MATH 523 - ASSIGNMENT 4

To be handed in not later than 5pm, Monday 16th April 2012.
Please hand in during lectures, to Burnside 1225, or to the Mathematics Office Burnside 1005

1 The data set `Heart.csv` contains binary response data from a case-control study relating to fatal outcomes of myocardial infarction (MI) incidents. The data frame comprises seven columns of data

- `ID`: subject ID number
- `death` : binary outcome, 1=Death within 48 hours of MI.
- `anterior` : factor predictor, two levels, type of MI: `Inf`=Inferior, `Ant`=Anterior.
- `hcabg` : factor predictor, two levels, history of heart surgery intervention: `PTCA`, `CABG`.
- `killip` : factor predictor, four levels, Killip severity score: 1,2,3,4 (increasing severity)
- `age`: continuous covariate, age of subject
- `age.cat` factor predictor, four levels, age in four categories: `(0,60],(60,70],(70,80],(80,100]`

Carry out an analysis of these data to identify predictors of a fatal outcome. Explain your results in terms of the odds and odds ratios of the death outcome in different cross-categorized subsets.

Assume that analysis of deviance procedures are valid for these binary response data.

10 MARKS

2 The data set `Opinion.csv` contains the results of an opinion poll carried out in two cities, amongst individuals who were cross-classified by Sex (Female and Male) and Age Group (six categories). Each individual was asked to respond Yes or No to a given question. Individuals who could not or would not respond were omitted.

Regarding these data as a $2 \times 2 \times 2 \times 6$ table, address the following questions, using a binomial response GLM.

(a) Which factors appear to influence the probability of responding Yes ?

4 MARKS

(b) Ignoring the factor `City`, is the odds ratio comparing response probabilities amongst males and females **constant** across age groups ? If it is, report an approximate 95 % credible interval for the common odds ratio. If it is not, suggest an alternative model that might yield a better explanation of the the observed pattern of odds ratios.

6 MARKS

Note: to load a stored data frame, use the `load` function. For example, to load the `Heart.rda` data object, use

```
load("Heart.rda")
```