ECO 420Y — Homework 1

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Question 1

```r
#============================ Question 1 =======================================
## Pay 2 dollars to roll three dice. The casino pays 5 if sum=10, else pays 1.

set.seed(123)

i <- 1
return <- rep(-1, 100000)

while (i <= 100000) {
  die1 <- sample(1:6, 1)
  die2 <- sample(1:6, 1)
  die3 <- sample(1:6, 1)
  if ((die1 + die2 + die3) == 10) return[i] <- 3
  i <- i + 1
}

print(mean(return))
```

```
## [1] -0.4954
```

```r
print(var(return))
```

```
## [1] 1.763796
```

Question 2

```r
#============================ Question 2 =======================================
## Simulate 95% CI for 5-year buy-hold-sell returns on SP500

library(tseries)
library(quantmod)

symbols <- c("SP500")
getSymbols(symbols, src = "FRED")
```

```
## [1] "SP500"
```

```
sp <- coredata(SP500)
n <- nrow(sp)
j <- 1
ra_sp <- NULL

while (j + 252*5 <= n) {
  ra_sp <- c(ra_sp, (sp[j + 252*5] - sp[j]) / sp[j])
  j <- j + 1
}

quantile(ra_sp, probs = c(0.025, 0.975), na.rm = TRUE)
```

```
##      2.5%      97.5%
## 0.4032606 1.1314197
```

Histogram

```
hist(ra_sp, breaks = 50,
     main = "Distribution of 5-year SP500 Returns",
     xlab = "5-year return")
```


Distribution of 5−year SP500 Returns