MThambeliyagodage\_Data605\_W10\_Assign10

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## Data 605 Assignment 10

### Problem 1

Smith is in jail and has 1 dollar; he can get out on bail if he has 8 dollars. A guard agrees to make a series of bets with him. If Smith bets A dollars, he wins A dollars with probability .4 and loses A dollars with probability .6.

Find the probability that he wins 8 dollars before losing all of his money if

#### (A)

He bets 1 dollar each time (timid strategy).

p <- 0.4  
q <- 0.6  
r <- q/p  
  
  
for (i in 0:8){  
P <- round((1-r^i)/(1-r^8),4)  
print (P)  
}

## [1] 0  
## [1] 0.0203  
## [1] 0.0508  
## [1] 0.0964  
## [1] 0.1649  
## [1] 0.2677  
## [1] 0.4219  
## [1] 0.6531  
## [1] 1

#### (B)

He bets, each time, as much as possible but not more than necessary to bring his fortune up to 8 dollars (bold strategy).

b <- matrix(c(1,0.6,0.6,0.6,0,0,0,0,0,0,0,0.4,0,0,0,0,0,0.4,0,0,0,0,0,0.4,1),nrow = 5, byrow=FALSE)  
b

## [,1] [,2] [,3] [,4] [,5]  
## [1,] 1.0 0 0.0 0.0 0.0  
## [2,] 0.6 0 0.4 0.0 0.0  
## [3,] 0.6 0 0.0 0.4 0.0  
## [4,] 0.6 0 0.0 0.0 0.4  
## [5,] 0.0 0 0.0 0.0 1.0

b1 <- matrix(c(0,1,0,0,0),nrow=1)  
b1

## [,1] [,2] [,3] [,4] [,5]  
## [1,] 0 1 0 0 0

b2 <- b1 %\*% b  
b2

## [,1] [,2] [,3] [,4] [,5]  
## [1,] 0.6 0 0.4 0 0

b3 <- b2 %\*% b  
b4 <- b3 %\*% b  
b4

## [,1] [,2] [,3] [,4] [,5]  
## [1,] 0.936 0 0 0 0.064

The probability is 0.064

#### (C)

Which strategy gives Smith the better chance of getting out of jail?

The probability of bold strategy is better than timid strategy to get out of jail.