Appendix - Naive Approach

Raphaël Morsomme

2019-01-07

Following the five steps for playing a hand of poker, the naive approach would use a code similar to the following:

```
#
# Setup
ante   <- 2
cards  <- 1 : 10
bets   <- seq(0, 20, 2)
n_card <- length(cards)
n_bet  <- length(bets )

strategy_A <- array(sample(x = bets, size = n_card, replace = T),
                    dim = c(n_card, 1), dimnames = list(cards, "Strategy A"))
strategy_B <- array(sample(x = c("Call", "Fold"), n_card * n_bet, T),
                    dim=c(n_card, n_bet, 1), dimnames = list(cards, bets, "Strategy B"))

# Strategies of the two players
print(strategy_A)
```

```
##    Strategy A
## 1           4
## 2           4
## 3          12
## 4          16
## 5          20
## 6          10
## 7           6
## 8           0
## 9          12
## 10          4
```

```
print(strategy_B)
```

```
## , , Strategy B
##
##    0      2      4      6      8      10     12     14     16     18
## 1  "Call" "Fold" "Fold" "Fold" "Call" "Call" "Call" "Fold" "Fold" "Call"
## 2  "Fold" "Fold" "Fold" "Call" "Fold" "Call" "Fold" "Call" "Fold" "Call"
## 3  "Fold" "Call" "Call" "Fold" "Fold" "Call" "Call" "Fold" "Call" "Fold"
## 4  "Fold" "Call" "Call" "Fold" "Fold" "Fold" "Fold" "Fold" "Call" "Call"
## 5  "Fold" "Call" "Call" "Call" "Fold" "Call" "Call" "Call" "Fold" "Call"
## 6  "Call" "Call" "Fold" "Call" "Call" "Fold" "Fold" "Call" "Fold" "Call"
## 7  "Call" "Fold" "Fold" "Call" "Call" "Call" "Call" "Call" "Call" "Fold"
## 8  "Call" "Fold" "Fold" "Call" "Call" "Fold" "Fold" "Fold" "Fold" "Fold"
## 9  "Call" "Call" "Fold" "Fold" "Fold" "Call" "Fold" "Fold" "Call" "Call"
## 10 "Fold" "Fold" "Fold" "Fold" "Fold" "Call" "Fold" "Fold" "Fold" "Call"
##    20
## 1  "Fold"
```

```
## 2  "Fold"
## 3  "Call"
## 4  "Call"
## 5  "Fold"
## 6  "Fold"
## 7  "Call"
## 8  "Fold"
## 9  "Call"
## 10 "Call"
```

```
#
# Five Steps

# 1. Player A's Bet
card_A   <- sample(cards, 1)
bet_A    <- strategy_A[card_A]

# 2. Player B's Action
card_B   <- sample(cards, 1)
action_B <- strategy_B[card_B, match(x = bet_A, table = bets), 1]

# 3. Pot Size
if (action_B == "Fold") pot <- 2 *  ante
if (action_B == "Call") pot <- 2 * (ante + bet_A)

# 4. Winner
if(action_B == "Fold") result <- "A wins"
if(action_B == "Call"){if(card_A >  card_B) result <- "A wins"
                       if(card_A <  card_B) result <- "B wins"
                       if(card_A == card_B) result <- "draw"}

# 5. Gain/loss
if(result == "draw"  ) gain <- 0
if(result == "A wins") gain <- pot/2
if(result == "B wins") gain <- pot/2

# Summary
print(paste("Player A receives a", card_A, "and bets", bet_A,
            ". Player B receives a", card_B, "and decides to", action_B))
```

```
## [1] "Player A receives a 2 and bets 4 . Player B receives a 2 and decides to Fold"
```

```
print(paste("The pot is", pot, "and the result of the hand is:", result))
```

```
## [1] "The pot is 4 and the result of the hand is: A wins"
```