**MACRO FOR calculating KS, GINI, RANK ORDERING & Goodness of fit – for Logistic model validation**

/\*dedicated to god \*/

**%macro** validation (set,score,resp,group,title);

data table1;

set &set(keep = &score &resp);

nonresp = **1** - &resp;

run;

proc sort data = table1; by descending &score; run;

data \_null\_;

set table1;

call symput('size',\_n\_);

run;

data table1;

set table1;

decile = floor(**1**+&group \* (\_n\_ - **1**)/&size);

run;

proc summary data = table1 nway missing;

var &score;

class decile;

output out = table2 (drop = \_type\_ \_freq\_ ) sum(nonresp &resp) = nonresp resp

min(&score) = minscore max(&score) = maxscore

mean(&score) = meanscore;

run;

proc summary data = table1 nway missing;

var &score;

output out = table11(drop = \_type\_ \_freq\_ ) min (&score) = minscore

max(&score) = maxscore

mean(&score) = meanscore;

run;

data table2;

set table2 end = last;

minscore = minscore\***1000**; format minscore **8.0**;

maxscore = maxscore\***1000**; format maxscore **8.0**;

predrespr = meanscore\***100**;format predrespr **8.1**;

actrespr = (resp/(resp+nonresp)) \***100**; format actrespr **8.1**;

overall\_odds = nonresp/resp;

cumnonresp+nonresp;

cumresp+resp;

cumtotal = cumnonresp + cumresp;

cumrespr = (cumresp/cumtotal)\***100**; format cumrespr **8.1**;

cumodds = cumnonresp/cumresp; format cumodds **8.2**;

if last then do;

call symput ('sumodds',cumodds);

call symput('sumnonresp',cumnonresp);

call symput('sumresp',cumresp);

call symput('sumcumresprate',cumrespr);

end;

run;

data table3(drop = cumresp cumnonresp cumodds y cumgini);

set table2 end = final;

info\_odds = overall\_odds/&sumodds; format info\_odds **8.1**;

format overall\_odds **8.1**;

log\_odds = log(info\_odds); format log\_odds **8.1**;

prob\_nonresp = nonresp/(nonresp+resp);format prob\_nonresp **8.2**;

chi\_sq = ((nonresp-

(&sumnonresp/(&sumnonresp + &sumresp)) \* (nonresp + resp)) \*\***2**)/((&sumnonresp/(&sumnonresp+&sumresp))\*(nonresp+resp))+

((resp-(&sumresp/(&sumnonresp+&sumresp))\*(nonresp+resp))\*\***2**)/((&sumresp/(&sumnonresp+sumresp))\*(nonresp+resp)); format chi\_sq **8.1**;

cumchi\_sq + chi\_sq;

pernonresp = (nonresp/&sumnonresp)\***100**; format pernonresp **8.1**;

perresp = (resp/&sumresp)\***100**; format perresp **8.1**;

cumpernonresp+pernonresp; format cumpernonresp **8.1**;

cumperresp + perresp; format cumperresp **8.1**;

perobs = ((nonresp+resp)/(&sumnonresp+&sumresp))\***100**; format perobs **8.0**;

cumperobs+perobs; format cumperobs **8.0**;

lift = (actrespr/&sumcumresprate)\***100**; format lift **8.0**;

cumlift = (cumrespr/&sumcumresprate)\***100**; format cumlift **8.0**;

ks = abs(cumperresp - cumpernonresp); format ks **8.1**;

lg1 = lag(resp);

if \_n\_ = **1** then flag = **1**; else flag = (resp<=lg1);

if flag = **0** then break = \_n\_;

y = lag(cumperresp);

gini = ((sum(cumperresp,y)/**2**)\*pernonresp)/(**100**\*\***2**); format gini **8.2**;

cumgini+gini;

if final then do;

call symput('sumgini',cumgini);

end;

predresp = meanscore \* (resp+nonresp);

diff = resp=predresp;

gofcell = (diff\*\***2**)/((resp+nonresp)\*meanscore\*(**1**-meanscore));

gof+gofcell; format gof **8.1**;

meanscore = meanscore\***1000**; format meanscore **8.0**;

run;

data table3;

set table3;

totalgini = &sumgini - **0.5**; format totalgini **8.4**;

run;

proc transpose data = table3 out = table4; var break; run;

data table4 (keep = sat\_rank ranking);

set table4 (drop = \_NAME\_);

array a{&group} col1 - col&group;

do i =**1** to &group;

if a{i} > **0** then leave;

end;

if i = (&group+**1**) then sat\_rank = 'all';else sat\_rank = i-**1**;

if sat\_rank = 'all' then ranking = 'SATISFACTORY ';

else ranking = 'NOT SATISFACTORY';

run;

proc transpose data = table3 out = table5; var ks; run;

data table5(keep = ks maxksdec);

set table5(drop = \_NAME\_);

array ks1{&group} col1 - col&group;

format ks **8.1**;

ks = **0**;

do i = **1** to &group;

if ks1{i} > ks then ks = ks1{i}; else leave;

end;

maxksdec = i-**1**;

run;

proc transpose data = table3 out = table6; var totalgini;run;

data table6;

set table6 (keep = col1);

rename col1 = gini;

run;

proc transpose data = table3 out = table7; var gof; run;

data table7;

set table7(keep = col&group);

rename col&group = gof;

run;

data mrg;

set table4 table5 table6 table7;

run;

data total(drop = cumrespr);

set table2(obs = **1**);

nonresp = &sumnonresp;

resp = &sumresp;

actrespr = (resp/(resp+nonresp))\***100**; format actrespr **8.1**;

overall\_odds = nonresp/resp;

info\_odds = overall\_odds/&sumodds;

format overall\_odds **8.1**;

format info\_odds **8.1**;

log\_odds = log(info\_odds); format log\_odds **8.1**;

prob\_nonresp = nonresp/(nonresp+resp); format prob\_nonresp **8.2**;

pernonresp = (nonresp/nonresp)\***100**; format pernonresp **8.1**;

perresp = (resp/resp)\***100**; format perresp **8.1**;

perobs = ((nonresp+resp)/(&sumnonresp+&sumresp))\***100**; format perobs **8.0**;

run;

data tone;

set table11;

minscore = minscore \***1000**; format minscore **8.0**;

maxscore = maxscore\***1000**; format maxscore **8.0**;

predrespr = meanscore \* **1000**; format predrespr **8.1**;

meanscore = meanscore\***1000**; format meanscore **8.0**;

run;

data ttwo(keep = cumchi\_sq cumgini);

set table3;

cumchisq + chi\_sq;

cumgini+gini;

if \_n\_ = &group;

run;

data tthree;

set table5(keep = ks);

run;

data tfour;

set table7 (keep = gof);

run;

data total;

merge total tone ttwo tthree tfour;

rename cumchi\_sq = chi\_sq;

rename cumgini = gini;

run;

data table3(drop = decile);

set table3 total;

if \_n\_ = &group+**1** then decile = **9999**;

decile1 = put(decile,**8.**); format decile1 $8.;

run;

data table3;

set table3;

rename decile1 = decile;

decile1 = left(trim(decile1));

if decile1 = "9999" then decile1 = "Total";

run;

proc print data = table3 noobs;

title "&title";

var decile nonresp resp actrespr predrespr minscore maxscore meanscore overall\_odds info\_odds log\_odds

prob\_nonresp chi\_sq pernonresp perresp cumpernonresp cumperresp perobs cumperobs cumrespr lift cumlift gini

ks gof;

run;

proc print data = mrg noobs;

var ranking sat\_rank ks maxksdec gini gof;

run;

**%mend**;

%***validation***(validat2,proba\_score,statind,**10**,KS Table);