bs <- function(spot, strike, maturity, sigma, drift) {

d1 <- 1/sigma/sqrt(maturity)\*(log(spot/strike)+(drift+sigma^2/2)\*maturity)

d2 <- d1 - sigma\*sqrt(maturity)

call <- pnorm(d1)\*spot - pnorm(d2)\*strike

put <- pnorm(-d2)\*strike\*exp(-drift\*maturity)-pnorm(-d1)\*spot

result <- c(call)

names(result) <- c("call")

result

}

for (strike in seq(50,150,10)) {

print(bs(100,strike,1,0.15,0.02))

}

bs2 <- function(spot, strike, maturity, sigma, drift) {

d1 <- 1/sigma/sqrt(maturity)\*(log(spot/strike)+(drift+sigma^2/2)\*maturity)

d2 <- d1 - sigma\*sqrt(maturity)

call <- pnorm(d1)\*spot - pnorm(d2)\*strike

put <- pnorm(-d2)\*strike\*exp(-drift\*maturity)-pnorm(-d1)\*spot

result <- c(put)

names(result) <- c("put")

result

}

for (strike in seq(50,150,10)) {

print(bs2(100,strike,1,0.15,0.02))

}

strike <- seq(50,150,10)

call <- bs(100,strike,1,0.15,0.02)

put <- bs2(100,strike,1,0.15,0.02)

z<-data.frame(strike,call,put)

print(z)

plot(z[,1],z[,2], pch=2,xlab="Strike",ylab="Option Value",col="red")

points(z[,1],z[,3], pch=3,xlab="Strike",ylab="Option Value",col="blue")

legend("top", c("Call","Put"), pch=2:3, cex=0.7)