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Abstract

Exam Management System (EMS) at Notre Dame University Bangladesh (NDUB) is an effective system for managing exam and course-related activities for NDUB. EMS automates the conventional system of managing exams. EMS helps NDUB faculties, students, and other academic officers to manage the exam processing very easily and effectively and EMS can maintain mobility of these activities better than conventional manual systems. The main intentions of EMS are to conduct the exam and course-related activities very easily and rapidly. Comprehensively EMS has many interesting features altogether situated in a fair intended web application. EMS is designed using recent technologies like ?Laravel 7.0?, ?Bootstrap?, ?JavaScript?, ?jQuery?, ?MySQL?. EMS's working speed is very rapid and its database can take a massive user load at a time. EMS can be very useful for the exam and course-related operations of Notre Dame University Bangladesh.

Index terms— exam management system, student management system, Laravel, MySQL, NDUB

1 Introduction

The Exam Management System can help Notre Dame University Bangladesh to get rid of complex database searches because EMS allows users to do the same tasks in a very user-friendly way. For operating those kinds of database tasks, this institute needs skilled manpower but the user interface of this management system will make this very simple and anyone will feel comfortable with the interface. Managing exams and courses is a very important and time-consuming task for a university. Assigning faculties manually for different courses is not a very arousing task. This task will take more time for an institute and an institute has a lot more work to manage, one of those tasks is assigning students for different courses according to different trimesters which is also a very time-consuming task if done manually. To automate these kinds of manual tasks Exam Management System is a very well-intended web application with a simple and attractive user interface.

User authentication is one of the important parts of EMS. The Exam Management System will take care of the privacy of each user and keep safe important information. When this web application gets a password as input it quickly hashes the password. So hacking any user account will be a very hard task for any anonymous hacker. EMS begins with the Registrar. Before everything, the registrar needs to create a department for the university. The registrar has the responsibility to create accounts for users as well as, to manage trimesters and create batches according to trimester and, assign faculties in special cases. A course coordinator organizes faculties with courses, set credit hours for faculties and courses, assign solo students in trimester as well as a batch to trimester, assign courses to batches, and many more significant tasks are done by the course coordinator, manage repeat, supplementary, credit transfer students, and so on. Faculties got to see all the assigned courses and students at their accounts and can do the marking of students' works, and can submit the mark sheet to the Exam Controller [1]. The Exam Controller has the responsibility to publish the final trimester mark. The Exam Controller can see all mark sheets according to the trimester and also gets access to students' mark sheets if there are any mistakes in marking occur [2]. Finally, when the trimester result is published then students can see their results in their accounts and can see all previous mark sheets [1] which were already published also can download the mark sheet transcript [3].

Above all, the Exam Management System is a highly secured, well-intended web application, developed with the latest and most secured technologies. EMS will help the staff and students to automate manual tasks and

increase their speed of work. EMS will reduce the amount of paperwork and every user will be able to operate their works from anywhere.

II.

3 Methodology

The Notre Dame University Bangladesh (NDUB) operates its course and exam related activities conventionally. Though the university's way of managing exams and courses is very composite, effective, and well organized but due to the process is operating manually with manpower and lots of paperwork, the university needs quite a heavy amount of time to rape up one trimester and start a new trimester. So the Exam Management System (EMS) is developed in a very amazing way that it can overcome all time and manpower issues and provide a much better service than the manual system. To structure the system we need to deeply analyze the composite system in which NDUB manages its exam and course-related activities. Developing the Exam Management System (EMS) requires a lot of analysis because a lot of end-users are going to use this management system so we need to collect requirements from all the possible end-users and combine all those requirements in the EMS. We have studied so many ways to analyze how to make things work in the automated system, simply because the manual system that NDUB uses is very composite. Notre Dame University Bangladesh (NDUB) didn't use automation before to manage its exam and courserelated activities. So we have researched the impact and possibilities of the Exam Management System (EMS) over the existing manual system.

To develop Exam Management System a stepby-step process has followed which is required to develop a well-intended system. A well-intended system can be made by identifying and observing the needs of end-users by acquiring end-user requirements by various means and methods. To develop Exam Management System a development cycle has been used which makes this system well-developed and comfortable for end-users. This is a very simple but effective approach. Steps that have been followed to develop the Exam Management System are i) system planning, ii) system analysis, iii) system design, iv) system implementation, v) system support.

4 a) System Planning

Notre Dame University Bangladesh (NDUB) does not have any online exam management system. We regard the importance of an online exam management system that can help students, faculties, as well as university officials to minimize their amount of paperwork. So by observing the university's exam and course management process we decide to automate the exam and course management process and develop a well-intended web application that will reduce the amount of work for students, faculties, and university officials. Exam Management System (EMS) is developed in such a way that it is appropriate for many kinds of important operations, such as EMS will reduce the paperwork for faculties and university officials, it will take less manpower than the manual way of running the whole exam and course-related activities. EMS could save a lot of money because it needs less manpower so it can save the money of more employee salaries. By observing the manual process of exam and courserelated process of the university we have developed the system.

5 b) System Analysis

In this phase, we tried to gather all requirements from the end-users of the Exam Management System (EMS), as well as collecting requirements we perform a feasibility study on the EMS. We were gathering requirements from the possible end-users who will use the Exam Management System in the organization and each one has a different requirement and retrieves different information. We perform a feasibility study on the Exam Management System based on economic feasibility and technical feasibility to ensure that EMS can carry out the requirements of Notre Dame University Bangladesh.

Requirements from End-users: We observe the manual process of exam management, assigning faculty, assigning courses, result publication, etc. As well as by several meetings and conversations with the possible end-users of the system we gather many important requirements for the Exam Management System. Can create new departments.

Requirements gathered from the registrar's office are as follows, the registrar can create new batches, can create new trimesters, create new accounts for students, can create new accounts for faculties, can create new accounts for course coordinators, can view all departments. Also, the registrar can update the department name, the registrar can view all batches, can update batch information, and can update faculty designation. From the registrar's office, all students' information should be available at any time, students' batch information should be updatable, and all faculties' information should be available at any time.

Requirements gathered from the departmental course coordinator are as follows, course coordinator should be able to assign regular courses for batches, should be able to assign repeat/retake courses for students [4], can assign supplementary exams for students. can assign single courses with batches for credit transfer students, and should be able to assign faculty for all kinds of courses [1].

Requirements gathered from faculties are, faculties can view all assigned courses, and faculties should be able to mark students' work.

Requirements gathered from the exam controller are as follows, the exam controller can view all assigned courses, should be able to mark students' work, should be able to view all mark sheets any time [2], if necessary, can update students' marks, can see unsubmitted mark sheets, and the exam controller can publish trimester final result.

Requirements gathered from students are, students can see trimester final results after results are published [3], students should be able to see previous trimesters' results, and students should be able to know remaining credit hours for graduation.

Feasibility Study: A feasibility study determines the possibility of promoting a system and produces refined estimates for more development of the system. Feasibility study is a formal system proposal that acts as Economic Feasibility: We examine the economic feasibility of our system. By an economically feasible system, we mean a system that provides the best value for invested money on that system. The economic feasibility test provides some very valuable information for the responsible organization. By economic feasibility, an organization can understand how much amount of money should they invest in a project. Economic feasibility is evaluating the effectiveness of the EMS by using the cost/benefit analysis method. We try to develop the Exam Management System as an economically feasible system. To develop the EMS we won't have to spend any money on technologies. Because we are only using open-source tools and So the Exam Management System (EMS) is economically feasible.

Technical Feasibility: Technical feasibility is applied to decide on what technology should we use to develop our desire project. We usually use the latest and most popular technologies to develop a system to make it technically feasible so that we could get long-term support from the used technologies. The Exam Management System (EMS) is developing by trending open-source technologies. So the EMS could be supported by existing technologies. Technical feasibility determines whether current technical resources be upgraded or added that fulfill the new requirements. The technologies that we are using are very popular and support many amazing and complex web application's backends for many years. So the technologies that we are using to develop EMS can be upgraded and can fulfill new requirements if necessary.

To develop the Exam Management System we use HTML, CSS, BootStrap, JavaScript, jQuery for frontend and Laravel for backend, and MySQL in the database. These technologies have served the purpose of the technological world for a long time and these still come first when developers think to develop a wellintended web application. So of course these technologies will ensure the requirements that the Exam Management System needs to be technically feasible.

6 c) System Design

In this phase, various physical models or diagrams have been created that will satisfy all gathered requirements from end-users. At this stage, we were designing various UML diagrams and architecture that have helpful for end-users to understand the system's overview and as well as developers to understand the requirements of end-users. **System Architecture:** We develop the Exam Management System based on MVC architecture. This is one of the mostly used architectural patterns for developing various applications. MVC stands for Model, View, and Controller which an MVC framework consists of. These three categories have their functions. In Figure ??3 the system architecture of EMS is displayed.

7 Use Case

8 Fig. 3: System Architecture of Exam Management System

d) System Implementation

This is the construction phase. At this stage, we have written programs for Exam Management System. Also, we develop the system, test the system, do the documentation for the system and install the system on the local server. We also evaluate the system and enter data in the system to prepare for end-users.

9 e) Functionalities of the Software

Exam Management System (EMS) has many functionalities. Exam Management System has five types of end-user roles, such as Registrar, Course Coordinator, Faculty, Exam Controller, Student. For every end-user, this system has various well-intended functionalities.

10 Home Page and common features:

The Exam Management System has a fascinating home page to attract users. EMS has some common features that can be accessed from any end-users account. Such as Every user can log in and logout from his/her account. Each user can update his/her profile information as well as can change their password, also users can change their profile picture. **Registrar:** The registrar has some general role in the management system. Registrar has a dashboard from where the registrar can operate all kinds of operations concerned to him. From the dashboard, the registrar can view and update his/her profile if necessary The registrar can create a new account for 'Course Coordinator', 'Faculty', and 'Student'. The registrar also can create new departments as well as new batches

and new trimesters. From the registrar account all existing departments, batches, students, faculties can be viewed. The registrar can assign faculty for nondepartmental courses for any department if the departmental course coordinator wants.

Course Coordinator: Course coordinator of a department has some very important roles in Exam Management System. Course coordinators need to manage the work process between students and faculty. From assign faculties to assign students, a course coordinator needs to do many important tasks. A course coordinator can perform all these operations from his/her dashboard.

A course coordinator has the responsibility to set faculties maximum credit hours. A course coordinator can assign regular courses for any batch also can assign repeat/retake courses (with batch/without batch) and supplementary courses for students. A course coordinator needs to assign faculties for regular, repeat/retake, and supplementary courses for any trimester at this stage course coordinator can send a request to the register for assigning faculties for non-departmental courses if necessary.

Faculty: Faculties are one of the most important parts of an educational institute. Faculties need to manage a lot of work besides teaching. That's why Exam Management System has a lot of facilities for faculties that are accessible from their well-intended dashboard.

Faculties examine students' work and give them marks on the online mark sheet. Faculties can download the mark sheets if necessary. Faculties got their assigned courses and batches after the departmental Course Coordinator assigned them. Faculties got to see all the assigned courses and students from their accounts. Faculties examine students' work and give them marks on the online mark sheet. Faculties can download the mark sheets if necessary. Faculties can see a mark update information if the exam controller updates any student's mark who was assigned to him/her for that course. when the marking of trimester final will be done faculties will be able to submit the mark sheet to the Exam Controller.

Exam Controller: The Exam Controller starts his/her work after faculties submit the final mark sheet. The responsibility of the Exam Controller is to publish the final trimester result at the most suitable time. When the Exam Controller will publish the trimester final result only then students will be able to see their trimester result on their account. The Exam Controller can manage all these tasks from his/her dashboard.

The exam controller can see all mark sheets which are already published by faculties from his/her account. The exam controller has the responsibility to publish the trimester final result. If any faculty doesn't submit a trimester mark sheet then the exam controller can see the list of those unsubmitted mark sheets.

Students: Students are the last part of this management system. Students can see their results when all other users have finally done their work. Students can control all features from their well-designed dashboard.

Students can see their newly published results, as well as they, can see their old results searching by trimester name. Students are also able to see their whole mark sheet transcript at once on one page which will contain all the results of the already published results and CGPA of completed trimesters. Students' dashboard has a section from where they can know their remaining trimesters and credit hours.

11 f) System Support

This step is necessary when the system is in use for real-life operations. During this phase, IT staff maintains, enhances, and protects the system. IT staff maintains the system's security and solves if any technical issue occurs.

12 III.

13 Results and Discussion

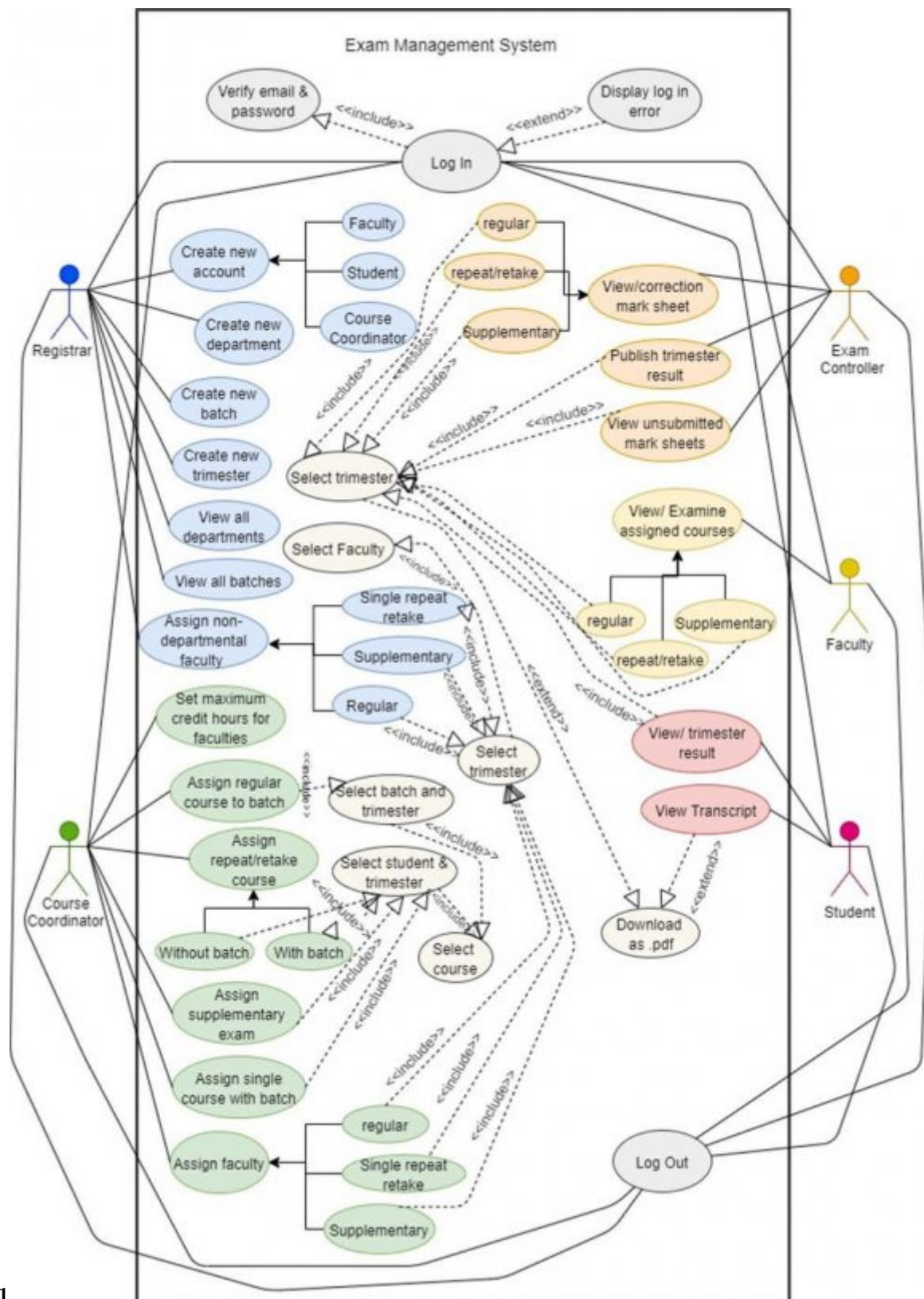
The Exam Management System (EMS) has provided very good performance in the testing phase. EMS performs all necessary tasks in a very short time. EMS can take a massive amount of user load due to the combination of Laravel and MySQL. EMS serves all end-users requirements, as well as EMS, offers some extra features also which are very appreciated by the endusers because by those features end-users can manage their work more easily. The Exam Management System is definitely able to serve its purpose to manage exam and course-related activities of Notre Dame University Bangladesh. By its performance, EMS assured that it can save a lot of time for students and university officials and of course can save a decent amount of money.

IV.

14 Conclusion

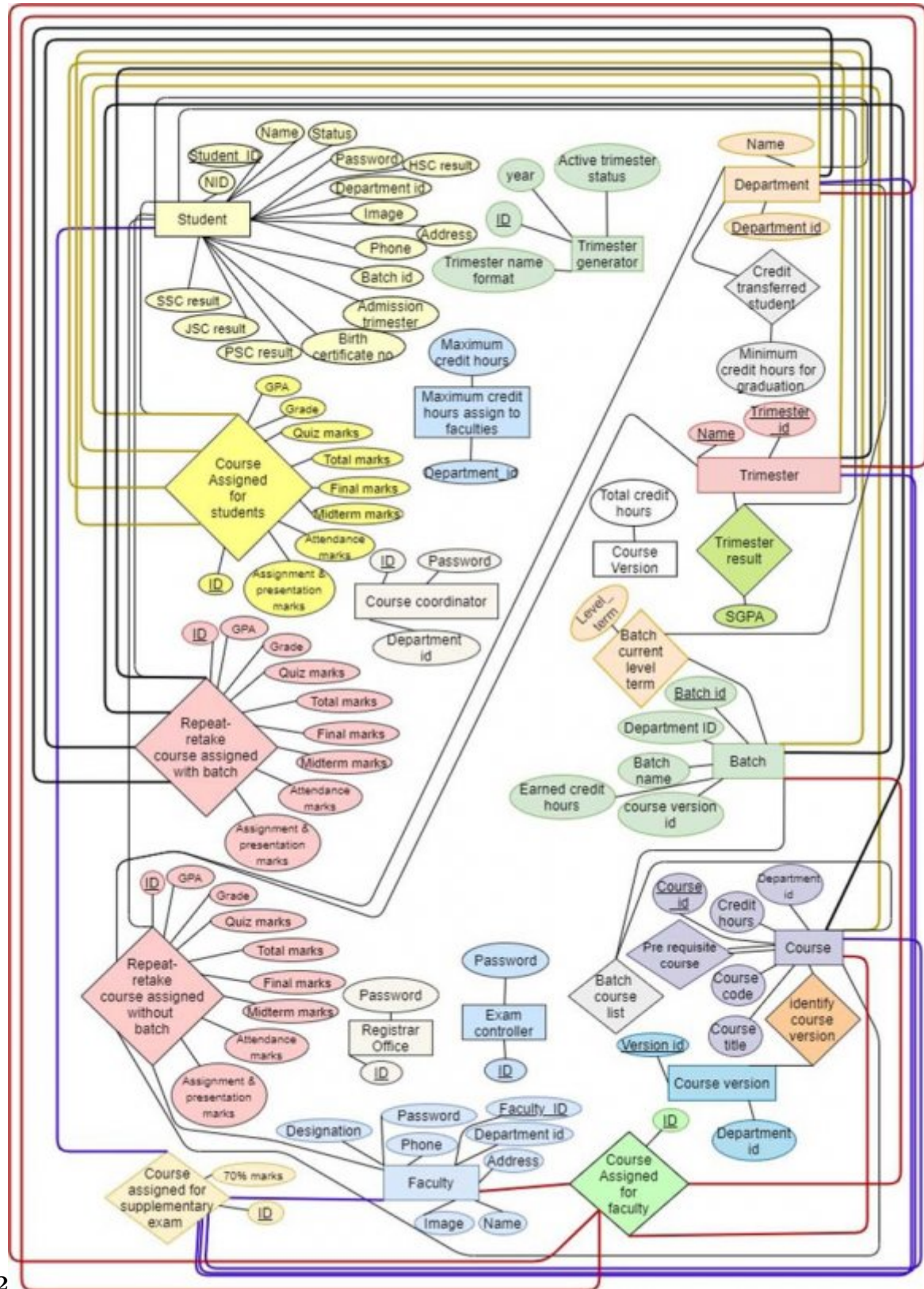
Exam Management System (EMS) is a very important web application. This application is developed based on the work process of Notre Dame University Bangladesh (NDUB). This web application will help to automate the process of how NDUB manages exams, faculties, students, and courses. EMS is certainly very helpful as a management system that could be a very good example of how a management system can help educational institutions to improve their work process and quality of work. EMS digitalized manual things, which will help students to know their results from anywhere without rushing to notice board when results are published as well as faculties to examine students work very easily. Other officials will also get benefited from this system because

217 it will reduce the amount of manual workload. Overall EMS could create a good environment for the university
218 officials as well as students.



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Figure 1: Fig. 1 :



2

Figure 2: Fig. 2 :

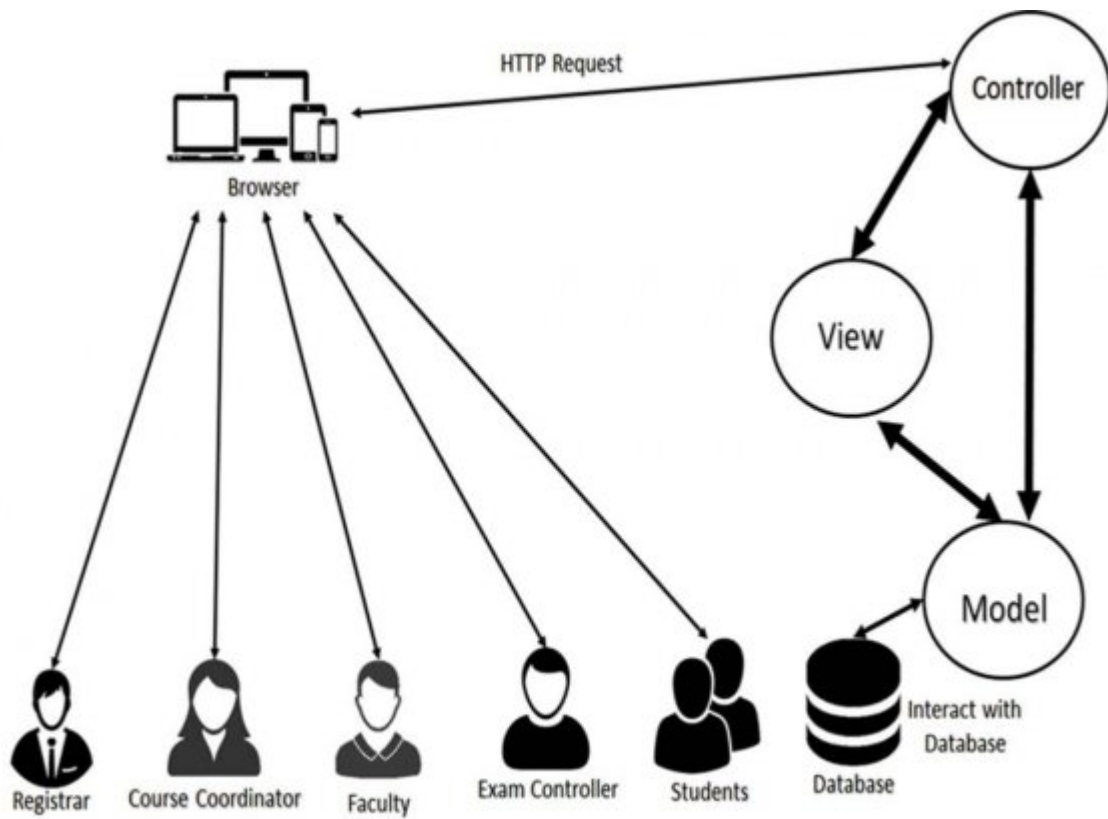


Figure 3: G

Figure 4:

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