

STAT 2011 Lab - Week 2

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Question 1

```
rolls1=sample(x=c(1,2,3,4,5,6), size=4000, replace=TRUE)
table(rolls1)
```

```
## rolls1
##  1  2  3  4  5  6
## 671 701 618 698 657 655
```

Question 2

```
four.rolls = matrix(rolls1, nrow=1000, ncol=4)
```

Question 3

```
min.roll = apply(four.rolls, 1, min)
```

Question 4

```
sum(min.roll == 1)
```

```
## [1] 514
```

Question 5

```
rolls2 = sample(x=c(1,2,3,4,5,6), size = 48000, replace=TRUE)
two.rolls = matrix(rolls2, nrow=24000, ncol=2)
sum.rolls = apply(two.rolls, 1, sum)
twodozen = matrix(sum.rolls, nrow = 24, ncol = 1000)
min.pair = apply(twodozen, 2, min)
sum(min.pair == 2)
```

```
## [1] 516
```

Question 6

```
p1.est = sum(min.roll == 1)/1000
p1.est
```

```
## [1] 0.514
```

```
p2.est = sum(min.pair == 2)/1000
p2.est
```

```
## [1] 0.516
```

Question 7

```
results1 <- 0
results2 <- 0
for (i in 1:25) {

  rolls1.test=sample(x=c(1,2,3,4,5,6), size=4000, replace=TRUE)
  table(rolls1.test)
  four.rolls.test = matrix(rolls1.test, nrow=1000, ncol=4)
  min.roll.test = apply(four.rolls.test, 1, min)
```

```

results1[i] <- sum(min.roll.test == 1)

rolls2.test = sample(x=c(1,2,3,4,5,6), size = 48000, replace=TRUE)
two.rolls.test = matrix(rolls2.test, nrow=24000, ncol=2)
sum.rolls.test = apply(two.rolls.test, 1, sum)
twodozen.test = matrix(sum.rolls.test, nrow = 24, ncol = 1000)
min.pair.test = apply(twodozen.test, 2, min)
results2[i] <- sum(min.pair.test == 2)

}

```

Question 8

```

prob.ests1 <- results1/1000
prob.ests2 <- results2/1000
se1 <- sd(prob.ests1)
se2 <- sd(prob.ests2)

```

Question 9

```

p1 = 1 - (5/6)^4
p1

```

```

## [1] 0.5177469

```

```

p2 = 1 - (35/36)^24
p2

```

```

## [1] 0.4914039

```

Question 10

```

abs(p1.est - p1)/se1

```

```

## [1] 0.2202061

```

```

abs(p2.est - p2)/se2

```

```

## [1] 1.307897

```