

Lab Assignment 5 (Project Warm-Up)

1. Write a program to calculate the interval in days between two dates expressed in the form [Month, Day, Year]. Assume there are no leap years (i.e. all Februaries have exactly 28 days, all years have exactly 365 days). Assume the second date always follows the first one (i.e. the first date is really a lower bound for the interval).

For example:

?- interval([march, 3, 1978], [april, 7, 1980], X).

X = 765

?- interval([april, 7, 1978], [march, 3, 1980], X).

X = 695

Hint: Treat this problem as a subtraction of two 3-digit numbers:

$$\begin{array}{r} Y2, M2, D2 \\ - Y1, M1, D1 \\ \hline \text{Solution} \end{array}$$

The procedural code would look like something in lines of:

```
if (D2 >= D1)
    D = D2 - D1
else
    D = D2 + days(M2) - D1
    if (M2 = 1)
        M2 = 12
        Y2 = Y2 - 1
    else
        M2 = M2 - 1

if (M2 >= M1)
    M = days(M2) + days(M2 - 1) + ... + days(M1)
else
    M = days(12) + days(11) + ... + days(M1) +
        days(M2) + days(M2 - 1) + ... + days(1)
    Y2 = Y2 - 1

Solution = (Y2 - Y1) * 365 + M + D
```

Clearly you should have facts for names of the months and number of days each month has. Computing the difference between days is a straight-forward predicate with 2 rules. Computing the difference between months can be thought of as computing the difference between the 1st of each month – using a recursion might be a good idea. And finally, you will need one predicate to tie this all together.