Basics of SQL and how to use it in Alma Analytics

Gem Stone-Logan
California Digital Library
gem.stone-logan@ucop.edu

Agenda

- General SQL Overview
- Explanation of basic SQL syntax
- Alma Analytics equivalents to SQL
- Where you can use SQL in Alma Analytics
- SQL example in column formula
- SQL example in filter
- Using SQL to join two subjects together
    - Possible bonus troubleshooting strategies

How to Pronounce SQL?

Two ways:

- Ess-cue-ell /ˌɛsˌkjuːˈɛl/
- Sequel /ˈsiːkwəl/

My opinion: it doesn't matter as long as people know what you're talking about.

What is SQL?

SQL is a query language that is mainly used when working with relational database management system (RDBMS) systems.

RDBMS Examples: MySQL, Microsoft SQL Server, Oracle Database, PostgreSQL, MySQL

While there is an SQL "standard", in practice every RDBMS uses a slightly different flavor.

Why care about SQL?

- Greater customization
- Better for automating
- General understanding of what's happening

Parts of an SQL Statement (when retrieving data)

`SELECT`

`FROM`

(optional) `JOIN`

(optional) `WHERE`

(optional) `UNION`

While every database has a slightly different way of doing things, the basics are often the same.

Sample Bib Table

title	mms_id	oclc
The Daughter of Doctor Moreau	9918605915306531	1281240579
The Kaiju Preservation Society	9917784458506531	1262693703
Nona the Ninth	9918538884306531	1304833436
Nettle & Bone	9919069261806531	1268120733
Babel: or the necessity of violence: an arcane history of the Oxford translators' revolution	9919288262606531	1341991711

Databases are made up of tables. From Wikipedia: "A table is a collection of related data held in a table format within a database. It consists of columns and rows." This is a sample bib table which has title, mms_id, and oclc columns/fields and five rows of data.

Example SQL Statement (Pseudocode)

```
SELECT title

FROM bib
```

title
The Daughter of Doctor Moreau
The Kaiju Preservation Society
Nona the Ninth
Nettle & Bone
Babel: or the necessity of violence: an arcane history of the Oxford translators' revolution

This isn't real code, it's just to provide an idea of how SQL is usually structured. This would pull all titles contained within our fake bib table..

Sample Loan Table

loan_date	patron_id	mms_id
8/16/2023	1234	9917784458506531
7/30/2023	3456	9918538884306531

Here is a sample loan table which has loan_date, patron_id, mms_id and two rows of data.

Example SQL Statement (Pseudocode)

```
SELECT bib.title,
loan.loan_date
FROM bib
INNER JOIN loan
ON loan.mms_id = bib.mms_id
```

This isn't real code, it's just to provide an idea of how SQL is usually structured. Here I'm using an inner join which will return title and loan date for checked out items. We can do this because both tables contain an mms_id that we can use to join them together.

As an aside, this uses an explicit join. There's another way to do them that you may find in older textbooks and internet posts using just the FROM and WHERE clauses which is considered an implicit join. Newer database versions may not support the old method.

Sample Results

title	loan_date
The Kaiju Preservation Society	8/16/2023
Nona the Ninth	7/30/2023

Here would be the results of our previous query.

Example SQL Statement (Pseudocode)

```
SELECT bib.title,
loan.loan_date
FROM bib
LEFT JOIN loan
ON loan.mms_id = bib.mms_id
```

This isn't real code, it's just to provide an idea of how SQL is usually structured. This is similar to the join we just looked at except it will return all titles, regardless of whether or not they're checked out, and if a loan date exists, it will also show that.

Sample Results

title	loan_date
The Daughter of Doctor Moreau	
The Kaiju Preservation Society	8/16/2023
Nona the Ninth	7/30/2023
Nettle & Bone	
Babel: or the necessity of violence: an arcane history of the Oxford translators' revolution	

Here would be the results of our previous query.

Example SQL Statement (Pseudocode)

```
SELECT title, oclc

FROM bib

WHERE oclc = "1341991711"
```

title	oclc
Babel: or the necessity of violence: an arcane history of the Oxford translators' revolution	1341991711

This isn't real code, it's just to provide an idea of how SQL is usually structured. This would only pull titles and oclc numbers from the bib table if the title has this OCLC number.

SQL: Does Case Matter?

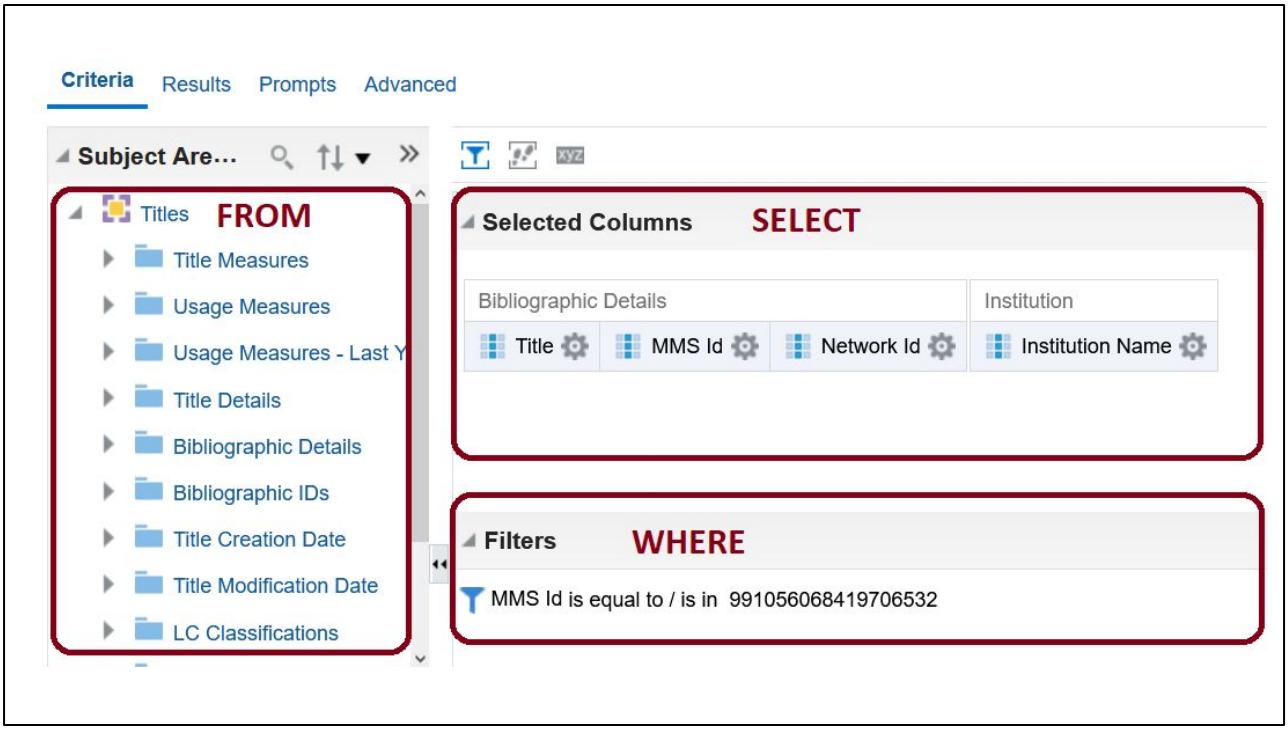
While keywords (such as SELECT, WHERE, COUNT, SUM) are often written in uppercase, they are not case sensitive.

However, Alma data IS case sensitive so filtering for "Berkeley" will not retrieve results for "berkeley".

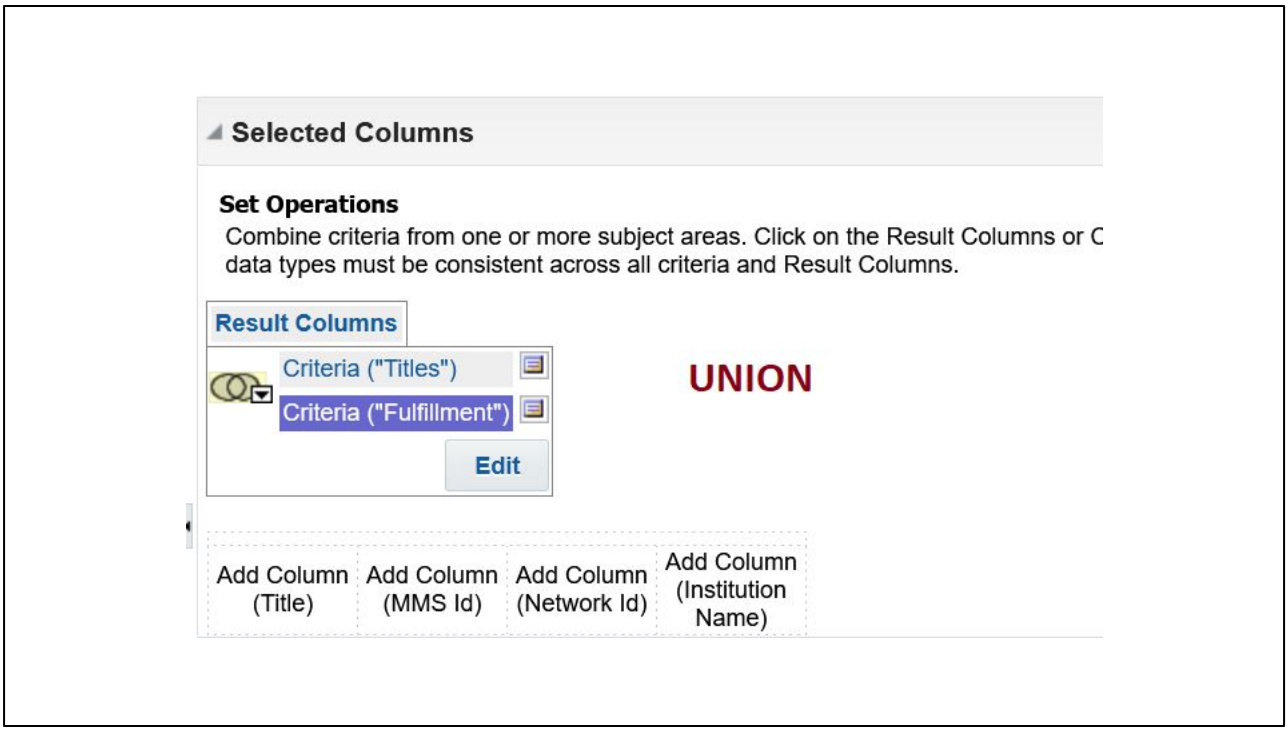
Alma Analytics and SQL

Alma Analytics	SQL Equivalent
Columns to retrieve	SELECT
Subject	FROM
	JOIN
Filters	WHERE
Combine subject results	UNION

Understanding the SQL equivalents can be useful when brainstorming how to get the results you want. For example, if you're trying to change how your columns look, you're probably looking for something that can be done in the SELECT part of an SQL statement. Whereas if you want to change what data you retrieve, you want to look for things that can be done in a WHERE clause. JOINs do not appear to have a clear equivalent in regular Alma Analytics.



Understanding the SQL equivalents can be useful when brainstorming how to get the results you want. For example, if you're trying to change how your columns look, you're probably looking for something that can be done in the SELECT part of an SQL statement. Whereas if you want to change what data you retrieve, you want to look for things that can be done in a WHERE clause.



Combine subjects in the SQL UNION equivalent. There doesn't seem to be an Analytics equivalent to JOIN.

SQL with Alma Analytics

Alma Analytics is built on Oracle Analytics Server (OAS) and is related to OBIEE (Oracle Business Intelligence Enterprise Edition)

Sometimes you can find ideas searching specifically for these two products. This page, says Alma Analytics is "built on Oracle Analytics Server". However, this page refers to Alma Analytics as Oracle Business Inteligence.

Where can you use SQL in Alma Analytics?

- Regular analysis/reports
  - Columns
  - Filters
  - Other random places
- Create Analysis from Simple Logical SQL

Using SQL in Column Formulas: Case(If)

Challenge:

Electronic Collections can have a "Public Name" and a "Public Name (override)". I want to retrieve one column that contains the version that will appear to the user.

Solution: Case (If)

Using SQL in Column Formulas: Case(If)

- In Criteria click the gear next to the column you wish to modify
- Click the insert Function icon and select a function from a menu to be given the basic SQL syntax 

Using SQL in Column Formulas: Case(If)

How to figure out a new formula?

- The Insert Function window provides some basic information
- Google "Oracle Analytics Server" and your function
- Check your favorite Alma Analytics Resources

Some of my favorite resources are included at the end of this presentation.

Selected	Case (If)
Syntax	CASE WHEN request_condition1 THEN expr1 ELSE expr2 END
Where	*exprs* is any valid expression.
Example	
Description	This form of the Case statement evaluates each WHEN condition and if satisfied, assigns the value in the corresponding THEN expression. If none of the WHEN conditions are satisfied, it assigns the default value specified in the ELSE expression. If no ELSE expression is specified, the system will automatically add an ELSE NULL.

Expression	Example	Description	Syntax

CASE (If)	`CASE`
	
	`WHEN score-par < 0 THEN 'Under Par'`
	
	`WHEN score-par = 0 THEN 'Par'`
	
	`WHEN score-par = 1 THEN 'Bogey'`
	
	`WHEN score-par = 2 THEN 'Double Bogey'`
	
	`ELSE 'Triple Bogey or Worse'`
	
	`END`
		Evaluates each `WHEN` condition and if satisfied, assigns the value in the corresponding `THEN` expression.
		
		If none of the `WHEN` conditions are satisfied, it assigns the default value specified in the `ELSE` expression. If no `ELSE` expression is specified, the system automatically adds an `ELSE NULL`.
		
		Note: See *Best Practices for using CASE statements in Analyses and Visualizations*.
			`CASE WHEN request_condition1 THEN expr1 ELSE expr2 END`

https://docs.oracle.com/en/middleware/bi/analytics-server/metadata-oas/conditional-expressions.html#GUID-17D67DA8-DE8E-4C05-9B9F-4D0244B263CA

Basic formula

```
CASE WHEN [Insert Alma Column SQL] = ['Result you want replaced'] THEN  ['New result'] ELSE [Repeat Insert Alma Column SQL] END
```

Example with LC Classification Code

```
CASE
WHEN "LC Classifications"."Classification Code" = 'Unknown'
THEN
'Unclassed or mis-coded'
ELSE "LC Classifications"."Classification Code"
END
```

https://wiki.harvard.edu/confluence/display/LibraryStaffDoc/Advanced+Formulas#AdvancedFormulas-ModifyingaPortionofaColumnwithaCaseStatement(columnformula)

Using SQL in Column Formulas: Case(If)

The official names of the columns:

- "Electronic Collection"."Electronic Collection Public Name"
- "Electronic Collection"."Electronic Collection Public Name (override)"

I find it easiest to add both columns I want data from initially to the report and then copy their complete columns names prior to working on the formula. We find the names by clicking on the gear icon and then choosing Edit Formula.

Using SQL in Column Formulas: Case(If)

If it exists, we want the "Public Name (override)" to appear. Otherwise, we want "Public Name"

Using SQL in Column Formulas: Case(If)

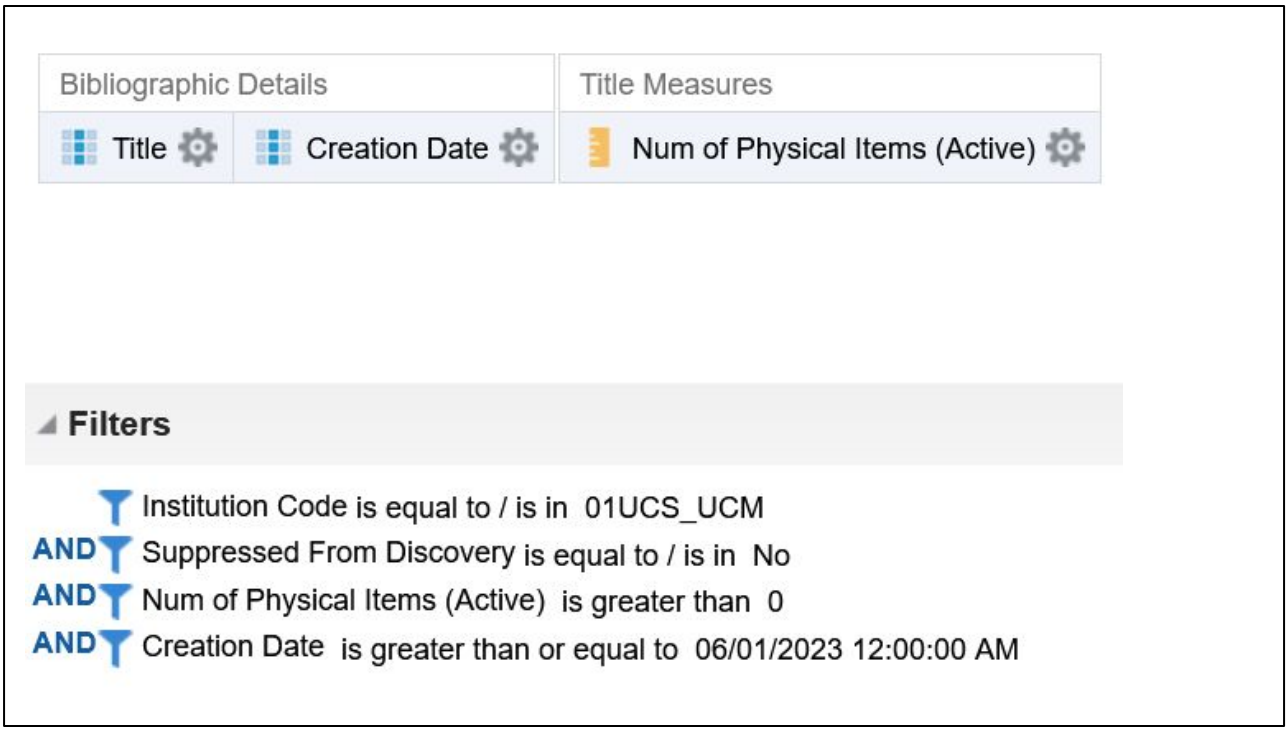
```
CASE WHEN "Electronic
Collection"."Electronic Collection Public
Name (override)" IS NOT NULL

THEN "Electronic Collection"."Electronic
Collection Public Name (override)"

ELSE "Electronic Collection"."Electronic
Collection Public Name"

END
```

Note that while we won't get an error if we try to say "Electronic Collection"."Electronic Collection Public Name (override)"=", it won't give us the results we want. This is because a blank/null can't be equal to anything. Here's a good discussion of NULL (specifically for SQL Server for the same concepts apply): https://simplesqltutorials.com/7-mistakes-with-null/

Using SQL in Filters: New Titles

Challenge:

Titles added in the last 90 days



Use Date - New Titles

Using SQL in Filters: New Titles

Using SQL to create a relative date:

- Find a formula close to what we want

```
TIMESTAMPADD(SQL_TSI_DAY, -7, CURRENT_DATE)
```

- Edit our existing creation date filter and convert it to SQL

https://knowledge.exlibrisgroup.com/Alma/Product_Documentation/010Alma_Online_Help_(English)/080Analytics/050Common__Analytics_Procedures#Relative_Dates

Using SQL in Filters: New Titles

TIMESTAMPADD: Add a specific amount of time to a date

SQL_TSI_DAY: Specifying that we want to add days (vs hours or some other time unit)

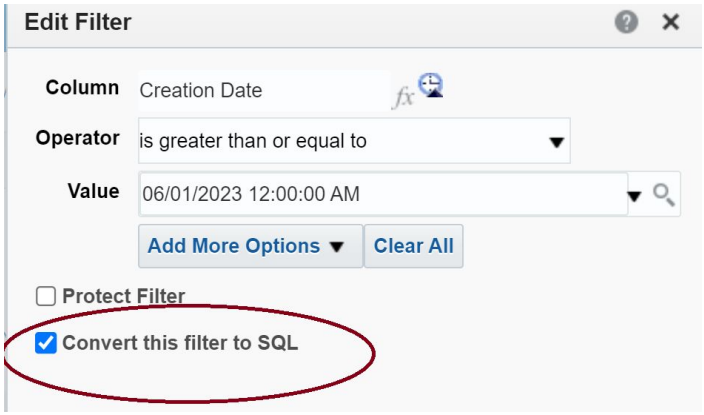
-90: The negative indicates we want to subtract

CURRENT_DATE: Today's date

https://docs.oracle.com/middleware/1221/biee/BIVUG/GUID-1A697795-7D1E-4296-961A-1002FDBD4F47.htm#BILUG667

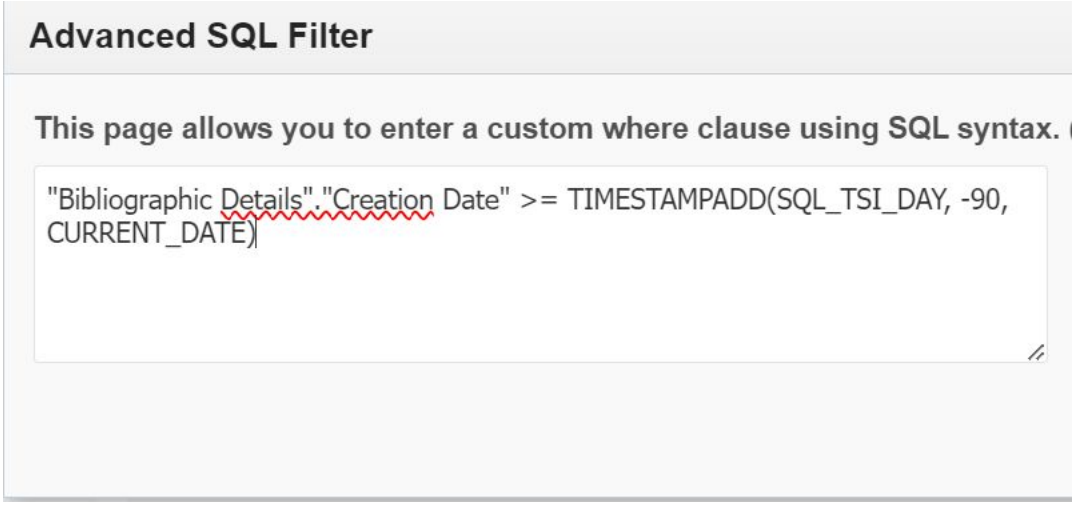
Using SQL in Filters: New Titles

Converting an existing filter to SQL



Edit a filter and click the **Convert this filter to SQL** option.

Using SQL in Filters: New Titles



Using SQL in Alma: Additional Functions

Sometimes you run across a useful sounding function which you can't find in the Analytics function list. There are two functions you may be able to use to mimic the behavior:

`EVALUATE` and `EVALUATE_AGGR`

https://docs.oracle.com/middleware/12211/biee/BIVUG/GUID-7035040C-BB40-4392-920A-9A435593F659.htm#BILUG683

Evalute and Evaluate_aggr pass through your command directly to the underlying database.

Using SQL in Alma: Additional Functions

`EVALUATE` and `EVALUATE_AGGR` are similar but `EVALUATE_AGGR` is used with aggregate functions.

The Harvard Analytics Wiki has some specific examples of how these functions can be used.

https://wiki.harvard.edu/confluence/display/LibraryStaffDoc/Advanced+Formulas#AdvancedFormulas-EVALUATEandEVALUATE_AGGRDatabaseFunctions

SQL in Alma Analytics: Simple Logical SQL

Create Analysis from Simple Logical SQL is an option when you want to do something that Analytics doesn't easily allow. It is particularly useful when trying to join two subjects that aren't designed to join.

SQL in Alma Analytics: Simple Logical SQL

Downsides

- Complicated
- Hard to maintain
- No Ex Libris Support
- Sometimes things break for no reason

Mitigation

- Document *everything* you do

SQL in Alma Analytics: JOIN Scenario

Challenge:

- One campus wants see the summary holdings both at their campus and our storage facilities

Library Code	Summary Holding (UCSD)	Title (Complete)	Summary Holding (NRLF)	Summary Holding (SRLF)
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.1(1963)-25(1986)	v.53-71(2003-2010)
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.26(1987)-52(2002)	v.53-71(2003-2010)
WongAvery	ed.12(2001)	Nomenclature supplement	2001(12)	
WongAvery	1997 (1997-1997)	Unlisted drugs. Index-guide		
WongAvery	1 (2005-2005)	The year in anaesthesia and c		
WongAvery	63,64:1-5 (2002-2003)	AIHA journal : a journal for th	v.63(2002)-64(2003)	

UCSD's holdings are easy to pull. It's adding a column for NRLF and SRLF where things get more complicated.

SQL in Alma Analytics: JOIN Scenario

One Solution:

- Create a report with the campus information and add the storage facilities as a LEFT JOIN

SQL in Alma Analytics: JOIN Scenario

To use a JOIN you need a column that is in both data sets.

- In this case, we can use Network Id.
- If this was all from one IZ, we could potentially use MMS Id.

At least, it doesn't seem I can prompt when I join two subjects. However, I could be wrong about this.

SQL in Alma Analytics: Types of Joins

LEFT JOIN

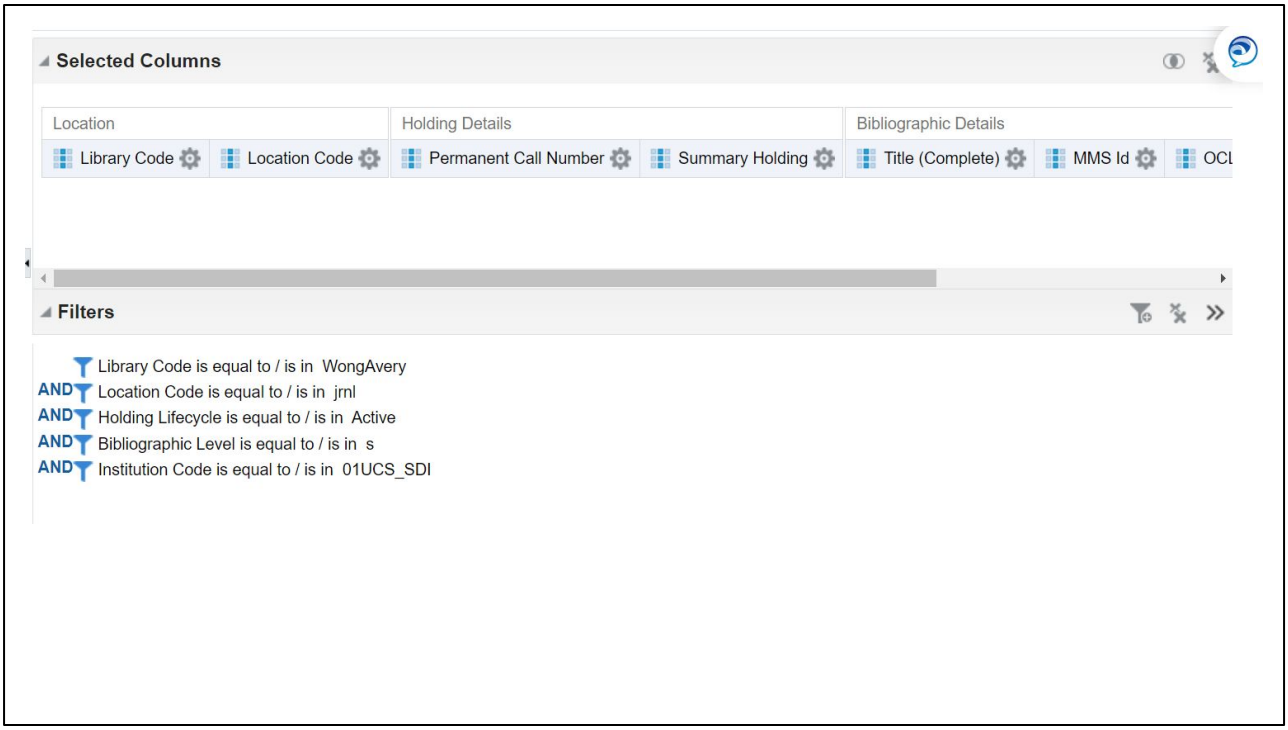
Includes all of UCSD's holdings but only includes NRLF if UCSD also has holdings.

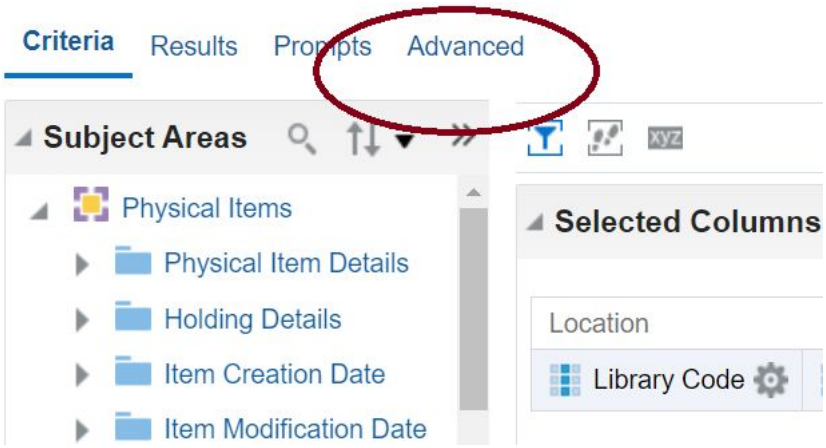
Library Code	Summary Holding (UCSD)	Title (Complete)	Summary Holding (NRLF)
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.1(1963)-25(1986)
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.26(1987)-52(2002)
WongAvery	ed.12(2001)	Nomenclature supplemen	2001(12)
WongAvery	1997 (1997-1997)	Unlisted drugs. Index-guide	
WongAvery	1 (2005-2005)	The year in anaesthesia and critical care.	

An INNER JOIN would include too little information because it would only retrieve results where both UCSD and NRLF had holdings.
https://dataschool.com/how-to-teach-people-sql/sql-join-types-explained-visually/

SQL in Alma Analytics: JOIN Scenario

1. Get the report as close as possible to what you want.
2. Click the **Advanced** tab and look at the SQL in the **SQL Issued** section


Selected Columns
Location
Holding Details
Bibliographic Details
Library Code
Location Code
Permanent Call Number
Summary Holding
Title (Complete)
MMS Id
OCL
Filters
Library Code is equal to / is in WongAvery
AND Location Code is equal to / is in jrnl
AND Holding Lifecycle is equal to / is in Active
AND Bibliographic Level is equal to / is in s
AND Institution Code is equal to / is in 01UCS_SDI


Criteria
Results
Prompts
Advanced
Subject Areas
Physical Items
Physical Item Details
Holding Details
Item Creation Date
Item Modification Date
xyz
Selected Columns
Location
Library Code

Criteria Results Prompts **Advanced**

SQL Issued

The following box contains the SQL code that will be sent to the Oracle Analytics Server when this analysis is executed.

```
SELECT
   0 s_0,
   "Physical Items"."Bibliographic Details"."MMS Id" s_1,
   "Physical Items"."Bibliographic Details"."Network Id" s_2,
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)" s_3,
   "Physical Items"."Bibliographic Details"."Title (Complete)" s_4,
   "Physical Items"."Holding Details"."Permanent Call Number" s_5,
   "Physical Items"."Holding Details"."Summary Holding" s_6,
   "Physical Items"."Location"."Library Code" s_7,
   "Physical Items"."Location"."Location Code" s_8
FROM "Physical Items"
WHERE
```

SQL in Alma Analytics: Join Scenario

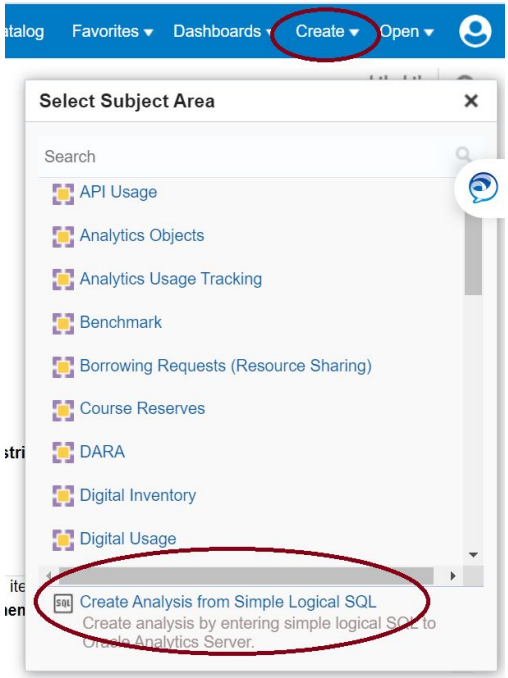
3. Clean up the SQL (personal preference)
    a. In the SELECT portion, replace the meaningless column names with actual names
    b. Remove the column I don't want
    c. Remove the remaining saw aliases (like saw_0)
    d. Delete the extra stuff at the end
    e. If needed, rearrange the columns

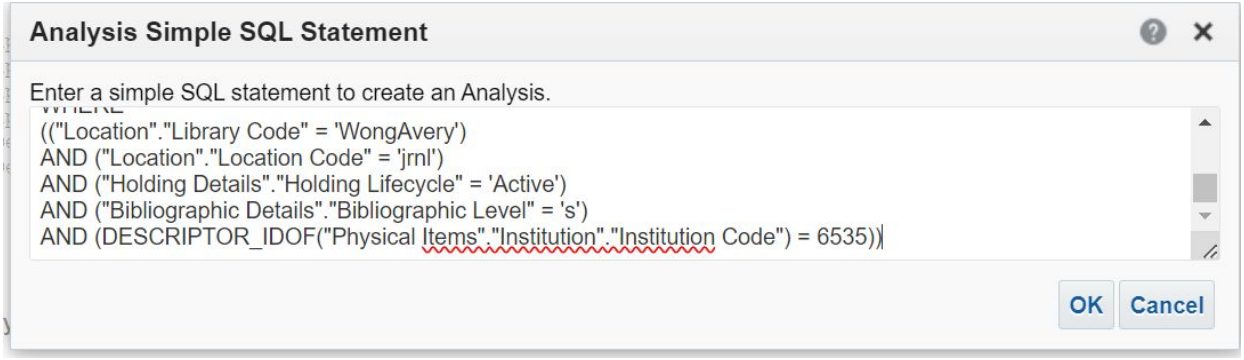
```
SELECT
   "Physical Items"."Location"."Library Code",
   "Physical Items"."Location"."Location Code",
   "Physical Items"."Holding Details"."Permanent Call Number",
   "Physical Items"."Holding Details"."Summary Holding",
   "Physical Items"."Bibliographic Details"."Title (Complete)",
   "Physical Items"."Bibliographic Details"."MMS Id",
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)",
   "Physical Items"."Bibliographic Details"."Network Id"
   FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") =
6535))
```

Original report but SQL cleaned up

SQL in Alma Analytics: JOIN Scenario

4. Test the new SQL
    a. In Analytics, click **Create**
    b. Click **Analysis**
    c. Click **Create Analysis from Simple Logical SQL**
    d. Copy in SQL to test
    e. Click **OK**


Favorites
Dashboards
Create
Open
Select Subject Area
Search
API Usage
Analytics Objects
Analytics Usage Tracking
Benchmark
Borrowing Requests (Resource Sharing)
Course Reserves
DARA
Digital Inventory
Digital Usage
Create Analysis from Simple Logical SQL
Create analysis by entering simple logical SQL to


Analysis Simple SQL Statement
Enter a simple SQL statement to create an Analysis.
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6535))
OK
Cancel

SQL in Alma Analytics: JOIN Scenario

5. Reformat the existing SQL to be a subquery and test again

This is necessary because Alma Analytics will not let you join existing subjects together. You have to convince Analytics you have an entirely new subject.

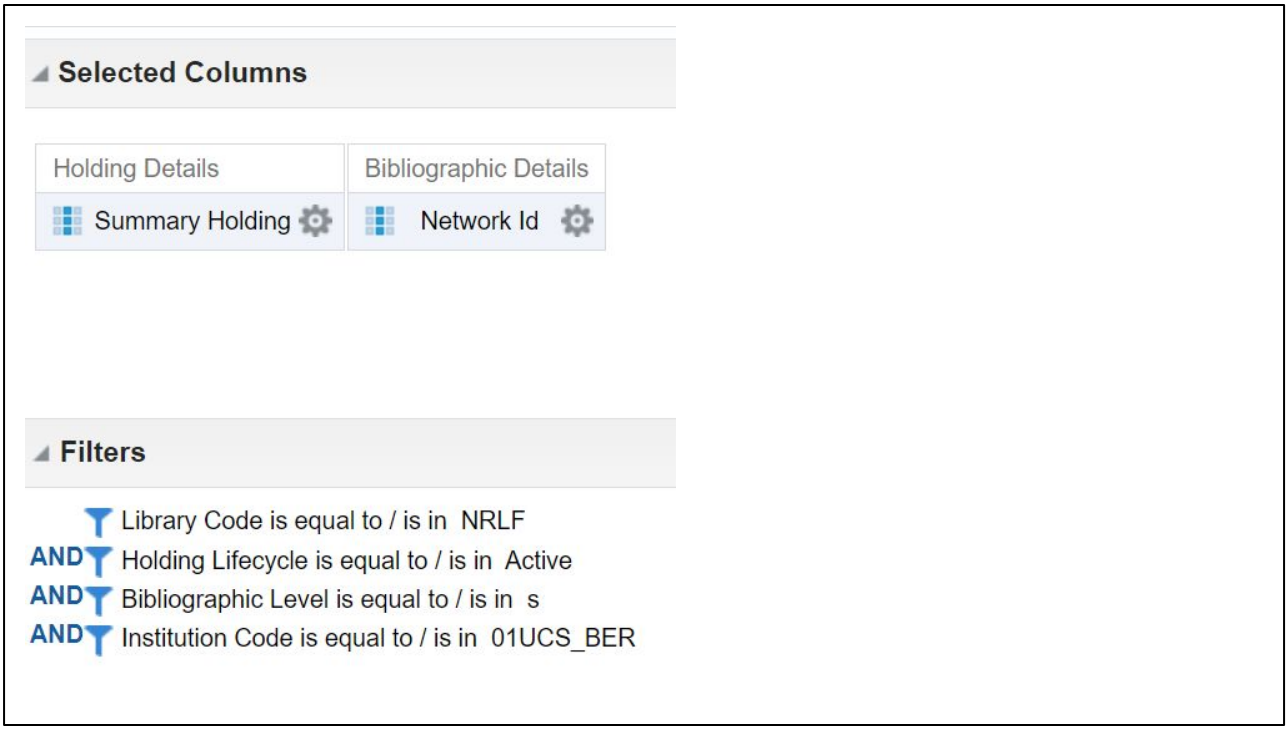
```
SELECT ucsd."Library Code",
      ucsd."Location Code",
      ucsd."Permanent Call Number",
      ucsd."Summary Holding",
      ucsd."Title (Complete)",
      ucsd."MMS Id",
      ucsd."OCLC Control Number (035a)",
      ucsd."Network Id"
FROM
(SELECT
   "Physical Items"."Location"."Library Code",
   "Physical Items"."Location"."Location Code",
   "Physical Items"."Holding Details"."Permanent Call Number",
   "Physical Items"."Holding Details"."Summary Holding",
   "Physical Items"."Bibliographic Details"."Title (Complete)",
   "Physical Items"."Bibliographic Details"."MMS Id",
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)",
   "Physical Items"."Bibliographic Details"."Network Id"
   FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6535))
) ucsd
```

Original report created as a subquery

SQL in Alma Analytics: JOIN Scenario

6. Now we can create our NRLF query
    a. If we want, we can create this first in Analytics, copy the SQL, and then clean it up.

This is necessary because Alma Analytics will not let you join existing subjects together. You have to convince Analytics you have an entirely new subject.



We need the Network Id because that's how we're going to join this with UCSD's data.

```
SELECT
   0 s_0,
   "Physical Items"."Bibliographic Details"."Network Id" s_1,
   "Physical Items"."Holding Details"."Summary Holding" s_2
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'NRLF') AND ("Holding Details"."Holding
Lifecycle" = 'Active') AND ("Bibliographic Details"."Bibliographic Level" =
's') AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") =
6532))
ORDER BY 3 ASC NULLS FIRST, 2 ASC NULLS FIRST
FETCH FIRST 10000001 ROWS ONLY
```

Sample SQL for pulling data from nrlf.

```
SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'NRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") =
6532))
```

Sample SQL from nrlf cleaned up

SQL in Alma Analytics: JOIN Scenario

7. Add the NRLF query to the UCSD query
    a. Make sure to give the NRLF subquery an alias
    b. Explain what the common column is between the two tables
    c. Add the NRLF Summary holdings in the top SELECT clause

This is necessary because Alma Analytics will not let you join existing subjects together. You have to convince Analytics you have an entirely new subject.

```
SELECT ucsd."Library Code",
       ucsd."Location Code",
       ucsd."Permanent Call Number",
       ucsd."Summary Holding",
       ucsd."Title (Complete)",
       ucsd."MMS Id",
       ucsd."OCLC Control Number (035a)",
       ucsd."Network Id",
       nrlf."Summary Holding"
FROM
(SELECT
   "Physical Items"."Location"."Library Code",
   "Physical Items"."Location"."Location Code",
   "Physical Items"."Holding Details"."Permanent Call Number",
   "Physical Items"."Holding Details"."Summary Holding",
   "Physical Items"."Bibliographic Details"."Title (Complete)",
   "Physical Items"."Bibliographic Details"."MMS Id",
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)",
   "Physical Items"."Bibliographic Details"."Network Id"
   FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6535))
) ucsd
LEFT JOIN
(SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'NRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6532))) nrlf ON nrlf."Network Id"=ucsd."Network Id"
```

UCSD and NRLF combined with a Left Join (recommend grabbing the text from the slide and pasting into something like notepad to make it bigger font)

SQL in Alma Analytics: JOIN Scenario

8. The same process for SRLF
    a. Our base table is UCSD so join SRLF with UCSD, not with NRLF

This is necessary because Alma Analytics will not let you join existing subjects together. You have to convince Analytics you have an entirely new subject.

```
SELECT
   0 s_0,
   "Physical Items"."Bibliographic Details"."Network Id" s_1,
   "Physical Items"."Holding Details"."Summary Holding" s_2
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'SRLF') AND ("Holding Details"."Holding
Lifecycle" = 'Active') AND ("Bibliographic Details"."Bibliographic Level" =
's') AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") =
6533))
ORDER BY 3 ASC NULLS FIRST, 2 ASC NULLS FIRST
FETCH FIRST 10000001 ROWS ONLY
```

Sample SRLF SQL

```
SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'SRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") =
6533))
```

Sample SRLF code cleaned up

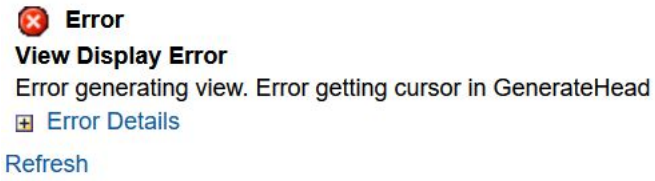
```
SELECT ucsd."Library Code",
          ucsd."Location Code",
          ucsd."Permanent Call Number",
          ucsd."Summary Holding",
          ucsd."Title (Complete)",
          ucsd."MMS Id",
          ucsd."OCLC Control Number (035a)",
          ucsd."Network Id",
          nrlf."Summary Holding"
          srlf."Summary Holding"
FROM
(SELECT
   "Physical Items"."Location"."Library Code",
   "Physical Items"."Location"."Location Code",
   "Physical Items"."Holding Details"."Permanent Call Number",
   "Physical Items"."Holding Details"."Summary Holding",
   "Physical Items"."Bibliographic Details"."Title (Complete)",
   "Physical Items"."Bibliographic Details"."MMS Id",
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)",
   "Physical Items"."Bibliographic Details"."Network Id"
   FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6535))
) ucsd
LEFT JOIN
(SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'NRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6532))) nrlf ON nrlf."Network Id"=ucsd."Network Id"
LEFT JOIN
(SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'SRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6533))) srlf ON srlf."Network Id"=ucsd."Network Id"
```

NOTE: We will get an error if we try to run this.
UCSD, NRLF, and SRLF altogether (recommend grabbing the text from the slide and pasting into something like notepad to make it bigger font)

SQL in Alma Analytics: JOIN Scenario

What if we have a typo?

- When cutting and pasting it's really easy to mess up commas



This is necessary because Alma Analytics will not let you join existing subjects together. You have to convince Analytics you have an entirely new subject.

```
SELECT ucsd."Library Code",
          ucsd."Location Code",
          ucsd."Permanent Call Number",
          ucsd."Summary Holding",
          ucsd."Title (Complete)",
          ucsd."MMS Id",
          ucsd."OCLC Control Number (035a)",
          ucsd."Network Id",
          nrlf."Summary Holding",
          srlf."Summary Holding"
FROM
(SELECT
   "Physical Items"."Location"."Library Code",
   "Physical Items"."Location"."Location Code",
   "Physical Items"."Holding Details"."Permanent Call Number",
   "Physical Items"."Holding Details"."Summary Holding",
   "Physical Items"."Bibliographic Details"."Title (Complete)",
   "Physical Items"."Bibliographic Details"."MMS Id",
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)",
   "Physical Items"."Bibliographic Details"."Network Id"
   FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6535))
) ucsd
LEFT JOIN
(SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'NRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6532))) nrlf ON nrlf."Network Id"=ucsd."Network Id"
LEFT JOIN
(SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'SRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6533))) srlf ON srlf."Network Id"=ucsd."Network Id"
```

UCSD, NRLF, and SRLF altogether with the typo fixed.
NOTE: as of 8/28/2023 this is not working for unknown reasons but it did work just a couple of weeks ago (i.e. this version does not have a typo in it).

(recommend grabbing the text from the slide and pasting into something like notepad to make it bigger font)

SQL in Alma Analytics: JOIN Scenario

Sometimes you just can't get what you want

State: HY000. Code: 46234. [nQSError: 46234] Operation APagedBufferFile::WriteAndInsertFilePageDescriptor failed, during creation of temp file: /dev/shm/nQS_EX_41257_261_25ef0006_3307418.TMP, as it'll exceed the current configured limit. Current configured size limit in MB: 5120

Please have your service administrator review this error. (HY000)

SQL in Alma Analytics: JOIN Scenario

Each query is working individually so if we order by ucsd."MMS Id", would could combine the two reports in Excel.

This may not be the ideal solution but it's an option.

```
SELECT ucsd."Library Code",
       ucsd."Location Code",
       ucsd."Permanent Call Number",
       ucsd."Summary Holding",
       ucsd."Title (Complete)",
       ucsd."MMS Id",
       ucsd."OCLC Control Number (035a)",
       ucsd."Network Id",
       srlf."Summary Holding"
FROM
(SELECT
   "Physical Items"."Location"."Library Code",
   "Physical Items"."Location"."Location Code",
   "Physical Items"."Holding Details"."Permanent Call Number",
   "Physical Items"."Holding Details"."Summary Holding",
   "Physical Items"."Bibliographic Details"."Title (Complete)",
   "Physical Items"."Bibliographic Details"."MMS Id",
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)",
   "Physical Items"."Bibliographic Details"."Network Id"
   FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6535))
) ucsd
LEFT JOIN
(SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'SRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6533))) srlf ON srlf."Network Id"=ucsd."Network Id"
ORDER BY ucsd."MMS Id"
```

UCSD and SRLF with an Order By Clause (recommend grabbing the text from the slide and pasting into something like notepad to make it bigger font)

```
SELECT ucsd."Library Code",
       ucsd."Location Code",
       ucsd."Permanent Call Number",
       ucsd."Summary Holding",
       ucsd."Title (Complete)",
       ucsd."MMS Id",
       ucsd."OCLC Control Number (035a)",
       ucsd."Network Id",
       nrlf."Summary Holding"
FROM
(SELECT
   "Physical Items"."Location"."Library Code",
   "Physical Items"."Location"."Location Code",
   "Physical Items"."Holding Details"."Permanent Call Number",
   "Physical Items"."Holding Details"."Summary Holding",
   "Physical Items"."Bibliographic Details"."Title (Complete)",
   "Physical Items"."Bibliographic Details"."MMS Id",
   "Physical Items"."Bibliographic Details"."OCLC Control Number (035a)",
   "Physical Items"."Bibliographic Details"."Network Id"
   FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'WongAvery')
AND ("Location"."Location Code" = 'jrnl')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6535))
) ucsd
LEFT JOIN
(SELECT
   "Physical Items"."Bibliographic Details"."Network Id",
   "Physical Items"."Holding Details"."Summary Holding"
FROM "Physical Items"
WHERE
(("Location"."Library Code" = 'NRLF')
AND ("Holding Details"."Holding Lifecycle" = 'Active')
AND ("Bibliographic Details"."Bibliographic Level" = 's')
AND (DESCRIPTOR_IDOF("Physical Items"."Institution"."Institution Code") = 6532))) nrlf ON nrlf."Network Id"=ucsd."Network Id"
ORDER BY ucsd."MMS Id"
```

UCSD and NRLF with an Order By Clause (recommend grabbing the text from the slide and pasting into something like notepad to make it bigger font)

Additional Resources (Alma)

- Video: Alma Analytics: Become an Export (highly recommended)
- Ex Libris: Alma Analytics SQL Filter Examples
- Ex Libris: Presentations and Documents - Analytics
- Harvard Wiki: Advanced Formulas
- Ex Libris Developers: Using JOIN in Analytics to combine data from two subject areas

Additional Resources (Generic)

- SQL Operators: The Complete Guide
- SQL Server NULL: Are you making these 7 mistakes?

Questions?

Contact:

gem.stone-logan@ucop.edu

Bonus Slides

For the sake of time, I had to cut a little bit.
After this are some extra slides.

Using SQL in Filters

Challenge:

Count how many bibs have science fiction in their subject

Using SQL in Filters: Bib Count

First attempt:

- Use the Num of Titles (Active) Measure
- Filter on subject contains science fiction

Using SQL in Filters: Bib Count

This seems too low.

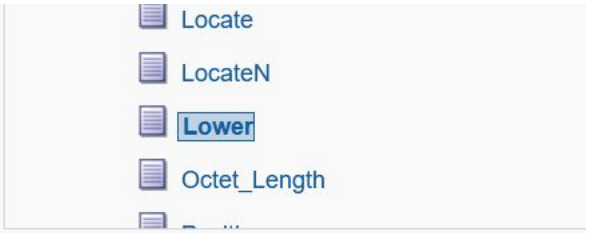
Data is case sensitive.

Using SQL in Filters: Bib Count

One way to convert the subject to all lowercase:

- Click to edit the filter
- Next to Column click the fx icon
- Then enter the formula similar to how we did when doing the columns

Functions



Selected Lower

Syntax LOWER(expr)

Where *expr* is any expression that evaluates to a character string.

Example

Description Converts a character string to lowercase.

Using SQL in Filters: Bib Count

Looking at the filter SQL

- Edit the filter like normal
- Check next to **Convert this filter to SQL**
- Click **OK**

```
LOWER("Bibliographic
Details"."Subjects") LIKE
'%science fiction%'
```

SQL in Alma Analytics: Union Scenario

Challenge:

- Titles subject only updates monthly
- I have new MMS Ids and I don't know if they're for physical or electronic items
- The built-in union ability doesn't allow for prompting

At least, it doesn't seem I can prompt when I join two subjects. However, I could be wrong about this.

SQL in Alma Analytics: Union Scenario

1. Get the report as close as possible to what you want.
2. Click the **Advanced** tab and look at the SQL in the **SQL Issued** section

```
SELECT
   saw_0,
   saw_1,
   saw_2,
   saw_3
 FROM ((SELECT
   "Institution"."Institution Name" saw_0,
   "Bibliographic Details"."MMS Id" saw_1,
   "Bibliographic Details"."Network Id" saw_2,
   "Portfolio"."Portfolio Id" saw_3
 FROM "E-Inventory"
 WHERE
"Bibliographic Details"."MMS Id" = '991055712629706532'
) UNION (SELECT
   "Institution"."Institution Name" saw_0,
   "Bibliographic Details"."MMS Id" saw_1,
   "Bibliographic Details"."Network Id" saw_2,
   "Physical Item Details"."Physical Item Id" saw_3
 FROM "Physical Items"
 WHERE
"Bibliographic Details"."MMS Id" = '991055712629706532'
)) t1 ORDER BY saw_0, saw_1, saw_2, saw_3
```

SQL in Alma Analytics: Union Scenario

3. Clean up the SQL (personal preference)
    a. In the SELECT portion, replace the meaningless column names with actual names
    b. Remove the column I don't want
    c. Remove the remaining saw aliases (like saw_0) but keep column alias at the end (t1)
    d. Delete the extra stuff at the end

```
SELECT
   "Institution Name",
   "MMS Id",
   "Network Id"
 FROM ((SELECT
   "Institution"."Institution Name",
   "Bibliographic Details"."MMS Id",
   "Bibliographic Details"."Network Id",
   "Portfolio"."Portfolio Id"
 FROM "E-Inventory"
 WHERE
"Bibliographic Details"."MMS Id" = '991055712629706532'
) UNION (SELECT
   "Institution"."Institution Name",
   "Bibliographic Details"."MMS Id",
   "Bibliographic Details"."Network Id",
   "Physical Item Details"."Physical Item Id"
 FROM "Physical Items"
 WHERE
"Bibliographic Details"."MMS Id" = '991055712629706532'
)) t1
```

SQL in Alma Analytics: Union Scenario

4. Test the new SQL
    a. In Analytics, click **Create**
    b. Click **Analysis**
    c. Click **Create Analysis from Simple Logical SQL**
    d. Copy in SQL to test
    e. Click **OK**

SQL in Alma Analytics: Union Scenario

4. Replace the MMS Ids with a Variable Prompt
    a. Figure out what you want to call the variable (for example, prompt_mms_id)
    b. Enclose it in `@{}` (for example `@{prompt_mms_id}`)
    c. Substitute the MMS Ids for your new prompt.

```
SELECT
   "Institution Name",
   "MMS Id",
   "Network Id"
 FROM ((SELECT
   "Institution"."Institution Name",
   "Bibliographic Details"."MMS Id",
   "Bibliographic Details"."Network Id",
   "Portfolio"."Portfolio Id"
 FROM "E-Inventory"
 WHERE
"Bibliographic Details"."MMS Id" = ' @{prompt_mms_id}'
) UNION (SELECT
   "Institution"."Institution Name",
   "Bibliographic Details"."MMS Id",
   "Bibliographic Details"."Network Id",
   "Physical Item Details"."Physical Item Id"
 FROM "Physical Items"
 WHERE
"Bibliographic Details"."MMS Id" = ' @{prompt_mms_id}'
)) t1
```

SQL in Alma Analytics: Union Scenario

5. Enter the new SQL and add a Variable Prompt
    a. Follow the same steps as #4
    b. Click the **Prompts** link
    c. Click the Plus sign and choose **Variable Prompt**

SQL in Alma Analytics: Union Scenario

5. Enter the new SQL and add a Variable Prompt (cont)
    d. Next to Presentation Variable type your variable name (i.e. prompt_mms_id) don't include the @ or curly braces
    e. Give it a Label
    f. Click OK and Save the report

SQL in Alma Analytics: Union Scenario

5. Test the report by clicking **Open**
6. Try entering multiple MMS Ids
    a. What does the SQL look like?
    b. What does this look like in a regular report?
    c. Compare the differences:

Test with MMS Id 991055712629706532 (physical)
and 991035455165104701 (electronic)

SQL in Alma Analytics: Union Scenario

Our SQL:

```
"MMS Id" =
'99105571262970653 2;99103545516510 4701'
```

Regular SQL:

```
"MMS Id" IN ('99105571262970653 2',
'99103545516510 4701')
```

Test with MMS Id 991055712629706532 (physical)
and 991035455165104701 (electronic)

SQL in Alma Analytics: Union Scenario

7. Modify our SQL, run it, and look at the results again.

Our SQL:

```
"MMS Id" IN
('99105571262970653 2'',''991035455165
104701')
```

This time, try entering the MMS Ids as:
991055712629706532','991035455165104701

SQL in Alma Analytics: Union Scenario

8. Modify our SQL, run it, and look at the results again.

I have a suspicion it's going to work this time so when I'm making the prompt I edit the "display" to provide some instruction for the user how to properly enter the MMS Ids
This time, try entering the MMS Ids as:
'991055712629706532','99103545516510470 1'

```
SELECT
   "Institution Name",
   "MMS Id",
   "Network Id"
 FROM ((SELECT
   "Institution"."Institution Name",
   "Bibliographic Details"."MMS Id",
   "Bibliographic Details"."Network Id",
   "Portfolio"."Portfolio Id"
 FROM "E-Inventory"
 WHERE
"Bibliographic Details"."MMS Id" IN (@{prompt_mms_id})
) UNION (SELECT
   "Institution"."Institution Name",
   "Bibliographic Details"."MMS Id",
   "Bibliographic Details"."Network Id",
   "Physical Item Details"."Physical Item Id"
 FROM "Physical Items"
 WHERE
"Bibliographic Details"."MMS Id" IN (@{prompt_mms_id})
)) t1
```

SQL in Alma Analytics: Types of Joins

FULL OUTER JOIN

Pulls everything from both locations.

Library Code	Summary Holding (UCSD)	Title (Complete)	Summary Holding (NRLF)
			winter/spring 2001/02
			zesz. 1(1928)-3(1936)
			zesz. 1(1951)
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.1(1963)-25(1986)
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.26(1987)-52(2002)
WongAvery	ed.12(2001)	Nomenclature supplement	2001(12)
WongAvery	1997 (1997-1997)	Unlisted drugs. Index-guide	
WongAvery	1 (2005-2005)	The year in anaesthesia and critical care.	
WongAvery	63,64:1-5 (2002-2003)	AIHA journal : a journal for the science of occu	v.63(2002)-64(2003)

A FULL OUTER JOIN would include too much information because we don't care about NRLF holdings if UCSD doesn't have them. Note: In other systems you can often say "OUTER JOIN" rather than "FULL OUTER JOIN"
https://dataschool.com/how-to-teach-people-sql/sql-join-types-explained-visually/

SQL in Alma Analytics: Types of Joins

INNER JOIN

Only includes holdings if both locations have it.

Library Code	Summary Holding (UCS	Title (Complete)	Summary Holding (NRLF
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.1(1963)-25(1986)
WongAvery	1-35,62 (1963-2006)	Advances in parasitology.	v.26(1987)-52(2002)
WongAvery	ed.12(2001)	Nomenclature supplemer	2001(12)
WongAvery	63,64:1-5 (2002-2003)	AIHA journal : a journal f	v.63(2002)-64(2003)

An INNER JOIN would include too little information because it would only retrieve results where both UCSD and NRLF had holdings.
https://dataschool.com/how-to-teach-people-sql/sql-join-types-explained-visually/