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Lab 1

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#1

#mean is 4.5

(1/10\*1)+(1/10\*2)+(1/10\*3)+(1/10\*4)+(1/10\*5)+(1/2\*6)

[1] 4.5

#variance is 3.25

(1/10\*(1-4.5)^2) + (1/10\*(2-4.5)^2) + (1/10\*(3-4.5)^2) + (1/10\*(4-4.5)^2 ) + (1/10\*(5-4.5)^2 ) + (1/2\*(6-4.5)^2)

[1] 3.25

#2 (Rachel helped me with this part)

numRolls <- 10000

rolls <- vector(length = numRolls,mode = "double")

for (i in 1:numRolls) rolls[i]<- sample(1:6,1,prob = c(.1,.1,.1,.1,.1,.5))

mean(rolls)

[1] 4.5076

var(rolls)

[1] 3.242867

#3 (I helped Rachel with this)

hist(sample(1:6,1000000,prob = c(.1,.1,.1,.1,.1,.5), replace = TRUE))

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#4 (Rachel and I worked independently but checked each others code.)

TrialSizes <-c(5,10,15,20,25,30,40,50,60,70,80,90,100,200,300,400,500,1000,2000,3000,4000,5000,10000,20000,30000,1000000)

means <- vector(mode = "double",length = length(TrialSizes))

variances <- vector(mode = "double", length = length(TrialSizes))

for (i in 1:length(TrialSizes))

{

rolls <-vector(length = TrialSizes[i], mode = "double")

for(j in 1:TrialSizes[i])

{ rolls[j] <-sample(1:6,1,prob = c(.1,.1,.1,.1,.1,.5))}

means[i] <- mean(rolls)

variances[i] <- var(rolls)

}

plot(log10(TrialSizes),means)

lines(log10(TrialSizes), rep(4.5,length(TrialSizes)))

plot(log10(TrialSizes), variances)

lines(log10(TrialSizes),rep(3.25,length(TrialSizes)))

#According to my graphs that I looked at. The mean converged at 4.5 in two instances. 2.3 and 6. When you convert that it is 199.5262 and 1e+06.

# The varience had three instances. 4.3, 4.5, and 6. When converting it it turned into:

#19952.62, 31622.78, and 1e+06

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