Software Engineering
CS4443 - Spring 2021
Software Requirement Analysis
For
Teaching Assistant Management Software

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Context Diagram

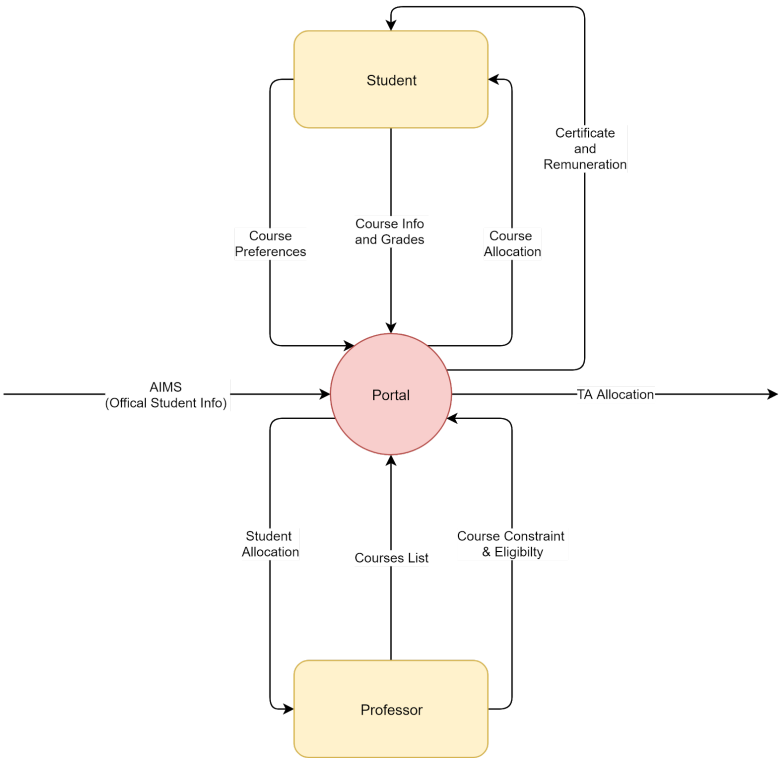


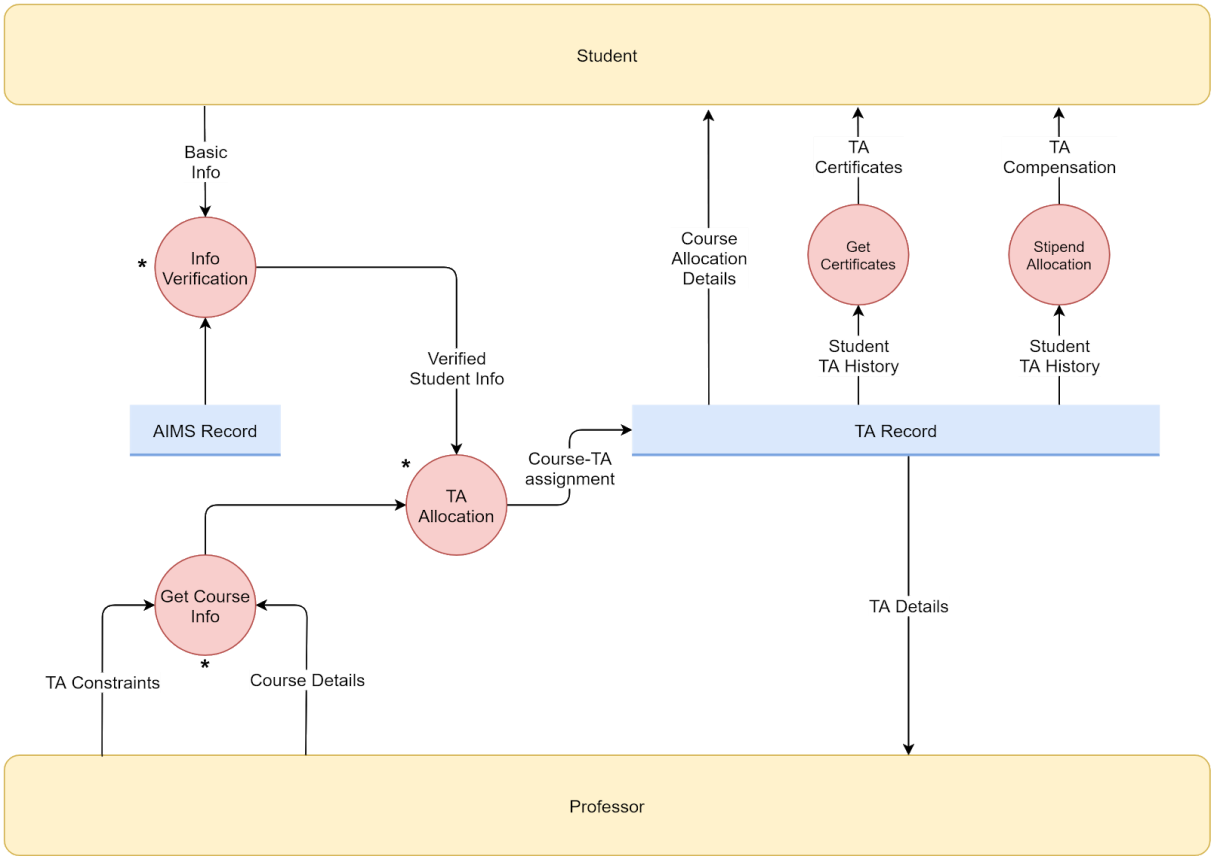
Fig 1: Context Diagram

A context diagram in engineering is a diagram that defines the boundary between the software, or part of a software, and all its external entities such as inputs, outputs, sources, and sinks . The above diagram represents the context diagram for the software we envisioned for a Teaching Assistant Management Software.

Data flow diagrams

Data flow diagrams are a way for representing the flow of data through a system or process and are essential in the design process of a system or software. For our software, we decided to form two independent teams and come up with our own vision of what the software should be and come up with the corresponding DFDs. After discussing, analyzing and critiquing each other's DFDs we finally combined the two DFD into a new one combining the strengths of both DFDs and eliminating most of their weaknesses. This document aims to shed some light on the design process behind each DFD and how we reached the final DFD along with the salient features of the final version.

1) DFD of first independent team

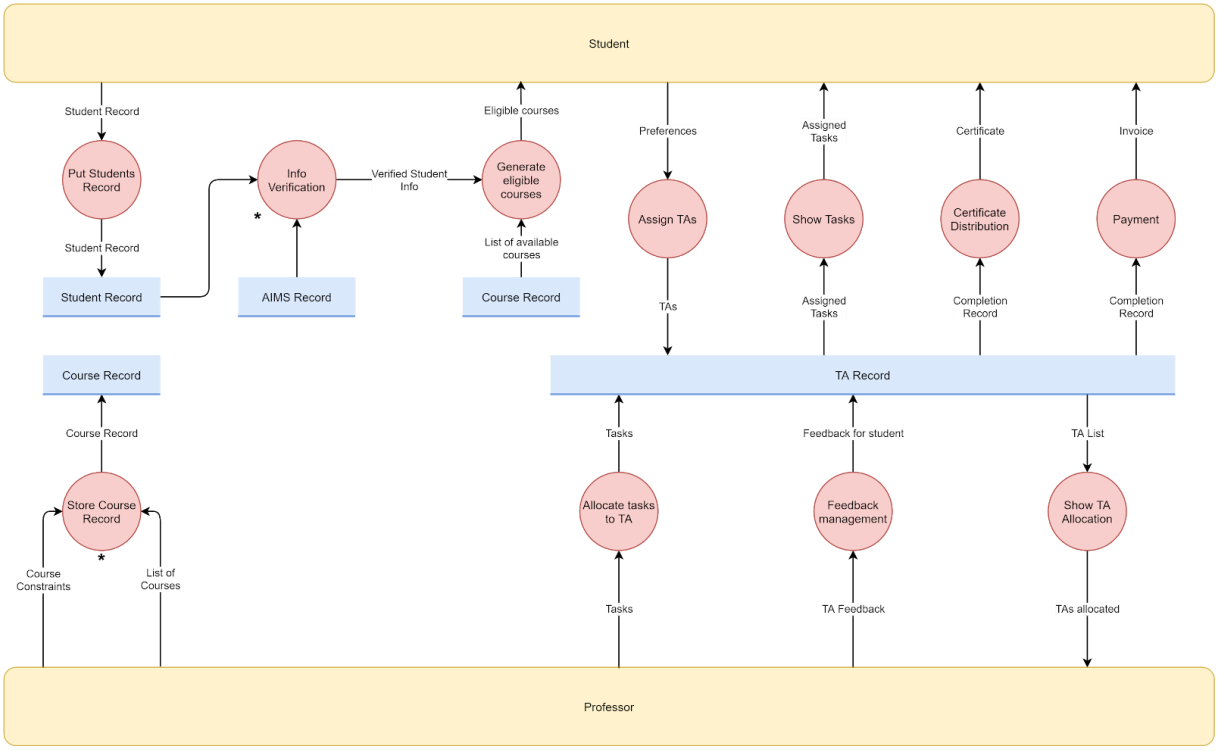


The principal actors in this system are Student and Professor. The main TA allocation algorithm is applied after collecting the course details and preferences from the professor and after verifying student details from AIMS. The allocated TAs are informed that they've been made TA for respective course(s). Similarly, the course instructor is notified of the list of TAs allotted for their course(s). These details are maintained in the TA Record. Upon successful completion of the course, certificates and stipend are automatically generated and sent to the student.

This DFD does not consider activity assignments and TA feedback by professors. It assumes that students and professors have already established their identity using authentication. Students cannot know in advance which courses they are eligible for. However, it verifies student information before performing the allocation and notifies both professor and student of the allotted courses/TAs respectively.

This DFD also does not provide any clarity on how the TA allocation process and certificate and stipend distribution was triggered.

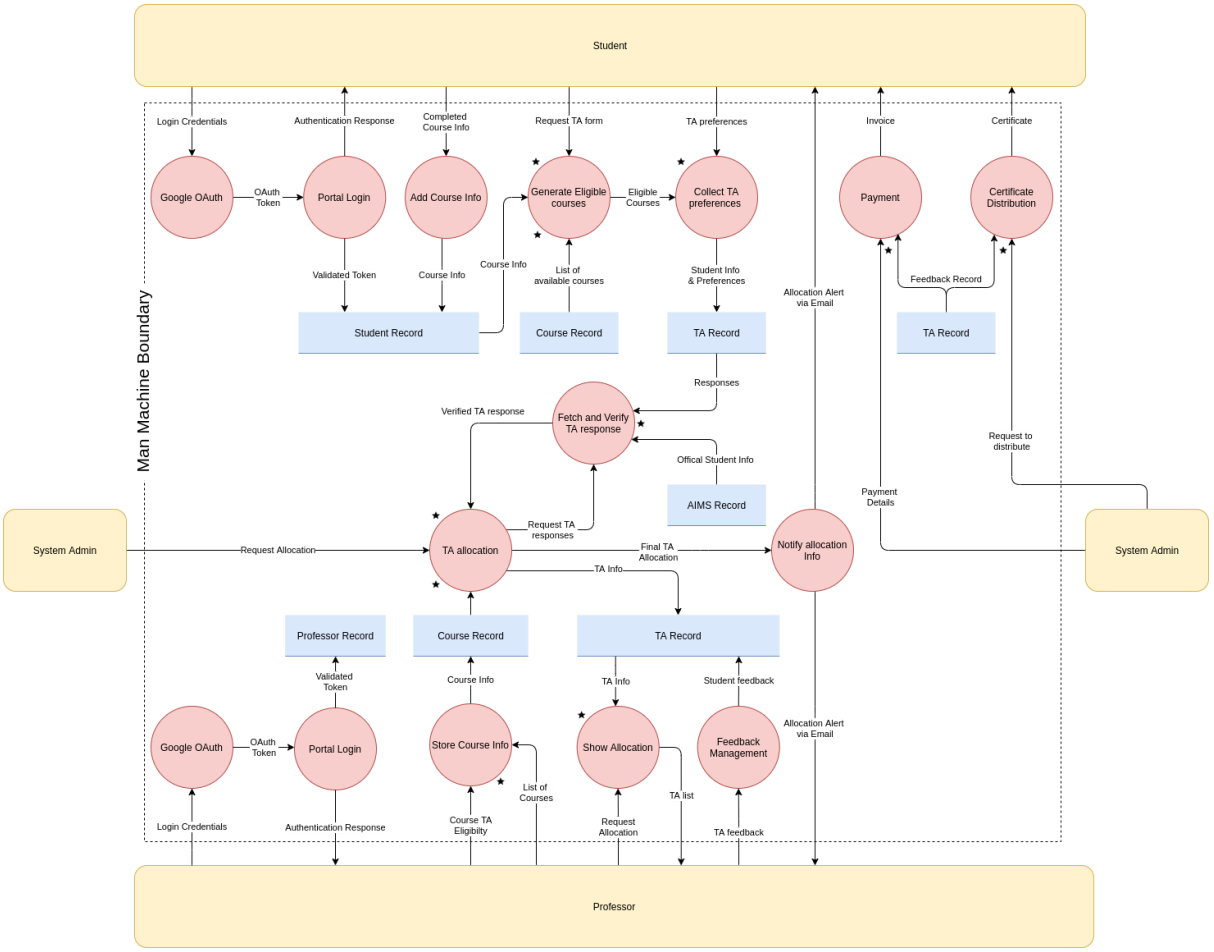
2) DFD of second independent team



The two main users of the system would be professors and students. They each submit their data required for allocation of teaching assistants. For the professors this would be the courses they are teaching for which they want assistants and any criteria they would like to impose for selecting those assistants. For the students this information would be information about them like CGPA, which courses they have done, which major they are in, which year they are in, their individual grades in each course and so on. The students would be selected based on this information and the criteria imposed by the professor. But this information would be stored in 2 different records and the student information would be first verified through AIMS to check the consistency and correctness of the data. If the data is verified, then using this and criterion given by the professor, a list is generated and sent to the student showing which courses they are eligible for. They choose their preferences and using this information, they are assigned as teaching assistants for various courses. This is used to generate a new record which would be responsible for managing the different aspects regarding management of TAs including assigning tasks to the assistants, feedback, evaluation and incentive disbursement.

This DFD does not tackle how the users would log in. Hence this also does not tackle how each data submitted would be verified apart from the student course records. But this DFD uses a single TA record to streamline all the main functions after the allotment has been completed. Also the students don't have to check eligibility of each course and would directly know which courses they are eligible for. But no notification system is in place to intimidate the students or professors about major events such as when TA allocation has been completed. Also it is not clear if the feedback is being used for disbursement of incentives or not.

3) Final DFD



Improvements:

1) Login: The above DFD clearly illustrates how the students and professors are being authenticated.
2) Security: Google Authentication, i.e, non-IITH users cannot access the portal
3) Feedback loop before certificate and payment distribution which are dispersed according to evaluations from professors.
4) New Principal user (System Administrator) can choose to automate TA allocation or manually trigger it if required.
5) Payments are done by external entities and invoices and confirmation are delivered through the software.
6) Improved and Better workflow for verification of student grades. (This will help us to easily plugin verification via AIMS without changing the TA allocation procedure)
7) Notification system to notify students and professors of events like when TA allocation has been completed.
8) Man-Machine Boundary: Previous DFDs did not show any distinction between automated and manual processes.
9) Star symbols are used to show usage of multiple inputs in a transform.