Program Summary - HeartDisFinal.sas

Execution Environment

Author:	u60718448
File:	/home/u60718448/sasuser.v94/HeartDisFinal.sas
SAS Platform:	Linux LIN X64 3.10.0-1062.9.1.el7.x86_64
SAS Host:	ODAWS01-USW2.ODA.SAS.COM
SAS Version:	9.04.01M6P11072018
SAS Locale:	en_US
Submission Time:	4/28/2022, 10:06:34 PM
Browser Host:	147.126.10.154
User Agent:	Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/100.0.4896.127 Safari/537.36
Application Server:	ODAMID01-USW2.ODA.SAS.COM

Code: HeartDisFinal.sas

```
Proc Import Out = heart
            datafile = "/home/u60718448/sasuser.v94/heart.csv"
            DBMS= CSV
            replace;
            Getnames = yes;
run;

data heartcleaned;
set heart;
length gender $ 6.0 ExerciseInducedAng $ 3.0 ChestPainType $ 12.0 HighFBS $ 5.0 RestingECG $ 10.0;
if sex = 1 then gender = "Male";
if sex = 0 then gender = "Female";

if cp = 0 then ChestPainType = "Typical";
if cp = 1 then ChestPainType = "Atypical";
if cp = 2 then ChestPainType = "Non-Anginal";
if cp = 3 then ChestPainType = "Asymptomatic";

if fbs = 1 then HighFBS = "True";
if fbs = 0 then HighFBS = "False";

run;


*visualize the distribution of each categorical variable in our dataset;
title "Analysis of Sex";
proc sgplot data=heartcleaned;
vbar gender / group= output stat=percent missing;
label gender = "Sex";
run;
title "Analysis of Chest Pain";
proc sgplot data=heartcleaned;
vbar ChestPainType / group= output stat=percent missing;
label ChestPainType = "Chest Pain";
run;
title "Analysis of High Fasting Blood Sugar";
proc sgplot data=heartcleaned;
vbar highfbs / group= output stat=percent missing;
label highfbs = "High Fasting Blood Sugar";
run;



*scatter plot of our numerical varaibles on output, check to see if there is
    complete separation between output and out numerical variables of interest;
proc gplot data = heart;
title "Plot of Age on Output";
plot output*age;
run;
proc gplot data = heart;
title "Plot of Age on Resting Blood Pressure";
plot output*trtbps;
run;
proc gplot data = heart;
title "Plot of Age on Cholesterol Level";
plot output*chol;
run;
proc gplot data = heart;
title "Plot of Age on Maximum Heart Rate Achieved";
```

```
plot output*thalachh;
run;
*No complete seperation detected;



*frequency of each categorical data in our dataset;
proc sort data = heartcleaned;
by output;
run;
proc freq data = heartcleaned;
title "Frequency of Categorical Variables in our Dataset";
table output*(gender ChestPainType highfbs output);
run;



*analyze the mean values of numerical variables;
proc sort data = heart;
by output;
run;
proc means data = heart ;
by output;
title "Mean Values of Age, Resting Blood Pressure, Cholesterol Level, and Maximum Heart Rate Achieved by Output";
var age trtbps chol thalachh;
run;




*Building our first model;
proc logistic data = heart plots(only)=roc;
model output = age cp trtbps chol fbs thalachh;
run;
*removed age, chol, and fbs because the p-valued were not statistically significant at alpha = 0.05.

Create new model with variables that are statistically significant and run a stepwise selection;
proc logistic data = heart plots(only)=roc;
model output = cp trtbps thalachh / selection = stepwise Risklimits lackfit ctable;
run;



*Building a full model and repeating the process
*Create full model with all variables;
proc logistic data = heart plots(only)=roc;
model output = age trtbps chol thalachh oldpeak cp fbs restecg exng slp caa thall;
run;
*removed Age, trtbps, chol, fbs, restecg, slp;
proc logistic data = heart plots(only)=roc;
model output = thalachh oldpeak cp exng caa thall / selection = stepwise Risklimits lackfit ctable;
run;
```

Log: HeartDisFinal.sas

Notes (61)

```
1          OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
68
69         Proc Import Out = heart
70         datafile = "/home/u60718448/sasuser.v94/heart.csv"
71         DBMS= CSV
72         replace;
72       !
73              Getnames = yes;
74         run;

NOTE: Unable to open parameter catalog: SASUSER.PARMS.PARMS.SLIST in update mode. Temporary parameter values will be saved to
WORK.PARMS.PARMS.SLIST.
75          /*************************************************************************
```

```
76          *   PRODUCT:   SAS
77          *   VERSION:   9.4
78          *   CREATOR:   External File Interface
79          *   DATE:      29APR22
80          *   DESC:      Generated SAS Datastep Code
81          *   TEMPLATE SOURCE:  (None Specified.)
82          ***********************************************************************/
83             data WORK.HEART    ;
84             %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
85             infile '/home/u60718448/sasuser.v94/heart.csv' delimiter = ',' MISSOVER DSD lrecl=32767 firstobs=2 ;
86                informat age best32. ;
87                informat sex best32. ;
88                informat cp best32. ;
89                informat trtbps best32. ;
90                informat chol best32. ;
91                informat fbs best32. ;
92                informat restecg best32. ;
93                informat thalachh best32. ;
94                informat exng best32. ;
95                informat oldpeak best32. ;
96                informat slp best32. ;
97                informat caa best32. ;
98                informat thall best32. ;
99                informat output best32. ;
100               format age best12. ;
101               format sex best12. ;
102               format cp best12. ;
103               format trtbps best12. ;
104               format chol best12. ;
105               format fbs best12. ;
106               format restecg best12. ;
107               format thalachh best12. ;
108               format exng best12. ;
109               format oldpeak best12. ;
110               format slp best12. ;
111               format caa best12. ;
112               format thall best12. ;
113               format output best12. ;
114            input
115                        age
116                        sex
117                        cp
118                        trtbps
119                        chol
120                        fbs
121                        restecg
122                        thalachh
123                        exng
124                        oldpeak
125                        slp
126                        caa
127                        thall
128                        output
129            ;
130            if _ERROR_ then call symputx('_EFIERR_',1);  /* set ERROR detection macro variable */
131            run;

NOTE: The infile '/home/u60718448/sasuser.v94/heart.csv' is:
      Filename=/home/u60718448/sasuser.v94/heart.csv,
      Owner Name=u60718448,Group Name=oda,
      Access Permission=-rw-r--r--,
      Last Modified=31Mar2022:11:32:20,
      File Size (bytes)=11323

NOTE: 303 records were read from the infile '/home/u60718448/sasuser.v94/heart.csv'.
      The minimum record length was 33.
      The maximum record length was 36.
NOTE: The data set WORK.HEART has 303 observations and 14 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              9367.06k
      OS Memory           37404.00k
      Timestamp           04/29/2022 03:06:31 AM
      Step Count                        320  Switch Count  2
      Page Faults                       0
      Page Reclaims                     98
      Page Swaps                        0
      Voluntary Context Switches        11
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           272


303 rows created in WORK.HEART from /home/u60718448/sasuser.v94/heart.csv.



NOTE: WORK.HEART data set was successfully created.
NOTE: The data set WORK.HEART has 303 observations and 14 variables.
NOTE: PROCEDURE IMPORT used (Total process time):
```

```
      real time           0.14 seconds
      user cpu time       0.05 seconds
      system cpu time     0.01 seconds
      memory              9367.06k
      OS Memory           37664.00k
      Timestamp           04/29/2022 03:06:31 AM
      Step Count                        320  Switch Count  10
      Page Faults                       0
      Page Reclaims                     2407
      Page Swaps                        0
      Voluntary Context Switches        96
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           320


132
133        data heartcleaned;
134        set heart;
135        length gender $ 6.0 ExerciseInducedAng $ 3.0 ChestPainType $ 12.0 HighFBS $ 5.0 RestingECG $ 10.0;
136        if sex = 1 then gender = "Male";
137        if sex = 0 then gender = "Female";
138
139        if cp = 0 then ChestPainType = "Typical";
140        if cp = 1 then ChestPainType = "Atypical";
141        if cp = 2 then ChestPainType = "Non-Anginal";
142        if cp = 3 then ChestPainType = "Asymptomatic";
143
144        if fbs = 1 then HighFBS = "True";
145        if fbs = 0 then HighFBS = "False";
146
147        run;

NOTE: Variable ExerciseInducedAng is uninitialized.
NOTE: Variable RestingECG is uninitialized.
NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: The data set WORK.HEARTCLEANED has 303 observations and 19 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              1113.84k
      OS Memory           33708.00k
      Timestamp           04/29/2022 03:06:31 AM
      Step Count                        321  Switch Count  2
      Page Faults                       0
      Page Reclaims                     114
      Page Swaps                        0
      Voluntary Context Switches        11
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


148
149
150        *visualize the distribution of each categorical variable in our dataset;
151        title "Analysis of Sex";
152        proc sgplot data=heartcleaned;
153        vbar gender / group= output stat=percent missing;
154        label gender = "Sex";
155        run;

NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.10 seconds
      user cpu time       0.04 seconds
      system cpu time     0.01 seconds
      memory              8545.71k
      OS Memory           37680.00k
      Timestamp           04/29/2022 03:06:31 AM
      Step Count                        322  Switch Count  3
      Page Faults                       0
      Page Reclaims                     1414
      Page Swaps                        0
      Voluntary Context Switches        169
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           608

NOTE: There were 303 observations read from the data set WORK.HEARTCLEANED.

156        title "Analysis of Chest Pain";
157        proc sgplot data=heartcleaned;
158        vbar ChestPainType / group= output stat=percent missing;
159        label ChestPainType = "Chest Pain";
160        run;

NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.08 seconds
      user cpu time       0.04 seconds
      system cpu time     0.01 seconds
      memory              2179.84k
```

```
      OS Memory           38060.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        323  Switch Count  3
      Page Faults                       0
      Page Reclaims                     661
      Page Swaps                        0
      Voluntary Context Switches        174
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           384

NOTE: There were 303 observations read from the data set WORK.HEARTCLEANED.

161         title "Analysis of High Fasting Blood Sugar";
162         proc sgplot data=heartcleaned;
163         vbar highfbs / group= output stat=percent missing;
164         label highfbs = "High Fasting Blood Sugar";
165         run;

NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.08 seconds
      user cpu time       0.03 seconds
      system cpu time     0.00 seconds
      memory              2462.21k
      OS Memory           38060.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        324  Switch Count  3
      Page Faults                       0
      Page Reclaims                     574
      Page Swaps                        0
      Voluntary Context Switches        163
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           384

NOTE: There were 303 observations read from the data set WORK.HEARTCLEANED.

166
167
168
169         *scatter plot of our numerical varaibles on output, check to see if there is
170         complete separation between output and out numerical variables of interest;
171         proc gplot data = heart;
172         title "Plot of Age on Output";
173         plot output*age;
174         run;


NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE GPLOT used (Total process time):
      real time           0.13 seconds
      user cpu time       0.12 seconds
      system cpu time     0.01 seconds
      memory              6528.25k
      OS Memory           41496.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        325  Switch Count  1
      Page Faults                       0
      Page Reclaims                     966
      Page Swaps                        0
      Voluntary Context Switches        9
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           176


175         proc gplot data = heart;
176         title "Plot of Age on Resting Blood Pressure";
177         plot output*trtbps;
178         run;


NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE GPLOT used (Total process time):
      real time           0.13 seconds
      user cpu time       0.12 seconds
      system cpu time     0.01 seconds
      memory              6295.28k
      OS Memory           41496.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        326  Switch Count  1
      Page Faults                       0
      Page Reclaims                     931
      Page Swaps                        0
      Voluntary Context Switches        10
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           144


179         proc gplot data = heart;
180         title "Plot of Age on Cholesterol Level";
```

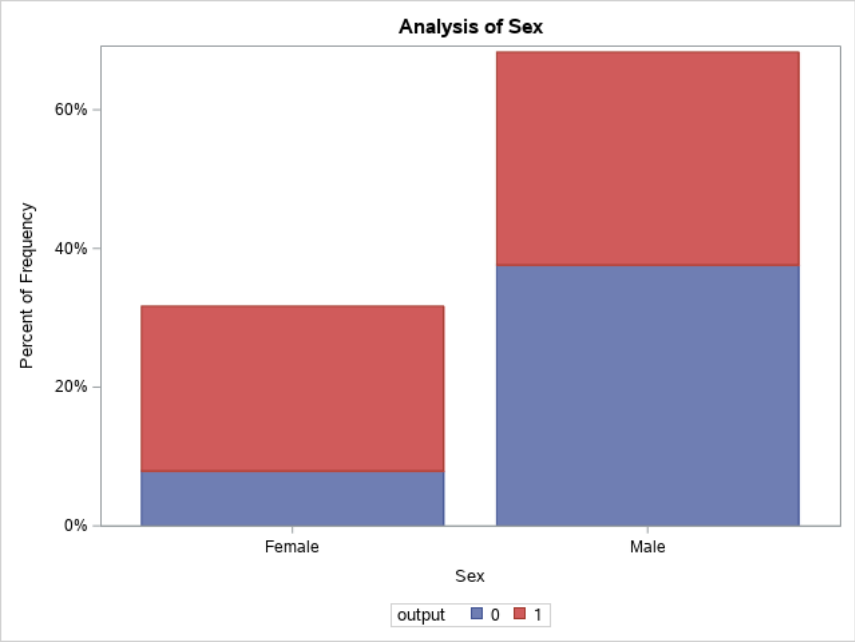
```
181        plot output*chol;
182        run;


NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE GPLOT used (Total process time):
      real time           0.13 seconds
      user cpu time       0.12 seconds
      system cpu time     0.01 seconds
      memory              6355.90k
      OS Memory           41496.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        327  Switch Count  1
      Page Faults                       0
      Page Reclaims                     923
      Page Swaps                        0
      Voluntary Context Switches        10
      Involuntary Context Switches      15
      Block Input Operations            0
      Block Output Operations           128


183        proc gplot data = heart;
184        title "Plot of Age on Maximum Heart Rate Achieved";
185        plot output*thalachh;
186        run;

187        *No complete seperation detected;
188
189
190
191
192        *frequency of each categorical data in our dataset;

NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE GPLOT used (Total process time):
      real time           0.13 seconds
      user cpu time       0.12 seconds
      system cpu time     0.01 seconds
      memory              6409.75k
      OS Memory           41496.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        328  Switch Count  1
      Page Faults                       0
      Page Reclaims                     912
      Page Swaps                        0
      Voluntary Context Switches        11
      Involuntary Context Switches      1
      Block Input Operations            0
      Block Output Operations           136


193        proc sort data = heartcleaned;
194        by output;
195        run;

NOTE: There were 303 observations read from the data set WORK.HEARTCLEANED.
NOTE: The data set WORK.HEARTCLEANED has 303 observations and 19 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              978.43k
      OS Memory           38060.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        329  Switch Count  2
      Page Faults                       0
      Page Reclaims                     102
      Page Swaps                        0
      Voluntary Context Switches        13
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


196        proc freq data = heartcleaned;
197        title "Frequency of Categorical Variables in our Dataset";
198        table output*(gender ChestPainType highfbs output);
199        run;

NOTE: There were 303 observations read from the data set WORK.HEARTCLEANED.
NOTE: PROCEDURE FREQ used (Total process time):
      real time           0.08 seconds
      user cpu time       0.08 seconds
      system cpu time     0.00 seconds
      memory              1709.87k
      OS Memory           38576.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        330  Switch Count  5
      Page Faults                       0
      Page Reclaims                     255
      Page Swaps                        0
```

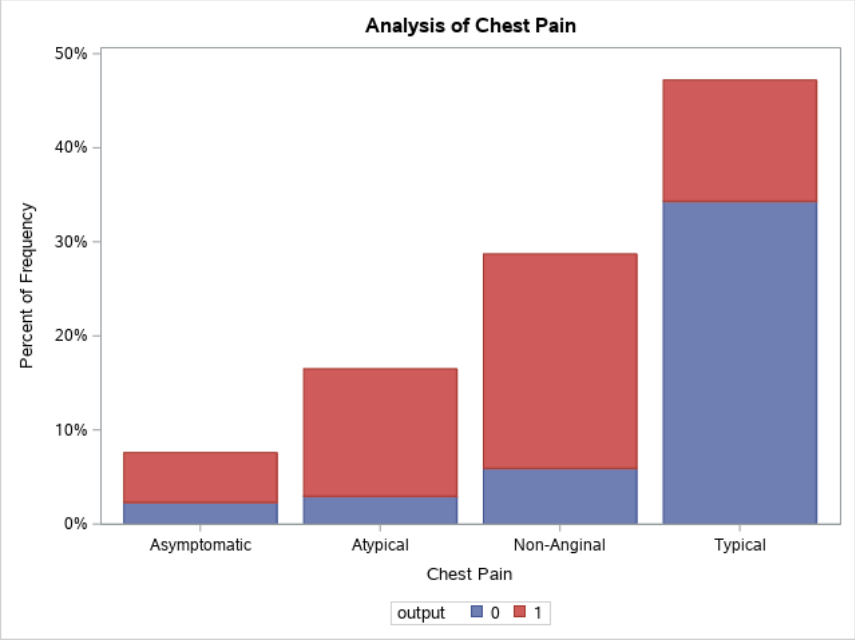
```
      Voluntary Context Switches        33
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           544


200
201
202
203        *analyze the mean values of numerical variables;
204        proc sort data = heart;
205        by output;
206        run;

NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: The data set WORK.HEART has 303 observations and 14 variables.
NOTE: PROCEDURE SORT used (Total process time):
      real time           0.00 seconds
      user cpu time       0.01 seconds
      system cpu time     0.00 seconds
      memory              929.59k
      OS Memory           38316.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        331  Switch Count  2
      Page Faults                       0
      Page Reclaims                     105
      Page Swaps                        0
      Voluntary Context Switches        17
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           264


207        proc means data = heart ;
208        by output;
209        title "Mean Values of Age, Resting Blood Pressure, Cholesterol Level, and Maximum Heart Rate Achieved by Output";
210        var age trtbps chol thalachh;
211        run;

NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE MEANS used (Total process time):
      real time           0.04 seconds
      user cpu time       0.04 seconds
      system cpu time     0.00 seconds
      memory              2127.65k
      OS Memory           39340.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        332  Switch Count  3
      Page Faults                       0
      Page Reclaims                     245
      Page Swaps                        0
      Voluntary Context Switches        19
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           16


212
213
214
215
216
217        *Building our first model;
218        proc logistic data = heart plots(only)=roc;
219        model output = age cp trtbps chol fbs thalachh;
220        run;

NOTE: PROC LOGISTIC is modeling the probability that output='0'. One way to change this to model the probability that output='1' is
      to specify the response variable option EVENT='1'.
NOTE: Convergence criterion (GCONV=1E-8) satisfied.
NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE LOGISTIC used (Total process time):
      real time           0.17 seconds
      user cpu time       0.11 seconds
      system cpu time     0.02 seconds
      memory              4555.50k
      OS Memory           40540.00k
      Timestamp           04/29/2022 03:06:32 AM
      Step Count                        333  Switch Count  0
      Page Faults                       0
      Page Reclaims                     505
      Page Swaps                        0
      Voluntary Context Switches        1097
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           544


221        *removed age, chol, and fbs because the p-valued were not statistically significant at alpha = 0.05.
222
223        Create new model with variables that are statistically significant and run a stepwise selection;
224        proc logistic data = heart plots(only)=roc;
```

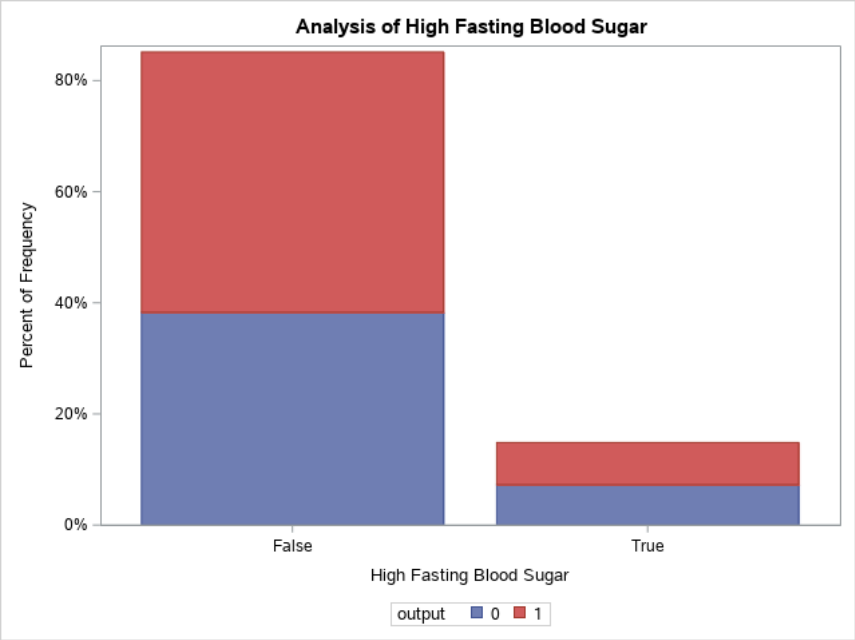
```
225         model output = cp trtbps thalachh / selection = stepwise Risklimits lackfit ctable;
226         run;

NOTE: PROC LOGISTIC is modeling the probability that output='0'. One way to change this to model the probability that output='1' is
      to specify the response variable option EVENT='1'.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 0.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 1.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 2.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 3.
NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE LOGISTIC used (Total process time):
      real time           0.46 seconds
      user cpu time       0.35 seconds
      system cpu time     0.01 seconds
      memory              4857.43k
      OS Memory           41060.00k
      Timestamp           04/29/2022 03:06:33 AM
      Step Count                        334  Switch Count  0
      Page Faults                       0
      Page Reclaims                     694
      Page Swaps                        0
      Voluntary Context Switches        2574
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           920


227
228
229
230         *Building a full model and repeating the process
231         *Create full model with all variables;
232         proc logistic data = heart plots(only)=roc;
233         model output = age trtbps chol thalachh oldpeak cp fbs restecg exng slp caa thall;
234         run;

NOTE: PROC LOGISTIC is modeling the probability that output='0'. One way to change this to model the probability that output='1' is
      to specify the response variable option EVENT='1'.
NOTE: Convergence criterion (GCONV=1E-8) satisfied.
NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE LOGISTIC used (Total process time):
      real time           0.19 seconds
      user cpu time       0.13 seconds
      system cpu time     0.00 seconds
      memory              4032.59k
      OS Memory           40540.00k
      Timestamp           04/29/2022 03:06:33 AM
      Step Count                        335  Switch Count  0
      Page Faults                       0
      Page Reclaims                     367
      Page Swaps                        0
      Voluntary Context Switches        1097
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           544


235         *removed Age, trtbps, chol, fbs, restecg, slp;
236         proc logistic data = heart plots(only)=roc;
237         model output = thalachh oldpeak cp exng caa thall / selection = stepwise Risklimits lackfit ctable;
238         run;

NOTE: PROC LOGISTIC is modeling the probability that output='0'. One way to change this to model the probability that output='1' is
      to specify the response variable option EVENT='1'.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 0.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 1.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 2.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 3.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 4.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 5.
NOTE: Convergence criterion (GCONV=1E-8) satisfied in Step 6.
NOTE: There were 303 observations read from the data set WORK.HEART.
NOTE: PROCEDURE LOGISTIC used (Total process time):
      real time           0.57 seconds
      user cpu time       0.46 seconds
      system cpu time     0.01 seconds
      memory              5148.96k
      OS Memory           41316.00k
      Timestamp           04/29/2022 03:06:34 AM
      Step Count                        336  Switch Count  1
      Page Faults                       0
      Page Reclaims                     691
      Page Swaps                        0
      Voluntary Context Switches        3652
      Involuntary Context Switches      1
      Block Input Operations            0
      Block Output Operations           1552


239
240
241         OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
```

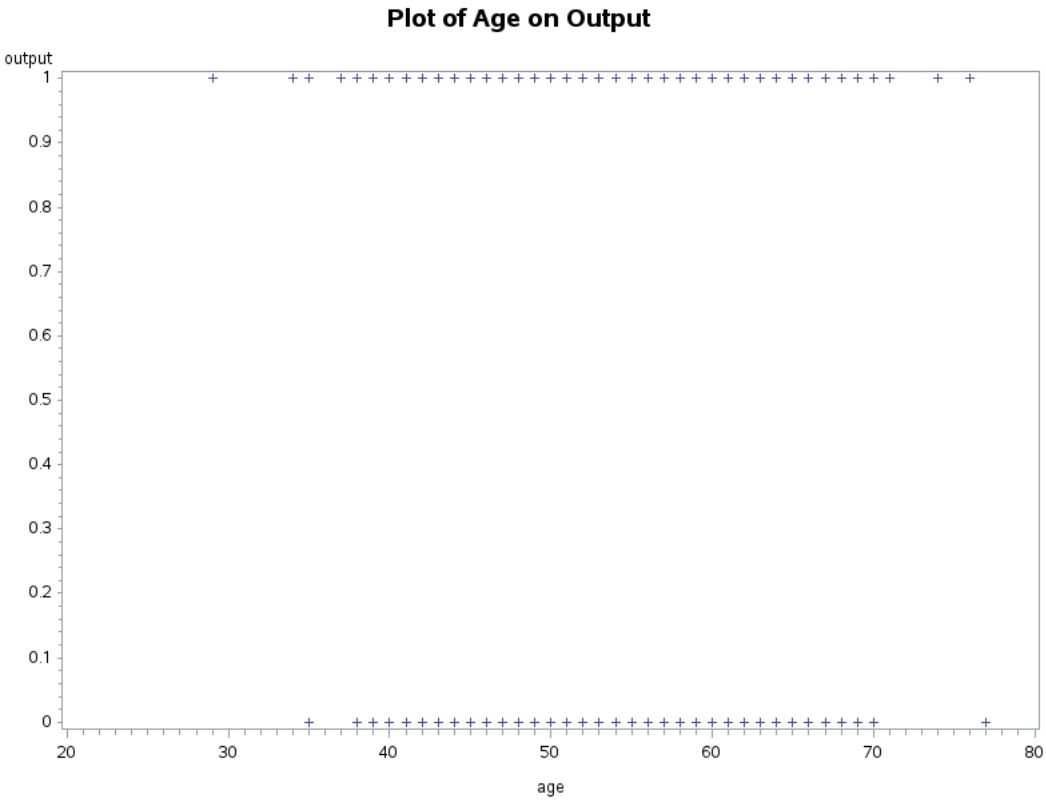
```
251
```

Results: HeartDisFinal.sas

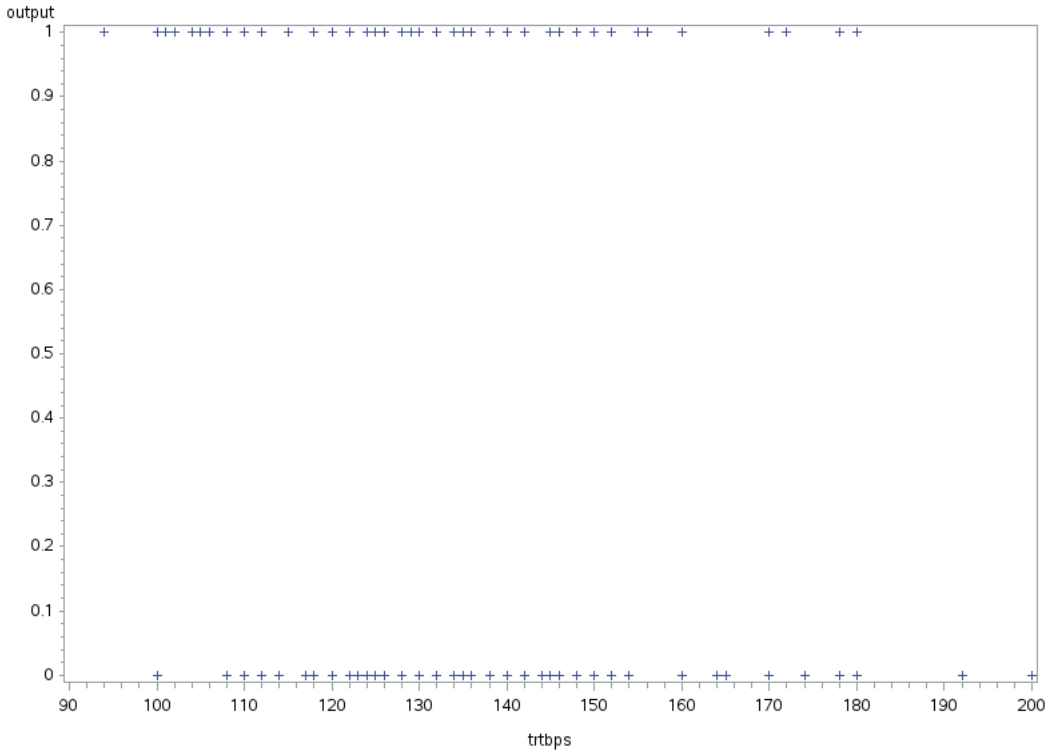




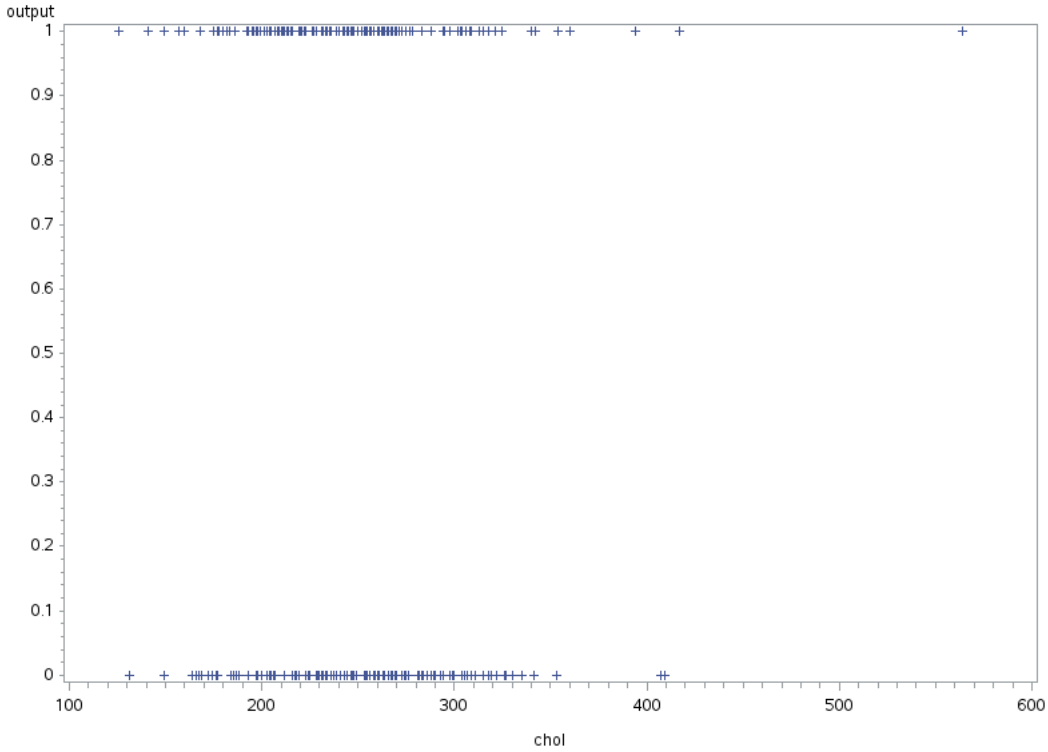

Analysis of High Fasting Blood Sugar
80%
60%
40%
20%
0%
Percent of Frequency
False
True
High Fasting Blood Sugar
output 0 1

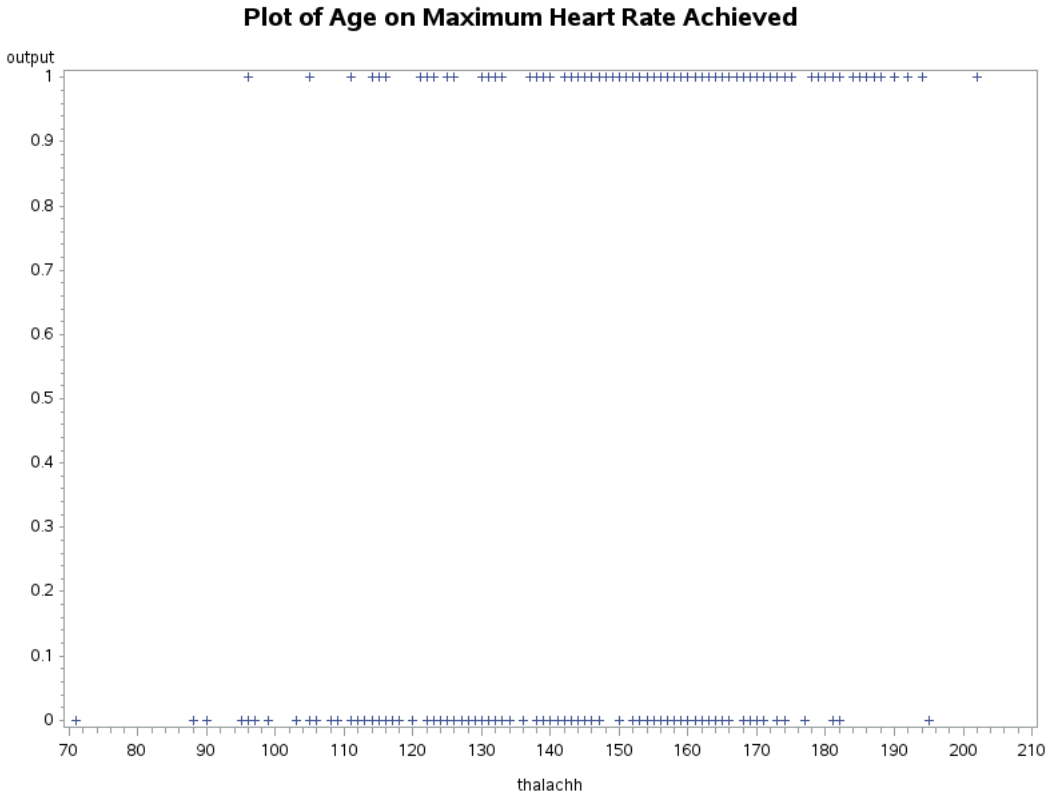

Plot of Age on Output
output
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
20
30
40
50
60
70
80
age

Plot of Age on Resting Blood Pressure



Plot of Age on Cholesterol Level





Frequency of Categorical Variables in our Dataset

The FREQ Procedure

Frequency
Percent
Row Pct
Col Pct

Table of output by gender

output	gender: Female	gender: Male	Total
0	24 7.92 17.39 25.00	114 37.62 82.61 55.07	138 45.54
1	72 23.76 43.64 75.00	93 30.69 56.36 44.93	165 54.46
Total	96 31.68	207 68.32	303 100.00

Frequency
Percent
Row Pct
Col Pct

Table of output by ChestPainType

output	ChestPainType: Asymptomatic	Atypical	Non-Anginal	Typical	Total
0	7 2.31 5.07 30.43	9 2.97 6.52 18.00	18 5.94 13.04 20.69	104 34.32 75.36 72.73	138 45.54
1	16 5.28 9.70 69.57	41 13.53 24.85 82.00	69 22.77 41.82 79.31	39 12.87 23.64 27.27	165 54.46
Total	23 7.59	50 16.50	87 28.71	143 47.19	303 100.00

Frequency
Percent
Row Pct
Col Pct

Table of output by HighFBS

output	HighFBS: False	True	Total
0	116 38.28 84.06 44.96	22 7.26 15.94 48.89	138 45.54
1	142 46.86 86.06 55.04	23 7.59 13.94 51.11	165 54.46
Total	258 85.15	45 14.85	303 100.00

Frequency Percent Row Pct Col Pct

Table of output by output			
	output		
output	0	1	Total
0	138 45.54 100.00 100.00	0 0.00 0.00 0.00	138 45.54
1	0 0.00 0.00 0.00	165 54.46 100.00 100.00	165 54.46
Total	138 45.54	165 54.46	303 100.00

Mean Values of Age, Resting Blood Pressure, Cholesterol Level, and Maximum Heart Rate Achieved by Output

The MEANS Procedure

output=0

Variable	N	Mean	Std Dev	Minimum	Maximum
age	138	56.6014493	7.9620815	35.0000000	77.0000000
trtbps	138	134.3985507	18.7299440	100.0000000	200.0000000
chol	138	251.0869565	49.4546136	131.0000000	409.0000000
thalachh	138	139.1014493	22.5987823	71.0000000	195.0000000

output=1

Variable	N	Mean	Std Dev	Minimum	Maximum
age	165	52.4969697	9.5506508	29.0000000	76.0000000
trtbps	165	129.3030303	16.1696133	94.0000000	180.0000000
chol	165	242.2303030	53.5528716	126.0000000	564.0000000
thalachh	165	158.4666667	19.1742756	96.0000000	202.0000000

Mean Values of Age, Resting Blood Pressure, Cholesterol Level, and Maximum Heart Rate Achieved by Output

The LOGISTIC Procedure

Model Information	
Data Set	WORK.HEART
Response Variable	output
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	303
Number of Observations Used	303

Response Profile		
Ordered Value	output	Total Frequency
1	0	138
2	1	165

Probability modeled is output='0'.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

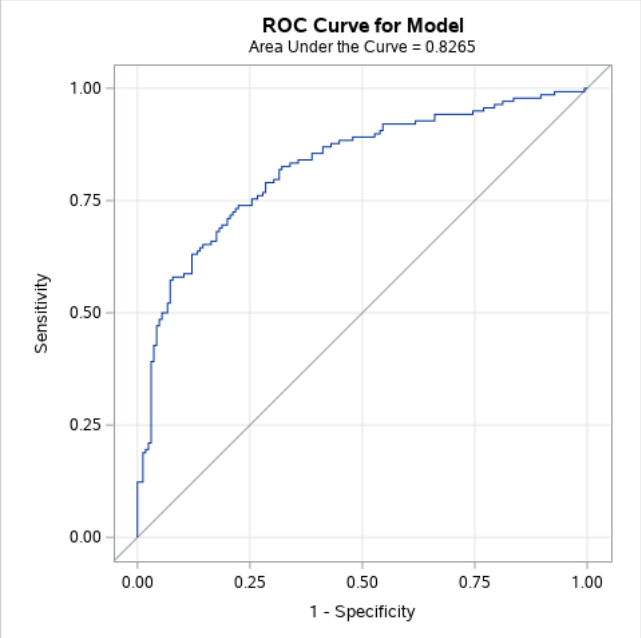
Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	324.534
SC	423.352	350.530
-2 Log L	417.638	310.534

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	107.1045	6	<.0001
Score	93.1726	6	<.0001
Wald	70.1656	6	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	2.0420	1.8022	1.2837	0.2572
age	1	0.0103	0.0179	0.3352	0.5626
cp	1	-0.8878	0.1482	35.8689	<.0001
trtbps	1	0.0217	0.00882	6.0447	0.0139
chol	1	0.00209	0.00275	0.5773	0.4474
fbs	1	0.2751	0.4006	0.4717	0.4922
thalachh	1	-0.0361	0.00753	22.9371	<.0001

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
age	1.010	0.976	1.046
cp	0.412	0.308	0.550
trtbps	1.022	1.004	1.040
chol	1.002	0.997	1.008
fbs	1.317	0.600	2.887
thalachh	0.965	0.950	0.979

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	82.7	Somers' D	0.653
Percent Discordant	17.3	Gamma	0.653
Percent Tied	0.0	Tau-a	0.325
Pairs	22770	c	0.827



Mean Values of Age, Resting Blood Pressure, Cholesterol Level, and Maximum Heart Rate Achieved by Output

The LOGISTIC Procedure

Model Information	
Data Set	WORK.HEART
Response Variable	output
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	303
Number of Observations Used	303

Response Profile		
Ordered Value	output	Total Frequency
1	0	138
2	1	165

Probability modeled is output='0'.

Stepwise Selection Procedure

Step 0. Intercept entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

-2 Log L	=	417.638

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
92.1135	3	<.0001

Step 1. Effect cp entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	360.061
SC	423.352	367.488
-2 Log L	417.638	356.061

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	61.5772	1	<.0001
Score	57.0188	1	<.0001
Wald	50.1140	1	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
40.8175	2	<.0001

Note: No effects for the model in Step 1 are removed.

Step 2. Effect thalachh entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	327.271
SC	423.352	338.413
-2 Log L	417.638	321.271

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	96.3667	2	<.0001
Score	85.6103	2	<.0001
Wald	67.1133	2	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
8.8517	1	0.0029

Note: No effects for the model in Step 2 are removed.

Step 3. Effect trtbps entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	320.199
SC	423.352	335.054
-2 Log L	417.638	312.199

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	105.4387	3	<.0001
Score	92.1135	3	<.0001
Wald	69.5089	3	<.0001

Note: No effects for the model in Step 3 are removed.

Note: All effects have been entered into the model.

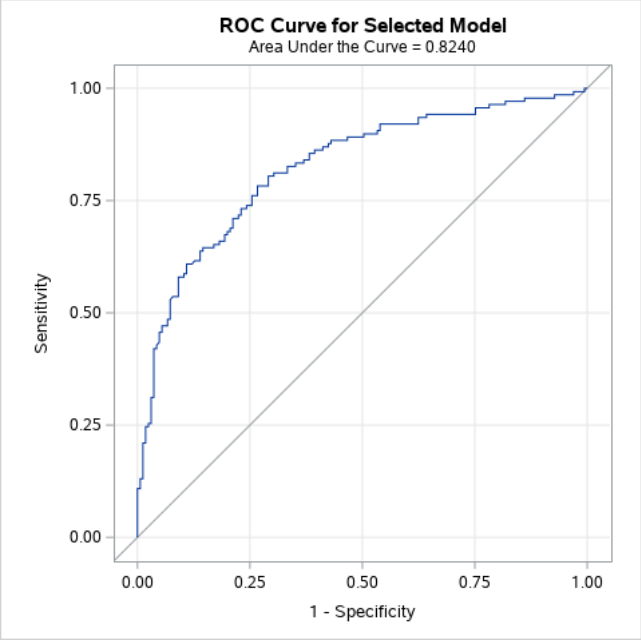
Summary of Stepwise Selection							
Step	Effect Entered	Effect Removed	DF	Number In	Score Chi-Square	Wald Chi-Square	Pr > ChiSq
1	cp		1	1	57.0188		<.0001
2	thalachh		1	2	33.0340		<.0001
3	trtbps		1	3	8.8517		0.0029

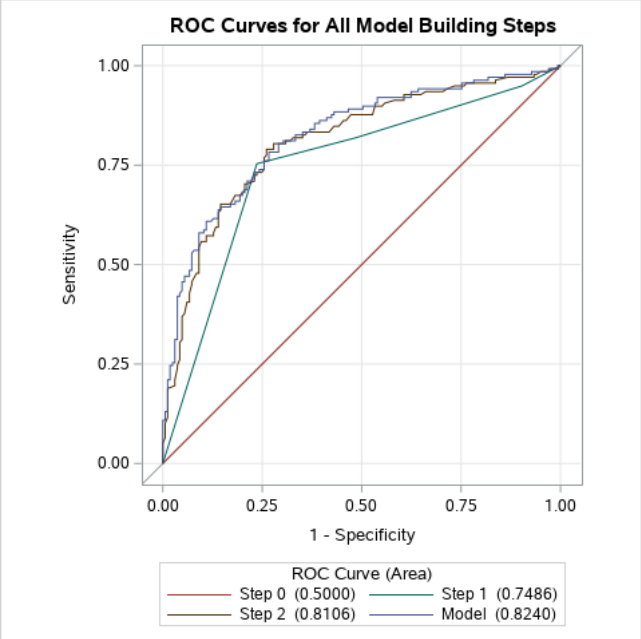
Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	2.9928	1.4565	4.2220	0.0399
cp	1	-0.8796	0.1462	36.2050	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
trtbps	1	0.0246	0.00839	8.5869	0.0034
thalachh	1	-0.0375	0.00696	28.9875	<.0001

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	82.4	Somers' D	0.648
Percent Discordant	17.6	Gamma	0.648
Percent Tied	0.0	Tau-a	0.322
Pairs	22770	c	0.824

Odds Ratio Estimates and Wald Confidence Intervals				
Effect	Unit	Estimate	95% Confidence Limits	
cp	1.0000	0.415	0.312	0.553
trtbps	1.0000	1.025	1.008	1.042
thalachh	1.0000	0.963	0.950	0.976





Partition for the Hosmer and Lemeshow Test					
		output = 0		output = 1	
Group	Total	Observed	Expected	Observed	Expected
1	30	4	2.25	26	27.75
2	30	4	4.09	26	25.91
3	30	5	5.99	25	24.01
4	30	7	8.00	23	22.00
5	30	10	11.04	20	18.96

Partition for the Hosmer and Lemeshow Test					
		output = 0		output = 1	
Group	Total	Observed	Expected	Observed	Expected
6	30	17	14.06	13	15.94
7	30	13	17.81	17	12.19
8	30	21	20.95	9	9.05
9	30	27	23.97	3	6.03
10	33	30	29.84	3	3.16

Hosmer and Lemeshow Goodness-of-Fit Test		
Chi-Square	DF	Pr > ChiSq
8.2783	8	0.4068

Classification Table									
	Correct		Incorrect		Percentages				
Prob Level	Event	Non-Event	Event	Non-Event	Correct	Sensi-tivity	Speci-ficity	Pos Pred	Neg Pred
0.020	138	0	165	0	45.5	100.0	0.0	45.5	.
0.040	137	2	163	1	45.9	99.3	1.2	45.7	66.7
0.060	136	6	159	2	46.9	98.6	3.6	46.1	75.0
0.080	135	12	153	3	48.5	97.8	7.3	46.9	80.0
0.100	134	23	142	4	51.8	97.1	13.9	48.6	85.2
0.120	132	30	135	6	53.5	95.7	18.2	49.4	83.3
0.140	130	40	125	8	56.1	94.2	24.2	51.0	83.3
0.160	130	50	115	8	59.4	94.2	30.3	53.1	86.2
0.180	128	57	108	10	61.1	92.8	34.5	54.2	85.1
0.200	127	64	101	11	63.0	92.0	38.8	55.7	85.3
0.220	125	68	97	13	63.7	90.6	41.2	56.3	84.0
0.240	123	79	86	15	66.7	89.1	47.9	58.9	84.0
0.260	122	87	78	16	69.0	88.4	52.7	61.0	84.5
0.280	120	92	73	18	70.0	87.0	55.8	62.2	83.6
0.300	119	99	66	19	71.9	86.2	60.0	64.3	83.9
0.320	118	101	64	20	72.3	85.5	61.2	64.8	83.5
0.340	114	101	64	24	71.0	82.6	61.2	64.0	80.8
0.360	111	108	57	27	72.3	80.4	65.5	66.1	80.0
0.380	110	113	52	28	73.6	79.7	68.5	67.9	80.1
0.400	109	115	50	29	73.9	79.0	69.7	68.6	79.9
0.420	108	117	48	30	74.3	78.3	70.9	69.2	79.6
0.440	102	120	45	36	73.3	73.9	72.7	69.4	76.9
0.460	100	125	40	38	74.3	72.5	75.8	71.4	76.7
0.480	96	127	38	42	73.6	69.6	77.0	71.6	75.1
0.500	92	130	35	46	73.3	66.7	78.8	72.4	73.9
0.520	91	133	32	47	73.9	65.9	80.6	74.0	73.9
0.540	90	135	30	48	74.3	65.2	81.8	75.0	73.8
0.560	89	137	28	49	74.6	64.5	83.0	76.1	73.7
0.580	87	141	24	51	75.2	63.0	85.5	78.4	73.4
0.600	85	142	23	53	74.9	61.6	86.1	78.7	72.8
0.620	84	145	20	54	75.6	60.9	87.9	80.8	72.9
0.640	79	147	18	59	74.6	57.2	89.1	81.4	71.4
0.660	75	149	16	63	73.9	54.3	90.3	82.4	70.3
0.680	71	153	12	67	73.9	51.4	92.7	85.5	69.5
0.700	67	153	12	71	72.6	48.6	92.7	84.8	68.3
0.720	61	155	10	77	71.3	44.2	93.9	85.9	66.8
0.740	58	158	7	80	71.3	42.0	95.8	89.2	66.4
0.760	53	159	6	85	70.0	38.4	96.4	89.8	65.2
0.780	43	159	6	95	66.7	31.2	96.4	87.8	62.6
0.800	42	160	5	96	66.7	30.4	97.0	89.4	62.5
0.820	38	160	5	100	65.3	27.5	97.0	88.4	61.5
0.840	32	160	5	106	63.4	23.2	97.0	86.5	60.2
0.860	27	161	4	111	62.0	19.6	97.6	87.1	59.2
0.880	19	163	2	119	60.1	13.8	98.8	90.5	57.8
0.900	18	163	2	120	59.7	13.0	98.8	90.0	57.6
0.920	9	165	0	129	57.4	6.5	100.0	100.0	56.1
0.940	6	165	0	132	56.4	4.3	100.0	100.0	55.6
0.960	3	165	0	135	55.4	2.2	100.0	100.0	55.0
0.980	0	165	0	138	54.5	0.0	100.0	.	54.5

Mean Values of Age, Resting Blood Pressure, Cholesterol Level, and Maximum Heart Rate Achieved by Output

The LOGISTIC Procedure

Model Information	
Data Set	WORK.HEART
Response Variable	output
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	303

Number of Observations Used	303

Response Profile		
Ordered Value	output	Total Frequency
1	0	138
2	1	165

Probability modeled is output='0'.

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

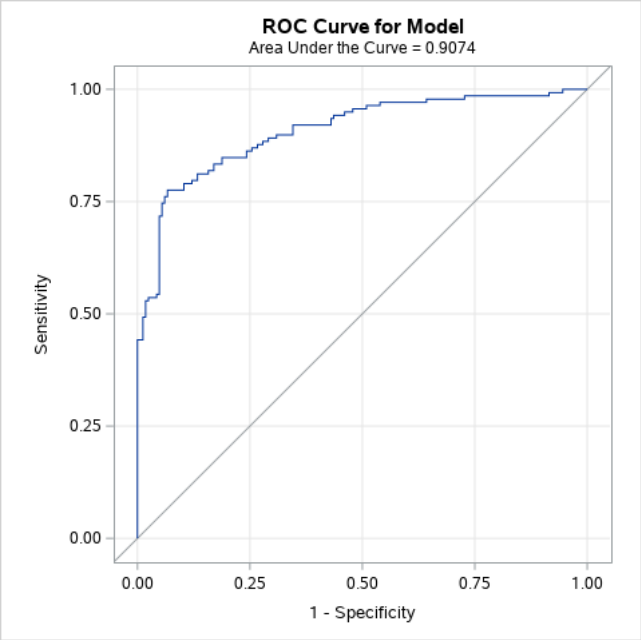
Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	253.770
SC	423.352	302.049
-2 Log L	417.638	227.770

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	189.8681	12	<.0001
Score	148.0747	12	<.0001
Wald	78.4423	12	<.0001

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-1.5766	2.3308	0.4575	0.4988
age	1	-0.00617	0.0216	0.0813	0.7756
trtbps	1	0.0165	0.0100	2.7149	0.0994
chol	1	0.000259	0.00337	0.0059	0.9387
thalachh	1	-0.0192	0.00968	3.9251	0.0476
oldpeak	1	0.6534	0.2111	9.5785	0.0020
cp	1	-0.8030	0.1805	19.7829	<.0001
fbs	1	0.1842	0.5188	0.1260	0.7226
restecg	1	-0.5768	0.3351	2.9638	0.0851
exng	1	0.9613	0.3906	6.0569	0.0139
slp	1	-0.4421	0.3362	1.7296	0.1885
caa	1	0.8200	0.1839	19.8816	<.0001
thall	1	1.1158	0.2854	15.2825	<.0001

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
age	0.994	0.953	1.037
trtbps	1.017	0.997	1.037
chol	1.000	0.994	1.007
thalachh	0.981	0.963	1.000
oldpeak	1.922	1.271	2.907
cp	0.448	0.314	0.638
fbs	1.202	0.435	3.323
restecg	0.562	0.291	1.083
exng	2.615	1.216	5.623
slp	0.643	0.333	1.242
caa	2.271	1.583	3.256
thall	3.052	1.744	5.340

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	90.7	Somers' D	0.815
Percent Discordant	9.3	Gamma	0.815
Percent Tied	0.0	Tau-a	0.405
Pairs	22770	c	0.907



Mean Values of Age, Resting Blood Pressure, Cholesterol Level, and Maximum Heart Rate Achieved by Output

The LOGISTIC Procedure

Model Information	
Data Set	WORK.HEART
Response Variable	output
Number of Response Levels	2
Model	binary logit
Optimization Technique	Fisher's scoring

Number of Observations Read	303
Number of Observations Used	303

Response Profile		
Ordered Value	output	Total Frequency
1	0	138
2	1	165

Probability modeled is output='0'.

Stepwise Selection Procedure

Step 0. Intercept entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

-2 Log L	=	417.638

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
143.7917	6	<.0001

Step 1. Effect exng entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	361.903
SC	423.352	369.330
-2 Log L	417.638	357.903

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	59.7351	1	<.0001
Score	57.7993	1	<.0001
Wald	51.3272	1	<.0001

Residual Chi-Square Test

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
106.7460	5	.0001

Note: No effects for the model in Step 1 are removed.

Step 2. Effect caa entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	319.112
SC	423.352	330.253
-2 Log L	417.638	313.112

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	104.5265	2	<.0001
Score	93.5473	2	<.0001
Wald	73.3612	2	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
68.8962	4	<.0001

Note: No effects for the model in Step 2 are removed.

Step 3. Effect oldpeak entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	292.590
SC	423.352	307.445
-2 Log L	417.638	284.590

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	133.0484	3	<.0001
Score	113.2582	3	<.0001
Wald	79.2476	3	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
46.0666	3	<.0001

Note: No effects for the model in Step 3 are removed.

Step 4. Effect cp entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	266.661
SC	423.352	285.229
-2 Log L	417.638	256.661

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	160.9774	4	<.0001
Score	129.7720	4	<.0001
Wald	78.9779	4	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
20.6481	2	<.0001

Note: No effects for the model in Step 4 are removed.

Step 5. Effect thall entered:

Model Convergence Status

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	254.224
SC	423.352	276.506
-2 Log L	417.638	242.224

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	175.4145	5	<.0001
Score	138.1661	5	<.0001
Wald	78.2888	5	<.0001

Residual Chi-Square Test		
Chi-Square	DF	Pr > ChiSq
6.0004	1	0.0143

Note: No effects for the model in Step 5 are removed.

Step 6. Effect thalachh entered:

Model Convergence Status
Convergence criterion (GCONV=1E-8) satisfied.

Model Fit Statistics		
Criterion	Intercept Only	Intercept and Covariates
AIC	419.638	250.236
SC	423.352	276.232
-2 Log L	417.638	236.236

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	181.4023	6	<.0001
Score	143.7917	6	<.0001
Wald	81.0070	6	<.0001

Note: No effects for the model in Step 6 are removed.

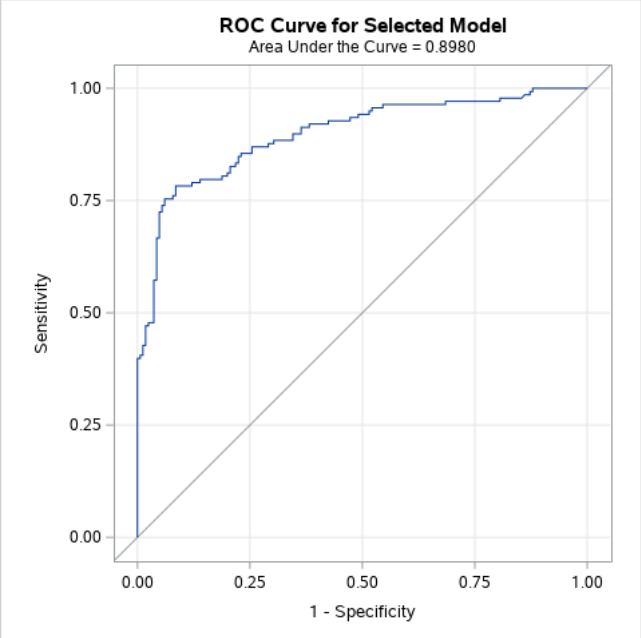
Note: All effects have been entered into the model.

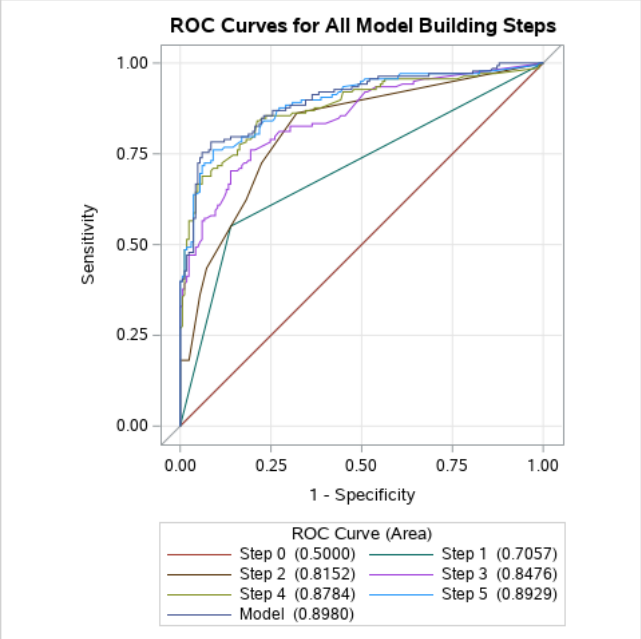
Summary of Stepwise Selection							
Step	Effect Entered	Effect Removed	DF	Number In	Score Chi-Square	Wald Chi-Square	Pr > ChiSq
1	exng		1	1	57.7993		<.0001
2	caa		1	2	44.0620		<.0001
3	oldpeak		1	3	26.4719		<.0001
4	cp		1	4	27.7758		<.0001
5	thall		1	5	15.0734		0.0001
6	thalachh		1	6	6.0004		0.0143

Analysis of Maximum Likelihood Estimates					
Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-0.5341	1.3936	0.1469	0.7015
thalachh	1	-0.0197	0.00822	5.7474	0.0165
oldpeak	1	0.7844	0.1844	18.0922	<.0001
cp	1	-0.7402	0.1712	18.6937	<.0001
exng	1	1.0604	0.3767	7.9235	0.0049
caa	1	0.7744	0.1728	20.0849	<.0001
thall	1	1.0427	0.2739	14.4945	0.0001

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	89.8	Somers' D	0.796
Percent Discordant	10.2	Gamma	0.796
Percent Tied	0.0	Tau-a	0.396
Pairs	22770	c	0.898

Odds Ratio Estimates and Wald Confidence Intervals				
Effect	Unit	Estimate	95% Confidence Limits	
thalachh	1.0000	0.980	0.965	0.996
oldpeak	1.0000	2.191	1.526	3.145
cp	1.0000	0.477	0.341	0.667
exng	1.0000	2.888	1.380	6.042
caa	1.0000	2.169	1.546	3.044
thall	1.0000	2.837	1.658	4.852





Partition for the Hosmer and Lemeshow Test					
		output = 0		output = 1	
Group	Total	Observed	Expected	Observed	Expected
1	30	3	1.12	27	28.88
2	30	2	2.37	28	27.63
3	30	3	3.74	27	26.26
4	30	6	5.73	24	24.27
5	30	8	8.48	22	21.52
6	30	8	11.89	22	18.11
7	30	22	18.72	8	11.28
8	30	26	25.19	4	4.81
9	30	27	28.26	3	1.74
10	33	33	32.50	0	0.50

Hosmer and Lemeshow Goodness-of-Fit Test		
Chi-Square	DF	Pr > ChiSq
8.8549	8	0.3547

Classification Table									
	Correct		Incorrect		Percentages				
Prob Level	Event	Non-Event	Event	Non-Event	Correct	Sensi-tivity	Speci-ficity	Pos Pred	Neg Pred
0.000	138	0	165	0	45.5	100.0	0.0	45.5	.
0.020	138	3	162	0	46.5	100.0	1.8	46.0	100.0
0.040	137	16	149	1	50.5	99.3	9.7	47.9	94.1
0.060	134	31	134	4	54.5	97.1	18.8	50.0	88.6

Classification Table

Prob Level	Correct		Incorrect		Percentages				
	Event	Non-Event	Event	Non-Event	Correct	Sensi-tivity	Speci-ficity	Pos Pred	Neg Pred
0.080	134	41	124	4	57.8	97.1	24.8	51.9	91.1
0.100	132	53	112	6	61.1	95.7	32.1	54.1	89.8
0.120	132	68	97	6	66.0	95.7	41.2	57.6	91.9
0.140	129	75	90	9	67.3	93.5	45.5	58.9	89.3
0.160	127	84	81	11	69.6	92.0	50.9	61.1	88.4
0.180	127	91	74	11	71.9	92.0	55.2	63.2	89.2
0.200	126	95	70	12	72.9	91.3	57.6	64.3	88.8
0.220	123	102	63	15	74.3	89.1	61.8	66.1	87.2
0.240	122	107	58	16	75.6	88.4	64.8	67.8	87.0
0.260	121	109	56	17	75.9	87.7	66.1	68.4	86.5
0.280	120	114	51	18	77.2	87.0	69.1	70.2	86.4
0.300	118	120	45	20	78.5	85.5	72.7	72.4	85.7
0.320	115	123	42	23	78.5	83.3	74.5	73.2	84.2
0.340	111	128	37	27	78.9	80.4	77.6	75.0	82.6
0.360	110	131	34	28	79.5	79.7	79.4	76.4	82.4
0.380	110	134	31	28	80.5	79.7	81.2	78.0	82.7
0.400	110	136	29	28	81.2	79.7	82.4	79.1	82.9
0.420	109	138	27	29	81.5	79.0	83.6	80.1	82.6
0.440	108	142	23	30	82.5	78.3	86.1	82.4	82.6
0.460	108	143	22	30	82.8	78.3	86.7	83.1	82.7
0.480	106	144	21	32	82.5	76.8	87.3	83.5	81.8
0.500	105	148	17	33	83.5	76.1	89.7	86.1	81.8
0.520	105	151	14	33	84.5	76.1	91.5	88.2	82.1
0.540	104	151	14	34	84.2	75.4	91.5	88.1	81.6
0.560	104	152	13	34	84.5	75.4	92.1	88.9	81.7
0.580	103	152	13	35	84.2	74.6	92.1	88.8	81.3
0.600	101	152	13	37	83.5	73.2	92.1	88.6	80.4
0.620	99	155	10	39	83.8	71.7	93.9	90.8	79.9
0.640	96	156	9	42	83.2	69.6	94.5	91.4	78.8
0.660	93	157	8	45	82.5	67.4	95.2	92.1	77.7
0.680	91	157	8	47	81.8	65.9	95.2	91.9	77.0
0.700	87	157	8	51	80.5	63.0	95.2	91.6	75.5
0.720	86	157	8	52	80.2	62.3	95.2	91.5	75.1
0.740	83	157	8	55	79.2	60.1	95.2	91.2	74.1
0.760	83	158	7	55	79.5	60.1	95.8	92.2	74.2
0.780	80	158	7	58	78.5	58.0	95.8	92.0	73.1
0.800	79	158	7	59	78.2	57.2	95.8	91.9	72.8
0.820	77	158	7	61	77.6	55.8	95.8	91.7	72.1
0.840	73	158	7	65	76.2	52.9	95.8	91.3	70.9
0.860	69	159	6	69	75.2	50.0	96.4	92.0	69.7
0.880	66	159	6	72	74.3	47.8	96.4	91.7	68.8
0.900	62	159	6	76	72.9	44.9	96.4	91.2	67.7
0.920	55	162	3	83	71.6	39.9	98.2	94.8	66.1
0.940	51	163	2	87	70.6	37.0	98.8	96.2	65.2
0.960	39	165	0	99	67.3	28.3	100.0	100.0	62.5
0.980	23	165	0	115	62.0	16.7	100.0	100.0	58.9
1.000	0	165	0	138	54.5	0.0	100.0	.	54.5