

Granite Connection Learning Lab Database and Interface

1. INTRODUCTION

The Granite Connection Learning Lab is instrumental to the academic success of students across the Salt Lake Valley, offering a supportive location in which to recover credit, earn new credit, and develop important, lifelong skills. To facilitate the continued success of the Learning Lab, this database and user interface (as will be described in detail below) create a friendly and accessible means by which advisors and students may track progress.

At the current moment, the Granite Connection Learning Lab keeps student records in a variety of ways: handwritten records on paper forms, online spreadsheets referencing Google Docs, personal Excel spreadsheets, and others. The purpose of this database is to compile these different formats into one, simple interface that may be accessed by students and advisors alike, enabling speedy communication and dispute resolution.

As this database and user interface will be serving a high school, two concepts are of greatest importance: student confidentiality, and ease of access. As such, the user interface will display data on a need-to-know basis, keeping much of the unnecessary information hidden from the end user. Specifically, students will only be able to access information pertinent to themselves, while advisors will be able to access basic, useful information for each student utilizing the program. Meanwhile, the interface must not be cluttered or confusing in order to encourage use, while also being visually representative of the program and what it offers. The sections following demonstrate how these conceptualizations have been successfully implemented.

2. DATA MODELING

Within the Learning Lab, a variety of subjects must be tracked in order to paint an accurate image of daily operations. These subjects include, most importantly, the Student, as well as individual Advisors, Classes, and Packets. For each of these subjects, a variety of business rules apply, including:

- Each student has 1 advisor.
- Each advisor has multiple students.
- Each student may be a Day Student, an Outside Student, a Fulltime Student, or an Adult Student.
- Many students will be in for a class period, but some will come in before or after classes, or during lunch.
- Each student may have multiple packets.
- Class days are divided into two sub-categories: A and B.
- Mondays have a later start time than the rest of the week.
- Each class has multiple students.
- Each packet has a subject and a quarter associated with it.

Through these business rules, the following schema have been constructed to display the attributes of the subjects, as well as their relation to each other:

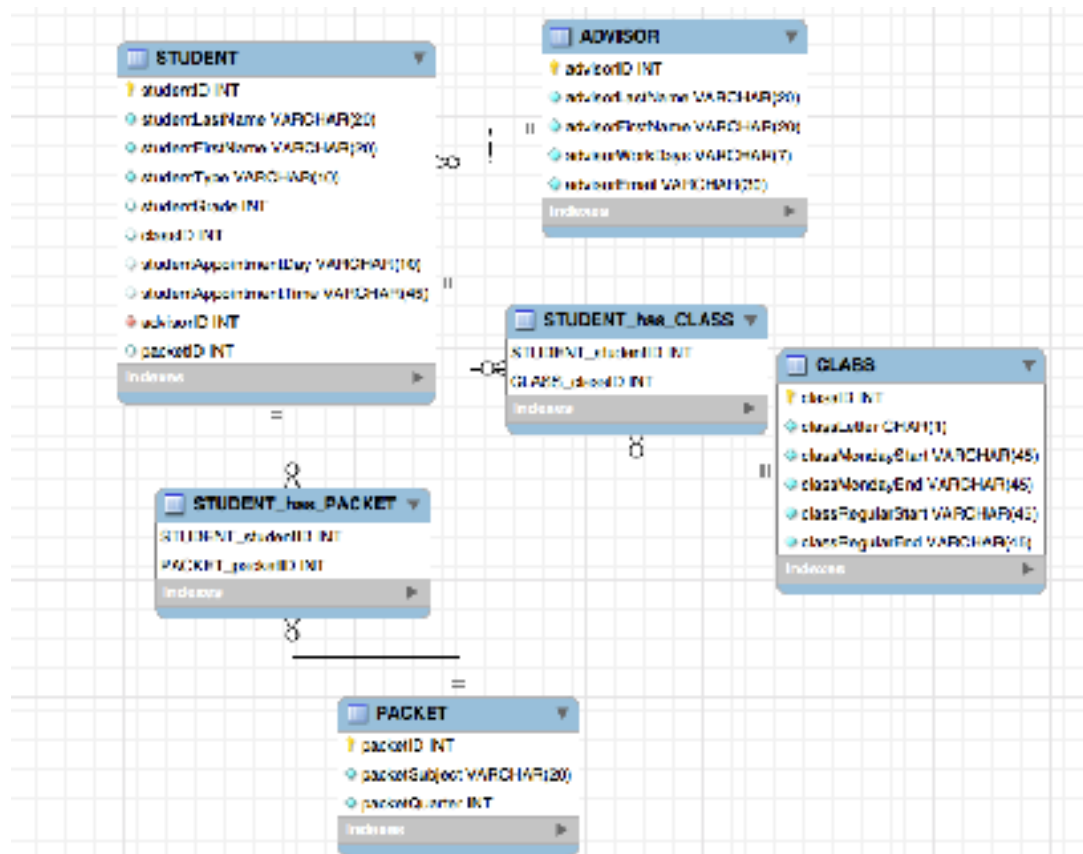
- STUDENT(studentID, studentLastName, studentFirstName, studentType, studentGrade, classID, studentAppointmentDay, studentAppointmentTime, advisorID, packetID)
- ADVISOR(advisorID, advisorLastName, advisorFirstName, advisorWorkDays, advisorEmail)
- CLASS(classID, classLetter, classMondayStart, classMondayEnd, classRegularStart, classRegularEnd)
- PACKET(packetID, packetSubject, packetQuarter)

As demonstrated by the variety of attributes a student possesses, the student is the focus of the Learning Lab. Each student has a unique, identifying student number, which will be used as their primary key. This ID is then followed by the student's basic information, including their name, classification, and grade. Finally, information related to the learning lab alone is represented via the student's appointment, packet, and advisor information.

The student is connected to these information categories via more unique identification numbers, including one for each advisor, packet, and class. Advisors may also be identified through their first and last name, the days they are present in the Learning Lab, and means of contact. Classes, meanwhile, are divided on whether they are an A or a B day class, as well as during which period they occur, and when they begin and end. Finally, a unique packet identifier is generated for each quarter of each academic subject.

3. DATABASE IMPLEMENTATION

The information contained in the schemas above was then further expanded via the use of an ER diagram created in MySQL Workbench, visually representing the connections between different subjects:



Many of the key business rules as established above can be seen in the diagram: the one-to-many relationship between students and advisors, for example, represents the rules stating that each advisor may have many students, but each student may only have one advisor. Students and packets, meanwhile, are connected by a many-to-many relationship, as are students and classes. For purposes of clean data representation, these relationships require a third table containing the primary keys of each participant, as can be seen with the tables labeled STUDENT_has_PACKET and STUDENT_has_CLASS.

Finally, the entities and relationships have been expanded sufficiently to implement the database within MySQL. The following tables were resultantly produced, beginning with advisors:

advisorID	advisorLastName	advisorFirstName	advisorWorkDays	advisorEmail
1	Nelson	Mike	MTuWThF	mpnelson@graniteschools.org
2	Willardsen	Danielle	MTuWTh	dwillardsen@graniteschools.org
3	Obregon	Marlon	MTuWThF	mrobregon@graniteschools.org
4	Mackay	Branaugh	MTuWThF	hcmackay@graniteschools.org
5	Young	Caleb	MTuWTh	cnyoung@graniteschools.org
6	Harbertson	Sean	MWF	smharbertson@graniteschools.org
7	Johansson	Hannah	MTuWThF	hajohansson@graniteschools.org

And proceeding with classes:

classID	classLetter	classMondayStart	classMondayEnd	classRegularStart	classRegularEnd
1	A	8:30AM	9:42AM	7:30AM	8:56AM
2	A	9:47AM	11:01AM	9:01AM	10:33AM
3	A	11:41AM	12:53PM	11:13AM	12:39PM
4	A	12:58PM	2:10PM	12:44PM	2:10PM
5	A	2:15PM	3:27PM	2:15PM	3:41PM
11	B	8:30AM	9:42AM	7:30AM	8:56AM
12	B	9:47AM	11:01AM	9:01AM	10:33AM
13	B	11:41AM	12:53PM	11:13AM	12:39PM
14	B	12:58PM	2:10PM	12:44PM	2:10PM
15	B	2:15PM	3:27PM	2:15PM	3:41PM

For the purposes of demonstration, the student table was limited to a few, sample entries, offering an impression of the completed table and allowing for user interface demonstration later on:

studentID	studentLastName	studentFirstName	studentType	studentGrade	studentAppointmentDay	studentAppointmentTime	advisorID	lastCheckIn
100000	Student	Jim	Day	12	NULL	NULL	4	2015-12-08 16:44:11
147542	Sykes	Lisa	Adult	13	NULL	NULL	2	NULL
9490046	Khotsomat	Alyssa	Day	12	Wed	2:00PM	6	NULL
9493354	Dutson	Scott	Full	12	Thurs	5:30PM	7	NULL
9493694	Lazalde	Adriana	Day	12	NULL	NULL	1	NULL
9497462	Uribe	Kathia	Day	12	Tues	3:30PM	6	NULL
9498219	Hernandez	Lexsi	Day	12	NULL	NULL	4	NULL
9510176	Telefoni	Isaiah	Day	11	NULL	NULL	3	NULL
9534071	Martinez	Antonio	Day	11	NULL	NULL	4	NULL
9565764	Reyes	Amy	Day	11	NULL	NULL	2	NULL
9576142	Pullman	Maison	Day	12	Thurs	3:30PM	7	NULL
9589006	Gaytan	Leonardo	Day	12	NULL	NULL	5	NULL
9593488	Perez	Marisol	Day	12	NULL	NULL	1	NULL
9598519	Torres	Isaac	Day	12	NULL	NULL	3	NULL
9617445	Macias	Jacob	Day	11	NULL	NULL	5	NULL

Finally, the packet table contains all primary packets (only some of which are displayed below, due to the magnitude of subjects and quarters). As the database progresses in development, more obscure elective packets will be added, including those such as Wildlife Biology, Musical Appreciation, and Foods and Nutrition. As it stands, the table appears as such:

packetID	packetSubject	packetQuarter
1	Algebra 1	1
2	Algebra 1	2
3	Algebra 1	3
4	Algebra 1	4
5	Algebra 2	1
6	Algebra 2	2
7	Algebra 2	3
8	Algebra 2	4
9	Art History	1
10	Art History	2
11	Art Found	1
12	Art Found	2
13	Biology	1
14	Biology	2
15	Biology	3
16	Biology	4

As mentioned, two more tables have been implemented to represent the many-to-many relationships between students and packets/classes. While these tables are very simple, including only two columns each that contain the primary keys of their contributors, they will be invaluable for a variety of queries.

Following the creation of the user interface, one final table was added to store user login information. This table is as follows, and will be populated as the interface goes live and students and advisors are required to create log in credentials:

username	password	type	studentID
studentuser	studentpass	Student	100000
bmackay	bremenmackay1	Advisor	NULL

4. USER INTERFACE

In designing the user interface, the most important elements were ease and cleanliness. As such, a simple interface was designed, incorporating a friendly log in page with rotating images that portray the Learning Lab and the various resources it offers:





Upon logging in, the user's username and password are queried using the USER table in the database. If the user's credentials are not found, the following page is displayed (with 'username' rather than 'password' in cases of an incorrect username) before the user is redirected to the main log in page for another attempt:

Invalid password - redirecting back to login page in 10 seconds...

Once the credentials are verified as being correct, the USER table is queried again, this time to determine whether the individual logging in is an advisor or a student. If the credentials are found to belong to a student, the following page is displayed. For purposes of this example, a fictional student under the name of Jim Student has been created, as well as given the qualities of a real student.

Student Info

ID	Last Name	First Name
100000	Student	Jim

Packet	Quarter
English 5	3
Math 1	2

Advisor	Available Weekdays
Branaugh	MTWTF

This page displays basic information for the student who has logged in, including their information, the packets they are currently working on, and their advisor and his/her availability. This is the only page a student will have access to, keeping the information of other students confidential. It is important to note, also, that once a student has signed in, the date and time of their sign in is immediately sent to the STUDENT table, where it is accessible by advisors.

If, instead, the user is determined to be an advisor, they will be redirected to the following page (complete with the same rotating images as in the log in page):



GRANITE CONNECTION
High School

Granite Connections Learning Lab



Advisor

Search either by student details or student name:

Advisor

Type

First Name

Last Name

The page features two different forms with which queries can be made. An advisor can display all students by selecting 'All' in both Advisor and Type categories, which displays the following page:

Matching Students:

ID	Last Name	First Name	Type	Grade	Appointment Day	Appointment Time	Advisor	Last Sign In
944434	Dutton	Scott	Full	12	Thurs	3:30PM	Hannah	
9389206	Gustaf	Leonardo	Day	12			Caio	
9488219	Hernandez	Lucia	Day	12			Branaugh	
9490346	Rhodesmet	Alyssa	Day	12	Wed	2:00PM	Scott	
9484364	Larsen	Adriana	Day	12			Nike	
9017443	Macias	Jacobo	Day	11			Caio	
9504371	Martinez	Antonio	Day	11			Branaugh	
9493444	Perez	Maria	Day	12			Nike	
9506142	Fullman	Mahon	Day	12	Thurs	3:30PM	Hannah	
9505764	Reyes	Amey	Day	11			Danielle	
100000	Student	Jin	Day	12			Branaugh	2015-12-10 10:25:14
147512	Sykes	Lisa	Adult	12			Danielle	
9510176	Reefers	Isaiah	Day	11			Marion	
9598519	Jones	Isaac	Day	12			Marion	
9487462	Uribe	Ruthia	Day	12	Tues	3:30PM	Scott	

Or an advisor can narrow down their search. For example, one can search by Advisor alone:

Matching Students:

ID	Last Name	First Name	Type	Grade	Appointment Day	Appointment Time	Advisor	Last Sign In
944434	Dutton	Scott	Full	12	Thurs	3:30PM	Hannah	
9506142	Fullman	Mahon	Day	12	Thurs	3:30PM	Hannah	

Or, the advisor can search by Type alone. The advisor may also search by Advisor *and* Type of student, narrowing down the results even farther:

Matching Students:

ID	Last Name	First Name	Type	Grade	Appointment Day	Appointment Time	Advisor	Last Sign In
9506142	Fullman	Mahon	Day	12	Thurs	3:30PM	Hannah	

Finally, a search may be performed directly on a student's name, resulting in a variation of the following page:

Matching Students:

ID	Last Name	First Name	Type	Grade	Appointment Day	Appointment Time	Advisor	Last Sign In
100000	Student	Jin	Day	12			Branaugh	2015-12-10 10:25:14

5. CONCLUSION

Before implementation, there are a few features that still need to be added. These include several security measures to keep student confidentiality further protected, as well as greater development of the query result pages. However, the examples provided thus far are representative of a simple, easy to use database and interface that would notably connect the users of the Learning Lab and encourage student growth.