LING82100: homework 7 solution

```
> d <- read.csv(
+     "http://wellformedness.com/courses/LING82100/Data/NYC.csv"
+ )
> contrasts(d$store) <- contr.sum
> contrasts(d$word) <- contr.sum
> contrasts(d$emphasis) <- contr.sum
> r <- glm(r ~ store + word + emphasis, data = d, family = binomial)
```

1 Estimated means

```
> intercept <- -0.93588
> coef.kleins <- -1.34852  # The effect thereof.
> coef.macys <- 0.45423    # The effect thereof.
> coef.saks <- -(coef.kleins + coef.macys)
> means <- c(kleins = plogis(intercept + coef.kleins),
+            macys = plogis(intercept + coef.macys),
+            saks = plogis(intercept + coef.saks))
> print(round(means, 2))
kleins  macys   saks
  0.09   0.38   0.49
```

The estimated means are shown in Table 1.

2 Post-hoc tests

```
> library(multcomp)
> pairs <- glht(r, linfct = mcp(store = "Tukey"))
```

	$P(r)$
S. Klein's	.09
Macy's	.38
Saks 5th Ave.	.49

Table 1: Estimated mean (r)-use for the three department stores.

```
> summary(pairs)

          Simultaneous Tests for General Linear Hypotheses

Multiple Comparisons of Means: Tukey Contrasts


Fit: glm(formula = r ~ store + word + emphasis, family = binomial,
    data = d)

Linear Hypotheses:
                    Estimate Std. Error z value Pr(>|z|)
Macy's - Klein's == 0   1.8028     0.2617   6.890   <1e-04 ***
Saks - Klein's == 0     2.2428     0.2820   7.954   <1e-04 ***
Saks - Macy's == 0      0.4400     0.1950   2.256   0.0604 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
(Adjusted p values reported -- single-step method)
```

The Tukey HSD test was used to perform post-hoc comparisons of (r) use in the three different department stores. We obtain significant effects of S. Klein's $<$ Macy's ($p < .001$) and S. Klein's $<$ Saks 5th Ave. ($p < .001$); the difference between Macy's and Saks was non-significant ($p = .060$).