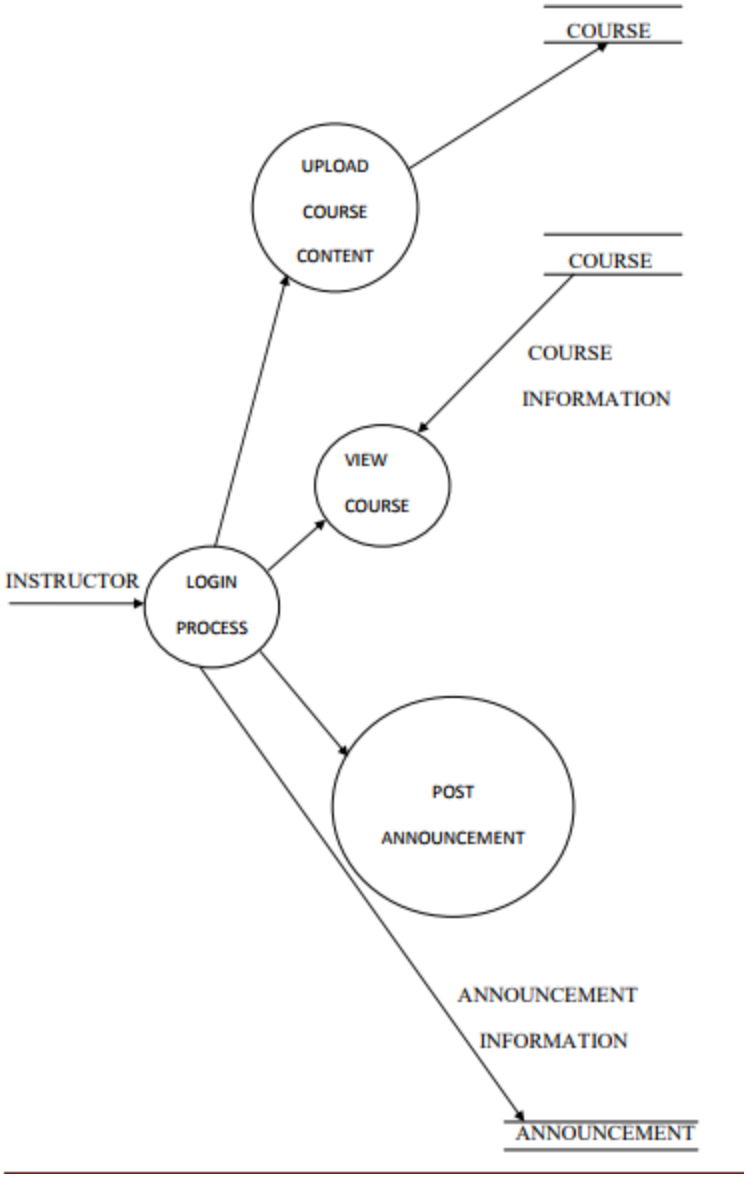
2. Session Facade class diagram

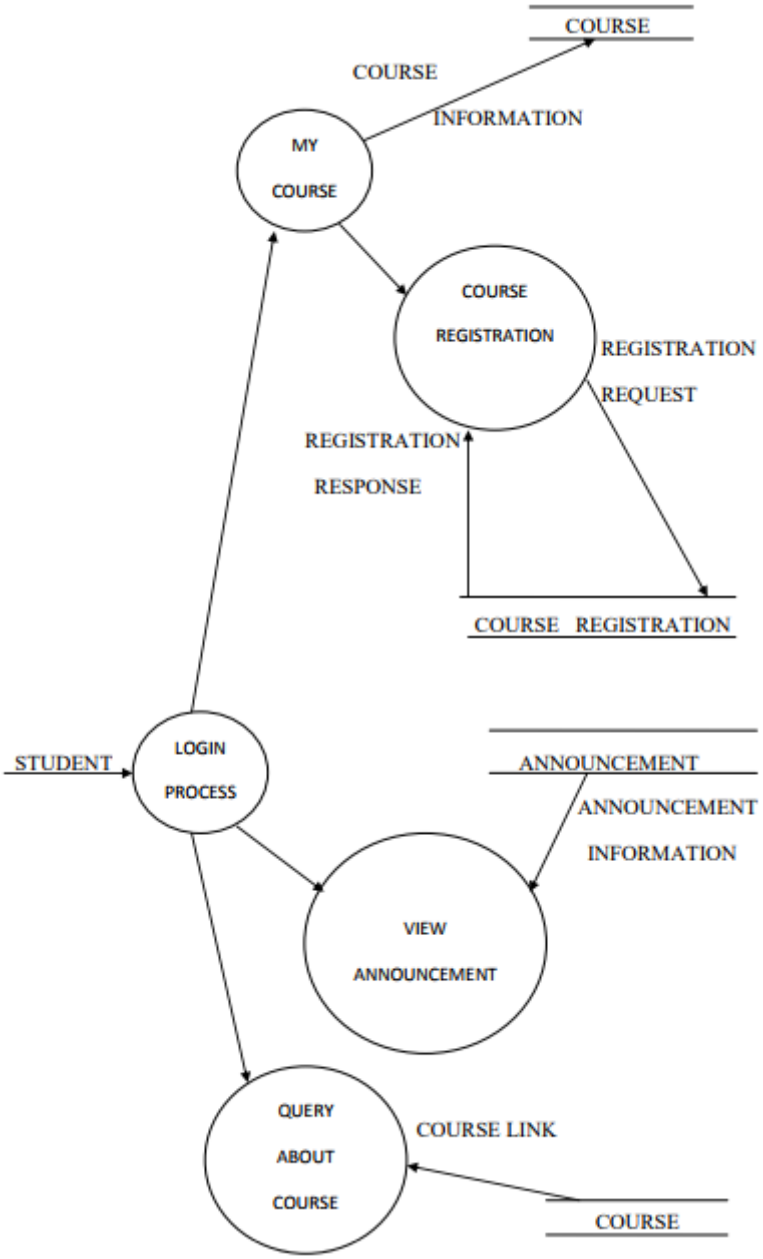
DATA FLOW DIAGRAM



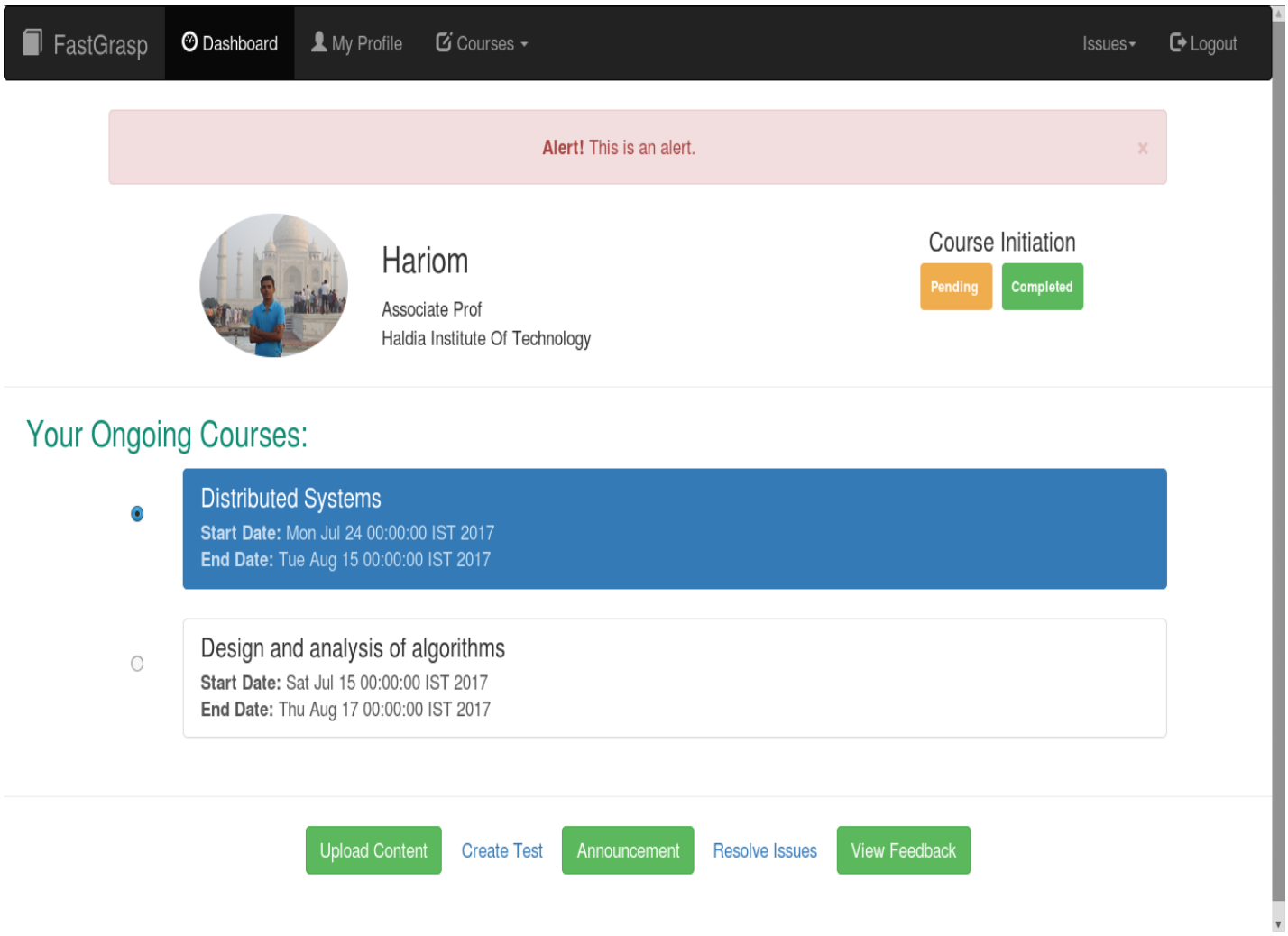

ADMINISTRATOR
ENTER USER_ID & PASSWORD
ENTER USER_ID & PASSWORD
ADMINISTRATOR
ENTER USER_ID & PASSWORD
INSTRUCTOR
PASSWORD
LOGIN PROCESS
PASSWORD
INSTRUCTOR
ENTER USER_ID & PASSWORD
STUDENT
ENTER USER_ID & PASSWORD
STUDENT
REGISTRATION REQUEST
REGISTRATION REPONSE
REGISTRATION PROCESS
FACULTY INFO
STUDENT INFO
STUDENT
FACULTY


COURSE
COURSE
CREATE
COURSE
CREATION
INSTRUCTOR
INSTRUCTOR
INFORMATION
ASSIGN
FACULTY
ADMINISTRATOR
LOGIN
PROCESS
VIEW
ANNOUNCEMENT
ANNOUNCEMENT
INFORMATION
ANNOUNCEMENT
FEEDBACK
VIEW
PROCESS
FEEDBACK
INFORMATION
FEEDBACK


COURSE
UPLOAD
COURSE
CONTENT
COURSE
COURSE
INFORMATION
VIEW
COURSE
INSTRUCTOR
LOGIN
PROCESS
POST
ANNOUNCEMENT
ANNOUNCEMENT
INFORMATION
ANNOUNCEMENT


COURSE
COURSE
INFORMATION
MY
COURSE
COURSE
REGISTRATION
REGISTRATION
REQUEST
REGISTRATION
RESPONSE
COURSE REGISTRATION
STUDENT
LOGIN
PROCESS
ANNOUNCEMENT
ANNOUNCEMENT
INFORMATION
VIEW
ANNOUNCEMENT
QUERY
ABOUT
COURSE
COURSE LINK
COURSE

SOFTWARE INTERFACE



Faculty Dashboard UI

SYSTEM DESIGN

- **Input Design:**

We can strongly say that it is technically feasible, since there will not be much difficulty in getting required resources for the development and maintaining the system as well. All the resources needed for the development of the software as well as the maintenance of the same is available in the organization here we are utilizing the resources which are available already.

The main objectives of the input design are:

- Produce cost effective method of input
- Achieve highest possible level of accuracy
- Ensure that the input is acceptable to and understood by the staff.

Input Data: The goal of designing input data is to make enter easy, logical and free from errors as possible. The entering data entry operators need to know the
allocated space for each field; field sequence and which must match with that in the source document. The format in which the data fields are entered should be given in the input form. Here data entry is online; it makes use of processor that accepts commands and data from the operator through a key board. The input required is analyzed by the processor. It is then accepted or rejected. Input stages include the following processes:

- Data Recording
- Data Transcription
- Data Conversion
- Data Verification
- Data Control
- Data Transmission
- Data Correction

One of the aims of the system analyst must be to select data capture method and devices, which reduce the number of stages so as to reduce both the changes of errors and the cost. Input types, can be characterized as:

- External
- Internal
- Operational
- Computerized
- Interactive

Input files can exist in document form before being input to the computer. Input design is rather complex since it involves procedures for capturing data as well as inputting it to the computer.

- **Output Design:**

Outputs from computer systems are required primarily to communicate the results of processing to users. They are also used to provide a permanent copy of these result for latter consultation. Computer output is the most important and direct source of information to the users. Designing computer output should proceed in an organized well throughout the manner. The right output must be available for the people who find the system easy to use. The outputs have been defined during the logical design stage. If not, they should have defined at the beginning of the output designing terms of types of output connect, format, response etc.

Various types of outputs are:

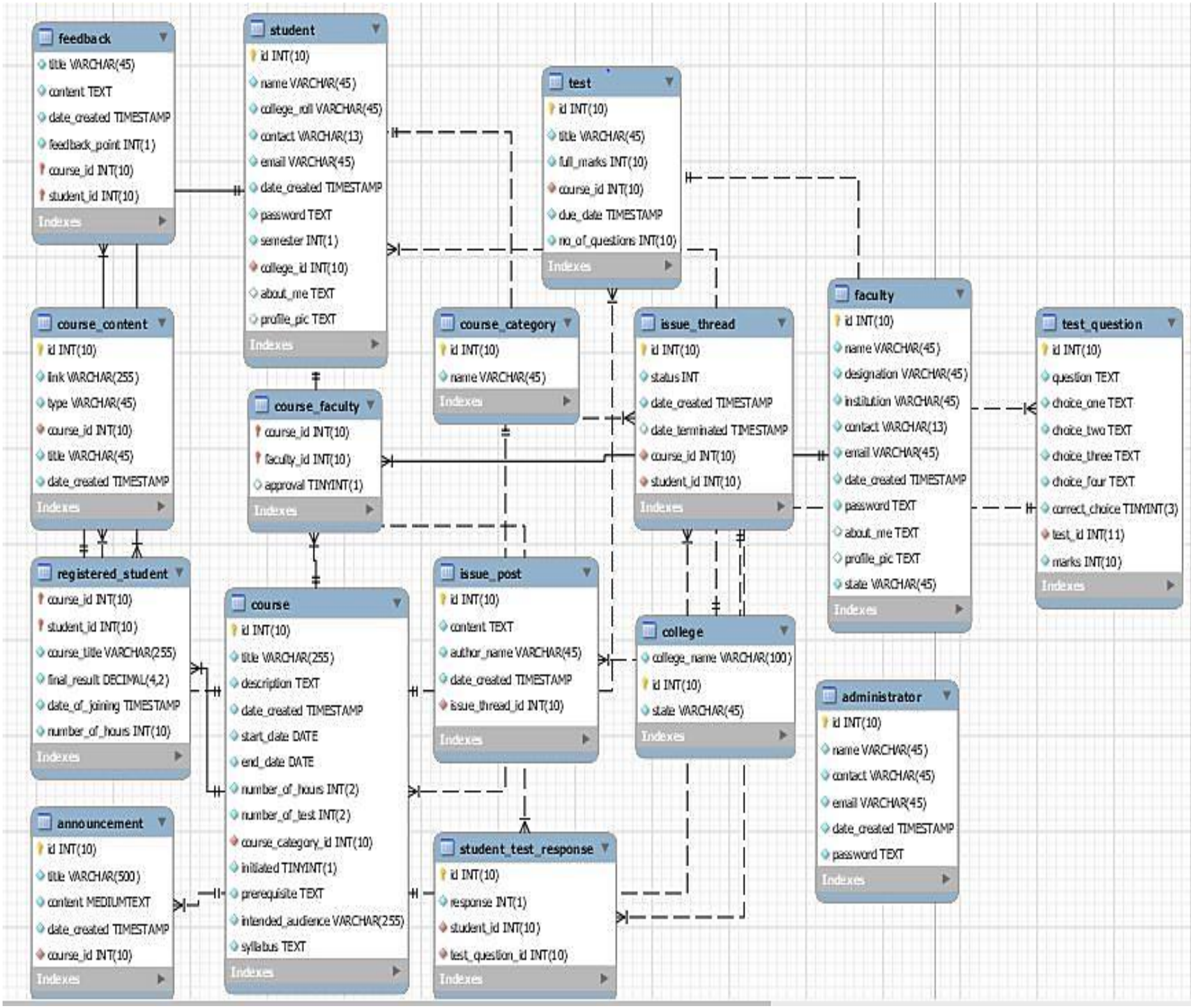
• External outputs
• Internal outputs
• Operational outputs
• Interactive outputs
• Turn around outputs

All screens are informative and interactive in such a way that the user can fulfill his requirements through asking queries.

DATABASE DESIGN

The general theme behind a database is to handle information as an integrated whole. A database is a collection of interrelated data stored with minimum redundancy to serve many users quickly and effectively. After designing input and output, the analyst must concentrate on database design or how data should be organized around user requirements. The general objective is to make information access, easy quick, inexpensive and flexible for other users. During database design the following objectives are concerned: -

- Controlled Redundancy
- Data independence
- Accurate and integrating
- More information at low cost
- Recovery from failure
- Privacy and security
- Performance
- Ease of learning and use


feedback
title VARCHAR(45)
content TEXT
date_created TIMESTAMP
feedback_point INT(1)
course_id INT(10)
student_id INT(10)
Indexes
student
id INT(10)
name VARCHAR(45)
college_roll VARCHAR(45)
contact VARCHAR(13)
email VARCHAR(45)
date_created TIMESTAMP
password TEXT
semester INT(1)
college_id INT(10)
about_me TEXT
profile_pic TEXT
Indexes
test
id INT(10)
title VARCHAR(45)
full_marks INT(10)
course_id INT(10)
due_date TIMESTAMP
no_of_questions INT(10)
Indexes
course_content
id INT(10)
link VARCHAR(255)
type VARCHAR(45)
course_id INT(10)
title VARCHAR(45)
date_created TIMESTAMP
Indexes
course_category
id INT(10)
name VARCHAR(45)
Indexes
issue_thread
id INT(10)
status INT
date_created TIMESTAMP
date_terminated TIMESTAMP
course_id INT(10)
student_id INT(10)
Indexes
faculty
id INT(10)
name VARCHAR(45)
designation VARCHAR(45)
institution VARCHAR(45)
contact VARCHAR(13)
email VARCHAR(45)
date_created TIMESTAMP
password TEXT
about_me TEXT
profile_pic TEXT
state VARCHAR(45)
Indexes
test_question
id INT(10)
question TEXT
choice_one TEXT
choice_two TEXT
choice_three TEXT
choice_four TEXT
correct_choice TINYINT(3)
test_id INT(11)
marks INT(10)
Indexes
course_faculty
course_id INT(10)
faculty_id INT(10)
approval TINYINT(1)
Indexes
registered_student
course_id INT(10)
student_id INT(10)
course_title VARCHAR(255)
final_result DECIMAL(4,2)
date_of_joining TIMESTAMP
number_of_hours INT(10)
Indexes
course
id INT(10)
title VARCHAR(255)
description TEXT
date_created TIMESTAMP
start_date DATE
end_date DATE
number_of_hours INT(2)
number_of_test INT(2)
course_category_id INT(10)
initiated TINYINT(1)
prerequisite TEXT
intended_audience VARCHAR(255)
syllabus TEXT
Indexes
issue_post
id INT(10)
content TEXT
author_name VARCHAR(45)
date_created TIMESTAMP
issue_thread_id INT(10)
Indexes
college
college_name VARCHAR(100)
id INT(10)
state VARCHAR(45)
Indexes
administrator
id INT(10)
name VARCHAR(45)
contact VARCHAR(45)
email VARCHAR(45)
date_created TIMESTAMP
password TEXT
Indexes
announcement
id INT(10)
title VARCHAR(500)
content MEDIUMTEXT
date_created TIMESTAMP
course_id INT(10)
Indexes
student_test_response
id INT(10)
response INT(1)
student_id INT(10)
test_question_id INT(10)
Indexes

CONCLUSION

As budding engineers, it is our duty to create products that give back to the community in which we live and have a positive impact on society. The central focus of the engineering profession is the application of scientific knowledge to meet societal needs. Engineering connects pure science to society. Engineering therefore has a social responsibility. As part of this moral obligation we developed **"Fastgrasp".**

A recent study conducted by Germany-based Education International showed that long journeys to school have a negative impact on students' health and on their education achievement levels.

"Up until now, neither education authorities nor national governments have considered the impact of long travel hours, to and from schools, on students' health and learning abilities. Sitting in a car or a bus for up to three hours per day is not rare, and tires a child's body more than an adult's," the study said.

Echoing similar sentiments, Charles Mutazihana, the head teacher of Kigali Parents School, says that long distances cause fatigue as the day commences which kills a learner's concentration.

The solution for this can easily be approaching the government to build more schools in rural areas so that education ceases to be a luxury. However, infrastructure development takes time and the issue being so serious needs immediate addressal.

We developed it in an effort to assimilate an e-portal that acts as a virtual classroom. The application replicates the facility of a real classroom and provides features such as lecture notes, assignments, tests etc. It helps in bridging the physical distance between a student's home and a classroom thereby eliminating any physical barrier in the exchange of knowledge.

BIBLIOGRAPHY

- Oracle Docs.
- stackoverflow.com
- https://netbeans.org/kb/docs/javaee/ecommerce/design.html
- http://www.oracle.com/technetwork/java/sessionfacade-141285.html
- http://www.newtimes.co.rw/section/read/201440/