STAT 455 Homework 03 - R Code

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Problem 2.3

```
#R = seat belt (risk),  R.y = no seat belt, R.n = seat belt
#F = fatal, F.y = yes fatal, F.n = non fatal
R.y_F.y <- 1601
R.n_F.y <- 510
R.y_F.n <- 162527
R.n_F.n <- 412368
vec <- c( R.y_F.y, R.n_F.y, R.y_F.n, R.n_F.n)
Total <- sum(vec)
Counts <- matrix(vec, nrow=2, ncol=2)
pi <- Counts/Total
pi.11 <- pi[1,1]
pi.12 <- pi[1,2]
pi.21 <- pi[2,1]
pi.22 <- pi[2,2]
pi.1p <- pi.11 + pi.12
pi.2p <- pi.21 + pi.22
Diff.in.Prop <- (pi.11/pi.1p) - (pi.21/pi.2p)
Relative.Risk <- ( (pi.11)/(pi.11 + pi.12) ) / ( (pi.21)/(pi.21 + pi.22) )
OR <- (pi.11*pi.22) / (pi.12*pi.21)
Table2.3 <- data.frame(c("Difference in Proportion", "Relative Risk", "Odds Ratio (OR)"),
                       decimal(c(Diff.in.Prop, Relative.Risk, OR), dec))
colnames(Table2.3) <- c("Statistic", "Value")
kable(Table2.3)
```

Statistic	Value
Difference in Proportion	0.0085
Relative Risk	7.8970
Odds Ratio (OR)	7.9649

Problem 2.8

```
odd.f <- 2.9 #= pi.11 / pi.12
OR <- 11.4
odd.m <- odd.f / OR
probsurv.f <- odd.f / (odd.f + 1)
probsurv.m <- odd.m / (odd.m + 1)
Table2.8 <- data.frame(c("Female", "Male"),decimal(c(probsurv.f, probsurv.m), dec))
colnames(Table2.8) <- c("Gender", "Proportion Survived")
kable(Table2.8)
```

Gender	Proportion Survived
Female	0.7436
Male	0.2028

Problem 2.12

```
Male.vec <-   c(512, 353, 120, 138,  53,  22, 313, 207, 205, 279, 138, 351)
Female.vec <- c( 89,  17, 202, 131,  94,  24, 19, 8, 391, 244, 299, 317)
Male <- matrix(Male.vec ,nrow=6, ncol=2)
Female <- matrix(Female.vec ,nrow=6, ncol=2)
Dep.Num <- c(1:6)
Department <- c(LETTERS[1:6])
Cond.OR <- c()
  for (Dep in Dep.Num){
    Matrix <- rbind(Male[Dep,], Female[Dep,])
    OR.dep <- (Matrix[1,1] * Matrix[2,2]) / (Matrix[1,2] * Matrix[2,1])
    Cond.OR <- c(Cond.OR, OR.dep)  }
Conditional.OR <-data.frame(Department,   decimal(Cond.OR, dec))
colnames(Conditional.OR) <- c("Department", "Conditional OR")
kable(Conditional.OR)
```

Department	Conditional OR
A	0.3492
B	0.8025
C	1.1331
D	0.9213
E	1.2216
F	0.8279

```
Sum.Matrix <- matrix(c(rep(0, 4)), nrow=2, ncol=2)
  for (Dep in Dep.Num){
    Matrix <- rbind(Male[Dep,], Female[Dep,])
    Sum.Matrix <- Sum.Matrix + Matrix   }
Marg.OR <- (Sum.Matrix[1,1] * Sum.Matrix[2,2]) / (Sum.Matrix[1,2] * Sum.Matrix[2,1])
Marginal.OR <- as.data.frame(decimal(Marg.OR, dec))
colnames(Marginal.OR) <- c("Marginal OR")
kable(Marginal.OR)
```

Marginal OR
1.8411

```
Corn.OR <- c() #using female and Department F(6) as the baseline
  for (Dep in c(1:5)){
    pi.G.f_D.f <- sum(Female[6, ]) / (sum(Female[6,])+sum(Male[6,]))
    pi.G.f_D <- (sum(Female[Dep,])) / (sum(Female[Dep,])+sum(Male[Dep,]))
    pi.G_D.f <- (sum(Male[6,])) / (sum(Female[6,])+sum(Male[6,]))
    pi.G_F <- sum(Male[Dep,]) / (sum(Female[Dep,])+sum(Male[Dep,]))
    Corn.OR.i <- ( pi.G_F * pi.G.f_D.f) / (pi.G.f_D * pi.G_D.f)
    Corn.OR <- c(Corn.OR, Corn.OR.i)
  }
Corner.OR <-data.frame(Department[1:5],   decimal(Corn.OR, dec))
colnames(Corner.OR) <- c("Department", "Corner OR")
kable(Corner.OR)
```

Department	Corner OR
A	6.9835
B	20.4783
C	0.5010
D	1.0166
E	0.4443