My First Attempt in Translating MS Access to SAS

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Situation

- There was an existing Access system (‘Durability’) to conduct some durability analyses .
- The queries took pre-processed data from a prior Access system (‘Warranty Analysis’), which in turn took data from the corporate warranty databases (Oracle). That system used over a dozen complex, debugged queries.
- The long-term goal was to run analyses on *all* models by *all* part numbers (1,000’s). The Durability system broke down at 50 combinations.

Limitations

- Existing systems were based on Access. Oracle was the ultimate source, but no programming could be on that end. The software choices were Excel, Access, Minitab and SAS.

- Limited SAS modules (e.g., no SAS/Access).

- All processing was to be one on a single PC.

Solution – Proc SQL

- The relevant tables from the Warranty Analysis system could be exported to .csv files.
- A set of SAS queries in Proc SQL could be written to duplicate the Durability system's queries in Access.
- Since the Durability system was debugged, there was a 'gold standard' for comparison.

How hard could this be?

First problems: SQL's, not SQL

- Unfortunately, 'SQL' does not stand for 'Standardized Query Language'.

- SAS SQL and Access SQL are not the same SQL, and I had to learn that the hard way.

First step – IIF is not a SAS Command

- Parts of the Access queries looked like this:

IIf([Date_1]<=[Date_2],-1,IIf(([Date_1]-[Date_2])/365*12=Int(([Date_1]-[Date_2])/365*12),Int(([Date_1]-[Date_2])/365*12),Int(([Date_1]-[Date_2])/365*12+1))) AS MIS,

- In SAS Proc SQL, the CASE statement was useful:

```
CASE    WHEN Date_1<=Date_2 THEN 0
                WHEN (((Date_1-Date_2)/365)*12)=
                        Int(((Date_1-Date_2)/365)*12) THEN
                        Int(((Date_1-Date_2)/365)*12)
                ELSE Int(((Date_1-Date_2)/365)*12)+1
END AS MIS,
```

Second step – Calculated Fields

- In Access, to reuse a calculated field, the calculation has to be repeated. This meant that:
  - The opportunity for typo's was doubled (or tripled,…)
  - The maintenance burden was increased, because multiple changes were always needed.

- This term occurred three times in one Access query:

  Round((DateSerial(Year([Date_3]),Month([Date_3]),1)-DateSerial(Year([Activity_Month]),Month([Activity_Month]),1))/365*12,0)

SAS CALCULATED Statement

- In SAS Proc SQL, the CALCULATED statement is needed and convenient.

- The calculation is used once to create the field (variable), and after that referred to by: ‘CALCULATED [field alias]’.

- If the ‘CALCULATED’ statement is omitted, SAS will throw an error.

Third - Order of Operations

- I found that Access and SAS have different orders of operation. This took me a while to figure out. I wasn't expecting it, and the error was not obvious. The numbers were wrong, but not in an obvious way.

  Access: ([Date_4]-[Date_2])/365*12

- To get the same numeric results in SAS, I had to add parentheses to force an order of operation:

  SAS: ((Date_4-Date_2)/365)*12

Fourth – Dates/Times

- I've messed around with several different software systems, and expect to mess around with several more. I do NOT expect to ever encounter one where dates and times are not a PITA.

- In Access, 'DATE' fields are actually date-time fields. They become DATETIME variables in SAS. Since I didn't know that, I didn't quickly understand the error messages.

- The DATEPART() function fixed that by extracting only the date part of a DATETIME variable. I plan on making a habit of using that at the start on all 'DATE' fields from other systems.

Conclusions

- The ‘S’ in SQL does not stand for ‘Standard’.
- Each version will have enhancements and ‘non-enhancements’; when you are stuck on an error, check for those.
- Basic things you’d expect to be unchangeable can be changed. Make very sure that it’s not your error, then
- When looking at numeric errors, look at ratios and differences for patterns. Especially since I knew that I was looking at month-year calculations, I should have checked for ratios of 365 and 12.