# CS532- Project 2
# Design document

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Student Registration System is an application to support typical student registration tasks in a university. It performs general tasks such as entering student details,information about courses and enrollment to various classes into the Database. The application supports insertion,update,delete and drop operations on the database tables. The application is designed using Oracles PL/SQL and JDBC.

Implementation
Access is provided in two forms to the end user
(1)Menu driven Interface implemented in Java.
(2)PL-SQL Procedures/functions

PL/SQL Implementation

A package named StudentregSys is created.
We have used a reference cursor proj2cursor

**Sequence**

Sequence generates the values for logid automatically when new log records are inserted into the logs table. All logid values have 4 digits. The sequence starts from 1 and is increments by 1 every time when a new logid value is generated.

**Procedures:**

procedure show_students(c_showStud out proj2cursor)
Displays information about students from the students table.

procedure show_courses(c_showCourses out proj2cursor)
Displays information about courses from the courses table.

procedure show_prerequisites(c_showPreReq out proj2cursor)
Displays information about prerequisites from the prerequisite table.

procedure show_classes(c_showCls out proj2cursor)
Displays information about classes from the classes table

procedure show_enrollments(c_showEnroll out proj2cursor)
Displays information about enrollment from the enrollment table

procedure show_logs(c_showLogs out proj2cursor)
Displays the entries in the logs table.

procedure add_student(s_sid in students.sid%type, s_firstname in students.firstname%type, s_lastname in students.lastname%type, s_status in students.status%type,s_gpa in students.gpa%type,s_email in students.email%type);
Adds student details into the students table.The information about students to be inserted is provided as parameters to the procedure.

procedure student_info(s_sid in students.sid%type,c_infoStud out proj2cursor,error_mes out varchar2);

Takes sid as input and lists the sid and firstname of the student as well as information about courses such as dept_code,course# and title.dept_code and course# are displayed together.If the student is not in the students table,a message like"The sid is invalid." is displayed and If the student has not taken any course,then "The student has not taken any course." is reported.

procedure course_info(c_dept_code in courses.dept_code%type,c_course# in courses.course#%type,c_courdet out proj2cursor,c_prereq out proj2cursor)
For a given course with dept_code and course# as parameters,returns all its prerequisite courses including direct and indirect prerequisites.

procedure class_info(v_classid in classes.classid%type,c_class_info out proj2cursor,err_msg out varchar2)
For a given class with classid provided as input parameter,lists the classid and course title of the class as well as sid and firstname of all students taking the class.If the class is not in the classes table, "The cid is invalid." is reported and if no student has taken or is taking the class, then a message which says "No student is enrolled in the class." is displayed.

procedure enroll_student(s_sid in students.sid%type,c_classid in classes.classid%type)
Procedure to enroll students into a class.The sid of the student and the classid of the class are provided as parameters.
If the student is not in the students table, then"The sid is invalid." is reported. If the class is not in the classes table, then "The classid is invalid."is reported. If the enrollment of the student into a class would cause class_size to exceed class limit then the enrollment is rejected. If the student is already in the class, then a message like "The student is already in the class." is displayed. If the student is already enrolled in three other classes in the same semester and the same year, then a message like "You are overloaded."is displayed and the student is enrolled. If the student is already enrolled in four other classes in the same semester and the same year, then "Students cannot be enrolled in more than four classes in the same semester."is reported and enrollment is rejected. If the student has not completed the required prerequisite courses,then the enrollment is rejected and a message that says "Prerequisite courses have not been completed." is displayed. For all the other cases, the requested enrollment is performed.

procedure delete_enrollments(s_sid in students.sid%type,c_classid in classes.classid%type, str_out out logs.operation%type);
Procedure to drop a student from a class. The sid of the student and the classid of the class are provided as parameters.If the student is not in the students table, then"The sid is invalid." is reported. If the class is not in the classes table, then "The classid is invalid."is reported. If dropping the student from the class would cause a violation of the prerequisite requirement for another class, then the drop attempt is rejected.In all other cases,the student is dropped from the class.

procedure delete_student(s_sid in students.sid%type);

Deletes the specified tuple for a student from the students table. If the student is not in the students table,“The sid is invalid.”is reported. When a student is deleted, all tuples in the enrollments table involving the student is deleted.

## Triggers

trigger_add_student
Creates a tuple into the logs table whenever information about a new student is inserted into students table.

trigger_del_student
Inserts into logs table whenever a student is deleted from the students table.
Deletes from enrollments table those values whose sid match those of the deleted sid argument

trigger_stud_enroll
Insert data into the logs table whenever a new enrollment is made.
Updates classes table by incrementing the class size by 1 every time an enrollment is made.

trigger_stud_del_enroll
Updates classes table by decrementing the class size by 1 every time a deletion is made.

## JDBC Part:

The detail of the functions and various procedures available is as following.

(a) Displaying the information available in database

Functions are provided to display information available in database is provided in package. Functions available in package and their respective purposes are as follows:

show_students
Displays information about students in the “students” table
show_courses
Displays information about students in the “courses” table
show_prerequisites
Displays information about courses prerequisites in the “prerequisites” table
show_classes
Displays information about classes in the “classes” table
show_enrollments
Displays enrollment information in the “enrollments” table
show_logs
Displays log information in the “logs” table
student_courses
Displays the courses that a student takes. We provide the sid (student ID) as input
search_prerequisites

Displays the prerequisites for a particular course. We provide the dept_code and course# as input
student_info
Displays the information for a particular student.

The Menu driven Interface is implemented in Java which can be summarized as follows:

Main Menu is displayed as

```
MAIN MENU
----------------------------------------
0 - EXIT
1 - VIEW DATA MENU
2 - EDIT DATA MENU
----------------------------------------

Enter your choice
```

User enters appropriate choice on Main Menu.
If the user wants to quit the Student Registration System application then he/she gives 0.
With this option the user gets the following message:

```
Thanks for using Student Registration System. Goodbye!!!
```

If the user selects 1 he/she gets the VIEW DATA MENU
With this option the user gets the following menu

```
MAIN------>VIEW DATA MENU
---------------------------------------------------------------------
0  - Return to main menu
1  - Display student data
2  - Display classes data
3  - Display prerequisite data
4  - Display enrollment data
5  - Display courses data
6  - Display log data
7  - Display prerequisite of course
8  - Display courses taken by student

-------------------------------------------------------------------

Enter your choice
```

The user can do the following with View Data Menu options
* Return to main menu: User inputs 0 to go back to the MAIN MENU screen

* Display student data: Allows user to view data from the students table
* Display prerequisite data: Allows user to view data from the prerequisites table
* Display enrollment data: Allows user to view data from the enrollment table
* Display courses data: Allows user to view data from the courses table
* Display log data: Allows user to view data from logs table
* Display prerequisite of course : Allows user to view information about the prerequisites for a specific course. This option takes the Dept_name and Course# as input parameter from the user.
* Display courses taken by student: Allows user to view information about a student and the courses he is enrolled for. This option takes the Sid as input parameter from the user.

If the user selects 2 he/she gets the VIEW DATA MENU
With this option the user gets the following menu

```
MAIN------>EDIT DATA MENU
-----------------------------------------
Return to main menu
1 – Add student
2 – Enroll student
3 – De-enroll student
4 – Delete student
-----------------------------------------



Enter your choice
```

The user can do the following with Edit Data Menu options
* Return to main menu: User inputs 0 to go back to the MAIN MENU screen
* Add student: Allows user to insert a student from the students table
* Enroll student: Allows user to enroll a student in a class
* De-enroll student : Allows user to de-enroll a student from a class
* Delete student: Allows user to delete a student from the students table