POL211 TA Session 3

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```
setwd(dirname(rstudioapi::getActiveDocumentContext()$path))
rm(list = ls()) # Remove all objects from workspace.
```

Revisit Hotel Vacancy problem

Calculate the answer to the proability that at least all hotels have one person

```
test <- list(NA)
index <- list(NA)
i <- 1

for(na in 1:12){
  for(nb in 1:(13-na)){
    for(nc in 1:(14-na-nb)){
      test[i] <- 1/16 * 1/(16 - na) * 1/(16-na-nb)
      index[i] <- i
      i <- i + 1
    }
  }
}
```

Distribution Functions

Binomial Distribution

```
?rbinom

# Random Draws from the distribution
rbinom(10, size = 1000, prob = c(0.9))
```

```
##  [1] 900 895 890 902 908 908 907 889 904 887
```

```
# Pr of specific values in the distribution
dbinom(900, size = 1000, prob = c(0.9))
```

```
## [1] 0.04201679
```

```
# Cummulative Probability of values
pbinom(900, size = 1000, prob = c(0.9))
```

```
## [1] 0.5154177
```

```
sum(dbinom(0:900, size = 1000, prob = c(0.9)))
```

```
## [1] 0.5154177
```

```
# The value that satisfies the specific cummulative probabilities
qbinom(0.8, size = 1000, prob = c(0.9))
```

```
## [1] 908
```

Binomial Distribution?

```
rbinom(10, size = 1, prob=0.5)
```

```
##  [1] 1 1 1 1 1 0 1 1 0 0
```

Poisson Distribution

```
?rpois

rpois(10, 414)
```

```
##  [1] 432 401 400 403 416 409 441 366 430 421
```

```
dpois(400, 414)
```

```
## [1] 0.01569664
```

```
ppois(400, 414)
```

```
## [1] 0.2549781
```

```
qpois(0.8, 414)
```

```
## [1] 431
```

Continuous Uniform

```
?runif

runif(10, min=10, max=20)
```

```
##  [1] 18.90179 11.51284 11.36647 10.89988 13.63508 11.40118 10.64625
##  [8] 14.67744 11.38659 10.48988
```

```
dunif(15, min=10, max=20)
```

```
## [1] 0.1
```

```
punif(17, min=10, max=20)
```

```
## [1] 0.7
```

```
qunif(0.8, min=10, max=20)
```

```
## [1] 18
```

Negative Binomial

```
?rnbinom

rnbinom(10, size=1000, prob=0.8)
```

```
##  [1] 257 249 270 273 280 258 257 262 204 259
```

```
dnbinom(200, size=1000, prob=0.8)
```

```
## [1] 0.0003296854
```

```
pnbinom(250, size=1000, prob=0.8)
```

```
## [1] 0.5169171
```

```
qnbinom(0.8, size=1000, prob=0.8)
```

```
## [1] 265
```