MTAT.03.083 – Systems Modeling

Exercises: Decision Modeling (Decision Tables)

Exercise 1
If the customer account is billed using a fixed rate method, a minimum monthly charge is assessed for consumption of less than 100 kwh. Otherwise, apply a schedule A rate structure. However, if the account is billed using a variable rate method, a schedule A rate structure will apply to consumption below 100 kwh, with additional consumption billed according to schedule B.

Taken from: http://csis.pace.edu/~marchese/cs615sp/L6/Sel6.html

Exercise 2.
A marketing company wishes to construct a decision table to decide how to treat clients according to three characteristics: Gender, City Dweller, and age group: A (under 30), B (between 30 and 60), C (over 60). The company has four products (W, X, Y and Z) to test market. Product W will appeal to male city dwellers. Product X will appeal to young males. Product Y will appeal to female middle aged shoppers who do not live in cities. Product Z will appeal to all but older males.

Taken from: https://classes.soe.ucsc.edu/cmps115/Spring05/supplements/DecisionTables.htm

Exercise 3.
A credit union offers two types of savings account: regular rate and split rate. The regular rate account pays dividends on the account balance at the end of each quarter—funds withdrawn during the quarter earn no dividends. There is no minimum balance on the regular rate account. Regular rate accounts may be insured. Insured accounts pay 5.75 percent annual interest. Uninsured regular rate accounts pay 6.00 percent annual interest.

For split rate accounts, dividends are paid monthly on the average daily balance for that month. Daily balances go up and down according to deposits and withdrawals. The average daily balance is determined by adding each day’s closing balance and dividing this sum by the number of days in the month. If the average daily balance is less than 25, then no dividend is paid. Otherwise, if the average daily balance is 25 or more, 6 percent per annum is paid on the first 500, 6.5 percent on the next 1,500, and 7 percent on funds over 2000. There is no insurance on split rate accounts.

Taken from: Whitten, Bentley, & Barlow: Systems Analysis & Design Methods, McGraw-Hill, 2005

Exercise 4.
Given a date written as a triplet (day, month, year), write a decision table that calculates the next date (tomorrow). Consider the following equivalence classes:

- M1 = {month | month has 30 days}
- M2 = {month | month has 31 days}
- M3 = {month | month is December}
- M4 = {month | month is February}
- D1 = {day | 1 ≤ day ≤ 27}
• D2= \{ \text{day} \mid \text{day} = 28 \}
• D3= \{ \text{day} \mid \text{day} = 29 \}
• D4= \{ \text{day} \mid \text{day} = 30 \}
• D5= \{ \text{day} \mid \text{day}=31 \}
• Y1= \{ \text{year} \mid \text{year is a leap year} \}, \text{i.e.} \ (\text{year} \mid 1812 \leq \text{year} \leq 2012 \ \text{AND} \ \text{year} \neq 1900 \ \text{AND} \ \text{year} = 0 \ \text{mod} \ 4)
• Y2= \{ \text{year} \mid \text{year is a common year} \} \text{ (not leap)}

Taken from http://www.eecs.yorku.ca/course_archive/2010-11/W/4313/slides/08-DecisionTable.pdf