

### **Lab 5: Using Data Mining**

The objective of this laboratory was creating a code for decision trees based on the ID3 algorithm, the output is the decision flow chart for classifying new entries. Afterwards, the results were compared with those of WEKA.

One of the advantages writing our own code over the WEKA implementation is that you can personalize it more in order to obtain the desired output and how to obtain them (format included), also as you can limit the number of outputs or processes, the processing time can be lower than that of an established program as WEKA. Moreover, WEKA has several advantages over this, first is the simplification as the program is already written and the outputs are a complete list of possible information that we can use, also they're more graphical and overall easier to use and understand. Also it has implemented many algorithms to get the decisions trees and also provide us a lot of more functionalities.

A disadvantage that WEKA has over our implementation is that WEKA output cannot be used within a program, it only provides graphical interpretation of the results but these results cannot be used as an input to another program to make use of the decision tree that is generated.

To test our code, and compare both programs, we used the "cars.arff" file so that we were able to compare decision tree that was created when executed using WEKA and the decision tree that was obtained with our code. The results can be observed at the end of this document. Comparing both outputs, we can verify that both, WEKA and our program, give us the same decision tree, but with different format The WEKA output gives a more readable output of the decision tree, but the output of our program, despite it is not so readable, can be used to implement a decision tree inside a more complex program.

For selecting this data set (which is included at the end of the file), we chose one where the values were always discrete as WEKA can calculate continuous decision trees and our code not. Moreover, the selected data set were selected for having answers not relying on monotonic pure tables so that the tree could be use for generalizing it,also we chose a bigger set for proving the capability of the code and WEKA.

Taking everything into account, the natural question is asking where the decision trees could be useful; analyzing their capability of of grouping answers according to parameters that can affect the outcome, they could be "easily" applied to diagnosticate diseases, also for studies regarding what product could a person with certain characteristics would buy or even if someone is akin to commit a crime, the applications are varied.

## APENDIX

Cars.arff

@relation car

@attribute buying {vhigh, high, med, low}

@attribute maint {vhigh, high, med, low}

@attribute doors {2, 3, 4, 5more}

@attribute persons {2, 4, more}

@attribute lug\_boot {small, med, big}

@attribute safety {low, med, high}

@attribute quality {unacc, acc, good, vgood}

@data

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vhigh,low,5more,more,big,high,acc  
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low,vhigh,5more,more,small,high,acc  
low,vhigh,5more,more,med,low,unacc  
low,vhigh,5more,more,med,med,acc  
low,vhigh,5more,more,med,high,acc  
low,vhigh,5more,more,big,low,unacc  
low,vhigh,5more,more,big,med,acc  
low,vhigh,5more,more,big,high,acc  
low,high,2,2,small,low,unacc  
low,high,2,2,small,med,unacc  
low,high,2,2,small,high,unacc  
low,high,2,2,med,low,unacc  
low,high,2,2,med,med,unacc  
low,high,2,2,med,high,unacc  
low,high,2,2,big,low,unacc  
low,high,2,2,big,med,unacc  
low,high,2,2,big,high,unacc  
low,high,2,4,small,low,unacc  
low,high,2,4,small,med,acc  
low,high,2,4,small,high,acc  
low,high,2,4,med,low,unacc  
low,high,2,4,med,med,acc  
low,high,2,4,med,high,acc  
low,high,2,4,big,low,unacc  
low,high,2,4,big,med,acc

low,high,2,4,big,high,vgood  
low,high,2,more,small,low,unacc  
low,high,2,more,small,med,unacc  
low,high,2,more,small,high,unacc  
low,high,2,more,med,low,unacc  
low,high,2,more,med,med,acc  
low,high,2,more,med,high,acc  
low,high,2,more,big,low,unacc  
low,high,2,more,big,med,acc  
low,high,2,more,big,high,vgood  
low,high,3,2,small,low,unacc  
low,high,3,2,small,med,unacc  
low,high,3,2,small,high,unacc  
low,high,3,2,med,low,unacc  
low,high,3,2,med,med,unacc  
low,high,3,2,med,high,unacc  
low,high,3,2,big,low,unacc  
low,high,3,2,big,med,unacc  
low,high,3,2,big,high,unacc  
low,high,3,4,small,low,unacc  
low,high,3,4,small,med,acc  
low,high,3,4,small,high,acc  
low,high,3,4,med,low,unacc  
low,high,3,4,med,med,acc  
low,high,3,4,med,high,acc  
low,high,3,4,big,low,unacc  
low,high,3,4,big,med,acc  
low,high,3,4,big,high,vgood  
low,high,3,more,small,low,unacc  
low,high,3,more,small,med,acc  
low,high,3,more,small,high,acc  
low,high,3,more,med,low,unacc  
low,high,3,more,med,med,acc  
low,high,3,more,med,high,vgood  
low,high,3,more,big,low,unacc

low,high,3,more,big,med,acc  
low,high,3,more,big,high,vgood  
low,high,4,2,small,low,unacc  
low,high,4,2,small,med,unacc  
low,high,4,2,small,high,unacc  
low,high,4,2,med,low,unacc  
low,high,4,2,med,med,unacc  
low,high,4,2,med,high,unacc  
low,high,4,2,big,low,unacc  
low,high,4,2,big,med,unacc  
low,high,4,2,big,high,unacc  
low,high,4,4,small,low,unacc  
low,high,4,4,small,med,acc  
low,high,4,4,small,high,acc  
low,high,4,4,med,low,unacc  
low,high,4,4,med,med,acc  
low,high,4,4,med,high,vgood  
low,high,4,4,big,low,unacc  
low,high,4,4,big,med,acc  
low,high,4,4,big,high,vgood  
low,high,4,more,small,low,unacc  
low,high,4,more,small,med,acc  
low,high,4,more,small,high,acc  
low,high,4,more,med,low,unacc  
low,high,4,more,med,med,acc  
low,high,4,more,med,high,vgood  
low,high,4,more,big,low,unacc  
low,high,4,more,big,med,acc  
low,high,4,more,big,high,vgood  
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low,high,5more,2,small,med,unacc  
low,high,5more,2,small,high,unacc  
low,high,5more,2,med,low,unacc  
low,high,5more,2,med,med,unacc  
low,high,5more,2,med,high,unacc

low,high,5more,2,big,low,unacc  
low,high,5more,2,big,med,unacc  
low,high,5more,2,big,high,unacc  
low,high,5more,4,small,low,unacc  
low,high,5more,4,small,med,acc  
low,high,5more,4,small,high,acc  
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low,high,5more,4,med,med,acc  
low,high,5more,4,med,high,vgood  
low,high,5more,4,big,low,unacc  
low,high,5more,4,big,med,acc  
low,high,5more,4,big,high,vgood  
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low,high,5more,more,small,med,acc  
low,high,5more,more,small,high,acc  
low,high,5more,more,med,low,unacc  
low,high,5more,more,med,med,acc  
low,high,5more,more,med,high,vgood  
low,high,5more,more,big,low,unacc  
low,high,5more,more,big,med,acc  
low,high,5more,more,big,high,vgood  
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low,med,2,2,small,med,unacc  
low,med,2,2,small,high,unacc  
low,med,2,2,med,low,unacc  
low,med,2,2,med,med,unacc  
low,med,2,2,med,high,unacc  
low,med,2,2,big,low,unacc  
low,med,2,2,big,med,unacc  
low,med,2,2,big,high,unacc  
low,med,2,4,small,low,unacc  
low,med,2,4,small,med,acc  
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low,med,2,4,med,med,acc

low,med,2,4,med,high,good  
low,med,2,4,big,low,unacc  
low,med,2,4,big,med,good  
low,med,2,4,big,high,vgood  
low,med,2,more,small,low,unacc  
low,med,2,more,small,med,unacc  
low,med,2,more,small,high,unacc  
low,med,2,more,med,low,unacc  
low,med,2,more,med,med,acc  
low,med,2,more,med,high,good  
low,med,2,more,big,low,unacc  
low,med,2,more,big,med,good  
low,med,2,more,big,high,vgood  
low,med,3,2,small,low,unacc  
low,med,3,2,small,med,unacc  
low,med,3,2,small,high,unacc  
low,med,3,2,med,low,unacc  
low,med,3,2,med,med,unacc  
low,med,3,2,med,high,unacc  
low,med,3,2,big,low,unacc  
low,med,3,2,big,med,unacc  
low,med,3,2,big,high,unacc  
low,med,3,4,small,low,unacc  
low,med,3,4,small,med,acc  
low,med,3,4,small,high,good  
low,med,3,4,med,low,unacc  
low,med,3,4,med,med,acc  
low,med,3,4,med,high,good  
low,med,3,4,big,low,unacc  
low,med,3,4,big,med,good  
low,med,3,4,big,high,vgood  
low,med,3,more,small,low,unacc  
low,med,3,more,small,med,acc  
low,med,3,more,small,high,good  
low,med,3,more,med,low,unacc

low,med,3,more,med,med,good  
low,med,3,more,med,high,vgood  
low,med,3,more,big,low,unacc  
low,med,3,more,big,med,good  
low,med,3,more,big,high,vgood  
low,med,4,2,small,low,unacc  
low,med,4,2,small,med,unacc  
low,med,4,2,small,high,unacc  
low,med,4,2,med,low,unacc  
low,med,4,2,med,med,unacc  
low,med,4,2,med,high,unacc  
low,med,4,2,big,low,unacc  
low,med,4,2,big,med,unacc  
low,med,4,2,big,high,unacc  
low,med,4,4,small,low,unacc  
low,med,4,4,small,med,acc  
low,med,4,4,small,high,good  
low,med,4,4,med,low,unacc  
low,med,4,4,med,med,good  
low,med,4,4,med,high,vgood  
low,med,4,4,big,low,unacc  
low,med,4,4,big,med,good  
low,med,4,4,big,high,vgood  
low,med,4,more,small,low,unacc  
low,med,4,more,small,med,acc  
low,med,4,more,small,high,good  
low,med,4,more,med,low,unacc  
low,med,4,more,med,med,good  
low,med,4,more,med,high,vgood  
low,med,4,more,big,low,unacc  
low,med,4,more,big,med,good  
low,med,4,more,big,high,vgood  
low,med,5more,2,small,low,unacc  
low,med,5more,2,small,med,unacc  
low,med,5more,2,small,high,unacc

low,med,5more,2,med,low,unacc  
low,med,5more,2,med,med,unacc  
low,med,5more,2,med,high,unacc  
low,med,5more,2,big,low,unacc  
low,med,5more,2,big,med,unacc  
low,med,5more,2,big,high,unacc  
low,med,5more,4,small,low,unacc  
low,med,5more,4,small,med,acc  
low,med,5more,4,small,high,good  
low,med,5more,4,med,low,unacc  
low,med,5more,4,med,med,good  
low,med,5more,4,med,high,vgood  
low,med,5more,4,big,low,unacc  
low,med,5more,4,big,med,good  
low,med,5more,4,big,high,vgood  
low,med,5more,more,small,low,unacc  
low,med,5more,more,small,med,acc  
low,med,5more,more,small,high,good  
low,med,5more,more,med,low,unacc  
low,med,5more,more,med,med,good  
low,med,5more,more,med,high,vgood  
low,med,5more,more,big,low,unacc  
low,med,5more,more,big,med,good  
low,med,5more,more,big,high,vgood  
low,low,2,2,small,low,unacc  
low,low,2,2,small,med,unacc  
low,low,2,2,small,high,unacc  
low,low,2,2,med,low,unacc  
low,low,2,2,med,med,unacc  
low,low,2,2,med,high,unacc  
low,low,2,2,big,low,unacc  
low,low,2,2,big,med,unacc  
low,low,2,2,big,high,unacc  
low,low,2,4,small,low,unacc  
low,low,2,4,small,med,acc

low,low,2,4,small,high,good  
low,low,2,4,med,low,unacc  
low,low,2,4,med,med,acc  
low,low,2,4,med,high,good  
low,low,2,4,big,low,unacc  
low,low,2,4,big,med,good  
low,low,2,4,big,high,vgood  
low,low,2,more,small,low,unacc  
low,low,2,more,small,med,unacc  
low,low,2,more,small,high,unacc  
low,low,2,more,med,low,unacc  
low,low,2,more,med,med,acc  
low,low,2,more,med,high,good  
low,low,2,more,big,low,unacc  
low,low,2,more,big,med,good  
low,low,2,more,big,high,vgood  
low,low,3,2,small,low,unacc  
low,low,3,2,small,med,unacc  
low,low,3,2,small,high,unacc  
low,low,3,2,med,low,unacc  
low,low,3,2,med,med,unacc  
low,low,3,2,med,high,unacc  
low,low,3,2,big,low,unacc  
low,low,3,2,big,med,unacc  
low,low,3,2,big,high,unacc  
low,low,3,4,small,low,unacc  
low,low,3,4,small,med,acc  
low,low,3,4,small,high,good  
low,low,3,4,med,low,unacc  
low,low,3,4,med,med,acc  
low,low,3,4,med,high,good  
low,low,3,4,big,low,unacc  
low,low,3,4,big,med,good  
low,low,3,4,big,high,vgood  
low,low,3,more,small,low,unacc



low,low,3,more,small,med,acc  
low,low,3,more,small,high,good  
low,low,3,more,med,low,unacc  
low,low,3,more,med,med,good  
low,low,3,more,med,high,vgood  
low,low,3,more,big,low,unacc  
low,low,3,more,big,med,good  
low,low,3,more,big,high,vgood  
low,low,4,2,small,low,unacc  
low,low,4,2,small,med,unacc  
low,low,4,2,small,high,unacc  
low,low,4,2,med,low,unacc  
low,low,4,2,med,med,unacc  
low,low,4,2,med,high,unacc  
low,low,4,2,big,low,unacc  
low,low,4,2,big,med,unacc  
low,low,4,2,big,high,unacc  
low,low,4,4,small,low,unacc  
low,low,4,4,small,med,acc  
low,low,4,4,small,high,good  
low,low,4,4,med,low,unacc  
low,low,4,4,med,med,good  
low,low,4,4,med,high,vgood  
low,low,4,4,big,low,unacc  
low,low,4,4,big,med,good  
low,low,4,4,big,high,vgood  
low,low,4,more,small,low,unacc  
low,low,4,more,small,med,acc  
low,low,4,more,small,high,good  
low,low,4,more,med,low,unacc  
low,low,4,more,med,med,good  
low,low,4,more,med,high,vgood  
low,low,4,more,big,low,unacc  
low,low,4,more,big,med,good  
low,low,4,more,big,high,vgood

low,low,5more,2,small,low,unacc  
low,low,5more,2,small,med,unacc  
low,low,5more,2,small,high,unacc  
low,low,5more,2,med,low,unacc  
low,low,5more,2,med,med,unacc  
low,low,5more,2,med,high,unacc  
low,low,5more,2,big,low,unacc  
low,low,5more,2,big,med,unacc  
low,low,5more,2,big,high,unacc  
low,low,5more,4,small,low,unacc  
low,low,5more,4,small,med,acc  
low,low,5more,4,small,high,good  
low,low,5more,4,med,low,unacc  
low,low,5more,4,med,med,good  
low,low,5more,4,med,high,vgood  
low,low,5more,4,big,low,unacc  
low,low,5more,4,big,med,good  
low,low,5more,4,big,high,vgood  
low,low,5more,more,small,low,unacc  
low,low,5more,more,small,med,acc  
low,low,5more,more,small,high,good  
low,low,5more,more,med,low,unacc  
low,low,5more,more,med,med,good  
low,low,5more,more,med,high,vgood  
low,low,5more,more,big,low,unacc  
low,low,5more,more,big,med,good  
low,low,5more,more,big,high,vgood  
%  
%  
%

Output using our code

safety: low  
ANSWER: unacc  
safety: med  
persons: 2  
ANSWER: unacc  
persons: 4  
buying: vhigh  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: unacc  
maint: med  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: unacc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: low  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: unacc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
buying: high  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: unacc  
doors: 4  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: acc  
maint: med  
ANSWER: acc

doors: 5more  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: acc  
maint: med  
ANSWER: acc  
lug\_boot: big  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: acc  
maint: med  
ANSWER: acc  
maint: low  
ANSWER: acc  
buying: med  
maint: vhigh  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: unacc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: high  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: unacc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: med  
ANSWER: acc  
maint: low  
lug\_boot: small  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3

ANSWER: acc  
doors: 4  
ANSWER: good  
doors: 5more  
ANSWER: good  
lug\_boot: big  
ANSWER: good  
buying: low  
maint: vhigh  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: unacc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: high  
ANSWER: acc  
maint: med  
lug\_boot: small  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: good  
doors: 5more  
ANSWER: good  
lug\_boot: big  
ANSWER: good  
maint: low  
lug\_boot: small  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: good  
doors: 5more  
ANSWER: good  
lug\_boot: big  
ANSWER: good  
persons: more  
buying: vhigh

maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: unacc  
maint: med  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: low  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
buying: high  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
maint: vhigh  
ANSWER: unacc  
maint: high  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
maint: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc

doors: 5more  
ANSWER: acc  
maint: low  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
lug\_boot: big  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: acc  
maint: med  
ANSWER: acc  
maint: low  
ANSWER: acc  
buying: med  
maint: vhigh  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: high  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: med  
doors: 2  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
doors: 3

ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
maint: low  
lug\_boot: small  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3  
ANSWER: good  
doors: 4  
ANSWER: good  
doors: 5more  
ANSWER: good  
lug\_boot: big  
ANSWER: good  
buying: low  
maint: vhigh  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
maint: high  
doors: 2  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more



ANSWER: acc  
maint: med  
lug\_boot: small  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3  
ANSWER: good  
doors: 4  
ANSWER: good  
doors: 5more  
ANSWER: good  
lug\_boot: big  
ANSWER: good  
maint: low  
lug\_boot: small  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3  
ANSWER: good  
doors: 4  
ANSWER: good  
doors: 5more  
ANSWER: good  
lug\_boot: big  
ANSWER: good  
safety: high  
persons: 2  
ANSWER: unacc  
persons: 4  
buying: vhigh  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: unacc  
maint: med  
ANSWER: acc

maint: low  
ANSWER: acc  
buying: high  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: acc  
maint: med  
ANSWER: acc  
maint: low  
ANSWER: acc  
buying: med  
maint: vhigh  
ANSWER: acc  
maint: high  
ANSWER: acc  
maint: med  
lug\_boot: small  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: vgood  
doors: 5more  
ANSWER: vgood  
lug\_boot: big  
ANSWER: vgood  
maint: low  
lug\_boot: small  
ANSWER: good  
lug\_boot: med  
doors: 2  
ANSWER: good  
doors: 3  
ANSWER: good  
doors: 4  
ANSWER: vgood  
doors: 5more  
ANSWER: vgood  
lug\_boot: big  
ANSWER: vgood  
buying: low  
maint: vhigh  
ANSWER: acc  
maint: high  
lug\_boot: small  
ANSWER: acc  
lug\_boot: med  
doors: 2  
ANSWER: acc  
doors: 3

ANSWER: acc  
doors: 4  
ANSWER: vgood  
doors: 5more  
ANSWER: vgood  
lug\_boot: big  
ANSWER: vgood  
maint: med  
lug\_boot: small  
ANSWER: good  
lug\_boot: med  
doors: 2  
ANSWER: good  
doors: 3  
ANSWER: good  
doors: 4  
ANSWER: vgood  
doors: 5more  
ANSWER: vgood  
lug\_boot: big  
ANSWER: vgood  
maint: low  
lug\_boot: small  
ANSWER: good  
lug\_boot: med  
doors: 2  
ANSWER: good  
doors: 3  
ANSWER: good  
doors: 4  
ANSWER: vgood  
doors: 5more  
ANSWER: vgood  
lug\_boot: big  
ANSWER: vgood  
persons: more  
buying: vhigh  
maint: vhigh  
ANSWER: unacc  
maint: high  
ANSWER: unacc  
maint: med  
doors: 2  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more

ANSWER: acc  
maint: low  
doors: 2  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
doors: 3  
ANSWER: acc  
doors: 4  
ANSWER: acc  
doors: 5more  
ANSWER: acc  
buying: high  
maint: vhigh  
ANSWER: unacc  
maint: high  
doors: 2  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
doors: 3  
ANSWER: acc  
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ANSWER: acc  
doors: 5more  
ANSWER: acc  
maint: med  
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lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
ANSWER: acc  
lug\_boot: big  
ANSWER: acc  
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ANSWER: acc  
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ANSWER: acc  
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lug\_boot: small  
doors: 2  
ANSWER: unacc  
doors: 3  
ANSWER: acc  
lug\_boot: med  
ANSWER: acc

lug\_boot: big  
ANSWER: acc  
buying: med  
maint: vhigh  
doors: 2  
lug\_boot: small  
ANSWER: unacc  
lug\_boot: med  
ANSWER: acc  
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ANSWER: vgood  
doors: 4  
ANSWER: vgood  
doors: 5more  
ANSWER: vgood  
lug\_boot: big  
ANSWER: vgood

## Output using weka

