Snake_and_Ladders

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Snake & Ladders Solution

```
# Snakes and ladders Simulation
```

```
library("ggplot2")
ladder.df <- data.frame(start=c(3,11), end=c(13,17))
slide.df <- data.frame(start=c(10,16,18), end=c(5,2,8))
#out <- for (i in c(1:num.iter)) {
out <-function()
{
curLoc <- 0 # Current location
nroll <- 0 # Number of rolls
slides <- 0 # Number of slides encountered
ladders <- 0 # Number of ladders encountered

# Keep rolling dice and moving until reach 100 or greater ending the game
while(curLoc < 20) {
  roll <- sample(6,size = 1,replace = TRUE,prob = c(1/6,1/6,1/6,1/6,1/6,1/6)) # generate random number
  curLoc <- curLoc + roll # increase position
  nroll <- nroll + 1 # increase number of rolls
  # Need to check if we landed on a ladder or slide and move forward or back
  if (any(ladder.df$s %in% curLoc)) {
    curLoc <- ladder.df$e[ladder.df$s %in% curLoc]
    ladders <- ladders + 1
  }
  if (any(slide.df$s %in% curLoc)) {
    curLoc <- slide.df$e[slide.df$s %in% curLoc]
    slides <- slides + 1
  }
  out.info <- list(No_of_rolls=nroll, No_of_ladder=ladders, No_of_snakes=slides)


}
return (nroll)
}
# Expectation of N
plays<-replicate(1000,out())
mean(plays)
```

```
## [1] 7.574
```

```
freq<-table(plays)
freq
```

```
## plays
##   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20
## 113 134 166 136  95  54  56  50  43  33  21  18  15   7  18   7   4   8
##  21  22  23  25  27  28  29  31  37  40
##   6   3   3   4   1   1   1   1   1   1
```

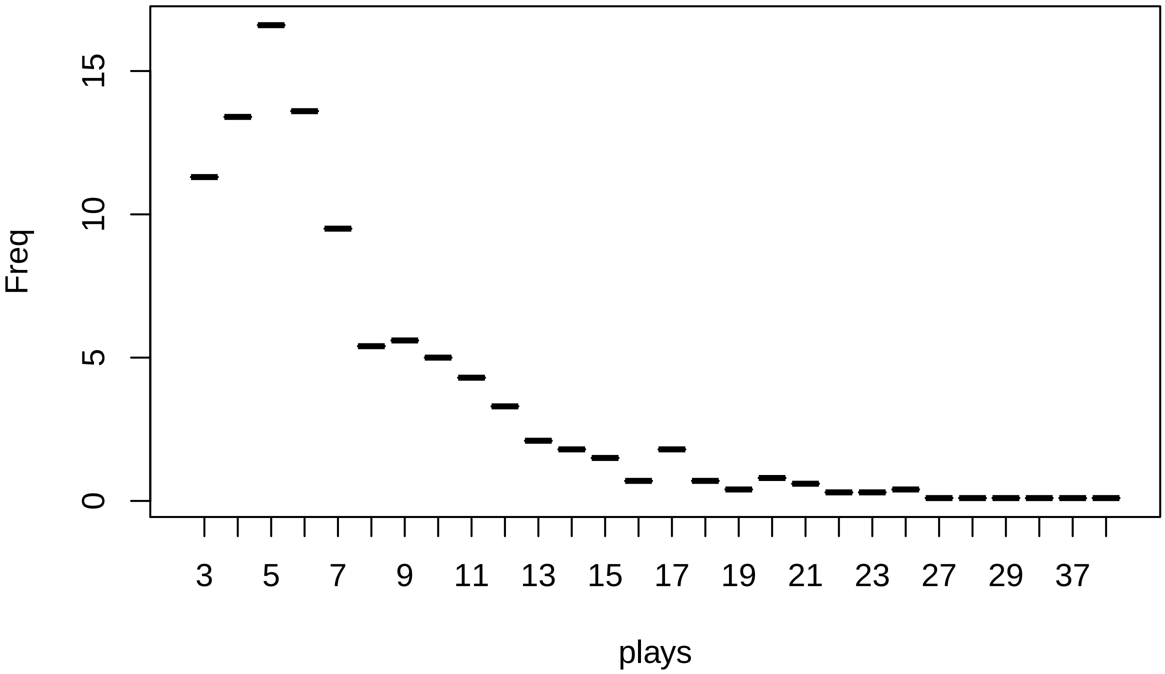
```
percent<-freq/10
percent
```

```
## plays
##    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17 
## 11.3 13.4 16.6 13.6  9.5  5.4  5.6  5.0  4.3  3.3  2.1  1.8  1.5  0.7  1.8 
##   18   19   20   21   22   23   25   27   28   29   31   37   40 
##  0.7  0.4  0.8  0.6  0.3  0.3  0.4  0.1  0.1  0.1  0.1  0.1  0.1
```

```
frq = as.data.frame(percent)
frq
```

```
##    plays Freq
## 1      3 11.3
## 2      4 13.4
## 3      5 16.6
## 4      6 13.6
## 5      7  9.5
## 6      8  5.4
## 7      9  5.6
## 8     10  5.0
## 9     11  4.3
## 10    12  3.3
## 11    13  2.1
## 12    14  1.8
## 13    15  1.5
## 14    16  0.7
## 15    17  1.8
## 16    18  0.7
## 17    19  0.4
## 18    20  0.8
## 19    21  0.6
## 20    22  0.3
## 21    23  0.3
## 22    25  0.4
## 23    27  0.1
## 24    28  0.1
## 25    29  0.1
## 26    31  0.1
## 27    37  0.1
## 28    40  0.1
```

```
plot(frq)
```


Freq
0
5
10
15
3
5
7
9
11
13
15
17
19
21
23
27
29
37
plays