Northwestern | myHR

myHR Administration

Advanced Query Functions

HCM 9.2, PT 8.55

Revised 5/28/2019

INTRODUCTION

Structured Query Language

This manual contains terms, concepts, and procedures that are rooted in traditional Structured Query Language (SQL). Please note that this guide does not attempt to provide a complete technical definition of any SQL concept; rather, the information is presented in the context of its specific functionality in the myHR Query environment.

myHR Reporting Database

Remember: All queries must be created in the myHR Reporting database; queries should never be created in Production. The potential exists to lock up or significantly slow down the database if something is implemented incorrectly; running queries in the Reporting database protects the daily HR and Payroll processes that regularly occur in the Production system.

Assistance

For general myHR questions, including lockouts and security, contact:

myHR Help Desk: 847-467-4800, myHRhelp@northwestern.edu

For query resources, visit the myHR website:

https://www.northwestern.edu/hr/essentials/hr-systems/myhr/index.html

For upcoming query training classes, visit the myHR Learn website:

https://learn.northwestern.edu/

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Joining Tables in Query

INTRODUCTION TO JOINS

Definition

A **JOIN** is the method used to combine data from two different tables into one set of results. For example, querying the JOB table provides appointment information, but does not contain an employee's name. The name can be easily added, however, by locating a second table which *does* contain the name (e.g. PERSONAL_DATA), and **joining** it to the JOB table.

To join two tables together, there must be at least one piece of common data (or field) between them. Typically this is a **KEY FIELD** of at least one of the two tables.

Key Fields

A **KEY FIELD** is a field on a particular table that acts as an identifier for each row of data. In any table, *no two rows of data will have the same values for all key fields.* On the PERSONAL_DATA table, EMPLID is the Key Field; no two rows on PERSONAL_DATA will have the same EMPLID.

Multiple Key Fields: A table often will require more than one Key Field. The NW_EMPLOYEES table contains active appointments; because an employee can have more than one appointment, both EMPLID *and* EMPL_RCD must be used to identify an appointment. As such, *both* are Key Fields for NW_EMPLOYEES.

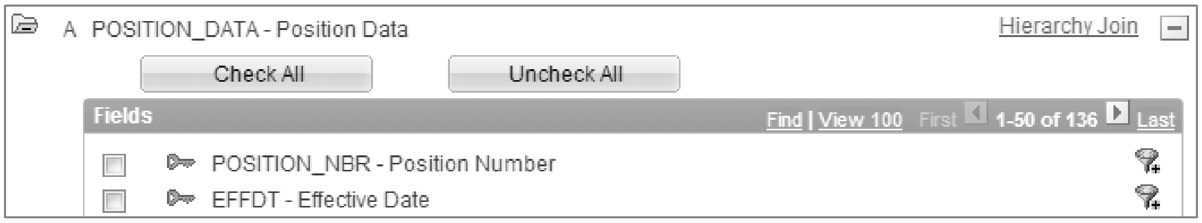
Dates as Key Fields: Tables that contain historical data often will include a date as a Key Field. In the case of POSITION_DATA, the field POSITION_NBR is not unique on its own. Because the table contains the entire history for a Position, one POSITION_NBR will have many rows of data. In this case, the EFFDT (Effective Date) field is used as a second Key; no two rows will have the same POSITION_NBR *and* EFFDT.

Non-Unique Key Fields: Sometimes fields on a table will be named as keys to assist in processing queries and data searches. For example, NW_GL_TABLE contains the NW_GL_NUM_ASSIGN key; this field identifies each row of data and is enough on its own to provide uniqueness. But the table also assigns EMPLID, EMPL_RCD, and PAYGROUP as additional keys. This allows for better functionality behind the scenes, such as quicker processing, sorting, and searching of data.

Here are some other examples of Key Fields; notice how the Keys provide a unique identifier for the data on each table:

Table Name	Type of Data	Key Field(s)
DEPT_TBL	Departments	DEPTID, EFFDT
PERSONAL_DATA	Employee's Personal Information	EMPLID
NW_EMPLOYEES	Active Appointments	EMPLID, EMPL_RCD
JOBCODE_TBL	Job Codes (Job Titles)	JOBCODE, EFFDT
POSITION_DATA	All Position Data & History	POSITION_NBR, EFFDT
JOB	All Job Data & History	EMPLID, EMPL_RCD, EFFDT, EFFSEQ

After adding a table to your query, its Key Fields can be seen on the Query tab, indicated by a key icon to the right of the field name:


A POSITION_DATA - Position Data
Hierarchy Join
Check All
Uncheck All
Fields
Find | View 100 First 1-50 of 136 Last

POSITION_NBR - Position Number
EFFDT - Effective Date

How Joins Work

When you combine data from two tables, the system needs to find one or more fields that both tables have in common; this allows the query to match data from the first table with corresponding data from the second table. Consider the following tables and fields:

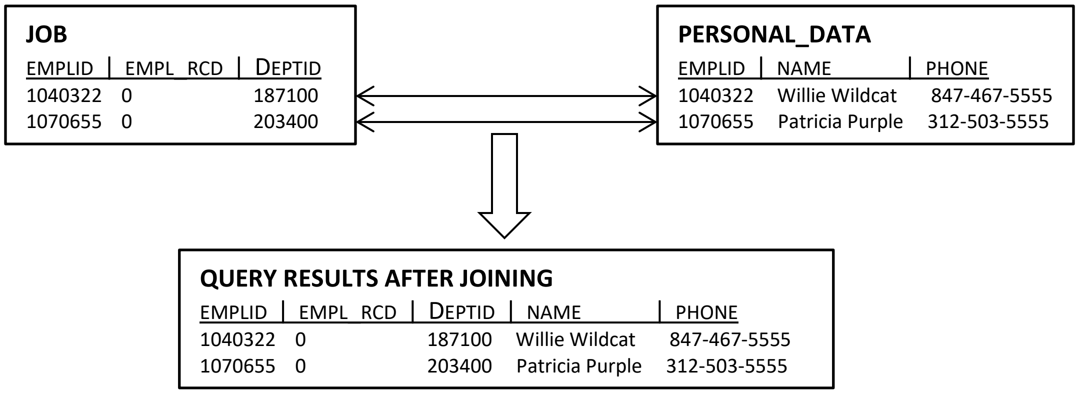
JOB

EMPLID	EMPL_RCD	DEPTID

PERSONAL_DATA

EMPLID	NAME	PHONE

Since the EMPLID appears on both tables, an employee's Job Data can be matched with his/her Personal Data. Where the EMPLID corresponds, data is combined:



JOB

EMPLID	EMPL_RCD	DEPTID
1040322	0	187100
1070655	0	203400

PERSONAL_DATA

EMPLID	NAME	PHONE
1040322	Willie Wildcat	847-467-5555
1070655	Patricia Purple	312-503-5555

QUERY RESULTS AFTER JOINING

EMPLID	EMPL_RCD	DEPTID	NAME	PHONE
1040322	0	187100	Willie Wildcat	847-467-5555
1070655	0	203400	Patricia Purple	312-503-5555

Types of Joins

There are five **JOIN** types available in myHR Query that can be used to match data together from different tables. The most commonly used Joins occur when you add a new table or data to your query:

- Standard Join (also called an "Inner Join")
- Left Outer Join

Other Joins are identified automatically while creating your query and are presented as options within the Query Manager:

- Hierarchy Join
- Related Record Join

A final Join type can be accomplished indirectly, using the Union feature:

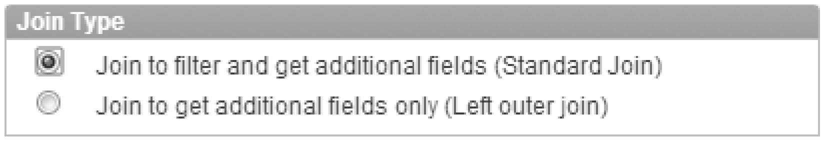
- Full Outer Join

Each of these Join Types is discussed in further detail in the following sections.

STANDARD & LEFT OUTER JOINS

Definitions

The Standard Join and the Left Outer Join allow you to manually combine data from two tables in myHR. Every time an additional table is added to your query via the RECORDS tab, you are presented with these two options:


Join Type

● Join to filter and get additional fields (Standard Join)

○ Join to get additional fields only (Left outer join)

A **STANDARD JOIN** is very strict. It will look for data that matches between the two tables; where there *is* a match, data from both tables will be combined and reported. Where there is *not* a match, *no data from either table will be reported.*

The **LEFT OUTER JOIN** is more lenient. This join will report *all* data from the first (left) table, regardless of whether or not it matches something in the second table.

The Difference Between a Standard and a Left Outer Join

Before selecting which of the two joins to use, it is very important to understand how it will affect your data. Consider a query that combines NW_EMPLOYEES to pull employees' names and NW_GL_TABLE to pull their year-to-date earnings:

NW_EMPLOYEES

EMPLID	EMPL_RCD	NAME
1040322	0	Wilma Wildcat
2070655	0	Patricia Purple

NW_GL_TABLE

EMPLID	Sum(NW_GL_AMT)
1040322	3225.43

Notice that "Patricia Purple" does not have a row in the NW_GL_TABLE; she was just hired into the department and has not yet received her first paycheck.

STANDARD JOIN: Using a **STANDARD JOIN**, you will receive only *one* result; Patricia does not have a row on the second table, so she will not appear:

QUERY RESULTS – STANDARD JOIN

EMPLID	EMPL_RCD	NAME	Sum(NW_GL_AMT)
1040322	0	Wilma Wildcat	3225.43

LEFT OUTER JOIN: When using the **LEFT OUTER JOIN**, Patricia *will* appear since all information on the left table is reported. Her GL Amount will simply be blank (or zero), since there was nothing that matched:

QUERY RESULTS – LEFT OUTER JOIN

EMPLID	EMPL_RCD	NAME	Sum(NW_GL_AMT)
1040322	0	Wilma Wildcat	3225.43
2070655	0	Patricia Purple	

Standard Join

As you can see in the previous example, a Standard Join provides inherent filtering. If we wanted to see *only* the employees that have earned pay, this would be the correct option: it will automatically ignore those who have not been paid.

Use a Standard Join when you only want to see data that has a match in both tables.

When using a Standard Join:

- It doesn't matter which table is first and which is second.
- You can Standard Join any table to any other table in your query.
- Criteria is not adversely impacted.

Left Outer Join

If our goal in the previous example was to see *all* of our employees, *regardless* of whether they have been paid, the Left Outer Join is the correct option.

Use a Left Outer Join if some data in the first table might *not* match data in the second table, but you still want to keep that data.

When using a Left Outer Join:

- **Order matters** – the data you want to keep *must* be the first table in the join. Nonmatching data in the second table will always be thrown out.
  - In the above example, if the tables were reversed, we would *not* see Patricia with a Left Outer Join.
- Criteria on the second table *may* have an adverse impact if not set up correctly.

Joining Code Tables

Tables that contain code descriptions always can be joined to any other table using a Standard Join. They will contain a match for *every* corresponding code, and there is no security applied to these tables. As a result, there is no concern for “dropping” unmatched rows. For example, DEPT_TBL will always have a match for every DEPTID.

These Code Tables are available to all query users:

Table Name	Type of Data	Defines the Field/Code
DEPT_TBL	Department Names	DEPTID
JOBCODE_TBL	Job Codes (Job Titles)	JOBCODE
PERSON_NAME	Current Names	EMPLID
LOCATION_TBL	Addresses Associated with Location Codes	LOCATION
NW_ADMIN_UNIT	Administrative Units	NW_ADMIN_UNIT
FUND_TBL NW_FN_DEPT_TBL PROJECT	Descriptions and related data for chartstring Fund, FN Dept, and Project	FUND_CODE DEPTID *(matches to NW_FN_DEPT)* PROJECT_ID

Joining Core Data Tables

Core Data Tables usually can be joined reliably with a Standard Join. For example, every POSITION_NBR will have a match on POSITION_DATA; every EMPLID will have a match on PERSONAL_DATA.

However, because these tables contain security, *results may be lost when Standard-Joining to another table if a person or position has since transferred out of your access.* Use a **Left Outer Join** if the first table is a GL table (e.g. NW_GL_TABLE), and the second table is a core data table which may contain an employee or position record that has since transferred out of your department.

The Core Data Tables available to users include:

Table Name	Type of Data	Based on the Data Code
POSITION_DATA	All position information	POSITION_NBR
PERSONAL_DATA	All personal information	EMPLID
JOB	All appointment information	EMPLID, EMPL_RCD

Tip: **PERSON_NAME** has a name for each employee and does not have any security restrictions. Use this table instead of PERSONAL_DATA if you only need name. You can safely use Standard Join with PERSON_NAME.

CREATING STANDARD & LEFT OUTER JOINS

Preparation

When preparing a complex query, it is very important to identify the tables required and how you will join them *before* creating the query in myHR.

Before creating any joins in a complex query, first determine:

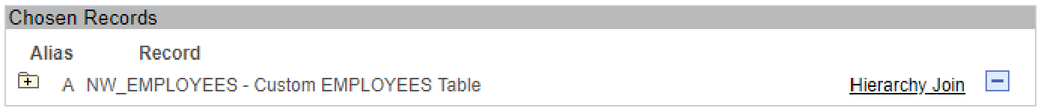
1. which tables will be required,
2. which common data fields will be used to join each pair of tables,
3. which Join Types will be implemented to avoid dropping results, and
4. the order in which the tables must be placed (remember, order matters for Left Outer Join: the table from which all records should be kept needs to go first)

Implementing a Standard or Left Outer Join

Once you have determined the order in which tables will be joined, creating the join is as simple as adding a new table to your query.

Procedure

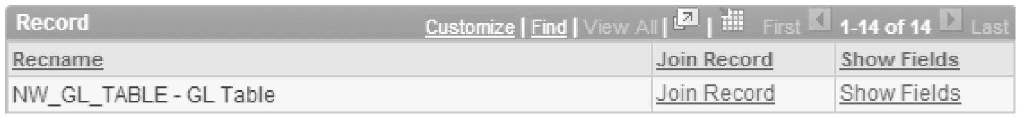
1. Begin your Query as normal by adding the first table.



Chosen Records

Alias	Record	
A	NW_EMPLOYEES - Custom EMPLOYEES Table	Hierarchy Join

2. Switch back to the Records tab and search for the new table:

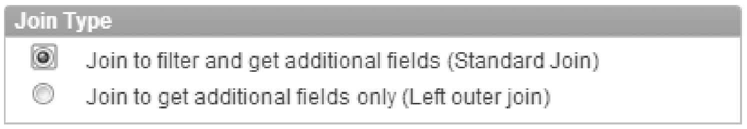


Record — Customize | Find | View All | First 1-14 of 14 Last

Recname	Join Record	Show Fields
NW_GL_TABLE - GL Table	Join Record	Show Fields

3. Click Join Record.

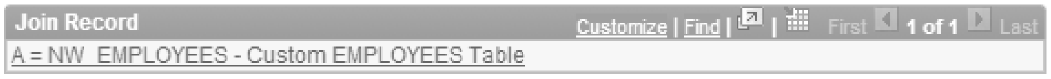
4. Select the appropriate Join Type:



Join Type

- [✓ Join to filter and get additional fields (Standard Join)]
- Join to get additional fields only (Left outer join)

5. Select the table to which you are joining this new table:

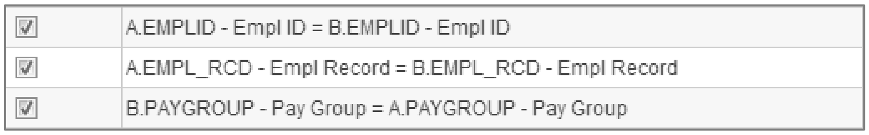


Join Record — Customize | Find | First 1 of 1 Last

A = NW_EMPLOYEES - Custom EMPLOYEES Table

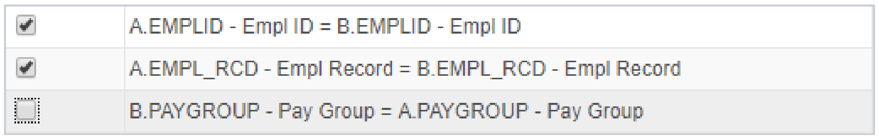
- For the purposes of a Left Outer Join, the first table is considered the "left" table; the table you are joining is considered the "right" table. All records in the first (left) table will be kept.

6. The system will try to identify the matching fields between the two tables; select the fields, if any, that you have identified for your join:



✓	A.EMPLID - Empl ID = B.EMPLID - Empl ID
✓	A.EMPL_RCD - Empl Record = B.EMPL_RCD - Empl Record
✓	B.PAYGROUP - Pay Group = A.PAYGROUP - Pay Group

- You do not have to select all fields that are displayed. For example, uncheck PAYGROUP if your query does not want to distinguish between paygroups. (For example, because the person may have had a different position in the past.)



✓	A.EMPLID - Empl ID = B.EMPLID - Empl ID
✓	A.EMPL_RCD - Empl Record = B.EMPL_RCD - Empl Record
☐	B.PAYGROUP - Pay Group = A.PAYGROUP - Pay Group

- If the system does not identify the correct field you want to match, simply leave one option checked and edit it in the criteria tab later. *(See "Joining Tables with Manual Criteria" below.)*

7. Click Add Criteria to complete the join.

8. Repeat Steps 2-7 until all tables are joined.

9. If you created a Left Outer Join, and the system automatically added an Effective-Dated criteria, edit the criteria. *See "Criteria with Left Outer Joins."*

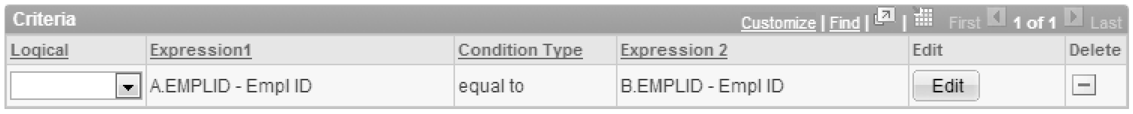
Joining Tables with Manual Criteria

You can match any field on one table to any field on another table; the fields do not have to be the same name. If you try to match two fields that do not have the same name, the system will not automatically identify them for you; when this occurs you will have to manually edit the join.

Procedure

1. Create the Join using the procedure above. In Step #6, leave one of the criteria checked; even though it's incorrect, you will be able to manually edit it.

2. After completing the join, switch to the Criteria tab and locate the incorrect criteria that was just added:

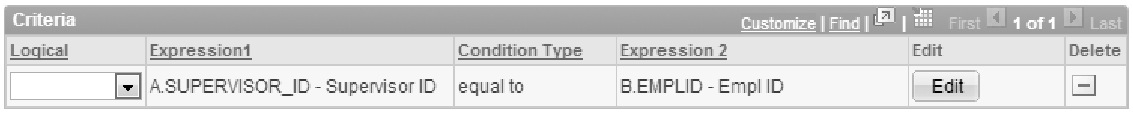


Criteria — Customize | Find | First 1 of 1 Last

Logical	Expression1	Condition Type	Expression 2	Edit	Delete
	A.EMPLID - Empl ID	equal to	B.EMPLID - Empl ID	Edit	−

3. Click Edit for that criteria.

4. Using the normal criteria procedure, edit the criteria to manually match the fields that you intended to match for this join:



Criteria — Customize | Find | First 1 of 1 Last

Logical	Expression1	Condition Type	Expression 2	Edit	Delete
	A.SUPERVISOR_ID - Supervisor ID	equal to	B.EMPLID - Empl ID	Edit	−

5. By changing the criteria, you have now manually edited the join.

Note: Sometimes you will attempt to join two tables, and the system will not identify any matching fields that you can later edit. In this case, create your join as usual. Then switch to the Criteria tab and *add a new criteria* to manually match the fields as necessary.

CRITERIA WITH LEFT OUTER JOINS

Overview

When using a Left Outer Join, the placement of the criteria can *greatly* impact the set of results received. Consider a query in which we want a list of employees and their earnings for the pay period ending 2/16/2013. We decide to use a Left Outer Join so that the query still contains the names of employees who did *not* receive pay for that period. Here is the data on NW_EMPLOYEES and NW_GL_TABLE:

NW_EMPLOYEES

EMPLID	EMPL_RCD	NAME
1040322	0	Wilma Wildcat
2070655	0	Patricia Purple

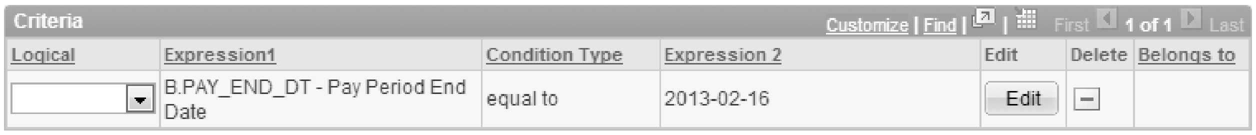
NW_GL_TABLE

EMPLID	PAY_END_DT	NW_GL_AMT
1040322	2/02/2013	1205.44
1040322	2/16/2013	1134.58
2070655	2/02/2013	789.02

In addition to the Left Outer Join, we must add a criteria stating that **PAY_END_DT = 2/16/2013**. This criteria can be applied either **before** or **after** the data is combined.

Criteria Applied <u>After</u> a Left Outer Join

By default, criteria are applied *after* the Left Outer Join, appearing in the CRITERIA tab as:

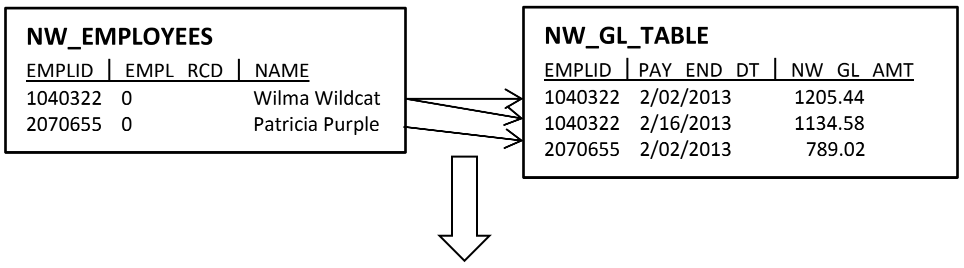


Criteria

Logical	Expression1	Condition Type	Expression 2	Edit	Delete	Belongs to
	B.PAY_END_DT - Pay Period End Date	equal to	2013-02-16	Edit	−	

GOAL: Display all employees, and their earnings from period ending 2/16/13. If no one had earnings on 2/16/13, display their names with no pay.

STEP 1: Before the criteria is considered, the Left Outer Join is applied:



NW_EMPLOYEES

EMPLID	EMPL_RCD	NAME
1040322	0	Wilma Wildcat
2070655	0	Patricia Purple

NW_GL_TABLE

EMPLID	PAY_END_DT	NW_GL_AMT
1040322	2/02/2013	1205.44
1040322	2/16/2013	1134.58
2070655	2/02/2013	789.02

Left-Joined Data

EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
1040322	0	Wilma Wildcat	2/02/2013	1205.44
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple	2/02/2013	789.02

STEP 2: After the data is combined, *then* the criteria of "PAY_END_DATE = 2013-02-16" is applied, leaving us with one row of results:

QUERY RESULTS – Criteria Applied *after* Left Outer Join

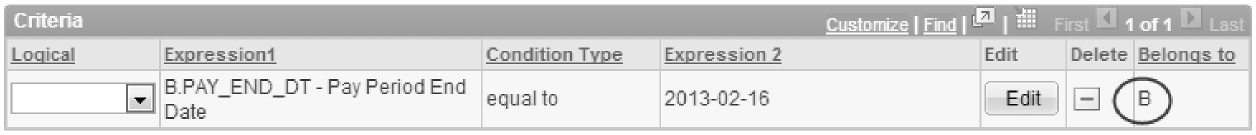
EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
~~1040322~~	~~0~~	~~Wilma Wildcat~~	~~2/02/2013~~	~~1205.44~~
1040322	0	Wilma Wildcat	2/16/2013	1134.58
~~2070655~~	~~0~~	~~Patricia Purple~~	~~2/02/2013~~	~~789.02~~

RESULT: Even though we are using a Left Outer Join, Patricia Purple *will not appear* in the results. Initially, she *did* have a match between both tables**, but her row was removed by the PAY_END_DT criteria in Step 2.**

For Patricia to appear, Steps 1 & 2 must be reversed.

Criteria Applied BEFORE a Left Outer Join

If the criteria is set to occur *before* the Left Outer Join, the CRITERIA tab will indicate that it "Belongs to" a particular table:



Criteria — Customize | Find | First 1 of 1 Last

Logical	Expression1	Condition Type	Expression 2	Edit	Delete	Belongs to
	B.PAY_END_DT - Pay Period End Date	equal to	2013-02-16	Edit	−	B

GOAL: Display all employees, and their earnings from period ending 2/16/13. If no one had earnings on 2/16/13, display their names with no pay.

STEP 1: Before the data is joined, the criteria is applied *only* to the table in question:

NW_GL_TABLE

EMPLID	PAY_END_DT	NW_GL_AMT
~~1040322~~	~~2/02/2013~~	~~1205.44~~
1040322	2/16/2013	1134.58
~~2070655~~	~~2/02/2013~~	~~789.02~~

STEP 2: Now the Left Outer Join occurs with the pre-filtered data on the GL Table:

NW_EMPLOYEES

EMPLID	EMPL_RCD	NAME
1040322	0	Wilma Wildcat
2070655	0	Patricia Purple

$\longrightarrow$

NW_GL_TABLE

EMPLID	PAY_END_DT	NW_GL_AMT
1040322	2/16/2013	1134.58

$\Downarrow$

QUERY RESULTS – Criteria Applied *before* the Left Outer Join

EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple		

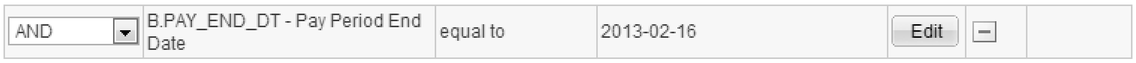
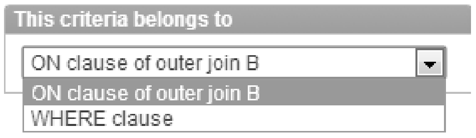
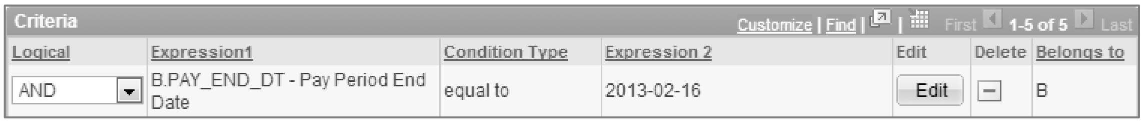
RESULT: The criteria occurred first; this time when the data was "joined," Patricia Purple *did not* have a match between the tables. As expected (and desired) by the Left Outer Join, she now appears in the results without pay data.

How to Change a Criteria to Occur Before the Left Outer Join

When Left Outer Joining tables, criteria for the second table are applied *after* the join by default.

THIS INCLUDES ALL EFFECTIVE-DATE CRITERIA THAT ARE AUTOMATICALLY ADDED.

If a criteria for the second table must occur *before* the data is joined, including any Effective-Date criteria, the setting must be changed manually.

Procedure	
1.	On the tab, add or edit the criteria that needs to occur *before* the join.  AND | B.PAY_END_DT - Pay Period End Date | equal to | 2013-02-16 | Edit
2.	In the Criteria Properties, select the "**This criteria belongs to**" drop-down box.  This criteria belongs to: ON clause of outer join B / WHERE clause • If the criteria should be applied **before** the join, select: "On clause of outer join {table}." Be sure to choose the letter that corresponds to the second table of the join. • If the criteria should be applied **after** the join, select: "WHERE clause."
3.	Click to save the Criteria.
4.	The Criteria tab now confirms that this filter will be applied *before* the join, as this criteria "Belongs to" the **B** table only:  Criteria — Logical | Expression1 | Condition Type | Expression 2 | Edit | Delete | Belongs to — AND | B.PAY_END_DT - Pay Period End Date | equal to | 2013-02-16 | Edit | | B

HIERARCHY JOIN

Definition

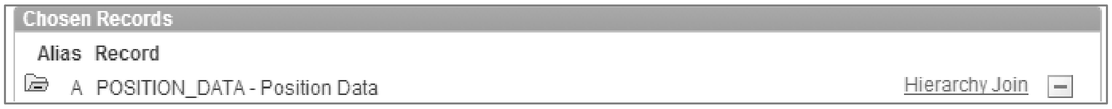
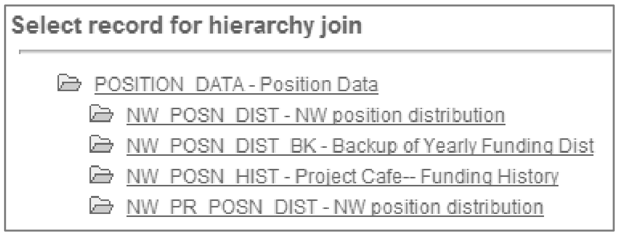
Some tables in myHR have an inherent hierarchy, where a second table is considered a “child” of the first. Consider the following two tables:

$$\begin{tikzcd}\boxed{\text{POSITION\_DATA}} \arrow[r] & \boxed{\text{NW\_POSN\_DIST}}\end{tikzcd}$$

POSITION_DATA is a “parent” table, containing all position information. NW_POSN_DIST is closely related; it is a “child” of the first table, containing the Position Funding for each Position.

When you add a table to your query that has a related child or parent, the **HIERARCHY JOIN** becomes available automatically.

Implementing a Hierarchy Join

	Procedure
1.	After adding a table to your query that is part of a hierarchy, a Hierarchy Join link becomes visible next to that table on the Query tab:  Chosen Records Alias Record A POSITION_DATA - Position Data Hierarchy Join
2.	Click the Hierarchy Join link to see related tables:  Select record for hierarchy join POSITION_DATA - Position Data NW_POSN_DIST - NW position distribution NW_POSN_DIST_BK - Backup of Yearly Funding Dist NW_POSN_HIST - Project Cafe-- Funding History NW_PR_POSN_DIST - NW position distribution
3.	To join a related table, click the table name; the table is automatically added to your query.

RELATED RECORD JOIN

Definition

While some tables have a formal Parent-Child relationship, others contain partially-related data that can be accessed through a **RELATED RECORD JOIN**. This often occurs when one table contains a code or number (such as DEPTID), and that code or number's definition (such as the Department Name) is in another table. Consider:

JOB
EMPLID | DEPTID | JOBCODE

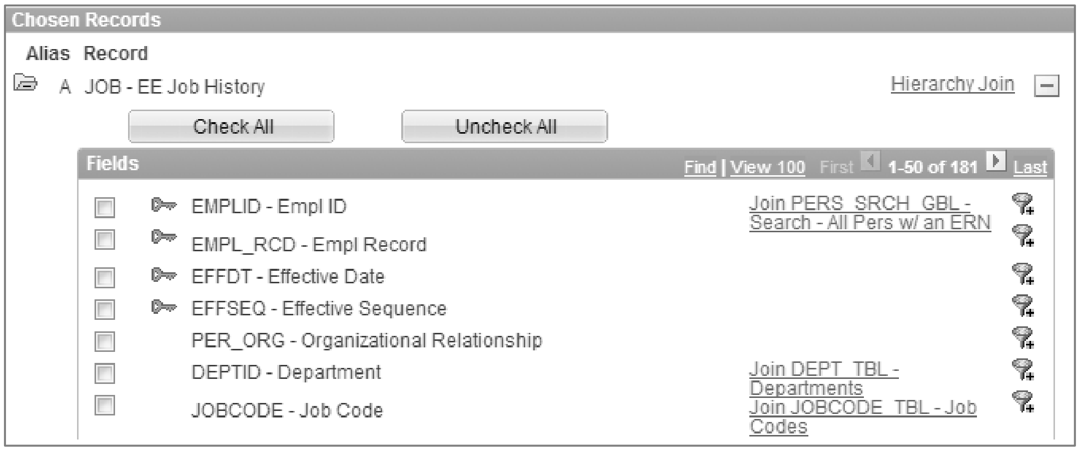
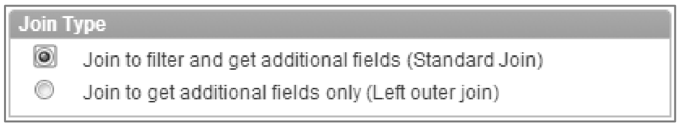
DEPT_TBL
(Department Names)

JOBCODE_TBL
(Job Titles)

JOB contains all appointment data, including DEPTID, and JOBCODE. Each of these fields is related to another table, shown on the right, which contains a related description.

Using Related Record Joins, related data from these tables, such as Department Name and Job Title, can be quickly added to a query.

Implementing a Related Record Join

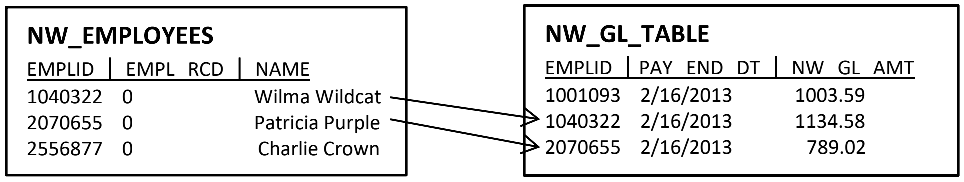
	Procedure
1.	After adding a table to your query, look at the fields on the Query tab. Wherever a related record is identified, a Join {Table Name} link will appear to the right of the field:  Chosen Records Alias Record A JOB - EE Job History Hierarchy Join Check All Uncheck All Fields Find | View 100 First 1-50 of 181 Last EMPLID - Empl ID — Join PERS_SRCH_GBL - Search - All Pers w/ an ERN EMPL_RCD - Empl Record EFFDT - Effective Date EFFSEQ - Effective Sequence PER_ORG - Organizational Relationship DEPTID - Department — Join DEPT_TBL - Departments JOBCODE - Job Code — Join JOBCODE_TBL - Job Codes
2.	To add the related table, click the Join {Table Name} link. The Join Type screen will appear:  Join Type [✓ Join to filter and get additional fields (Standard Join)] Join to get additional fields only (Left outer join)
3.	Choose the correct Join Type, and click OK; the table will be added to your query. • If you are joining a table that contains descriptive data for codes or ID numbers, such as the tables above, the Join Type can be **Standard Join**. • In other instances, review the previous sections to determine which Join Type is appropriate for your query.

Full Outer Join

Overview

Remember that a Left Outer Join takes all the results from the *first* table, and pulls in only matching data from the second table. But what if there is also data in the second table that doesn't have a match? A **FULL OUTER JOIN** allows you to retain unmatched data from *both* tables.

Consider this data, where we want to see all General Ledger earnings for Pay Period End Date 2/16/2013:



NW_EMPLOYEES

EMPLID	EMPL_RCD	NAME
1040322	0	Wilma Wildcat
2070655	0	Patricia Purple
2556877	0	Charlie Crown

NW_GL_TABLE

EMPLID	PAY_END_DT	NW_GL_AMT
1001093	2/16/2013	1003.59
1040322	2/16/2013	1134.58
2070655	2/16/2013	789.02

Notice there is data on each table without a match:

- **Charlie Crown** is an active employee, but didn't receive a paycheck on 2/16/2013.
- EmplID **1001093** is no longer an active employee, but *did* receive pay on 2/16/2013.

Consider the ways we can join these tables:

- If we use a **Standard Join**, the query will return only the matching data for Wilma and Patricia; we will not know that Charlie Crown is an active employee, nor will we see the paycheck for EmplID 1001093.

QUERY RESULTS – Standard Join

EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple	2/16/2013	789.02

- If we implement a **Left Outer Join** with NW_EMPLOYEES first, Charlie Crown's row *will* be returned – but we still won't see the paycheck for EmplID 1001093.

QUERY RESULTS – Left Join, with NW_EMPLOYEES First

EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple	2/16/2013	789.02
2556877	0	Charlie Crown		

- If we *reverse* the table order and perform a **Left Outer Join** with NW_GL_TABLE first, we *will* get the paycheck for 1001093, but we will *not* see Charlie Crown.

QUERY RESULTS – Left Join, with NW_GL_TABLE First

EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
1001093			2/16/2013	1003.59
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple	2/16/2013	789.02

- If we want to see all data, including the data from *both* tables that do not have a match, we must combine *both* Left Outer Joins. Only then will we capture the unmatched data from each side:

QUERY RESULTS – Combined Results from Both Left Outer Joins

EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple	2/16/2013	789.02
2556877	0	Charlie Crown		
1001093			2/16/2013	1003.59
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple	2/16/2013	789.02

In practice, this is called a **FULL OUTER JOIN**. In myHR, this is accomplished by:

1. creating a query using the first Left Outer Join;
2. repeating the exact same query, but reversing the order of the tables;
3. combining the results from both queries via a UNION. *

In this scenario, duplicate rows of data are automatically removed, providing the final results that include all matched and unmatched rows:

FINAL QUERY RESULTS – Using a Full Outer Join / Union

EMPLID	EMPL_RCD	NAME	PAY_END_DT	NW_GL_AMT
1040322	0	Wilma Wildcat	2/16/2013	1134.58
2070655	0	Patricia Purple	2/16/2013	789.02
2556877	0	Charlie Crown		
1001093			2/16/2013	1003.59

** See the next section on Unions for details on how to combine these two queries into one.*

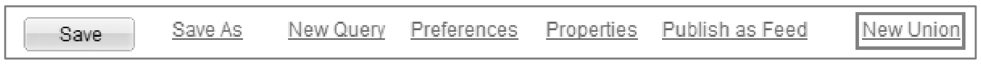
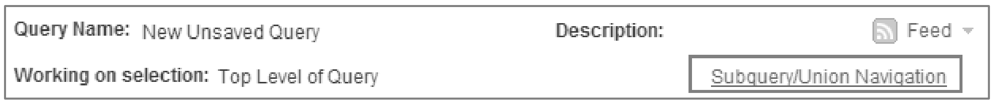
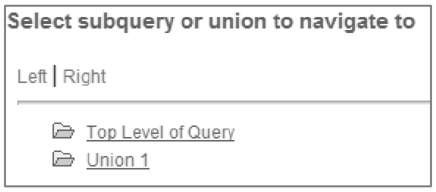
UNIONS

Definition

A **UNION** allows results from two or more queries to be combined into one set of data. Each query and its criteria are independent and processed separately; after each query is run, the results are then combined and sorted together. The queries may be similar or completely different, however:

- all queries must have the same number of columns (fields),
- the column headings set in the first query will be used,
- the sort order set in the first query will be used to sort *all* results,
- the field length from the first query will be used.

Creating a Union

	Procedure
1.	Create your first query with all necessary criteria. Be sure to order the fields before continuing. Take note of the fields you are using, and in which order they appear.
2.	At the bottom right of the Query Manager, select New Union:  Save Save As New Query Preferences Properties Publish as Feed New Union
3.	Create the second query with its criteria. *Be sure to place the fields in the same order as your first query.* • Each part of the Union is completely independent; you cannot refer directly to a field or criteria in the other part of the Union. You must re-create the criteria for the second Union separately. • If you are attempting to mimic a Full Outer Join, simply re-create the first query – will all its criteria – but reverse the order of the two Left Outer Joined tables. • Unfortunately you cannot "copy" the first query into the second; you must re-create it from scratch.
4.	To navigate back and forth between parts of the Union, click Subquery/Union Navigation in the top right corner of Query Manager:  Query Name: New Unsaved Query Description: Working on selection: Top Level of Query • The portion of the Union you are currently viewing is noted as the **Working on Selection**.
5.	Select the part of the query you wish to view/edit. "Top Level of Query" is the main (first) query in the Union.  Select subquery or union to navigate to Left | Right Top Level of Query Union 1

Notes:

- When using a Union, duplicate rows are *automatically* removed from your results. As such, the "Remove Duplicates" checkbox is not available for your query.
- To delete a Union, first navigate to the part you wish to remove (Step 4), and then choose the Delete Union link from the bottom right corner.

Section 2
Subqueries

INTRODUCTION TO SUBQUERIES

Definition

A **SUBQUERY** is a query whose results are used as part of a criteria; because of this, subqueries are always initiated by adding a new criteria to the main query.

When a subquery is created, it is applied to every row of data – just like any other criteria. For example, if you set a criteria for NW_POSN_TYPE = “STF,” your query will test every row of data and will only display rows with a Position Type of “STF.” Likewise, the subquery tests every row of data to determine whether or not that row will be displayed.

Types of Subqueries

There are many ways subqueries can be integrated into the criteria of your main query:

Subquery Condition	**The data from your main query is displayed if the subquery finds...**
Exists	If the subquery finds *any* result, the row from the main query is displayed.
Does Not Exist	If the subquery finds *no* result, the row from the main query is displayed.
In List	The subquery finds a list of values, such as EmplIDs. If the main query matches any value in this list, the row is displayed.
Not In List	The subquery finds a list of values, such as EmplIDs. If the main query *does not* match a value in this list, the row is displayed.
(Not) Equal To, (Not) Greater Than, (Not) Less Than	The subquery finds a specific value that can be matched to the main query like any conditional.

EXISTS / DOES NOT EXIST / IN LIST / NOT IN LIST

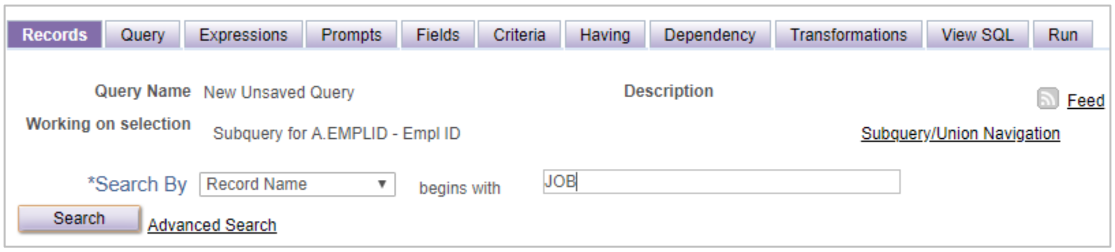
Description

When using **EXISTS** or **DOES NOT EXIST**, a subquery is written that may or may not bring back any results. In this test, the result itself does not matter – what matters is whether the subquery finds *any* result.

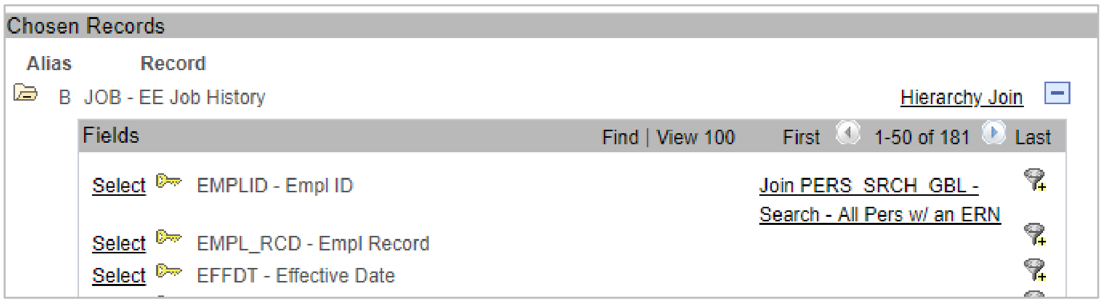
By contrast, **IN LIST** or **NOT IN LIST** allows the subquery to return a list of specific values. The query will test to see if your main data matches (or doesn't match) any value in that list.

Example

Query: Obtain a list of current employees and their appointments for each employee that was newly hired to the University in fiscal year 2012.

Procedure	
1.	Create the main query using the NW_EMPLOYEES table.
2.	Add fields to the query: EMPLID, EMPL_RCD, NAME, JOBTITLE, DEPTNAME
3.	On the Criteria tab, click Add Criteria.
4.	Set Expression 1 to field A.EMPLID
5.	Set Condition Type to “in list”. (We use “in list” because we will use a subquery to generate a list of employee ids for people who were hired in FY12.)
6.	Choose Expression 2 Type: select “Subquery”
7.	Click Define/Edit Subquery.
8.	Begin building the subquery by adding the JOB table. An effective date criterion is automatically added, we will edit this later. Note that “Working on section” at the top will say “Subquery for A.EMPLID” to let you know that the current query you are building is the subquery for the criterion.  Records Query Expressions Prompts Fields Criteria Having Dependency Transformations View SQL Run Query Name New Unsaved Query; Description; Feed; Working on selection Subquery for A.EMPLID - Empl ID; Subquery/Union Navigation; *Search By Record Name begins with JOB; Search; Advanced Search

9. Click the "Select" link next to EMPLID in the JOB table. The EMPLID list will be the output of the subquery, which will be used as the "in list" criterion for the main query. You can't add more than one field.

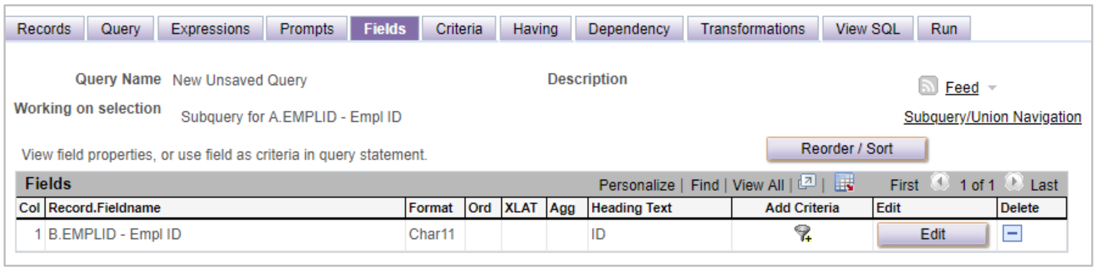

Chosen Records

Alias Record

B JOB - EE Job History — Hierarchy Join

Fields — Find | View 100 — First 1-50 of 181 Last

Select	EMPLID - Empl ID	Join PERS_SRCH_GBL - Search - All Pers w/ an ERN
Select	EMPL_RCD - Empl Record	
Select	EFFDT - Effective Date	



Query Name New Unsaved Query

Description

Working on selection Subquery for A.EMPLID - Empl ID

Feed

Subquery/Union Navigation

View field properties, or use field as criteria in query statement.

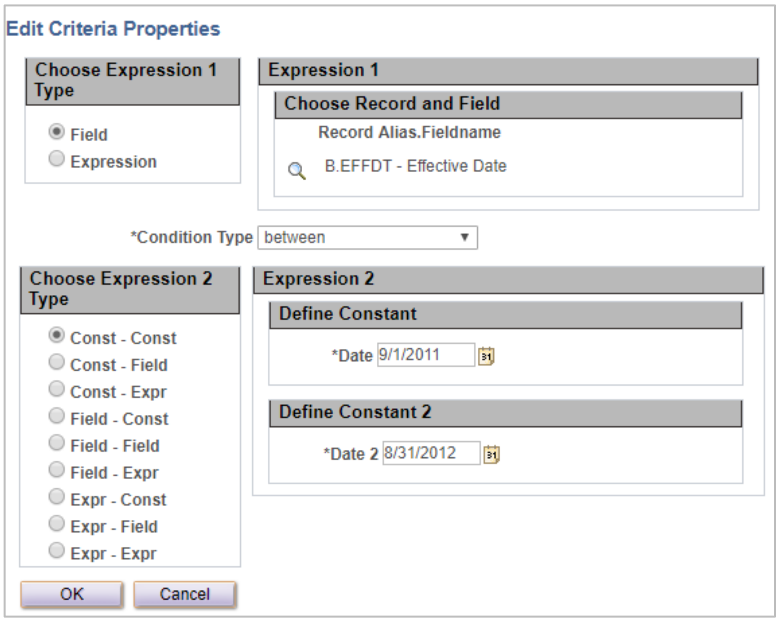
Reorder / Sort

Fields — Personalize | Find | View All | First 1 of 1 Last

Col	Record.Fieldname	Format	Ord	XLAT	Agg	Heading Text	Add Criteria	Edit	Delete
1	B.EMPLID - Empl ID	Char11				ID		Edit	

10. Click on the "Criteria" tab. It has the automatically-added effective date criterion.

11. Edit the Effective Date criterion to be B.EFFDT between 9/1/2011 and 8/31/2012 (this is fiscal year 2012)


Edit Criteria Properties

Choose Expression 1 Type: [✓ Field] Expression

Expression 1 — Choose Record and Field

Record Alias.Fieldname: B.EFFDT - Effective Date

*Condition Type: between

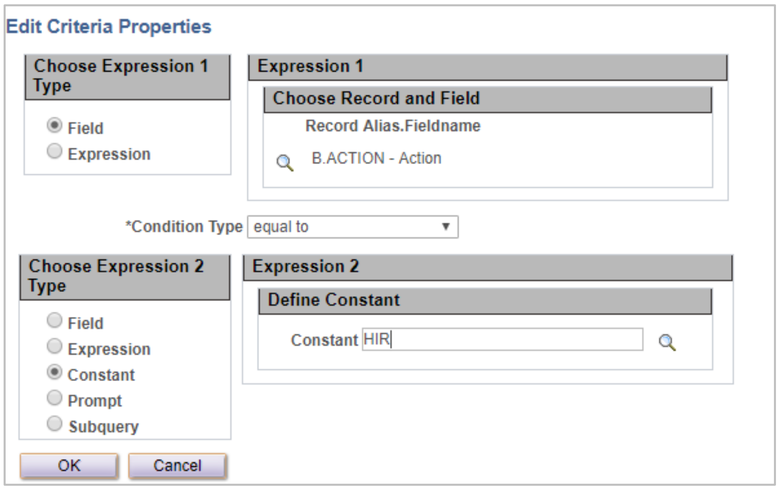
Choose Expression 2 Type: [✓ Const - Const] Const - Field, Const - Expr, Field - Const, Field - Field, Field - Expr, Expr - Const, Expr - Field, Expr - Expr

Expression 2

Define Constant: *Date 9/1/2011

Define Constant 2: *Date 2 8/31/2012

12. Click Add Criteria. For Expression 1 select the field B.ACTION. Condition type will be "equal to" and Expression 2 will be "HIR". This is the action for new hires. Click OK.


Edit Criteria Properties

Choose Expression 1 Type: (●) Field ( ) Expression

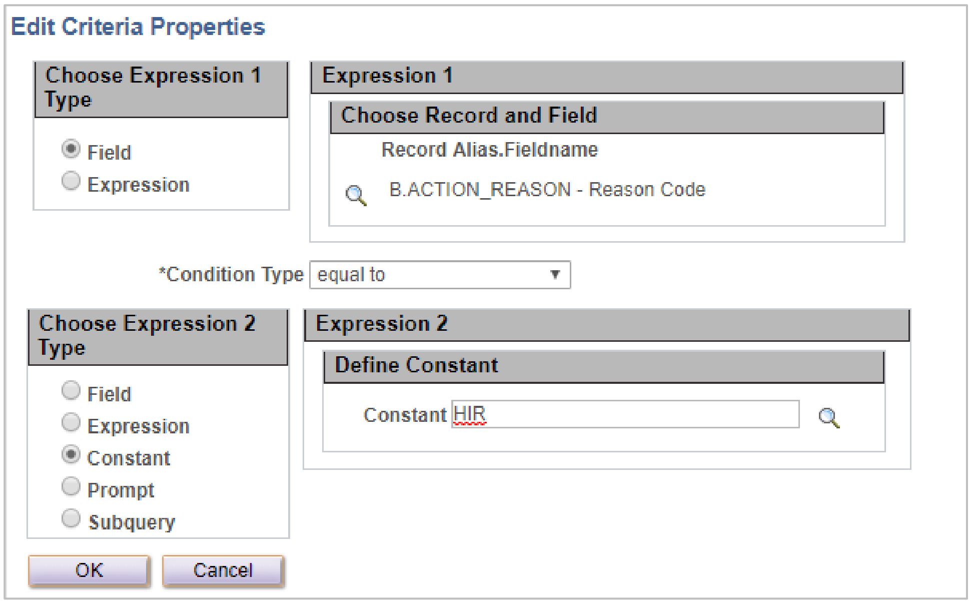
Expression 1 — Choose Record and Field — Record Alias.Fieldname: B.ACTION - Action

*Condition Type: equal to

Choose Expression 2 Type: ( ) Field ( ) Expression (●) Constant ( ) Prompt ( ) Subquery

Expression 2 — Define Constant — Constant: HIR

13. Click Add Criteria. For Expression 1 select the field B.ACTION_REASON. Condition type will be "equal to" and Expression 2 will be "HIR". This is the action-reason code for new hires. (Using this action-reason code will eliminate cases where an additional appointment was added to an existing employee in FY12.) Click OK.


Edit Criteria Properties

Choose Expression 1 Type: (●) Field ( ) Expression

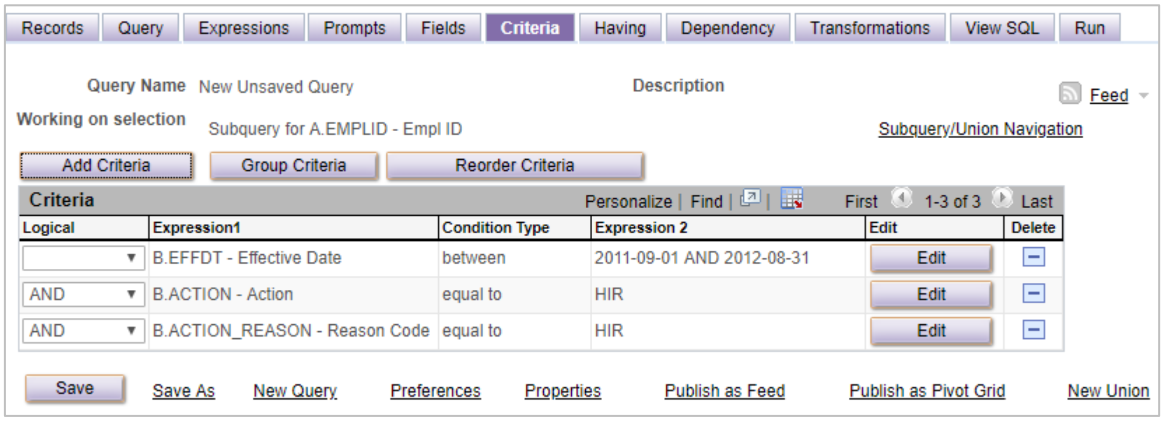
Expression 1 — Choose Record and Field — Record Alias.Fieldname: B.ACTION_REASON - Reason Code

*Condition Type: equal to

Choose Expression 2 Type: ( ) Field ( ) Expression (●) Constant ( ) Prompt ( ) Subquery

Expression 2 — Define Constant — Constant: HIR

14. You now have three criteria for the subquery: effective date in fiscal year 2012, action of hire, and action-reason code of hire.



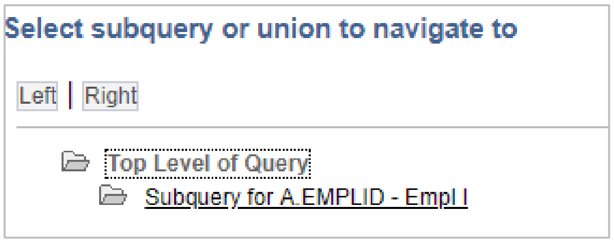
Query Name New Unsaved Query Description

Working on selection Subquery for A.EMPLID - Empl ID

Criteria

Logical	Expression1	Condition Type	Expression 2	Edit	Delete
	B.EFFDT - Effective Date	between	2011-09-01 AND 2012-08-31	Edit	⊟
AND	B.ACTION - Action	equal to	HIR	Edit	⊟
AND	B.ACTION_REASON - Reason Code	equal to	HIR	Edit	⊟

15. Click Subquery/Union Navigation in the top right corner to return to the Top Level of the query. Then click “Top Level of Query”. This wil return you to the main query. You can make any further edits here (add more columns, sort the output, etc.)


Select subquery or union to navigate to
Left | Right
Top Level of Query
Subquery for A.EMPLID - Empl I

16. Click “Run” to execute your query. Now you will see current employees who were hired in fiscal year 2012.

EQUAL TO / GREATER THAN / LESS THAN

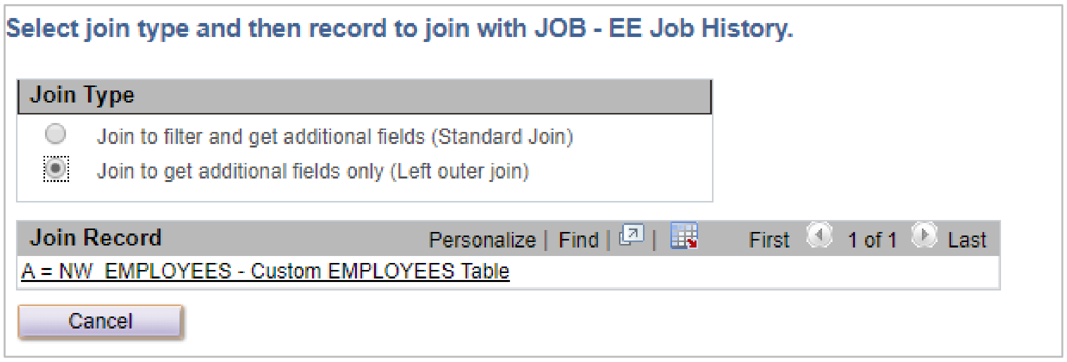
Subquery Test

In addition to the “In List” and “Exists” functions, a subquery can be used to return a specific value which is then compared to the original query.

Example

Query: Obtain a list of current employees and show their last promotion date and promotion reason code. If they never had a promotion, include them in the list and just leave the promotion columns blank.

Strategy: we will get current employees from the NW_EMPLOYEES table. We will Left Outer Join the JOB table to get the effective date of the last promotion. We will then use a subquery to find the last date in case the person had multiple promotions. The subquery will use the JOB table as well.

Procedure	
1.	Create the main query using the NW_EMPLOYEES table.
2.	Add fields to the query: EMPLID, EMPL_RCD, NAME, JOBTITLE, DEPTNAME
3.	On the “Criteria” tab, delete the effective date criterion. NW_EMPLOYEES table is already restricted to only show currently effective rows. (It doesn't hurt to leave the criterion there, it's just unnecessary.)
4.	Click on the “Records” tab and Left Outer Join the JOB table. We will use the effective date from the JOB table to display the promotion date. However, not everyone has had a promotion, and we don't want to remove people without a promotion from the report. That's why we are using Left Outer Join instead of Standard Join. Select “Join to get additional fields only” and click on the hyperlink for A = NW_EMPLOYEES. 

Select join type and then record to join with JOB - EE Job History.

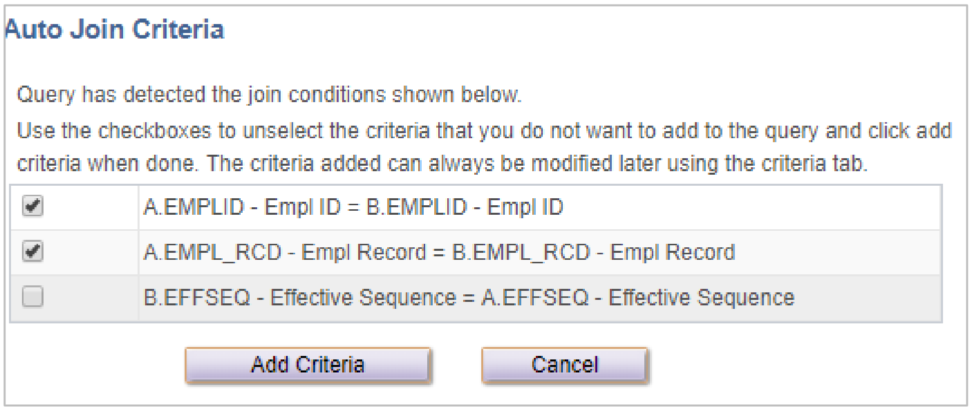
Join Type

Join to filter and get additional fields (Standard Join) [✓ Join to get additional fields only (Left outer join)]

Join Record

A = NW_EMPLOYEES - Custom EMPLOYEES Table

5. In the Auto Join Criteria, unselect the effective sequence join. We only want to join on employee id and employee record. Click "Add Criteria".



Auto Join Criteria

Query has detected the join conditions shown below.
Use the checkboxes to unselect the criteria that you do not want to add to the query and click add criteria when done. The criteria added can always be modified later using the criteria tab.

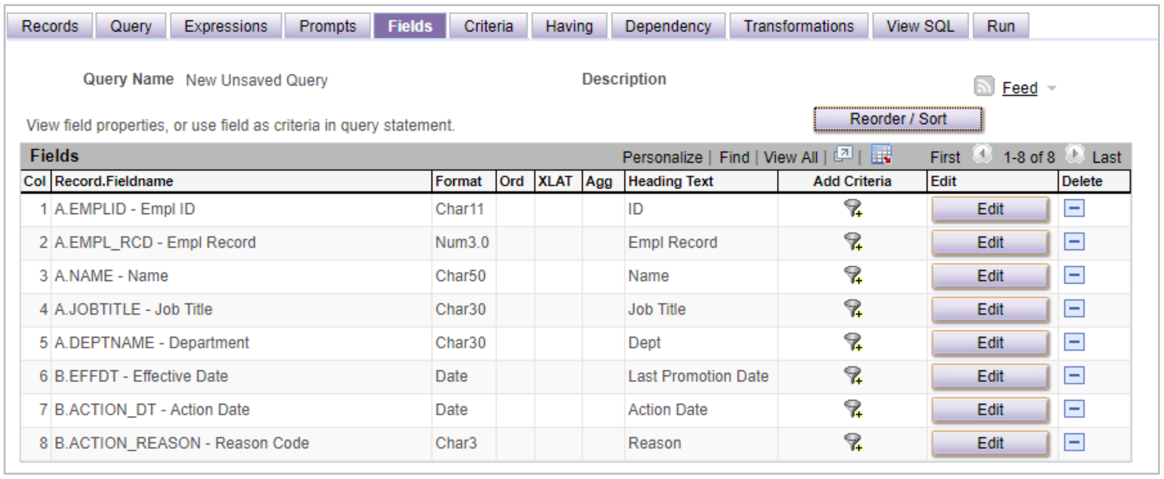
✓	A.EMPLID - Empl ID = B.EMPLID - Empl ID
✓	A.EMPL_RCD - Empl Record = B.EMPL_RCD - Empl Record
☐	B.EFFSEQ - Effective Sequence = A.EFFSEQ - Effective Sequence

An automatic effective date criterion will be added for the Job table. Just click "OK" on the pop-up message. We will edit that criterion later.

6. From the JOB table (table B), add the following fields to the report: EFFDT, ACTION_DT, ACTION_REASON

Action-reason code tells you the type of promotion: PRC is reclassification, PRP is promoted to different position

7. Go to the Fields tab and rename B.EFFDT field to "Last Promotion Date"



Query Name New Unsaved Query   Description

View field properties, or use field as criteria in query statement.

Fields

Col	Record.Fieldname	Format	Ord	XLAT	Agg	Heading Text	Add Criteria	Edit	Delete
1	A.EMPLID - Empl ID	Char11				ID		Edit	
2	A.EMPL_RCD - Empl Record	Num3.0				Empl Record		Edit	
3	A.NAME - Name	Char50				Name		Edit	
4	A.JOBTITLE - Job Title	Char30				Job Title		Edit	
5	A.DEPTNAME - Department	Char30				Dept		Edit	
6	B.EFFDT - Effective Date	Date				Last Promotion Date		Edit	
7	B.ACTION_DT - Action Date	Date				Action Date		Edit	
8	B.ACTION_REASON - Reason Code	Char3				Reason		Edit	

8. Go to the "Criteria" tab.

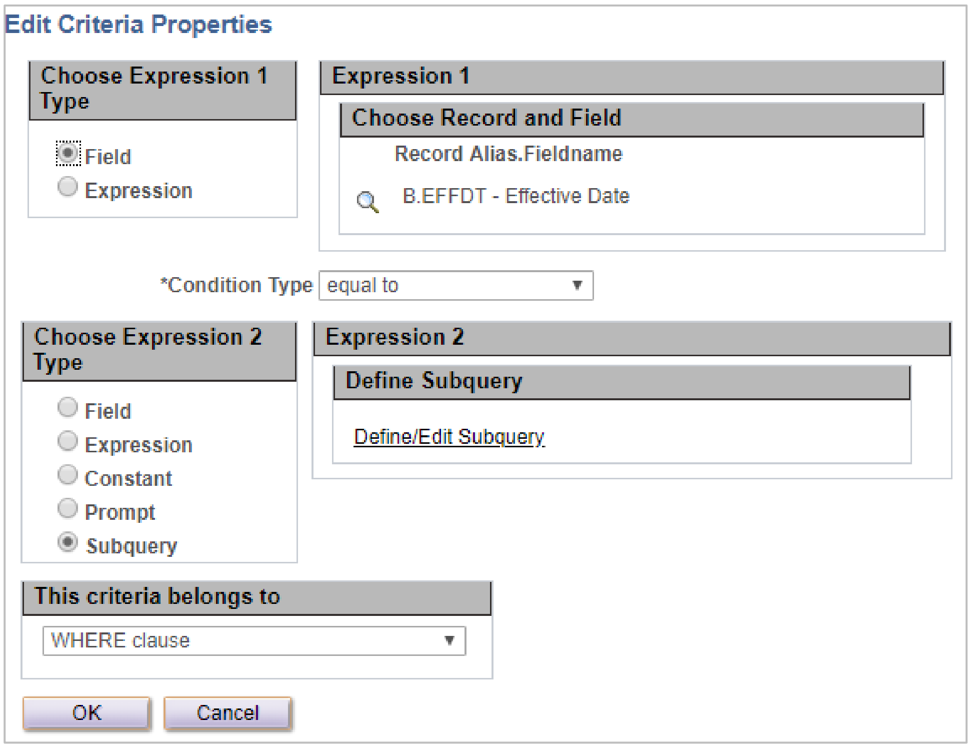
9. Find the row for B.EFFDT and click "Edit". We want to find the JOB table effective date that is the date of the last promotion. We will use a subquery to do this.

Leave Experssion 1 as B.EFFDT.

Set Condition Type to "equal to"

Set Expression 2 Type to Subquery.

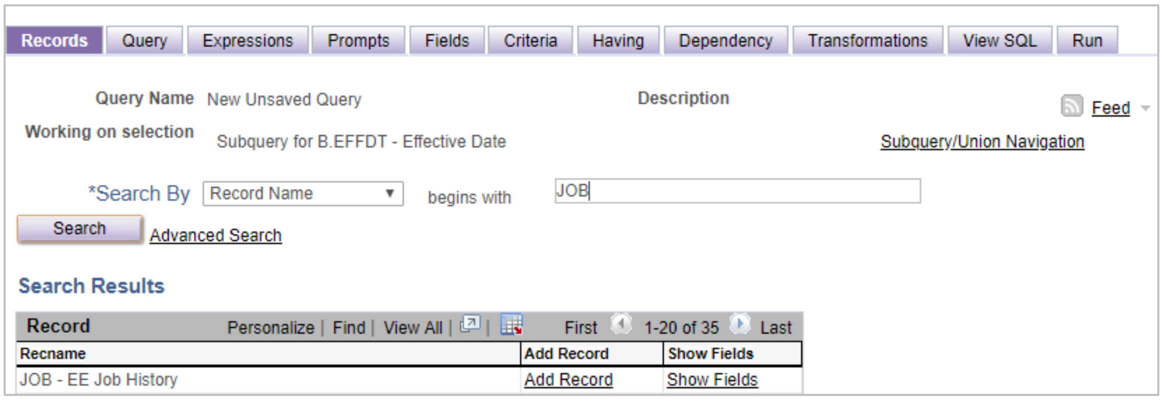
Don't click OK.



10. Click "Define/Edit Subquery" under Expression 2

11. Now, we have to find the last promotion date for a person. This information is in the JOB table. While on the Records tab for the subquery, search for record JOB and click "Add Record". An effective date criterion will automatically be added, we will edit this later.

Notice that we have a "Working on section" label now that tells us that we are working on the "Subquery for B.EFFDT."



Query Name New Unsaved Query

Description

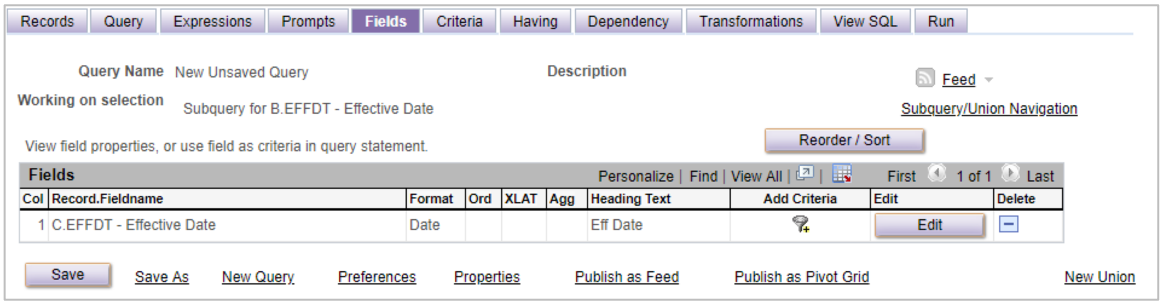
Working on selection Subquery for B.EFFDT - Effective Date

*Search By Record Name begins with JOB

Record 1-20 of 35

Recname	Add Record	Show Fields
JOB - EE Job History	Add Record	Show Fields

12. Click the "Select" hyperlink next to EFFDT. The output of the subquery will be the effective date of the last promotion. Remember that a subquery cannot have multiple columns.



Query Name New Unsaved Query
Description
Working on selection Subquery for B.EFFDT - Effective Date

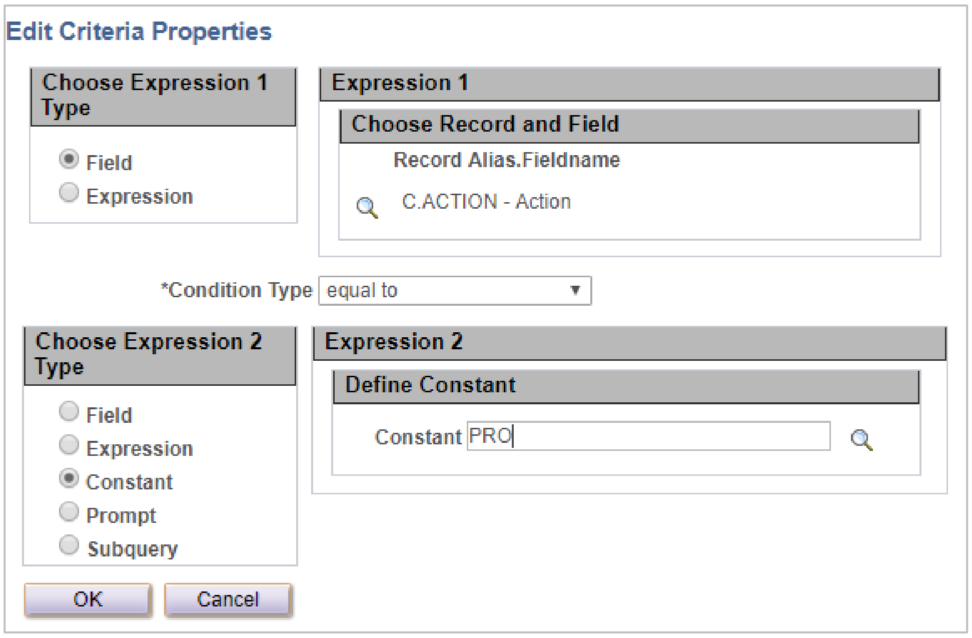
View field properties, or use field as criteria in query statement.

Fields

Col	Record.Fieldname	Format	Ord	XLAT	Agg	Heading Text	Add Criteria	Edit	Delete
1	C.EFFDT - Effective Date	Date				Eff Date		Edit	

13. Go to the "Criteria" tab and delete the C.EFFDT criterion. We are using the JOB table to find the last promotion date. We don't want to restrict the results to the currently-effective row.

14. Click "Add Criteria". For Expression 1, select C.ACTION. Condition Type should be "equal to". And Expression 2 will be PRO, which is the action code for promotions. Click OK.



Edit Criteria Properties

Choose Expression 1 Type
- [✓ Field]
- Expression

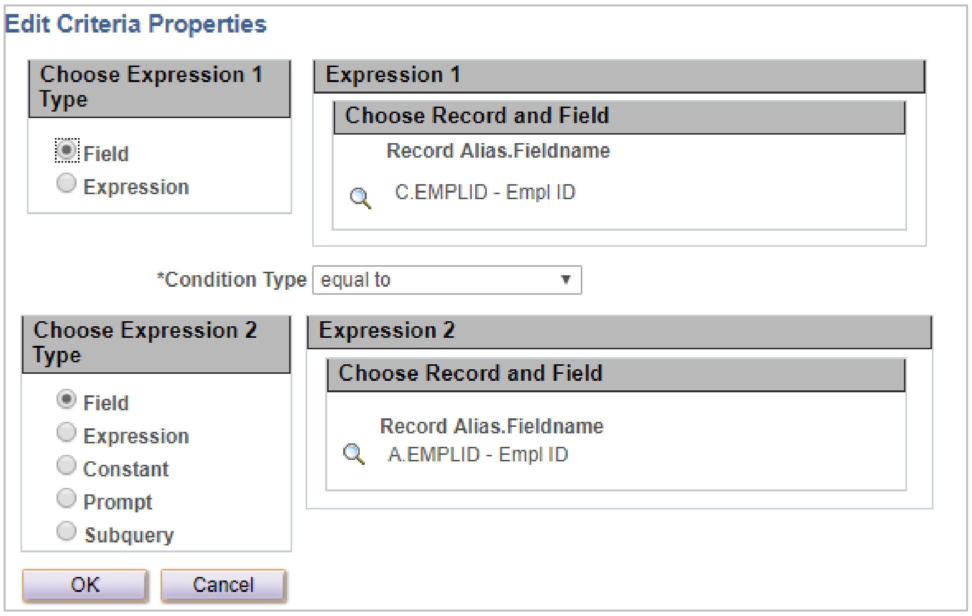
Expression 1
Choose Record and Field
Record Alias.Fieldname
C.ACTION - Action

*Condition Type: equal to

Choose Expression 2 Type
- Field
- Expression
- [✓ Constant]
- Prompt
- Subquery

Expression 2
Define Constant
Constant: PRO

15. Click “Add Criteria”. Expression 1 will be C.EMPLID. Condition Type is “equal to”, Expression 2 Type is “Field”, and Expression 2 is A.EMPLID. There is no auto-join between the tables in the main query and the tables in the subquery. We need to use Criteria to add the join condition on EMPLID between the main query's NW_EMPLOYEES table (table A) and the subquery JOB table (table C).


Edit Criteria Properties

Choose Expression 1 Type: [● Field] ○ Expression

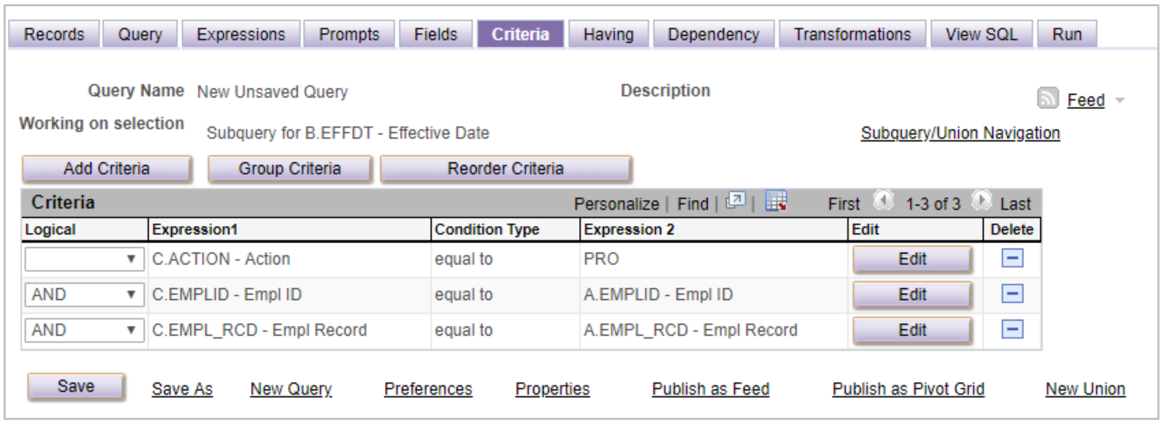
Expression 1 — Choose Record and Field — Record Alias.Fieldname: C.EMPLID - Empl ID

*Condition Type: equal to

Choose Expression 2 Type: [● Field] ○ Expression ○ Constant ○ Prompt ○ Subquery

Expression 2 — Choose Record and Field — Record Alias.Fieldname: A.EMPLID - Empl ID

16. Add a criterion for C.EMPL_RCD = A.EMPL_RCD. You will now have three items in the Criteria tab for the subquery.



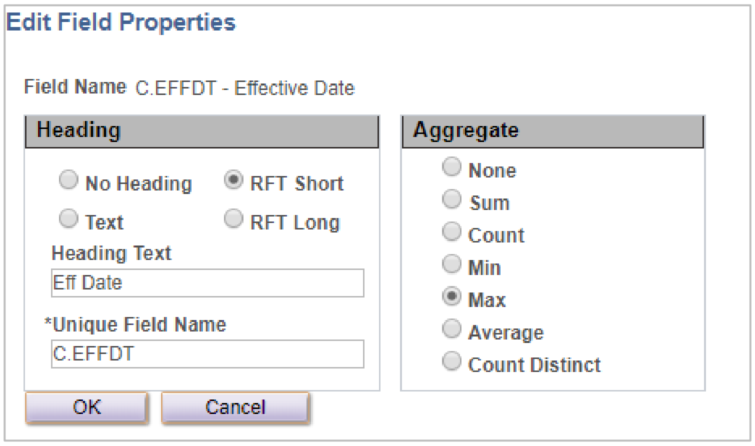
Query Name: New Unsaved Query
Description:
Working on selection: Subquery for B.EFFDT - Effective Date

Feed
Subquery/Union Navigation
Add Criteria
Group Criteria
Reorder Criteria
Personalize | Find | First 1-3 of 3 Last

Criteria

Logical	Expression1	Condition Type	Expression 2	Edit	Delete
	C.ACTION - Action	equal to	PRO	Edit	⊟
AND	C.EMPLID - Empl ID	equal to	A.EMPLID - Empl ID	Edit	⊟
AND	C.EMPL_RCD - Empl Record	equal to	A.EMPL_RCD - Empl Record	Edit	⊟

17. Go to the "Fields" tab. Click "Edit" for the C.EFFDT field. Under "Aggregate" select "Max". If a person had multiple promotions, we want the date of the most recent one. The output of the subquery will be the *latest* promotion date.



Edit Field Properties

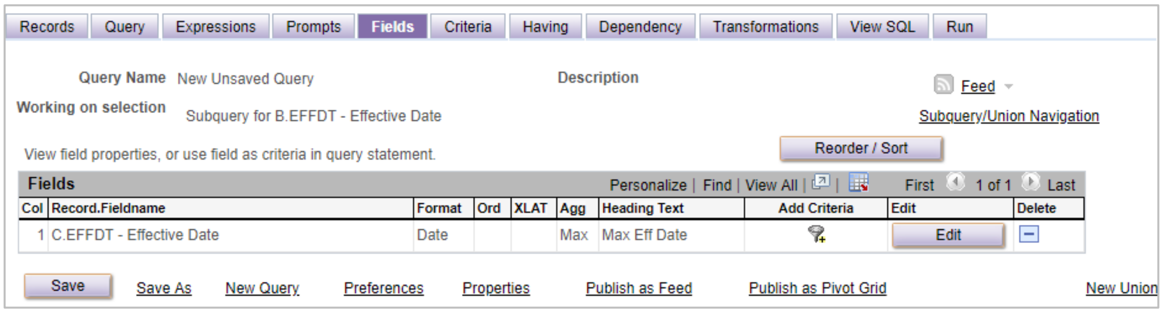
Field Name C.EFFDT - Effective Date

Heading: No Heading [✓ RFT Short] Text RFT Long

Heading Text: Eff Date

*Unique Field Name: C.EFFDT

Aggregate: None Sum Count Min [✓ Max] Average Count Distinct



Query Name New Unsaved Query

Description

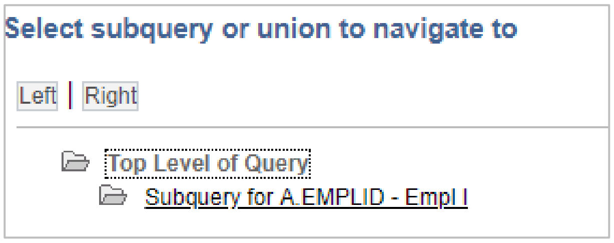
Working on selection Subquery for B.EFFDT - Effective Date

View field properties, or use field as criteria in query statement.

Fields

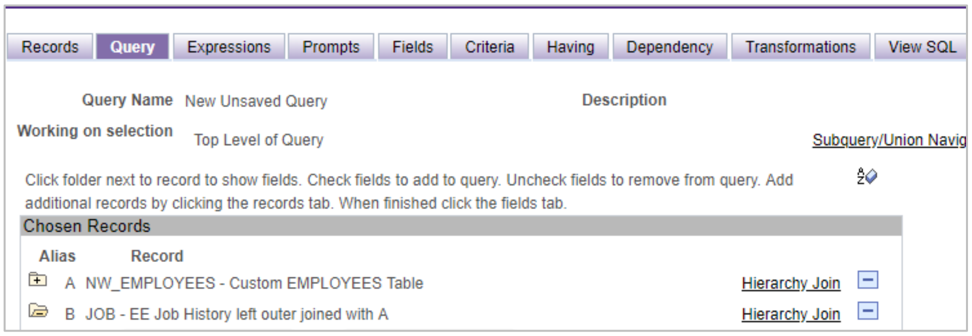
Col	Record.Fieldname	Format	Ord	XLAT	Agg	Heading Text	Add Criteria	Edit	Delete
1	C.EFFDT - Effective Date	Date			Max	Max Eff Date		Edit	

18. Click Subquery/Union Navigation in the top right corner to return to the Top Level of the query. Then click "Top Level of Query". This wil return you to the main query.



Select subquery or union to navigate to

19. Notice that now "Working on section" says "Top Level of Query"



Query Name New Unsaved Query

Description

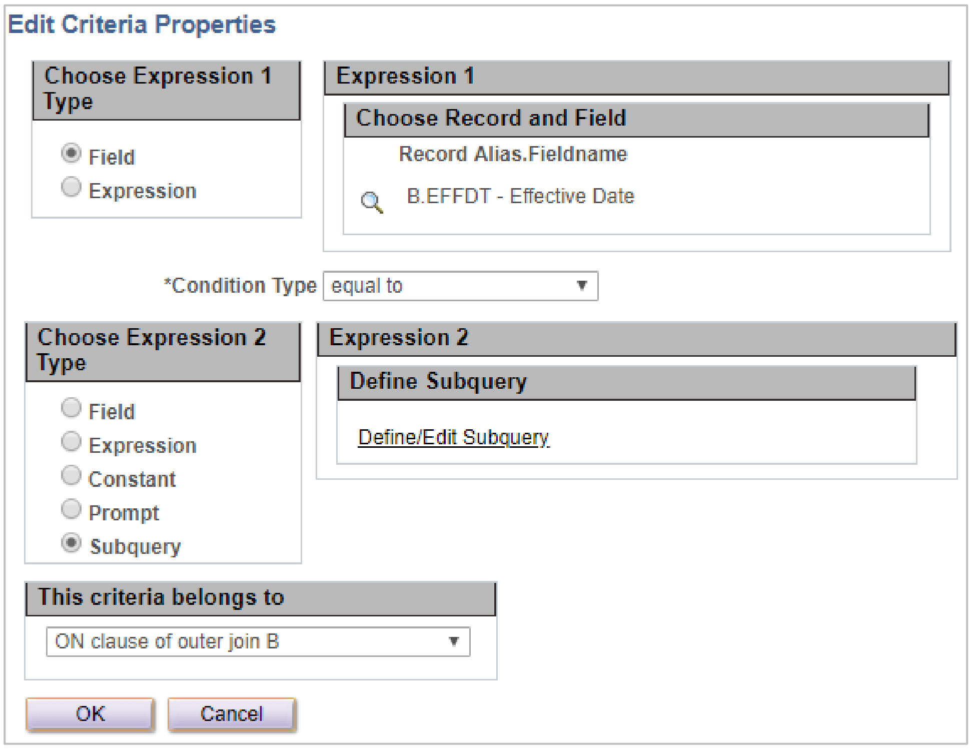
Working on selection Top Level of Query

Click folder next to record to show fields. Check fields to add to query. Uncheck fields to remove from query. Add additional records by clicking the records tab. When finished click the fields tab.

Chosen Records

Alias	Record	
A	NW_EMPLOYEES - Custom EMPLOYEES Table	Hierarchy Join
B	JOB - EE Job History left outer joined with A	Hierarchy Join

20. Go to the "Criteria" tab. Find the B.EFFDT equal to SUBQUERY row and click "Edit". In the pull-down menu for "This criteria belongs to", set the value to "ON clause of outer join B". Since we want to keep people who never had a promotion, it's important to move the criterion to the join clause and not leave it in the WHERE clause.


Edit Criteria Properties

Choose Expression 1 Type: [✓ Field] Expression

Expression 1 – Choose Record and Field
Record Alias.Fieldname: B.EFFDT - Effective Date

*Condition Type: equal to

Choose Expression 2 Type: Field, Expression, Constant, Prompt, [✓ Subquery]

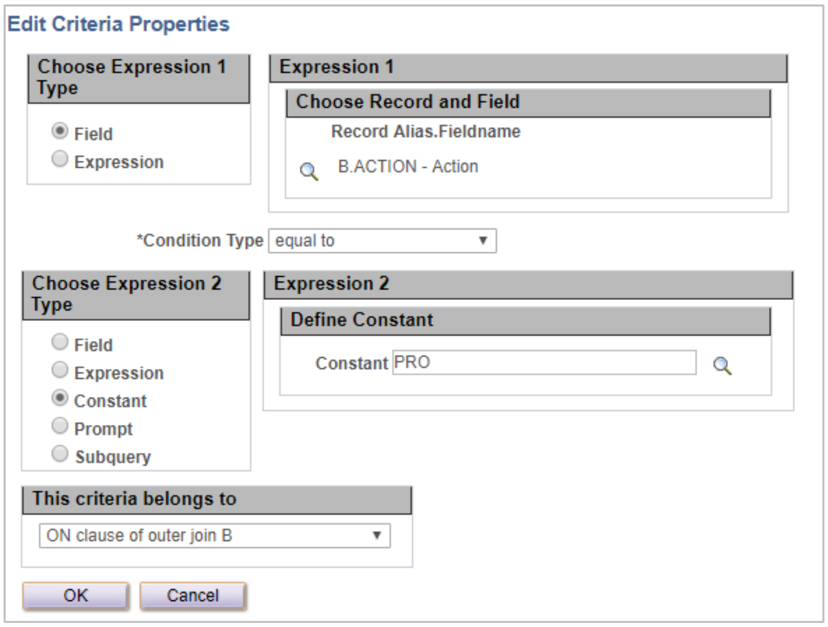
Expression 2 – Define Subquery
Define/Edit Subquery

This criteria belongs to: ON clause of outer join B

21. Still on the "Criteria" tab, click "Add Criteria". Add a criterion for B.ACTION = PRO.

We only want the promotion row's effective date to display. Since people often have multiple JOB row changes on a day when they get a promotion, you will get multiple rows for the same person in the output if you don't add this condition.

Set "This criteria belongs to" as "ON clause of outer join B". Since we have an outer join on B, we don't want to add a condition to the WHERE clause. Then click "OK".


Edit Criteria Properties

Choose Expression 1 Type: [✓ Field] Expression

Expression 1 – Choose Record and Field
Record Alias.Fieldname: B.ACTION - Action

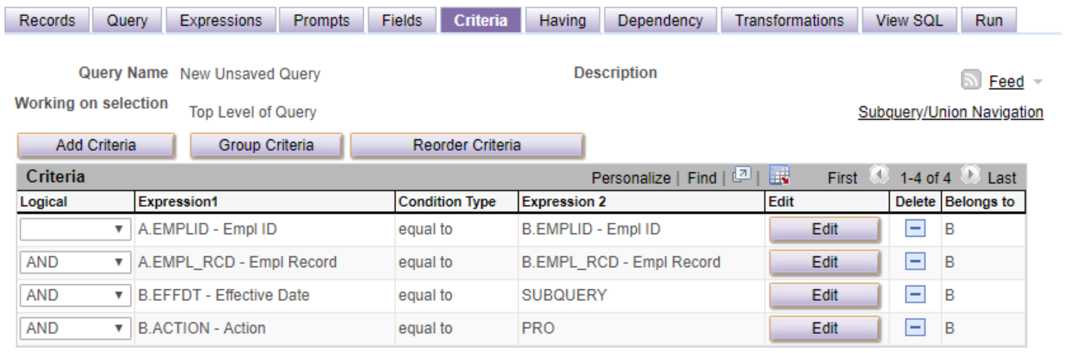
*Condition Type: equal to

Choose Expression 2 Type: Field, Expression, [✓ Constant], Prompt, Subquery

Expression 2 – Define Constant
Constant: PRO

This criteria belongs to: ON clause of outer join B

22. There should be four items on the Criteria tab, all of them with a "Belongs to" value of "B" since we are Left Outer Joining to table B (JOB).



Query Name New Unsaved Query

Description

Working on selection Top Level of Query

Criteria

Logical	Expression1	Condition Type	Expression 2	Edit	Delete	Belongs to
	A.EMPLID - Empl ID	equal to	B.EMPLID - Empl ID	Edit	⊟	B
AND	A.EMPL_RCD - Empl Record	equal to	B.EMPL_RCD - Empl Record	Edit	⊟	B
AND	B.EFFDT - Effective Date	equal to	SUBQUERY	Edit	⊟	B
AND	B.ACTION - Action	equal to	PRO	Edit	⊟	B

23. It is always a good idea to save your query as a private query with your initials in the beginning prior to hitting "Run". If the query runs for a long time and you have to cancel it, you will lose your work if you didn't save before running.

24. Click "Run" to execute your query. Now you will see current employees and information about their last promotion (if any).

Section 3
Expressions

INTRODUCTION TO EXPRESSIONS

Overview

An **EXPRESSION** utilizes special query functions to manipulate the appearance of data in your output or criteria. Expressions can be used one of two ways: to display a calculated field, or to restrict the output via a more complex criterion.

Creating an Expression

All of the expressions discussed in this section can be implemented as fields (to display formatted data) or as criteria (to provide more robust testing). Each expression must be entered on the Expressions tab of the Query Manager.

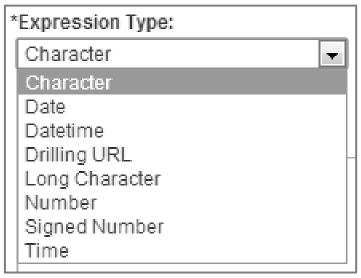
Procedure

1. Click the Expressions tab.

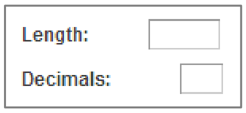
2. Select Add Expression.

3. In the **Expression Type** box, choose the type of data that your expression will create. The most common data types used will be:

- "Character" – if your data will be letters, numbers, or a combination of both.
- "Date" – if your data will create a full date (including month, day, and year).
- "Number" – if your data will create a number or decimal that will be operated on in the query (such as adding, summing or averaging).

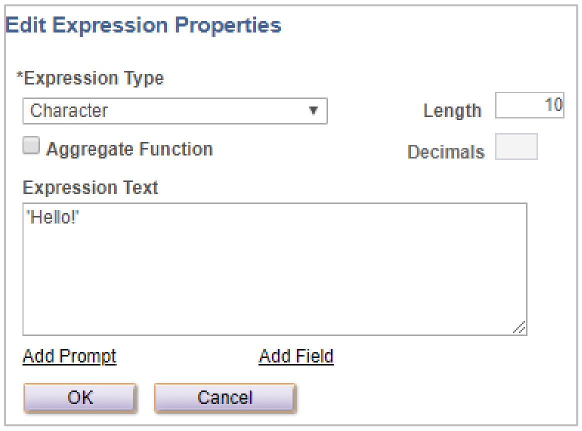


4. Enter the **Length** and **Decimal** values if required:



- If using a "Character" type, **Length** is the maximum number of characters in the data. **Decimals** is not required.
- If using a "Date" type, neither is required.
- If using a "Number" type, **Length** is the total number of digits, including decimal places; **Decimals** is the number of decimal places. *(Ex: a dollar amount of 15345.00 would have a Length of 7 and a Decimal of 2.)*

5. Enter the **Expression Text**. *(See the following pages for specific expression text.)* For example:



Edit Expression Properties

*Expression Type: Character

Length: 10

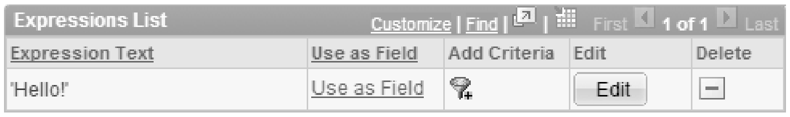
Decimals:

Aggregate Function

Expression Text: 'Hello!'

6. Click OK .

7. At this point, your expression is part of the query like any other field. You can add it as a column to your results by choosing Use as Field, or you can add a criteria on it by clicking the criteria funnel :



Expression Text	Use as Field	Add Criteria	Edit	Delete
'Hello!'	Use as Field		Edit	

Expression Code in this Manual

For each expression discussed in the following pages, the code used to create the expression will be presented with the following styling:

Style Example	Meaning
`DECODE`	Uppercase words are expression functions that must be entered exactly as they appear.
`string`	Lowercase italic text indicates where you will manually enter a field, data, or something else.
`( ) , ' '`	These characters should all be entered exactly as they appear. Character constants you enter (e.g. employee status codes, pay group codes) need to be enclosed in single quotes.
`[ ]`	Anything in brackets is optional.
`...`	The ellipsis indicates that the preceding section of code may be repeated as many times as necessary.
`A.EMPLID`	This format refers to a specific field in table “A” of your query. Table letters can be found to the left of the table name on the Query tab. In most instances, you can refer to any field from any table in your query in this manner.

Notes:

- Indentation of expression text in this section is indented to provide clarity. Although it is recommended to indent your expressions for readability, it is not required and will not impact the processing of your query.
- Never include double quotation marks (“) in your query.
- If you use an expression as a field, it's generally a good idea to edit the heading text.

"CASE" FUNCTION

Description

The **CASE** function allows you to include a level of IF…THEN…ELSE testing in your query. Using any number of test conditions, you can specify what the output should be for a row of data.

Expression Text

```
CASE
  WHEN condition [condition]... THEN output
 [WHEN condition [condition]... THEN output]...
 [ELSE output]
ENDA.NW_POSN_TYPE
```

Details

- **CASE** identifies the beginning of the test block.
- Each **WHEN** line presents one or more test conditions; if a **condition** is satisfied, its **output** is provided.
  - Multiple conditions may be joined with **AND** or **OR**, and may be grouped using parentheses.
  - **OUTPUT** can be another field, another expression, or a line of text enclosed in single quotes.
  - The first **WHEN** statement that is satisfied will be processed for that row of data; any subsequent **WHEN** statements will be ignored.
- **ELSE** is not required. If it is included at the end of the **WHEN** statements, its **output** will be provided if no **WHEN** statement is satisfied.
- **END** identifies the ending of the test block.

Example

Different fields on the NW_EMPLOYEES table can contribute to determining the type of appointment. This example uses numerous criteria to determine and display an appointment type:

```
CASE
  WHEN A.NW_POSN_CATEGORY = 'RES' THEN 'Research Fac'
  WHEN A.NW_POSN_TYPE = 'FAC' THEN 'Non-Research Faculty'
  WHEN A.NW_POSN_TYPE = 'STF' THEN 'Staff'
  WHEN A.JOBCODE = '100029' THEN 'Temporary Student'
  WHEN A.DEPTID LIKE '%98' THEN 'Work-Study Student'
  WHEN A.NW_POSN_TYPE = ' ' THEN 'Other Temp Employee'
  ELSE A.NW_POSN_TYPE
END
```

Remember, only the *first* `WHEN` statement that is satisfied will be processed for a particular row of data. A Research Faculty appointment will stop processing after Line #2, and will display "Research Fac" in the results. Any other faculty appointment will continue to Line #3, displaying "Non-Research Faculty."

"CONCATENATE" FUNCTION

Description

The **`CONCAT`** statement or operator allows you to combine (concatenate) any number of data fields and/or text strings into one piece of output.

Expression Text

Option 1: *`data1`* **`||`** *`data2`* `[`**`||`** *`data3`*`]...`

Option 2: **`CONCAT`**`(`*`data1`*`,` *`data2`*`)`

Details

- **`data`** may be a field name, such as `A.EMPLID`; a text string in single quotes, such as `'Evanston;'` or another expression.
- Using **Option 1**, any number of data may be combined with the **`||`** operator between them.
- Using **Option 2**, only *two* pieces of data can be combined in one **`CONCAT`** statement.

Example

Instead of using separate columns for the Department ID and Department Name, we can combine them into one field, separated by a colon, using the || operator.

```
A.DEPTID || ': ' || A.DEPTNAME
```

The output of the expression above would produce one piece of data for each row, such as:

```
004500: Human Resources
```

"DECODE" FUNCTION

Description

The `DECODE` function provides shorthand IF-THEN-ELSE testing where only one field is evaluated.

Expression Text

```
DECODE(test, searchfor1, result1 [, searchfor2, result2]... [, default])
```

Details

- `test` may be any field name or another expression
- `searchfor` is the value you are looking for `test` to equal
- If `test` matches `searchfor1`, `result1` will be returned; you may have as many search/result pairs as you like
- `default` is not required, but if present, it will be used when none of the preceding `searchfor` values are matched

---

Example

This expression:

```
DECODE(A.PAYGROUP, 'MOF', 'Monthly Fac', 'MON', 'Monthly Stf', A.PAYGROUP)
```

Will returning the following:

```
When Paygroup = MOF   ->   Monthly Faculty
When Paygroup = MON   ->   Monthly Staff
When Paygroup = NMF   ->   NMF
```

"Replace" Function

Description

The `REPLACE` function searches for specific text within a field and replaces it with something else.

Expression Text

REPLACE(*string, searchfor* [, *replacewith*])

Details

- `string` may be any field name or expression
- `searchfor` is the value you are searching for
- If `searchfor` is found anywhere within `string`, it will be replaced with `replacewith`
- `replacewith` is not required; if it is not provided, then `searchfor` will be removed and replaced with nothing

---

Example

Northwestern email address can take up a large amount of space in a spreadsheet. Using `REPLACE`, we can remove the full "northwestern.edu" suffix, and replace with a shorter "n..."

```
REPLACE(A.NW_EMAIL_ADDRESS, 'northwestern.edu', 'n...')
```

This expression would translate email addresses into new values as follows:

```
wildcat@northwestern.edu        ->   wildcat@n...
k-brady@law.northwestern.edu    ->   k-brady@law.n...
sjones@nmff.org                 ->   sjones@nmff.org
```

"Substring" Function

Description

The Substring function, `SUBSTR,` extracts and returns only a specific part of the data.

Expression Text

`SUBSTR(`*`string, startposition`*` [, `*`length`*`])`

Details

- `string` is the field or expression you are extracting a piece from.
- `startposition` is the character you want to start at
  - A positive start position of *n* will begin at the *n*th character from the left.
  - A negative start position of -*n* will begin at the *n*th character from the *right*.
- `length` is the number of characters to return; if not provided, the rest of the characters, to the end of the string, will be returned.

Example

If you'd like to display the first 4 digits of the department ID number:

```
SUBSTR(A.DEPTID, 1, 4)
```

This expression will yield the following output:

```
339010      ->    3390
434100      ->    4341
```

Date Functions

Add or Subtract Days from a Date Field

Expression: Use simple (+) or (-) operators to add or subtract days

Examples:

```
A.EFFDT + 1    ->    Returns the day after A.EFFDT
A.EFFDT - 7    ->    Returns the date 7 days before A.EFFDT
```

Add or Subtract Months from a Date Field

Expression: `ADD_MONTHS(field, months)`

Examples:

```
ADD_MONTHS(A.EFFDT, 1)     ->    Returns the month after A.EFFDT
ADD_MONTHS(A.EFFDT, -1)    ->    Returns the month before A.EFFDT
```

Reformatting and Extracting Date Fields

Description: Using expressions, you can easily extract part of a date (such as the year), or reformat the date to display differently. Because PeopleSoft stores different date fields in different ways, you may need to translate the date into a different data type first.

Expressions:

- If the date field is stored in PeopleSoft as a "date" type, such as an Effective Date:
  `TO_CHAR(TO_DATE(field), 'format')`
- If the date field is stored in PeopleSoft as a "time" type, such as Last Updated Date/Time:
  `TO_CHAR(TO_TIMESTAMP(field, 'HH24.MI.SS.FF'), 'format')`
- If the date field is stored as plain text, you must specify its existing format before re-formatting it:
  `TO_CHAR(TO_DATE(field, 'currentformat'), 'format')`

Format: The *format* must be in single quotes and specifies the formatting you'd like to apply to the date:

Date Code	Meaning	Date Code	Meaning
YYYY	4-digit year	**DY**	Abbreviated name of day
YY	2-digit year	**HH**	Hour of day (1-12)
MM	Month (01-12; JAN = 01)	**HH24**	Hour of day (0-23)
MON	Abbreviated name of month	**MI**	Minute (0-59)
DAY	Name of day	**SS**	Second (0-59)
DD	Day of month (1-31)	**AM**	Meridian indicator

Examples: For an Effective Date of 2013-01-06:

```
TO_CHAR(TO_DATE(A.EFFDT), 'YYYY')             ->   2013
TO_CHAR(TO_DATE(A.EFFDT), 'Mon DD, YYYY')     ->   Jan 06, 2013
```

SYSDATE

Description: Returns the current date/time for comparison to data. Use with the above functions to provide testing for certain time periods. Because SYSDATE contains a time, you may have to remove the time by changing it to a flat date.

Expression: `SYSDATE`

Examples:

`SYSDATE`	->	*Returns the current date and time.*
`TRUNC(SYSDATE)`	->	*Returns today's date without a time component.*
`SYSDATE + 7`	->	*Returns 7 days from the exact current date and time.*
`TO_DATE(SYSDATE + 7)`	->	*Returns 7 days from the current date, without a time.*

OTHER FUNCTIONS

Aggregate Functions

Just as fields can be aggregated within the Fields tab, expressions can be used to aggregate data as well. These expressions are useful it you want multiple aggregates on the same field at the same time.

These Aggregate functions are entered as any expression; the **Aggregate Field** checkbox must be checked when creating one of these expressions.

Aggregate	Expression
Sum	`SUM(`*`field`*`)`
Minimum	`MIN(`*`field`*`)`
Maximum	`MAX(`*`field`*`)`
Average	`AVG(`*`field`*`)`
Count all values	`COUNT(`*`field`*`)`
Count only distinct values	`COUNT(DISTINCT `*`field`*`)`

Number Rounding Functions

Expression	Description
`ROUND(`*`field, decimals`*`)`	Rounds the field to the specified number of decimal places.
`FLOOR(`*`field`*`)`	Rounds the number down to the nearest whole number.
`CEIL(`*`field`*`)`	Rounds the number up to the nearest whole number.

Character Formatting Functions

Expression	Description
`INITCAP(`*`field`*`)`	Capitalizes the first letter of each word.
`LOWER(`*`field`*`)`	Converts the entire field to lowercase.
`UPPER(`*`field`*`)`	Converts the entire field to uppercase.

Constants

Any constant can be created as an expression by entering the string in single quotes. For example, this expression:

```
'Faculty'
```

will output the literal data `Faculty` for every row in the query.

Section 4
Other Query Functionality

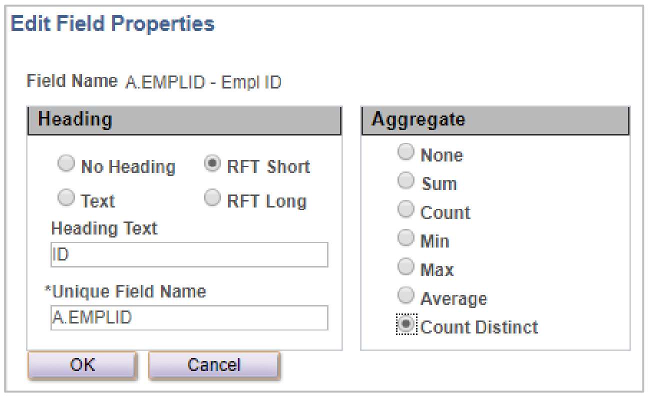
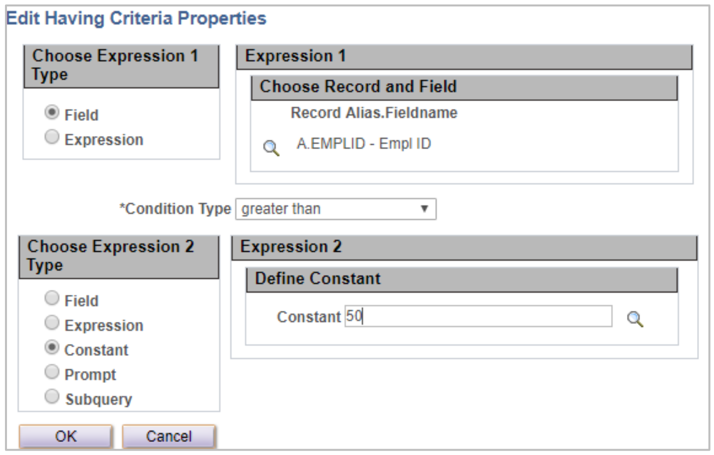
USING "HAVING" TO FILTER BY AGGREGATE FUNCTIONS

Overview

The "Having" tab in Query Manager allows us to filter the output using the result of an aggregate function. It is similar to the "Criteria" tab, but it's used when we have aggregate columns. You must first build a query that has an aggregate field (e.g. count, sum, minimum, maximum).

Example

Find all department IDs that have more than 50 employees.

	Procedure
1.	Create a query using the NW_EMPLOYEES table that has EMPLID and DEPTID as fields.
2.	On the "Fields" tab, click "Edit" for EMPLID. Change the Aggregate setting to "Count Distinct". Click "OK".  Edit Field Properties Field Name A.EMPLID - Empl ID Heading: No Heading [✓ RFT Short] Text RFT Long Heading Text: ID *Unique Field Name: A.EMPLID Aggregate: None Sum Count Min Max Average [✓ Count Distinct] OK Cancel
3.	Go to the "Having" tab and click "Add Having Criteria".
4.	For Experssion 1, select field A.EMPLID. Condition Type, use "greater than". For Expression 2, leave as "Constant" and type in 50. Click OK.  Edit Having Criteria Properties Choose Expression 1 Type: [✓ Field] Expression Expression 1 — Choose Record and Field — Record Alias.Fieldname: A.EMPLID - Empl ID *Condition Type: greater than Choose Expression 2 Type: Field Expression [✓ Constant] Prompt Subquery Expression 2 — Define Constant — Constant: 50 OK Cancel
5.	Run the report. Now you will only see department IDs that have more than 50 current employees.

LIST MATCHING WITH EXPRESSIONS

Overview

A query Expression can be used to produce query results that match one of a list of values. The result is similar to using an "In List" on the Criteria page, but provides an easier method to "import" a long list of values, as opposed to entering them one-by-one into a list.

myHR has developed a simple web form that will allow you to create the expression for use in matching a list of EmplIDs, Position Numbers, Projects, or any other data.

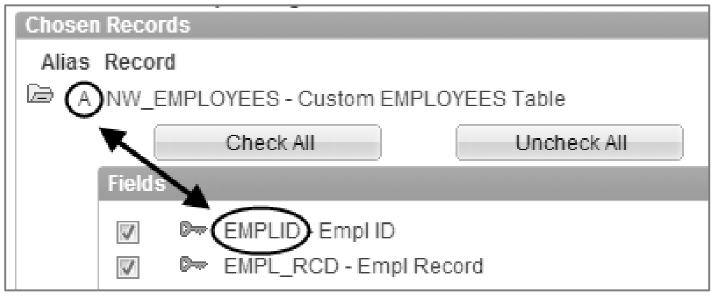
The process, though simple, involves a few steps:

1. Identify the Table and Field to match, using the "Query" tab.
2. Create your list of matching values in Excel, Word, or Notepad.
3. Format the values into an Expression using the myHR tool.
4. Create the Expression using the "EXPRESSIONS" tab in Query Manager.
5. Create the Criteria using the "CRITERIA" tab.

1. Identify the Table & Field to Match

The query has to know what table and field you are trying to match; these can be found on the "QUERY" tab in Query Manager.

In this example, if you want to pull data from NW_EMPLOYEES for a list of EMPLIDS, looking at the "QUERY" tab shows the Table Letter is "<u>A</u>" and the Field Name is "<u>EMPLID</u>":

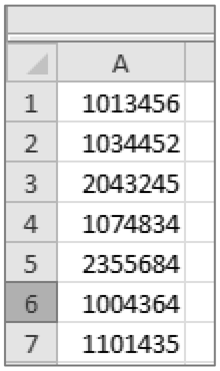


This information will be used when we complete the expression in Step #4.

2. Create Your List of Matching Values

If you don't already have a list of values you want to match, create a simple list in Excel, Word, or Notepad.

<u>Note:</u> There is no limit to the length of the list; you may have 7 values or 7000 values. This is one of the benefits of using Expression Matching.

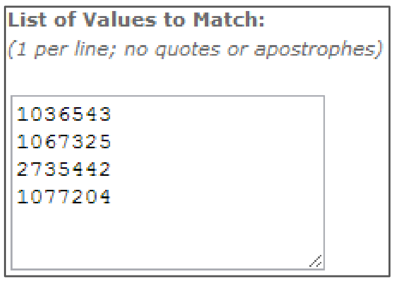
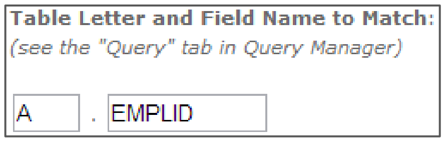


	A
1	1013456
2	1034452
3	2043245
4	1074834
5	2355684
6	1004364
7	1101435

3. Format the Values for the Expression

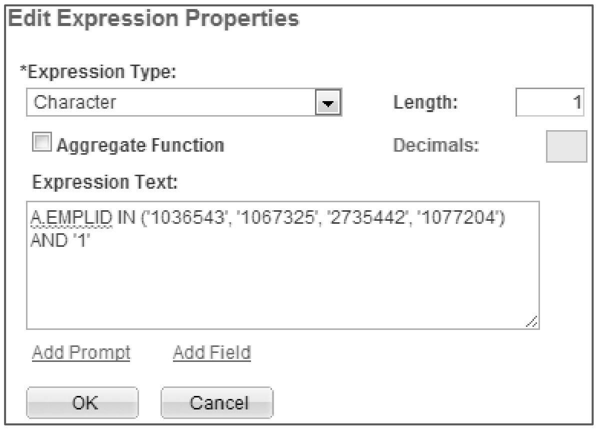
You must now format the list into a query expression. Using the tool on the HR/myHR website, the expression can automatically be generated for you.

a.	Copy the list of values by highlighting the cells, right-clicking, and choose "Copy."
b.	In your web browser, open the following webpage: https://www.northwestern.edu/hr/essentials/hr-systems/myhr/administration/expression-filter.html
c.	Select the "myHR Query Expression for Filtering" option.

d.	Enter the list of values you want to match into the appropriate box. If you already have a list or column of data, you can copy and paste that list from Excel, Word, or Notepad.	 List of Values to Match: (1 per line; no quotes or apostrophes) 1036543 1067325 2735442 1077204
e.	Ensure the **Table Letter** and **Field Name** indicate the field from your query you are trying to match.	 Table Letter and Field Name to Match: (see the "Query" tab in Query Manager) A . EMPLID
f.	Click Create Expression / List.	
g.	The full Expression is created for you. Copy the entire expression; this will be used in the next step.	

4. Create the Expression

Navigate to the “Expressions” tab in your query, and add a new expression as normal. Paste the entire Expression from the previous step, and modify no other data. Click "OK."

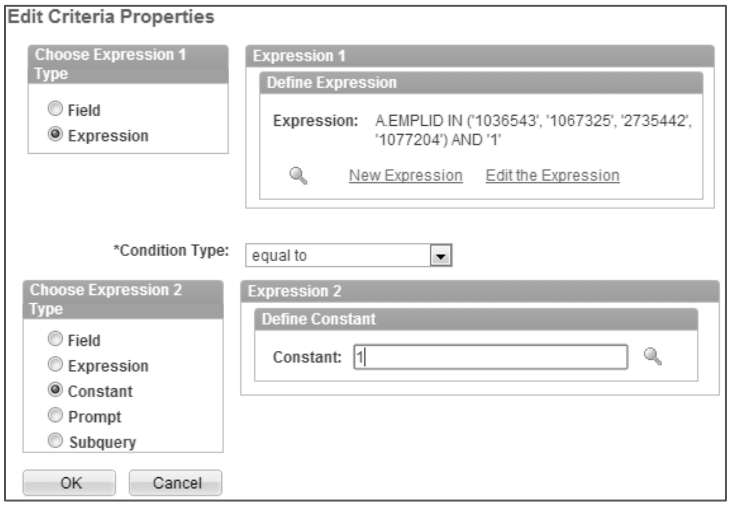

Edit Expression Properties

*Expression Type: Character
Length: 1
Aggregate Function
Decimals:
Expression Text:

```
A.EMPLID IN ('1036543', '1067325', '2735442', '1077204')
AND '1'
```

5. Create the Criteria

Navigate to the “Criteria” tab in your query, and add a new criteria as normal. For the first part of your criteria, choose the Expression you just created using the search magnifying glass. That Expression should be equal to 1. Click OK. Now you can run your query and only the list of IDs you imported will be included.


Edit Criteria Properties

Choose Expression 1 Type: Field [✓ Expression]

Expression 1 — Define Expression
Expression: A.EMPLID IN ('1036543', '1067325', '2735442', '1077204') AND '1'

*Condition Type: equal to

Choose Expression 2 Type: Field Expression [✓ Constant] Prompt Subquery

Expression 2 — Define Constant
Constant: 1

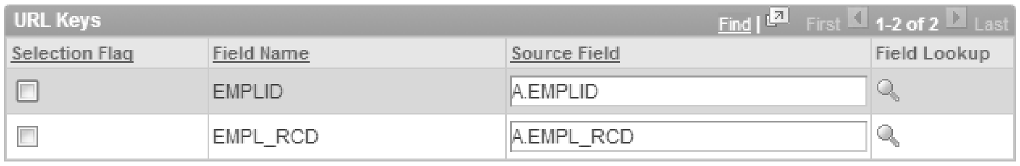
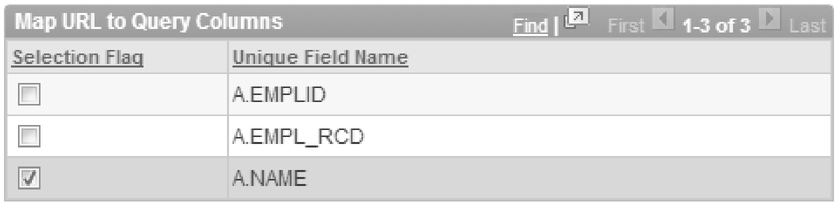
DRILLING URLS

Overview

Any query field in your results can be turned into clickable link, directing a user to a specific PeopleSoft page or another Query. This is a special type of Expression known as a DRILLING URL.

Drilling into a PeopleSoft Page

Imagine a query that provides EmplIDs and appointment data. For every query result, you want to be able to click an employee's Name and be directed to that employee's Job Data page.

	Procedure
1.	First, set up your query as usual with all necessary fields and criteria. For this example, we will include basic appointment data, including the employee's EMPLID, EMLP_RCD, and NAME.
2.	Click the Expressions tab.
3.	Select Add Expression .
4.	In the **Expression Type** box, choose "Drilling URL."
5.	Choose the Component URL link.
6.	Click the Add Content Reference Link, and use the folders to navigate to a PeopleSoft page. In this example, we will choose the "Job Data" page. • Note that *all* PeopleSoft pages are available, but users will get a security error if attempting to click through to a page they do not have access to.
7.	Use the prompt to select the **Page** to view. Page:
8.	Click Search Keys . This is where you will create the link to a particular employee's data.
9.	For each piece of data that you'd like to match to a particullar myHR page, first click the **Selection Flag**. Then choose the field in your query that matches. In the example above, you want to ensure that the Employee's EMPLID and EMPL_RCD for the myHR page match that of the query results:  URL Keys — Find | First 1-2 of 2 Last Selection Flag | Field Name | Source Field | Field Lookup ☐ | EMPLID | A.EMPLID ☐ | EMPL_RCD | A.EMPL_RCD
10.	Click Map Columns . This tells the query what you want to click on to get to the employee's Job Data page.
11.	If we want each Employee's name in my query results to be a clickable link, we will select the NAME field:  Map URL to Query Columns — Find | First 1-3 of 3 Last Selection Flag | Unique Field Name ☐ | A.EMPLID ☐ | A.EMPL_RCD ☑ | A.NAME
12.	Click OK .

When viewing your query, each Employee's Name will now be a clickable link, taking you to the Job Data page that matches that employee's EMPLID and EMPL_RCD.

Creating a Browser Shortcut / Link to a Query

Overview

Like any page in myHR, a shortcut link can be created that will take you directly to your query results after logging into the Reporting database.

1. Your link will always begin with this:

https://myhrreports.northwestern.edu/psp/hr92rept/EMPLOYEE/HRMS/q/?ICAction=

2. Do you want to exclude menu navigation?

If you want your query results to open in a simple browser window with no myHR navigation, replace the "`psp`" with "`psc`."

3. Format the Values for the Expression

To specify the exact query, add the following to the URL:

```
ICQryNameURL=PRIVATE.QUERY_NAME
```

- If the query is a *public* query, replace "`PRIVATE`" with "`PUBLIC`"
- Replace `QUERY_NAME` with the query's name
- To cause the link to download to Excel immediately, replace "`ICQryNameURL`" with "`ICQryNameExcelURL`". Otherwise, results will open in the standard HTML view.

Your link will now look similar to this:

```
https://myhrreports.northwestern.edu/psp/hr92rept/EMPLOYEE/HRMS/q/?ICAction=ICQryNam
eURL=PRIVATE.KEM_TEST
```