```
> #HW11
> #See HW09 for the description of the pima dataset.
> #Use the Rcode below to perform forward, backward, and bi-directional stepwise #regression.
Provide a paragraph summarizing the results.
> #Multiple Logistic Regression in R
>
> library(faraway)
> library(StepReg)
> logistic <- glm(test ~ age + bmi + diastolic + diabetes + glucose + insulin + pregnant +
triceps, family=binomial(logit),data=pima)
> summary(logistic)

Call:
glm(formula = test ~ age + bmi + diastolic + diabetes + glucose +
    insulin + pregnant + triceps, family = binomial(logit), data = pima)

Deviance Residuals:
    Min       1Q   Median       3Q      Max
-2.5566  -0.7274  -0.4159   0.7267   2.9297

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept) -8.4046964  0.7166359 -11.728  < 2e-16 ***
age          0.0148690  0.0093348   1.593 0.111192
bmi          0.0897010  0.0150876   5.945 2.76e-09 ***
diastolic   -0.0132955  0.0052336  -2.540 0.011072 *
diabetes     0.9451797  0.2991475   3.160 0.001580 **
glucose      0.0351637  0.0037087   9.481  < 2e-16 ***
insulin     -0.0011917  0.0009012  -1.322 0.186065
pregnant     0.1231823  0.0320776   3.840 0.000123 ***
triceps      0.0006190  0.0068994   0.090 0.928515
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 993.48  on 767  degrees of freedom
Residual deviance: 723.45  on 759  degrees of freedom
AIC: 741.45

Number of Fisher Scoring iterations: 5

> #analysis(logistic)
> anova(logistic)
Analysis of Deviance Table

Model: binomial, link: logit

Response: test

Terms added sequentially (first to last)
```

in the order the terms were written in the model

```
         Df Deviance Resid. Df Resid. Dev
NULL                       767     993.48
age       1   42.764       766     950.72
bmi       1   75.045       765     875.68
diastolic 1    3.782       764     871.89
diabetes  1   13.529       763     858.36
glucose   1  117.098       762     741.27
insulin   1    2.574       761     738.69
pregnant  1   15.239       760     723.45
triceps   1    0.008       759     723.45
> y <- "test"
> stepwiselogit(data=pima,y, exclude = NULL, include = NULL, selection = "forward",
```

```
+ select = "AIC", sle = 0.15, sls = 0.15)
$SummaryOfSelection
  Step EnteredEffect RemovedEffect DF NumberIn      AIC
1    1       glucose                1        1 812.7196
2    2           bmi                1        2  777.403
3    3      pregnant                1        3 752.1249
4    4      diabetes                1        4 744.3059
5    5     diastolic                1        5 740.5596
6    6           age                1        6 739.4617
7    7       insulin                1        7 739.4534

$AnalysisOfMaximumLikelihoodEstimate
             Parameter Estimate Std. Error  z value Pr(>|z|)
(Intercept) (Intercept)  -8.4051     0.7167 -11.7275        0
glucose         glucose   0.0351     0.0037    9.587        0
bmi                 bmi   0.0901     0.0145   6.2294        0
pregnant       pregnant   0.1232     0.0321   3.8409    1e-04
diabetes       diabetes   0.9476      0.298   3.1798   0.0015
diastolic     diastolic  -0.0132     0.0052  -2.5639   0.0103
age                 age   0.0148     0.0093    1.592   0.1114
insulin         insulin  -0.0012      8e-04  -1.4211   0.1553

> stepwiselogit(data=pima,y, exclude = NULL, include = NULL, selection = "backward",
+ select = "AIC", sle = 0.15, sls = 0.15)
$SummaryOfSelection
  Step EnteredEffect RemovedEffect DF NumberIn      AIC
1    1                   triceps  1        7 739.4534

$AnalysisOfMaximumLikelihoodEstimate
             Parameter Estimate Std. Error  z value Pr(>|z|)
(Intercept) (Intercept)  -8.4051     0.7167 -11.7275        0
pregnant       pregnant   0.1232     0.0321   3.8409    1e-04
glucose         glucose   0.0351     0.0037    9.587        0
diastolic     diastolic  -0.0132     0.0052  -2.5639   0.0103
insulin         insulin  -0.0012      8e-04  -1.4211   0.1553
bmi                 bmi   0.0901     0.0145   6.2294        0
diabetes       diabetes   0.9476      0.298   3.1798   0.0015
age                 age   0.0148     0.0093    1.592   0.1114

> stepwiselogit(data=pima,y, exclude = NULL, include = NULL, selection = "bidirection",
+ select = "AIC", sle = 0.15, sls = 0.15)
$SummaryOfSelection
  Step EnteredEffect RemovedEffect DF NumberIn      AIC
1    1       glucose                1        1 812.7196
2    2           bmi                1        2  777.403
3    3      pregnant                1        3 752.1249
4    4      diabetes                1        4 744.3059
5    5     diastolic                1        5 740.5596
6    6           age                1        6 739.4617
7    7       insulin                1        7 739.4534

$AnalysisOfMaximumLikelihoodEstimate
             Parameter Estimate Std. Error  z value Pr(>|z|)
(Intercept) (Intercept)  -8.4051     0.7167 -11.7275        0
glucose         glucose   0.0351     0.0037    9.587        0
bmi                 bmi   0.0901     0.0145   6.2294        0
pregnant       pregnant   0.1232     0.0321   3.8409    1e-04
diabetes       diabetes   0.9476      0.298   3.1798   0.0015
diastolic     diastolic  -0.0132     0.0052  -2.5639   0.0103
age                 age   0.0148     0.0093    1.592   0.1114
insulin         insulin  -0.0012      8e-04  -1.4211   0.1553

> ##------------------------------------------------------------------##
>
```

no variables that entered were later removed