Question 1

Consider the Random Utility Based MNL model. There are two alternatives (A, B) in a choice set. Each has a systematic (or: observed) utility: V(A)=2, V(B)=3.

When 3 units of utility ('utils') are added to V(A) and V(B), the predicted choice probability of alternative A increases.

Question 2

It is possible that model X has a better model fit (final log-likelihood), but at the same time a lower hit-rate, than model Y.

Question 3

The so-called Newton-Raphson method is often used to find the maximum likelihood estimates for parameters. In this process, it uses the first and second derivatives of the (Log-) Likelihood function, with respect to the parameter.

The second derivative is used to determine the step size along the (Log-) Likelihood-curve.

Question 4

A choice model is estimated on a dataset. Estimation results are kept aside. Half of the data are now discarded in a process of random selection of cases, and the model is re-estimated.

The width of the 95%-confidence intervals associated with parameter estimates will decrease.

Question 5

Consider an origin-destination (OD) pair which is served by a train service and a road. A government investment leads to an increase in the speed of a train service, which in turn leads to a train travel time reduction of 30 minutes. Before this intervention, the probability that a randomly sampled traveller (on the OD-pair) would travel by train was 10%. After the intervention, this probability increases to 30%, as some road users switch to the improved train service. The average value of time for the population of travellers on this OD-pair equals 10 euro per hour. There are 8,000 travellers per day on the given OD-pair; assume all make one trip per day.

Computed by means of the Rule-of-Half, the total monetary gain in welfare, per day, that is associated with the intervention, is larger for the group of 'stayers' than for the group of 'switchers'.

Question 6

Consider a Mixed Logit mode choice model between a car, bus and train option. The observed attributes are Time and Cost. A normally distributed 'Public Transport' constant is added to the utility of the bus and train option. Its estimated mean equals 1.5, and its estimated standard deviation equals 1. After estimating the Mixed Logit (ML) model, we find that it attains a model fit which is statistically superior to that of the corresponding MNL model (i.e., the model which does not estimate a standard deviation for the 'Public Transport' constant). The ML and MNL models are used to forecast the impact of an improvement of bus travel time.

The MNL model will predict a bigger impact on market share of the car mode, than the ML model.

Question 7

The accuracy of an estimated Mixed Logit model depends on how many draws have been used to evaluate the integral(s) over unobserved utilities.

When the standard errors of the estimated parameters are small, this indicates that you have used a sufficiently large number of draws.

Question 8

Consider a travel mode choice context, where three alternatives (A, B, C) are observed in terms of their travel time (T) and a combined quality indicator (Q). Consider the following choice set: { A(T=25, Q=15), B(T=40, Q=15), C(T=25, Q=10) }. Consider a policy which improves, i.e., decreases, A's travel time. As a consequence, A's market share increases. Consider a Mixed Logit model with a random parameter for travel time, whose standard deviation is estimated to be statistically insignificant, and thereafter fixed at zero.

If this model is used to predict the effect of the policy, alternative B’s market share is predicted to suffer more from A’s decrease in travel time, than C’s market share.