Stats*3510 - Assignment 2
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Q3

```
library(data.table)
dfNFL = fread("http://users.stat.ufl.edu/~winner/data/fieldgoal.dat")
colnames(dfNFL) = c("Yardage", "SuccessIndicator", "WeekNum")
```

a)

```
nfl.model = glm(SuccessIndicator~Yardage, family = binomial, data = dfNFL)
summary(nfl.model)
```

```
Coefficients:
            Estimate Std. Error z value Pr(>|z|)
(Intercept)  5.69788    0.45110   12.63   <2e-16 ***
Yardage     -0.10991    0.01058  -10.38   <2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 955.38  on 947  degrees of freedom
Residual deviance: 817.20  on 946  degrees of freedom
AIC: 821.2

Number of Fisher Scoring iterations: 5
```

b)

There is an extremely significant relationship (p = <2e-16) between yardage and field goals successful field goal attempts. That is, for every 1 unit increase in yardage the estimated log odds of a successful field goal attempt decreases by 0.10991.

c)

log(odds) = (p/1-p) = e^B0hat+B1hat(X):
For every 1 unit increase in yardage the estimated log odds of a successful field goal attempt decreases by 0.10991.

odds = p = e^B0hat+B1hat(X)/(1+e^B0hat+B1hat(X))
For every 1 unit increase in yardage the estimated odds of a successful field goal attempt are multiplied by e^-(0.10991)

d)

Casual googling has suggested the upper limit on successful field goal attempts is around 70 yards.

odds = p = e^B0hat+B1hat(X)/(1+e^B0hat+B1hat(X))
Odds = e^5.69788+(-0.10991)(70)/(1+e^5.69788+(-0.10991)(70))
= 0.119642

The estimated odds of a successful field goal attempt at 70 yards is approximately 11.96%. I am surprised by how large this estimate is given the farthest reported successful field goal attempt in game and in practice in in the mid 60s.