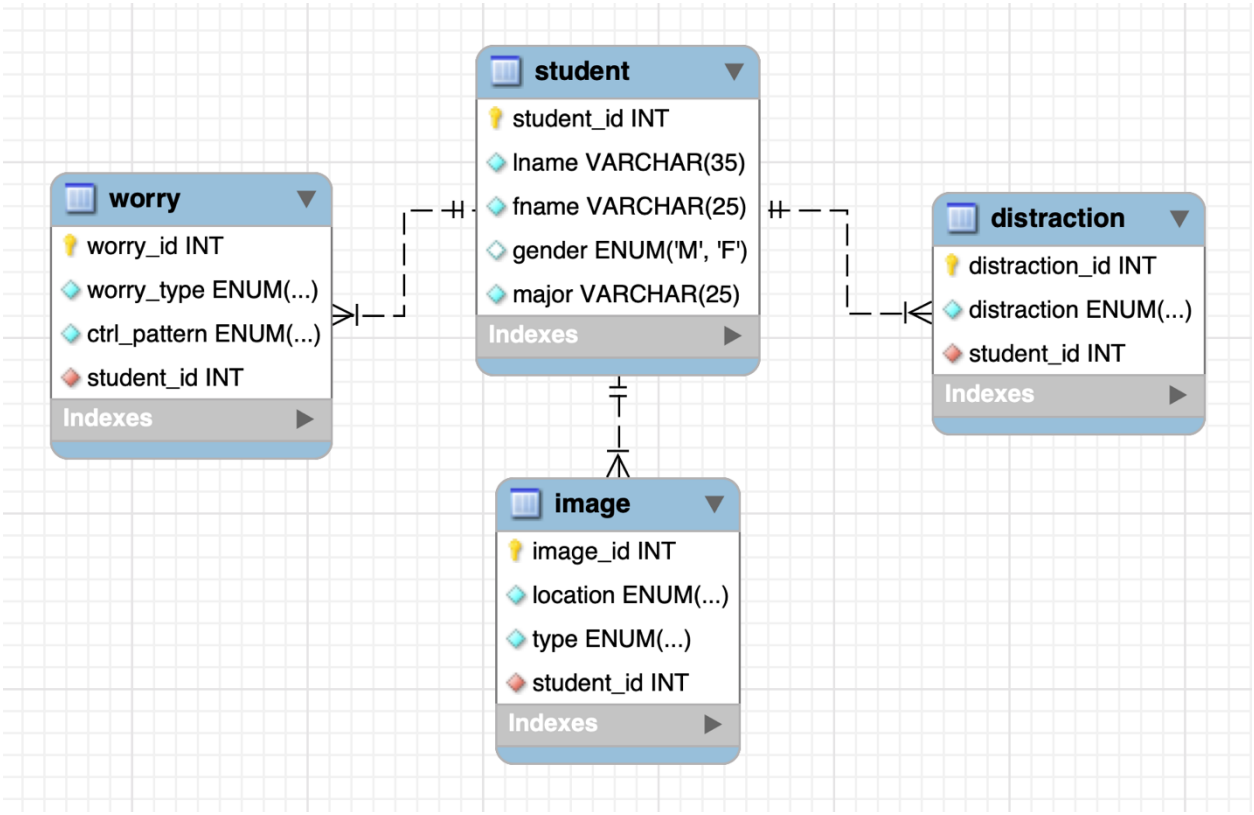
W03 – ERD and Datatypes Intro

CASE STUDY – How the data we gathered might look in a relational database and deciding which datatype to use for which piece of data.

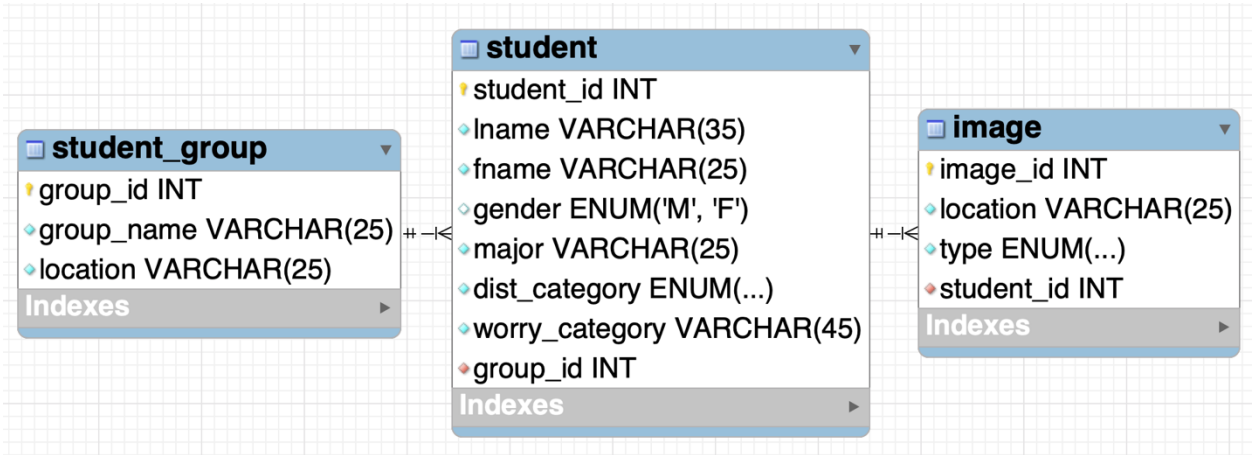
Here is one way the data we gathered might be represented in an Entity Relationship Diagram or ERD. This is a visual representation of each entity in our database and how they are related. We will learn all about the relationships between entities next week which is represented by the dotted lines connecting the tables.



Here we have included an entity representing each student that gathered the data. This would be representing data gathered by many different students. Then the entities distraction, worry, and image would hold the data that comes from each of the data gathering sheets you filled out.

In a few weeks we will learn about and a document called the 'Statement of Work' that helps us understand what entities and attributes we will even want to include in our ERD. But for today let's take a look at the datatypes of the attributes we are storing.

Here's another example of how an ERD might have been designed.



With this design groups in the class were added. Each group had a number of students in it and a location in the class. And each student took a number of different images. The only thing that was recorded from the worry and distraction data collecting is just that student's top worry and that student's top distraction. The image data was the only sheet that used most of the data gathered. The image data was placed in its own table.

You will see an actual database in this format with data from students in a past semester.

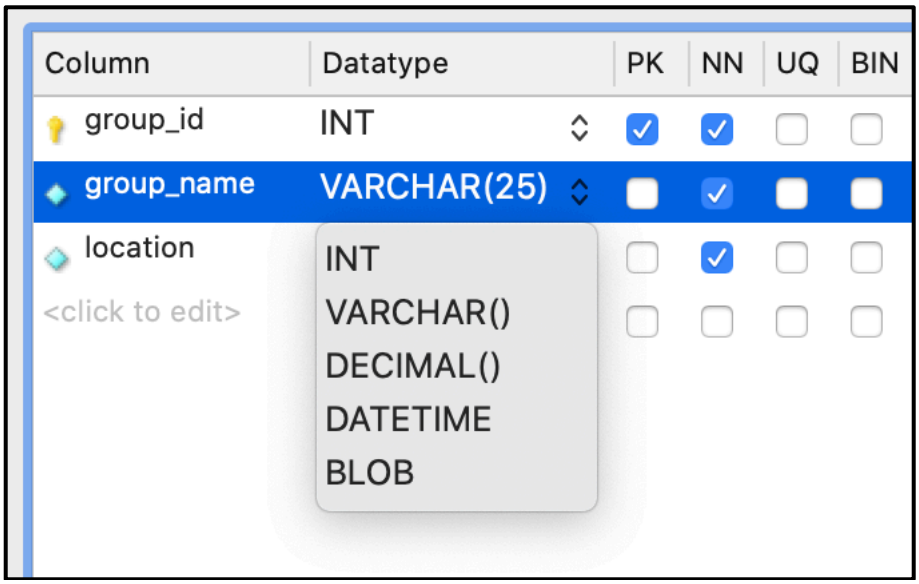
We will talk more about the group, student and image entities and how they are related another time. What I want to focus on here is datatypes that were chosen for each attribute of those entities.

For example, all the primary keys, group_id, student_id, and image_id were all the datatype of integer. Integer is a common choice for primary keys. It's a simple way to get the next whole number as a unique value for that column of the table. We will also learn more about primary keys later as well.

How do we choose which data should be what data type? Did the primary key have to be integer? No, it didn't. It does need to have a unique value for each row when the data is entered, but that value does not need to be an integer.

What about group_name? Here's what I'd ask myself. Is there a set number of group names to choose from? Or did the groups get to come up with their own group name? Is there a limit to how long the or short the group name has to be? Can it be any character or will there just be group numbers? If I came up with the answers that the groups can name themselves whatever they want and there is no limit to how long or short the name must be within reason. And since they can name their group whatever they want, I am assuming it can be any characters, not just numbers.

So, when choosing from all the different datatypes available, VARCHAR or variable character makes the most sense. The drop down has many different options. We don't go over all of them in this course, but we will look at most of the common datatypes.



Let's look at gender. For us, we will require either the student is male or female, no other options. Therefore, ENUM or enumerated is a good choice for us. We can only choose one or the other not both. What is also nice about ENUM is that you can restrict exactly how that is typed into the database. What if one data entry person types the word all the way out like 'male' or 'female'. And another puts a lowercase 'm' or 'f'. Putting out actually options inside the parenthesis limits the data entry person to an uppercase 'M' or 'F', that's it.

dist_category and worry_category might also fit well with ENUM. There were only so many categories to choose from on our data gathering sheets. I am purposely going to have the worry category be VARCHAR to illustrate potential problems or benefits with this type of data in a later lesson.

Here's some actual data that you might see in these tables. Notice how the column names that go vertically in the ERD, are now horizontal across the top of the table.

group_id	group_name	location
1	Zac	back_middle_1
2	Name	middle_right_2
3	The Great Emu War	middle_left_2
4	MIDR	middle_right_1
5	DATA YO-YO	front_left_2
6	The Snacks	front_middle_2
7	Group	back_right_2
8	Uno Players	front_left_1
9	Team Legit	middle_middle_1

student_id	lname	fname	gender	major	dist_category	worry_category	group_id
1	Spencer	Sam	M	Data Science	someone	Work/Study	1
2	Jones	Joshua	M	Data Science	someone	My Partner	1
3	Larsen	Lincoln	M	Accounting	digital	Work/Study	1
4	Adams	Andrew	M	Finance	social media	Work/Study	1
5	Victor	Vivian	F	Bioinformatics	someone	Work	2
6	Hector	Jose	M	Business Management	social media	Family	2
7	Daniels	Drew	M	CIT	internet	Finances	2
8	Michaels	Matthew	M	Bussiness Management	internet	School	2
9	Kearns	Kien	M	Software Engineering	internet	Future	2
10	Andersen	Austin	M	CIT	other	Finances	2
11	Butler	Buck	M	Finance	digital	World issues	1
12	Taylor	Trevor	M	Economics	internet	Work/Study	3
13	Andrews	Addison	M	Business Analytics	someone	Work/Study	3
14	Kelly	Kaelan	M	Data Science	social media	My Partner	3
15	Cornelison	Connor	M	Economics	internet	Myself	3
16	Thompson	Thomas	M	Financial Economics	other	Work/Study	3
17	Madsen	Matthew	M	Geology	someone	Work/Study	3
18	Hall	Halla	F	Business Management	social media	Photo/Media	4
19	Smith	Sarah	F	Business Management	digital	Notes/Tracking	4
20	Hansen	Henry	M	Software Engineering	social media	Games	4
21	Stanley	Seth	M	Data Science	digital	Streaming	4
22	Ellison	Eria	F	Computer Science	internet	Unused	4
23	Dye	Dev	M	CIT	internet	Social Media	4
24	Nathaniel	Natalie	F	Financial Economics	someone	Work/Study	5
25	Stevenson	Steven	M	Business Analytics	someone	Family	5

Notice here how the distraction category is restricted to only the categories that were represented on the gathering sheets, but since we left the worry category as VARCHAR there are a few entries that don't quite fit what was on the sheet, like 'Future' or 'Unused'. This was not one of the worry categories. We will see how this works when we start asking questions of our data or querying the data. You will see an overview this week of querying this database.

image_id	location	type	student_id
1	School	documentation	1
2	School	documentation	1
3	School	documentation	1
4	School	documentation	1
5	School	documentation	1
6	School	documentation	1
7	School	documentation	1
8	School	documentation	1
9	School	documentation	1
10	School	documentation	1
11	School	documentation	1
12	School	documentation	1
13	School	documentation	1
14	Home	documentation	1
15	Home	documentation	1
16	Social Setting	group	1
17	Social Setting	group	1
18	Work	selfie	1
19	Work	selfie	1
20	Other	documentation	1
21	Social Setting	group	2
22	Social Setting	group	2