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Automation of Open Electives

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Abstract: A dedicated website which has the features of open electives course allocation with specific requirements to the allocation admin and preference submission to students. At present the existing system is cumbersome which involves a hefty manual procedure which is, submitting hard copies to the representative and manual allocation of courses by the allocation admin. This includes spring boot, angular and Hibernate platforms. It consists of course and student controllers to work on the website which takes data and allocates open electives to the students automatically according to their preferences.

Keywords: Automation, Allocation, Course controller, Open electives, Student controller, Website

I. INTRODUCTION

A cumbersome process of allocating Open elective courses to the students have been taken manually these many days. Submission of options is also taken offline. To integrate these processes onto the web by building a website, we are proposing a website, which accomplishes the aforementioned tasks simply through mouse clicks. We would like to build a common platform which integrates both the tasks of course request and course allocation, performed by students and Course allocator respectively.

II. LITERATURE SURVEY

According to Ashok Shigli who was the administrator of open electives in our college, it is plethora of work for allocating the electives to the students of all departments, so that with the suggestion of Vijay kumar Mantri, faculty of IT Department they came in to conclusion to design a web application in order to automate the allocation of open electives. This lead to this project "Automate OE". All the requirements are collected directly from Dr. Ashok Shigli and started developing this project according to our architecture. The architecture includes two types of allocation methods which are combined and differential allocation.

In combined allocation as per guidance we followed a process named "7150", which means an open elective is allocated to the student who has seven cgpa with one backlog and five cgpa with zero backlogs. These are the bounds for which we can allocate open electives to the students in this process. It includes both third and fourth year students for processing open electives. This allocation is also free from FCFS process which stands for first come first serve allocation.

As per requirements another allocation method while allocating electives are differential allocation. In this allocation process only fourth year students are given preference for allocating electives because of the compulsory regulation of studying three open electives as per JNTUH instructions. So at first of all open elective controller would complete allocation of electives to students who are in their last semester with differential allocation procedure and then start allocation to other semester students with combined allocation procedure.

Requirement analysis in this project are done by Dr. Ashok Shigli. Technical support and guidance are followed from Mr. Vijay kumar Mantri and Ms.Krishna prasanna in order to complete this project. Architecture, Design, Development and testing of this project are done by the team.

Many Universities have adopted computers to handle each and every part of the student information processing shifting from traditional methods into a better environment electronic that enhances productivity by reducing process time, producing early and accurate reports, making information readily available when needed. This adoption did not happen in one night, but rather an evolutionary process that started with the generation of computers. Today, internet accessibility has become the defector for routine operations and information interchange for many Universities through the worldwide web, e-mail, social media and mobile phone applications. According to Mills (1990), provision of services like students' admission, registration and applications are becoming proficient through the use of technological tools and packages like word processors, spread sheets and databases

An Online Course Registration system for University of Dataville was developed with a frontend web interface and a back-end database. An example of the system had been University of Florida's ISIS Registration .A Database system had to be chosen as the back-end such as Oracle, MySQL, Microsoft SQL Server, DB2, and Access. A web server had to be chosen for the front end such as Tomcat, Glassfish, Run, etc. A server side language had to be chosen such as PHP, JSP, ASP, etc. The practical implementation of a real time database management system made them understand the intricacies involved in designing the database schema with inter related constraints and the complexity that exists in integrating the front end system with the back end data-store. Their project was developed keeping in mind the functionalities for students and instructors and the project also provided all the functionalities specified in the project document and more functionality can be added over the existing one so that the system has more enhanced features and is more efficient.

III.DESCRIPTION OF THE PROBLEM

At present the existing system is cumbersome which involves a hefty manual procedure which is, submitting hard copies to the representative and manual allocation of courses by the allocation admin. A cumbersome process of allocating Open elective courses to the students have been taken manually these many days. Submission of options is also taken offline. To integrate these processes onto the web by building a website, we are proposing a website, which accomplishes the aforementioned tasks simply through mouse clicks. We would like to build a common platform which integrates both the tasks of course request and course allocation, performed by students and Course allocator respectively. With this website we automate Open elective procedure in the college. Automate OE website contains multiple users usually students and allocation admin. Student submits his preferences through predefined form. Allocation admin has many options for allocating, among those (s)he can choose a specific workflow based on the requirement. This website is built based on the preferences of current allocation admin(Dr. Ashok Shigli) and architected accordingly.

IV.PROPOSED SYSTEM AND ADVANTAGES

A dedicated website which has the features of course allocation with specific requirements to the allocation admin and preference submission to students.

- Speed workflow at the time of opting for open electives
- Automatic allocation of electives to students based on CGPA, Backlogs, preferences

V.SOFTWARE UTILITIES

1. Spring boot(fast website development in MVC model)
2. Hibernate (for achieving ORM (object relational mapping))
3. Angular(Front end GUI)
4. REST API(exposed from backend)

VI.HARDWARE REQUIREMENTS

Major benefit is as we are employing spring boot utility in our project development, it comes with an embedded tomcat server. Henceforth for testing and utilizing through API, we do not require a dedicated server environment. Front-end Angular base module and components are to be hosted on a Tomcat server which supports as many threads as we require(usually active 3rd year and 4th year student count).

Software development requirements -- 8GB RAM , 250 GB ROM, intel i5 processor, Postgres database/MYSQL database (querying language employed is SQL)

VII.ARCHITECTURE

Automation of open electives is the concept of eradicating the time-worn offline collection of open electives and allocating it to the students. The offline process consists of collecting open elective forms by the respective class teachers and sending them to the main centralized faculty in order to evaluate and allocate the electives. As this process not been done in the single attempt, it recursively done until all the students are filled with their respective electives. This process won't be in the first come first come basis but it includes the factors like grades of the student, year of studying, seats available, subject's available, equal number of seats for each branch, backlog criteria and many others, which made this offline system a outmoded.

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In view of this process, we developed an automated allocation application which in turns collects the details from student as well as coordinators. The coordinator post the information regarding number of seats and sections available for a particular subject to be published for the student then the students are allowed to fill their form which consists of their roll number, name, year, branch, CGPA, backlogs, open elective preference 1, open elective preference 2, open elective preference 3 and submit their form.
The data would be stored in their respective database. The entire allocation process is divided in to two types they are

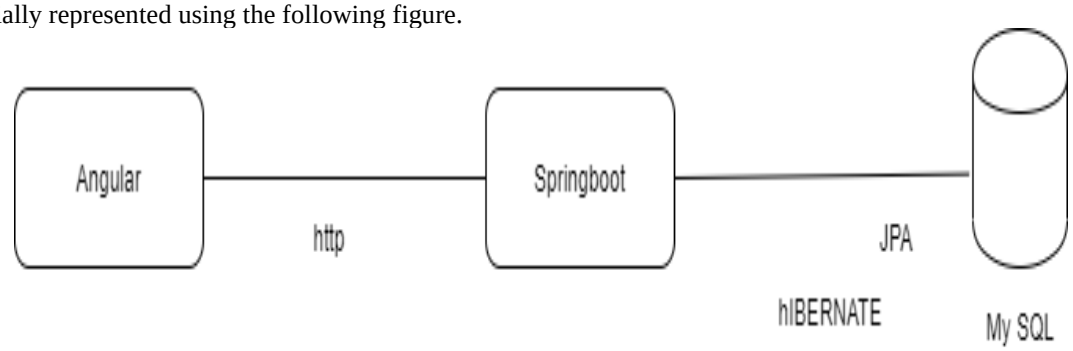
i. Combined allocation
ii. Differential allocation

In case of combined allocation all the students are combined and allocated but in differential the final year students would be separately allocated their open electives. To be in the comfort zone we have made the reports for visualizing the work, which are like reports regarding subject wise allocated and not allocated, course wise allocated and left empty. This automation would be great in time saving, decreasing the workload for many faculty who are currently working vigoursly in order to allocate open electives for students, all the excel work would be reduced, charts/reports are provided which made the work transparent, no more first come first serve allocations, proof of student selecting electives, money saver, easy for giving explanations regarding allocation of electives.

In combined allocation as per guidance we followed a process named “7150”, which means an open elective is allocated to the student who has seven cgpa with one backlog and five cgpa with zero backlogs. These are the bounds for which we can allocate open electives to the students in this process. It includes both third and fourth year students for processing open electives. This allocation is also free from FCFS process which stands for first come first serve allocation.

As per requirements another allocation method while allocating electives are differential allocation. In this allocation process only fourth year students are given preference for allocating electives because of the compulsory regulation of studying three open electives as per JNTUH instructions. So at first of all open elective controller would complete allocation of electives to students who are in their last semester with differential allocation procedure and then start allocation to other semester students with combined allocation procedure.

In this project, the working constitute frameworks like angular and spring boot. The whole process in this process can be pictorially represented using the following figure.



Working procedure of the project

A. Usecase Diagram:
A use case diagram is a dynamic or behavior diagram in UML. Use case diagrams model the functionality of a system using actors and use cases. Use cases are a set of actions, services, and functions that the system needs to perform. The "actors" are people or entities. This diagram is used to demonstrate the use cases of this project, which involves admin would publish the electives available for the year then students can choose his elective and submit it to the controller. Then Administrator would go with allocation process, at last he can generate his excel sheets in the reports page.

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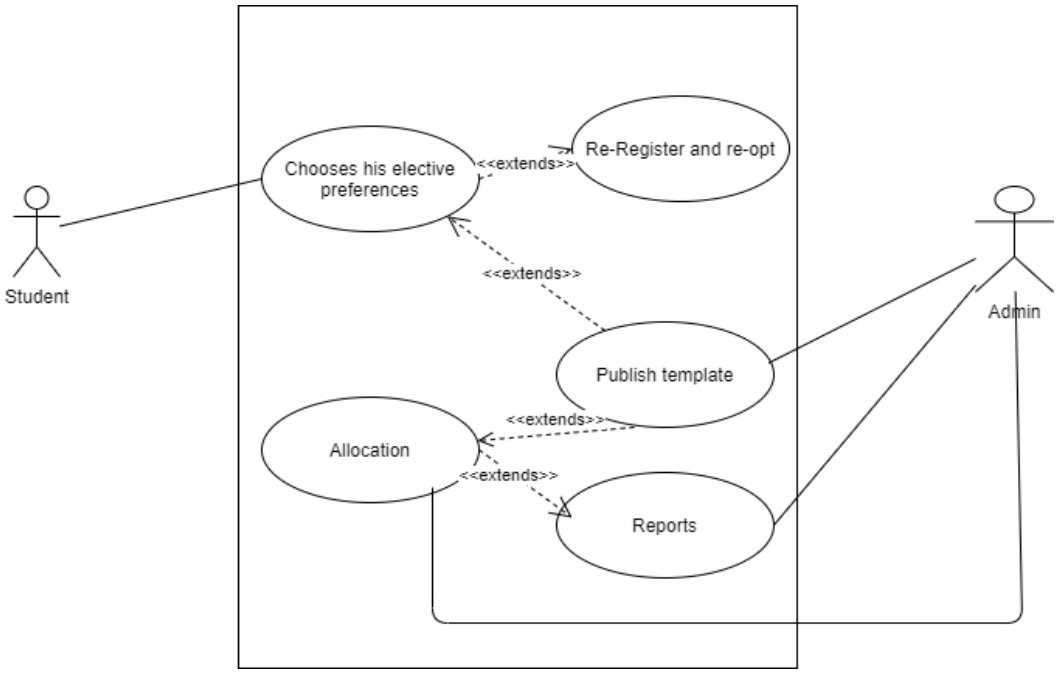
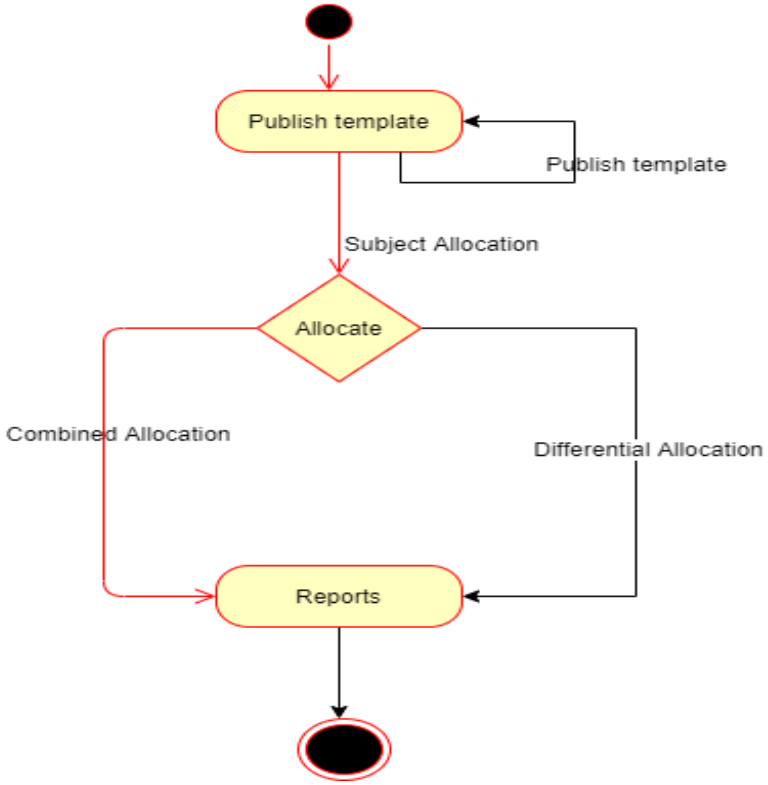


Use case diagram

B. Activity Diagram:



Activity diagram

C. Deployment Diagram:

A deployment diagram is a UML diagram type that shows the execution architecture of a system, including nodes such as hardware or software execution environments, and the middleware connecting them. Deployment diagrams are typically used to visualize the physical hardware and software of a system. In this admin would grant permissions for the open elective controller in order to post the electives, those posted electives can be used by the students to fill out their preferences and submit, which would end up in storing all those data in the database which is used by open elective administrator for allocation of open electives.

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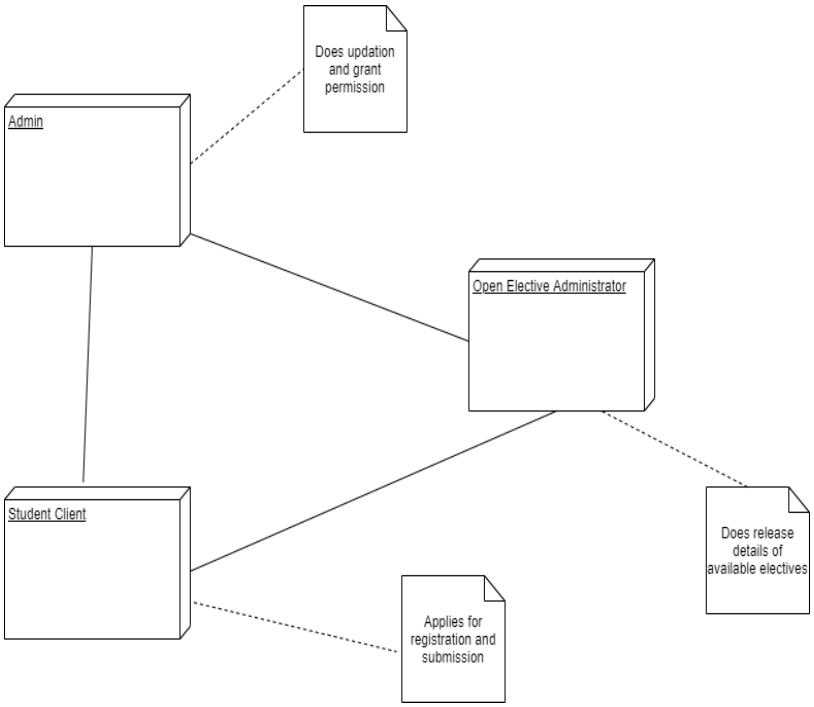
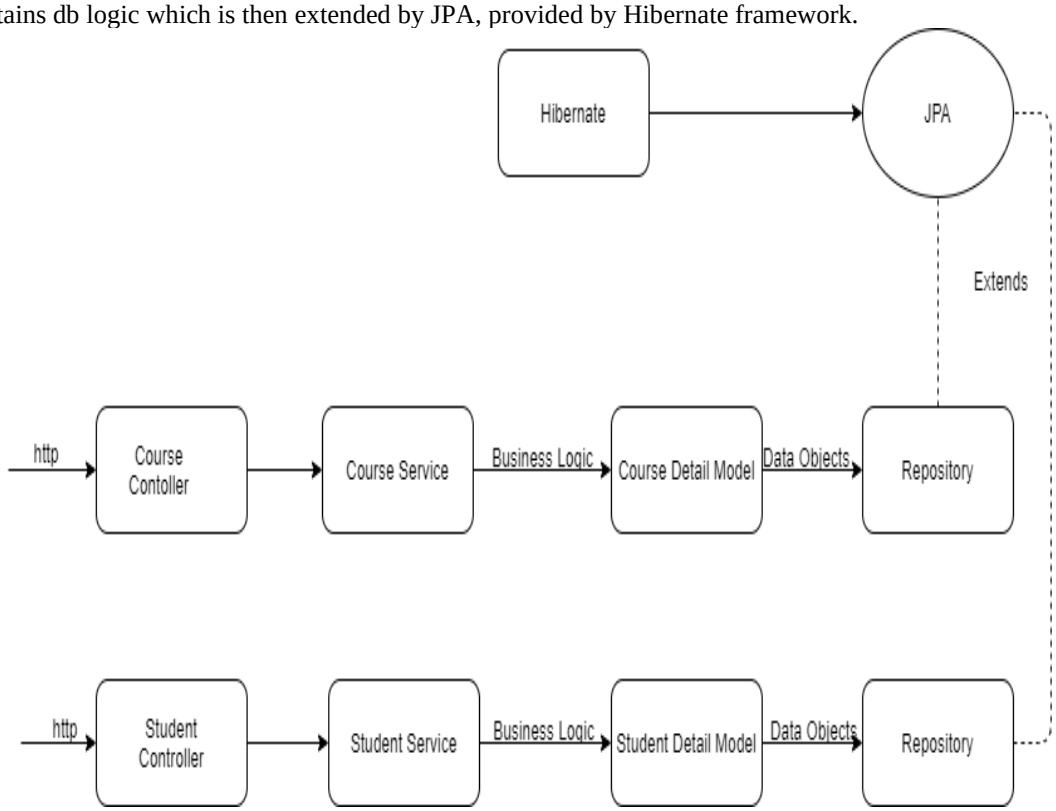


Deployment diagram

The above figure represents activity diagram of the flow process, where publish template would start the process and reports before ending the process are designed.

D. Back end Process Diagram:

In this process when an angular client side scripting allows a user to send a request as per student or course controller it would request its corresponding controller file which contains code regarding resultant API and calls the service for its business logic then that service would call Model internally for creation of data objects which are sent to repository which contains db logic which is then extended by JPA, provided by Hibernate framework.



Back end Process diagram

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VIII. CONCLUSION

We have implemented an automation, which makes open electives allocated automatically to students who have filled the form. When an admin publish the available open elective, students can choose their own preferences regarding those electives and submit their form. All the data collected from students are collected by database, which will be used by admin to allocate electives to the students according to their preferences. This allocation consists of two methods combined allocation and differential allocation, where combined is for both third and fourth year students with certain criteria (depending upon their academics) while differential is only for final year students where no such criteria comes under. Later after allocation, Admin can generate the final excel sheets regarding allocated students list, not allocated students list and also in eligible students list, whereas admin can also go with run next phase and complete allocation using buttons present in the reports page. This project would reduce a lot of time and work, which makes much easier to allocate open electives to the student.

ACKNOWLEDGMENT

We wish to acknowledge **Mr.Ashok Shigli**, administrator of open elective allocation in our college and other faculty for guiding and maintaining this project which have been used in the allocation of open electives to the students in our college.

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