# AblianFA2

2024-02-15

# FA2 Ablian

1. Use R to illustrate that the probability of getting:

a. a head is 0.5 if a fair coin is tossed repeatedly;
b. a red card is 0.5 if cards are drawn repeatedly with replacement from awell-shuffled deck;
c. an even number is 0.5 if a fair die is rolled repeatedly.

2. An experiment consists of tossing two fair coins. Use R to simulate this experiment 100 times and obtain the relative frequency of each possible outcome. Hence, estimate the probability of getting one head and one tail in any order.

```
#1a
sample(0:1,10,rep=T)
```

```
##  [1] 1 1 1 0 1 1 0 0 1 0
```

```
Flipcoin = function(n) sample(0:1,n,rep=T)
d1=Flipcoin(10)
d1
```

```
##  [1] 1 1 1 1 1 1 0 0 0 1
```

```
sum(d1==1)/10
```

```
## [1] 0.7
```

```
sum(d1==0)/10
```

```
## [1] 0.3
```

```
#1b
sample(1:52,52,rep=T)
```

```
##  [1] 36 13 10  2 39 37 44 22 25 37 48 11 12 32 49  1 25 23 15 40 19 42 24  7 47
## [26] 49 43 32 30 48 41 24 15 40 19 49 40 43 13 23  7  8  4  7 48 25 40 41 39 29
## [51] 19 45
```

```
cards = function(n) sample(1:52,n,rep=T)
d1=cards(52)
d1
```

```
##  [1] 46 12  5 13 33  8 24  9 43  1 38  1 34 44  3 32 52 14 49 46 12  8 52 51 11
## [26] 41 48 10 38 40 18  8 35 48  7 20 13  5 52 42 34 31 36 21 51 14 22 50 45 51
## [51] 48  2
```

```
sum(d1>=26)/52
```

```
## [1] 0.5384615
```

```
sum(d1<26)/52
```

```
## [1] 0.4615385
```

```
#1c
sample(1:6,6,rep=T)
```

```
## [1] 2 5 6 3 4 5
```

```
die = function(n) sample(1:6,n,rep=T)
d1=die(6)
d1
```

```
## [1] 2 1 1 4 6 6
```

```
sum1<- sum(d1==2)/6
sum2<- sum(d1==4)/6
sum3<- sum(d1==6)/6
sum5<- sum(d1==1)/6
sum6<- sum(d1==3)/6
sum7<- sum(d1==5)/6
sum4<- sum1 + sum2 + sum3
sum8<- sum5 + sum6 + sum7
sum4
```

```
## [1] 0.6666667
```

```
sum8
```

```
## [1] 0.3333333
```

```
#2
sample(0:1,100,rep=T)
```

```
##   [1] 0 1 0 0 1 0 0 0 1 1 0 1 1 0 1 1 1 1 1 1 0 1 1 1 0 0 0 1 0 1 1 1 1 1 1 1 0
##  [38] 0 0 0 0 0 0 0 1 0 1 0 0 1 0 0 0 0 1 1 0 1 1 1 0 0 1 0 1 0 0 0 0 1 0 0 1 0 0
##  [75] 0 0 0 1 1 0 0 0 0 1 0 1 0 0 1 1 0 0 0 0 1 1 0 0 0 1
```

```
Flipcoin = function(n) sample(0:1,n,rep=T)
d1=Flipcoin(100)
d1
```

```
##   [1] 1 0 1 1 0 0 1 0 1 0 1 1 1 0 1 1 0 1 1 0 1 1 1 0 1 1 0 0 0 0 1 0 0 0 0 1 1
##  [38] 0 1 0 1 0 1 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 1 1 1 0 1 0 0 1 0 0 0 0 1 1
##  [75] 0 0 1 0 1 0 1 0 0 1 1 0 1 0 1 1 0 0 1 1 0 0 0 1 0 1
```

```
sum(d1==1)/100
```

```
## [1] 0.45
```

```
sum(d1==0)/100
```

```
## [1] 0.55
```