FINANCIAL TERMS AND RATIOS

ASSET – Something that has a measurable cost. Fixed, current, or other assets. Includes claims on other persons.

CURRENT ASSETS – Assets which are normally realized in cash or used up in operations during one operating period. Includes cash, inventory and prepaid expenses.

CURRENT LIABILITIES – Liabilities due for payment with in one operating cycle (usually one year)

INVENTORY – Stocks of goods on hand for sale. It includes stores and supplies, and is valued at the lower of cost or market value, not selling price. It is increased by purchases and decreased by cost of goods sold.

BALANCE SHEET – A statement of the assets and liabilities of a company drawn up so as to give a fair view of its state of affairs at a concerned date.
Current ratio = \frac{Current assets}{Current liabilities}

Liquid or acid test ratio = \frac{Current assets-stocks}{Current liabilities}

Debt equity ratio = \frac{Debts}{Shareholder's equity}

Gross profit margin = \frac{Gross profit}{Sales}

Inventory turnover = \frac{Sales}{Inventory}

Debtors turnover = \frac{Credit sales}{Debtors}

Fixed assets turnover = \frac{Sales}{Net fixed assets}
HOW TO USE CAS

This appendix explains how to use CAS for the development of an expert system for credit analysis and rating.

CAS is a rule based, user friendly expert system shell specially designed for development of expert systems for credit rating analysis in corporate financials. The user can design the knowledge base in an easy way. It is a completely menu driven program.

Initially CAS prompts the User to select one of the following options

1. DESIGN
2. RUNTIME
3. EXIT

1. DESIGN

Designing of the expert system for credit analysis in CAS can be done in a simple way. It prompts the developer to enter details of the Expert system name etc.
CAS evaluates the credit rating by evaluating different attributes of the customer like Financial strength of the customer, Payment record of the customer etc. It maintains separate rule bases for different attributes. It prompts the user to enter different attributes names to evaluate credit rating.

Next it displays the following menu for each attribute

1. STATE VARIABLES
2. RULES
3. EXIT

First option STATE VARIABLES is to enter, view or delete the state variables used in the rule base for particular attribute. It again displays a menu

**FINANCIAL STRENGTH**

1. ENTER VARS
2. VIEW VARS
3. DELETE VARS
4. EXIT

Second option RULES is to enter rules, view rules or delete rules. It displays the following menu
FINANCIAL STRENGTH

1. ENTER RULES
2. VIEW RULES
3. DELETE RULES
4. EXIT

To enter rules it uses the following form

RULE NO : 12

CONDITION COMPONENT

IF ---------------- ranges from ------ and ---------

and ---------------- ranges from ------ and ---------

RESULT COMPONENT

var name --------- = ---------- value

To stop the rules entry, user has to press Cntl-W.
In a similar way it prompts the user to enter details of the state variables used in the knowledge base. It also prompts the user to enter details of different variables for fuzzy logic application.

Enter name of var : 

Enter type : 

Enter DB_Table : 

Enter Field Name : 

Enter default Value : 

Enter No. of Regions : 

Low_lim of R1 : 

Upper_lim of R1 : 

Memb_fun : 

Memb_function : 

\ldots\ldots\ldots\ldots

Low_lim9 : 

High_lim9 : 

Cur_val (crisp val) :

CAS allows the developer to develop an Expert System in iterative process. It allows to editing of the rules and details of variables.
2. RUNTIME

The end-user of the system runs the expert system. It takes the code of the customer or address of the customer and it accesses the facts from customer database. It writes its decision to a output report file.
APPENDIX C
FUZZY PROCESSING

The stages of fuzzy logic are illustrated below for a simple case of two variables speed (S) and distance (D) combined by means of only four fuzzy logic rules to form the change in speed (dS).

The control variables are 'S' and 'd'. The solution variable is 'dS'.

Divisions

S - LOW HIGH
D - NEAR FAR
dS - DC ST IC

Rules

If S is LOW and D is NEAR then dS is ST.
If S is LOW and D is FAR then dS is IC.
If S is HIGH and D is NEAR then dS is DC.
If S is HIGH and D is FAR then dS is ST.

In the present case consider a speed of 3 units and a distance of 110 units.

The change in speed is found as follows.
Fuzzification:

Low

High

0.7

0.3

0

3

Speed

10

Near

Far

0

Distance

100

Processing:

If (taking the min)

Then (adjust)

Deffuzzification

Logical Sum

Single output

This change in speed obtained is somewhere around 3.5 units.
The inputs are compared to membership functions and the lower of two conditions is selected (taking the minimum). Output of all the rules is combined in logical sum. Then in deffuzzification process, the most valid control value is output based and the other method may be used to arrive at a single solution.
APPENDIX D
SAMPLE RULE ABSE

Rule 1:
IF Bus-pot \( \Rightarrow \) HIGH
AND Geog-loc \( \Rightarrow \) HIGH
AND Fin-stgh \( = \) HIGH
AND Cust-back \( = \) HIGH
AND Pay-rec \( = \) HIGH
THEN Cr-rating \( \Rightarrow \) HIGH

Rule 2:
IF Bus-pot \( \Rightarrow \) HIGH
AND Geog-loc \( = \) HIGH
AND Fin-stgh \( = \) HIGH
AND Cust-back \( = \) LOW
AND Pay-rec \( = \) LOW
THEN Cr-rating \( \Rightarrow \) HIGH
Rule 3:
IF Bus-pot = MED
AND Geog-loc = MED
AND Fin-stgh = LOW
AND Cust-back = LOW
AND Pay-rec = LOW
THEN Cr-rating = LOW

Rule 4:
IF Bus-pot = LOW+
AND Geog-loc = HIGH
AND Fin-stgh = MED
AND Cust-back = HIGH
AND Pay-rec = MED
THEN Cr-rating = MED

Rule 5:
IF Bus-pot = HIGH
AND Geog-loc = HIGH
AND Fin-stgh = HIGH
Rule 6:

IF Bus-pot = LOW
AND Geog-loc = MED
AND Fin-stgh = MED
AND Cust-back = MED
AND Pay-rec = LOW
THEN Cr-rating = MED

Rule 7:

IF Bus-pot = LOW
AND Geog-loc = LOW
AND Fin-stgh = HIGH
AND Cust-back = MED
AND Pay-rec = LOW
THEN Cr-rating = LOW
Rule 8:

IF Bus-pot = LOW
AND Geog-loc = MED
AND Fin-stgh = MED
AND Cust-back = HIGH
AND Pay-rec = MED
THEN Cr-rating = MED

Rule 9:

IF Bus-pot = HIGH
AND Geog-loc = MED
AND Fin-stgh = HIGH
AND Cust-back = MED
AND Pay-rec = HIGH
THEN Cr-rating = HIGH