HW2 Molotkov Ivan

```
knitr::opts_chunk$set(echo = TRUE)
```

Libraries

```
library(glue)
```

1. Create our deck using R dataframe

```
deck <- read.csv('https://raw.githubusercontent.com/AntonZamyatin/r-course/main/HW2/deck.csv')
```

2. Player's hands

```
player_hand <- data.frame()
dealer_hand <- data.frame()
```

3. shuffle_deck function

Here I shuffle global deck.

```
shuffle_deck <- function() {
  deck <<- deck[sample(1:nrow(deck)), ]
}
```

4. Give a card to a player

```
give_card <- function(pl) {
  if (pl == "player") {
    player_hand <<- rbind(player_hand, deck[1, ])
    deck <<- deck[2:nrow(deck), ]
  } else if (pl == "dealer") {
    dealer_hand <<- rbind(dealer_hand, deck[1, ])
    deck <<- deck[2:nrow(deck), ]
  }
}
```

5. Chances to win

If player's score is greater than 21, they lose.

Otherwise, If player's score is greater than the dealer's, player wins.

Otherwise, we calculate the probability to win after the next deal.

```
get_chances <- function() {
  if (sum(player_hand$value) > 21) {
    return(0)
  } else if (sum(player_hand$value) >= sum(dealer_hand$value)) {
    return(100)
  } else {
    next_vals <- deck$value + sum(player_hand$value)
    is_win <- next_vals <= 21 & next_vals >= sum(dealer_hand$value)
    return(mean(is_win) * 100)
  }
}
```

6. Print state

```
print_game_state <- function() {
  cat('Dealer\'s hand:\n')
  for (i in 1:nrow(dealer_hand)) {
    print(glue(dealer_hand[i, "face"],
               dealer_hand[i, "suit"],
               dealer_hand[i, "value"], .sep = ' '))
  }
  print(glue('sum ', sum(dealer_hand$value), '\n\n'))

  cat('Your hand:\n')
  for (i in 1:nrow(player_hand)) {
    print(glue(player_hand[i, "face"],
               player_hand[i, "suit"],
               player_hand[i, "value"], .sep = ' '))
  }
  cat(glue('sum ', sum(player_hand$value), '\n\n'))

  cat(glue('chances ', get_chances(), '%', '\n================================\n\n
\n'))
}
```

7. Start game function

```
start_game <- function() {
  deck <<- read.csv('https://raw.githubusercontent.com/AntonZamyatin/r-course/mai
n/HW2/deck.csv')
  shuffle_deck()
  player_hand <<- data.frame()
  dealer_hand <<- data.frame()

  give_card("dealer")
  give_card("dealer")
  give_card("player")
  give_card("player")

  print_game_state()
}
```

8. Deal function

```
deal <- function() {
  give_card("player")

  print_game_state()
}
```

9. Stop game function

```
stop_game <- function() {
  if (sum(player_hand$value) > 21 | sum(player_hand$value) < sum(dealer_hand$valu
e)) {
    cat("LOSE")
  } else {
    cat("WIN")
  }
}
```

Simulated games. Player's strategy - take cards until sum is greater or equal to 15.

GAME 1

```
start_game()
```

```
## Dealer's hand:
## six hearts 6
## queen spades 10
## sum 16
##
## Your hand:
## four clubs 4
## jack clubs 10
## sum 14
## chances 45.8333333333333%
## ================================
```

```
while (sum(player_hand$value) < 15) {
  deal()
}
```

```
## Dealer's hand:
## six hearts 6
## queen spades 10
## sum 16
```

```
##
## Your hand:
## four clubs 4
## jack clubs 10
## ten clubs 10
## sum 24
## chances 0%
## ================================
```

```
stop_game()
```

```
## LOSE
```

GAME 2

```
start_game()
```

```
## Dealer's hand:
## eight clubs 8
## four spades 4
## sum 12
##
## Your hand:
## six hearts 6
## ace hearts 1
## sum 7
## chances 70.8333333333333%
## ================================
```

```
while (sum(player_hand$value) < 15) {
  deal()
}
```

```
## Dealer's hand:
## eight clubs 8
## four spades 4
## sum 12
##
## Your hand:
## six hearts 6
## ace hearts 1
## eight spades 8
## sum 15
## chances 100%
## ================================
```

```
stop_game()
```

```
## WIN
```

GAME 3

```
start_game()
```

```
## Dealer's hand:
## ten spades 10
## five clubs 5
## sum 15
##
## Your hand:
## nine hearts 9
## nine spades 9
## sum 18
## chances 100%
## ================================
```

```
while (sum(player_hand$value) < 15) {
  deal()
}
stop_game()
```

```
## WIN
```

GAME 4

```
start_game()
```

```
## Dealer's hand:
## four diamonds 4
## four clubs 4
## sum 8
##
## Your hand:
## ten spades 10
## eight clubs 8
## sum 18
## chances 100%
## ================================
```

```
while (sum(player_hand$value) < 15) {
  deal()
}
stop_game()
```

```
## WIN
```