

R Modifyng Values

coop711

2018-03-26

deck

```
deck <- read.csv("../data/cards.csv", stringsAsFactors = FALSE)
deck2 <- deck
```

Changing Values in Place

```
vec <- rep(0, 6)
vec[1]
```

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

```
vec[1] <- 1000
vec
```

```
## [1] 1000 0 0 0 0 0
```

```
vec[c(1, 3, 5)] <- c(1, 1, 1)
vec
```

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

```
vec[c(1, 3, 5)] <- 2
vec
```

```
## [1] 2 0 2 0 2 0
```

```
vec[4:6] <- vec[4:6] + 1
vec
```

```
## [1] 2 0 2 1 3 1
```

```
vec[7] <- 0
vec
```

```
## [1] 2 0 2 1 3 1 0
```

```
vec[9] <- 0
vec
```

```
## [1] 2 0 2 1 3 1 0 NA 0
```

```
# vec[9] <- NULL
vec <- vec[-9]
vec
```

```
## [1] 2 0 2 1 3 1 0 NA
```

```
deck2$new <- 1:52
N <- nrow(deck2)
deck2$new2 <- 1:N
head(deck2)
```

```
##   face   suit value new new2
## 1 king spades   13  1    1
## 2 queen spades   12  2    2
## 3 jack spades   11  3    3
## 4 ten spades    10  4    4
## 5 nine spades    9  5    5
## 6 eight spades   8  6    6
```

```
deck2$new <- NULL
head(deck2)
```

```
##   face   suit value new2
## 1 king spades   13    1
## 2 queen spades   12    2
## 3 jack spades   11    3
## 4 ten spades    10    4
## 5 nine spades    9    5
## 6 eight spades   8    6
```

```
deck2[seq(13, 52, by = 13), ]
```

```
##   face   suit value new2
## 13 ace  spades    1   13
## 26 ace  clubs    1   26
## 39 ace diamonds    1   39
## 52 ace  hearts    1   52
```

```
deck2[seq(13, 52, by = 13), 1]
```

```
## [1] "ace" "ace" "ace" "ace"
```

```
str(deck2[seq(13, 52, by = 13), 1])
```

```
## chr [1:4] "ace" "ace" "ace" "ace"
```

```
deck2[seq(13, 52, by = 13), 1, drop = FALSE]
```

```
## face  
## 13 ace  
## 26 ace  
## 39 ace  
## 52 ace
```

```
str(deck2[seq(13, 52, by = 13), 1, drop = FALSE])
```

```
## 'data.frame': 4 obs. of 1 variable:  
## $ face: chr "ace" "ace" "ace" "ace"
```

```
deck2$value[seq(13, 52, by = 13)]
```

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

```
deck2[seq(13, 52, by = 13), "value"]
```

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

```
deck2[seq(13, 52, by = 13), 3]
```

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

```
deck2[seq(13, 52, by = 13), c(FALSE, FALSE, TRUE)]
```

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

```
deck2$value[seq(13, 52, by = 13)] <- 14  
head(deck2, n = 13)
```

```
## face suit value new2  
## 1 king spades 13 1  
## 2 queen spades 12 2  
## 3 jack spades 11 3  
## 4 ten spades 10 4  
## 5 nine spades 9 5  
## 6 eight spades 8 6  
## 7 seven spades 7 7  
## 8 six spades 6 8  
## 9 five spades 5 9  
## 10 four spades 4 10  
## 11 three spades 3 11  
## 12 two spades 2 12  
## 13 ace spades 14 13
```

```
source("./shuffle.R", echo = TRUE)
```

```
##  
## > deal <- function(cards) {  
## + cards[1, ]  
## + }  
##  
## > shuffle <- function(cards) {  
## + random <- sample(1:52, size = 52)  
## + cards[random, ]  
## + }
```

```
deck3 <- shuffle(deck)  
deck3
```

```
##      face      suit value
## 31  nine diamonds    9
## 27  king diamonds   13
## 44  nine   hearts    9
## 33 seven diamonds    7
## 50 three   hearts    3
## 40  king   hearts   13
## 48  five   hearts    5
##  6  eight  spades    8
## 25  two    clubs     2
## 49  four   hearts    4
## 41 queen   hearts   12
## 28 queen diamonds   12
##  1  king   spades   13
## 23  four    clubs     4
## 37 three diamonds    3
##  4   ten    spades   10
## 47  six    hearts     6
## 16 jack    clubs    11
## 20 seven    clubs     7
## 21  six    clubs     6
## 34  six diamonds     6
##  5  nine    spades     9
## 12  two    spades     2
## 19 eight    clubs     8
## 18  nine    clubs     9
## 43  ten    hearts   10
## 10  four    spades     4
## 32 eight diamonds    8
## 26  ace    clubs      1
## 46 seven   hearts     7
## 13  ace    spades      1
## 35 five diamonds     5
## 14 king    clubs    13
##  8  six    spades      6
##  7 seven   spades      7
## 38  two diamonds     2
## 11 three   spades      3
## 17  ten    clubs    10
## 24 three   clubs      3
## 39  ace diamonds     1
##  2 queen   spades    12
##  9  five   spades      5
## 29 jack diamonds    11
## 36 four diamonds     4
## 52  ace    hearts      1
##  3 jack    spades    11
## 22 five    clubs      5
## 42 jack    hearts    11
## 30  ten diamonds    10
## 45 eight   hearts     8
## 51  two    hearts      2
## 15 queen   clubs    12
```

```
head(deck3)
```

```
##      face      suit value
## 31  nine diamonds    9
## 27  king diamonds   13
## 44  nine   hearts    9
## 33 seven diamonds    7
## 50 three   hearts    3
## 40  king   hearts   13
```

Logical Subsetting

```
vec <- vec[1:7]
vec
```

```
## [1] 2 0 2 1 3 1 0
```

```
vec[c(FALSE, FALSE, FALSE, FALSE, TRUE, FALSE, FALSE)]
```

```
## [1] 3
```

```
l <- c(FALSE, FALSE, FALSE, FALSE, TRUE, FALSE, FALSE)
w <- which(l)
vec[which(l)]
```

```
## [1] 3
```

```
vec[w]
```

```
## [1] 3
```

Logical Tests

```
1 > 2
```

```
## [1] FALSE
```

```
1 > c(0, 1, 2)
```

```
## [1] TRUE FALSE FALSE
```

```
c(1, 2, 3) == c(3, 2, 1)
```

```
## [1] FALSE TRUE FALSE
```

```
1 %in% c(3, 4, 5)
```

```
## [1] FALSE
```

```
c(1, 2) %in% c(3, 4, 5)
```

```
## [1] FALSE FALSE
```

```
c(1, 2, 3) %in% c(3, 4, 5)
```

```
## [1] FALSE FALSE TRUE
```

```
c(1, 2, 3, 4) %in% c(3, 4, 5)
```

```
## [1] FALSE FALSE TRUE TRUE
```

```
deck2$face == "ace"
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE
```

```
which(deck2$face == "ace")
```

```
## [1] 13 26 39 52
```

```
sum(deck2$face == "ace")
```

```
## [1] 4
```

```
ace <- deck2$face == "ace"
deck2$value[ace]
```

```
## [1] 14 14 14 14
```

```
deck2[ace, "value"]
```

```
## [1] 14 14 14 14
```

```
deck2$value[deck2$face == "ace"]
```

```
## [1] 14 14 14 14
```

```
ace3 <- deck3$face == "ace"
deck3$value[ace3]
```

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

```
deck3[ace3, "value"]
```

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

```
deck3$value[ace3] <- 14
deck3$value[deck3$face == "ace"] <- 14
deck3
```

```
##      face      suit value
## 31  nine diamonds    9
## 27  king diamonds   13
## 44  nine   hearts    9
## 33  seven diamonds    7
## 50  three   hearts    3
## 40  king   hearts   13
## 48  five   hearts    5
## 6   eight  spades    8
## 25  two    clubs     2
## 49  four   hearts    4
## 41  queen  hearts   12
## 28  queen  diamonds  12
## 1   king   spades   13
## 23  four   clubs     4
## 37  three  diamonds    3
## 4   ten    spades   10
## 47  six    hearts    6
## 16  jack   clubs   11
## 20  seven  clubs     7
## 21  six    clubs     6
## 34  six    diamonds   6
## 5   nine   spades     9
## 12  two    spades     2
## 19  eight  clubs     8
## 18  nine   clubs     9
## 43  ten    hearts   10
## 10  four   spades     4
## 32  eight  diamonds    8
## 26  ace    clubs    14
## 46  seven  hearts     7
## 13  ace    spades    14
## 35  five   diamonds    5
## 14  king   clubs    13
## 8   six    spades     6
## 7   seven  spades     7
## 38  two    diamonds    2
## 11  three  spades     3
## 17  ten    clubs    10
## 24  three  clubs     3
## 39  ace    diamonds   14
## 2   queen  spades    12
## 9   five   spades     5
## 29  jack   diamonds   11
## 36  four   diamonds    4
## 52  ace    hearts    14
## 3   jack   spades    11
## 22  five   clubs     5
## 42  jack   hearts    11
## 30  ten    diamonds   10
## 45  eight  hearts     8
## 51  two    hearts     2
## 15  queen  clubs    12
```

```
deck4 <- deck
deck4$value <- 0
deck4
```

```
##      face      suit value
## 1  king    spades     0
## 2  queen    spades     0
## 3  jack     spades     0
## 4   ten     spades     0
## 5   nine     spades     0
## 6  eight     spades     0
## 7  seven     spades     0
## 8   six     spades     0
## 9   five     spades     0
## 10  four     spades     0
## 11 three     spades     0
## 12  two     spades     0
## 13 ace       spades     0
## 14 king     clubs     0
## 15 queen     clubs     0
## 16 jack     clubs     0
## 17 ten       clubs     0
## 18 nine     clubs     0
## 19 eight     clubs     0
## 20 seven     clubs     0
## 21 six       clubs     0
## 22 five     clubs     0
## 23 four     clubs     0
## 24 three     clubs     0
## 25 two       clubs     0
## 26 ace       clubs     0
## 27 king    diamonds    0
## 28 queen    diamonds    0
## 29 jack     diamonds    0
## 30 ten       diamonds    0
## 31 nine     diamonds    0
## 32 eight     diamonds    0
## 33 seven     diamonds    0
## 34 six       diamonds    0
## 35 five     diamonds    0
## 36 four     diamonds    0
## 37 three     diamonds    0
## 38 two       diamonds    0
## 39 ace       diamonds    0
## 40 king     hearts     0
## 41 queen     hearts     0
## 42 jack     hearts     0
## 43 ten       hearts     0
## 44 nine     hearts     0
## 45 eight     hearts     0
## 46 seven     hearts     0
## 47 six       hearts     0
## 48 five     hearts     0
## 49 four     hearts     0
## 50 three     hearts     0
## 51 two       hearts     0
## 52 ace       hearts     0
```

```
deck4[, "value"] <- 10
head(deck4, 13)
```

```
##      face      suit value
## 1  king    spades    10
## 2  queen    spades    10
## 3  jack     spades    10
## 4   ten     spades    10
## 5   nine     spades    10
## 6  eight     spades    10
## 7  seven     spades    10
## 8   six     spades    10
## 9   five     spades    10
## 10  four     spades    10
## 11 three     spades    10
## 12  two     spades    10
## 13 ace       spades    10
```

```
deck4[, 3] <- 0
deck4$suit == "hearts"
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE TRUE TRUE TRUE TRUE
## [45] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
```

```
h <- deck4$suit == "hearts"
which(h)
```

```
## [1] 40 41 42 43 44 45 46 47 48 49 50 51 52
```

```
which(deck4$suit == "hearts")
```

```
## [1] 40 41 42 43 44 45 46 47 48 49 50 51 52
```

```
deck4$value[deck4$suit == "hearts"]
```

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

```
deck4$value[h]
```

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

```
deck4$value[deck4$suit == "hearts"] <- 1
deck4$value
```

```
## [1] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## [36] 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

```
deck4$value[h] <- 10
deck4[h, "value"] <- 1
deck4$value
```

```
## [1] 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
## [36] 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
```

```
deck4$value[deck4$suit == "hearts"]
```

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

```
q <- deck4$face == "queen"
q
```

```
## [1] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
deck4[q, ]
```

```
## face suit value
## 2 queen spades 0
## 15 queen clubs 0
## 28 queen diamonds 0
## 41 queen hearts 1
```

```
deck4[deck4$face == "queen", ]
```

```
## face suit value
## 2 queen spades 0
## 15 queen clubs 0
## 28 queen diamonds 0
## 41 queen hearts 1
```

```
(s <- deck4$suit == "spades")
```

```
## [1] TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE TRUE
## [12] TRUE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
deck4[s, ]
```

```
## face suit value
## 1 king spades 0
## 2 queen spades 0
## 3 jack spades 0
## 4 ten spades 0
## 5 nine spades 0
## 6 eight spades 0
## 7 seven spades 0
## 8 six spades 0
## 9 five spades 0
## 10 four spades 0
## 11 three spades 0
## 12 two spades 0
## 13 ace spades 0
```

```
deck4[deck4$suit == "spades", ]
```

```
## face suit value
## 1 king spades 0
## 2 queen spades 0
## 3 jack spades 0
## 4 ten spades 0
## 5 nine spades 0
## 6 eight spades 0
## 7 seven spades 0
## 8 six spades 0
## 9 five spades 0
## 10 four spades 0
## 11 three spades 0
## 12 two spades 0
## 13 ace spades 0
```

Boolean Operators

```
a <- c(1, 2, 3)
b <- c(1, 2, 3)
c <- c(1, 2, 4)
a == b
```

```
## [1] TRUE TRUE TRUE
```

```
b == c
```

```
## [1] TRUE TRUE FALSE
```

```
a == b & b == c
```

```
## [1] TRUE TRUE FALSE
```

```
deck4$face == "queen" & deck4$suit == "spades"
```

```
## [1] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
q & s
```

```
## [1] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
which(deck4$face == "queen" & deck4$suit == "spades")
```

```
## [1] 2
```

```
which(q & s)
```

```
## [1] 2
```

```
queenOfSpades <- deck4$face == "queen" & deck4$suit == "spades"
queenOfSpades
```

```
## [1] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
queen_spades <- q & s
queen_spades
```

```
## [1] FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
which(queenOfSpades)
```

```
## [1] 2
```

```
deck4[queenOfSpades, ]
```

```
## face suit value
## 2 queen spades 0
```

```
deck4$value[queenOfSpades]
```

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

```
deck4[queen_spades, ]
```

```
## face suit value
## 2 queen spades 0
```

```
deck4[queen_spades, "value"]
```

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

```
deck5 <- deck
deck5
```



```
##      face      suit value
## 1 king    spades   13
## 2 queen   spades   12
## 3 jack    spades   11
## 4 ten     spades   10
## 5 nine    spades    9
## 6 eight   spades    8
## 7 seven   spades    7
## 8 six     spades    6
## 9 five    spades    5
## 10 four   spades    4
## 11 three   spades    3
## 12 two    spades    2
## 13 ace     spades    1
## 14 king    clubs   13
## 15 queen   clubs   12
## 16 jack    clubs   11
## 17 ten     clubs   10
## 18 nine    clubs    9
## 19 eight   clubs    8
## 20 seven   clubs    7
## 21 six     clubs    6
## 22 five    clubs    5
## 23 four    clubs    4
## 24 three   clubs    3
## 25 two     clubs    2
## 26 ace     clubs    1
## 27 king   diamonds  13
## 28 queen   diamonds  12
## 29 jack    diamonds  11
## 30 ten     diamonds  10
## 31 nine    diamonds   9
## 32 eight   diamonds   8
## 33 seven   diamonds   7
## 34 six     diamonds   6
## 35 five    diamonds   5
## 36 four    diamonds   4
## 37 three   diamonds   3
## 38 two     diamonds   2
## 39 ace     diamonds   1
## 40 king    hearts   13
## 41 queen   hearts   12
## 42 jack    hearts   11
## 43 ten     hearts   10
## 44 nine    hearts    9
## 45 eight   hearts    8
## 46 seven   hearts    7
## 47 six     hearts    6
## 48 five    hearts    5
## 49 four    hearts    4
## 50 three   hearts    3
## 51 two     hearts    2
## 52 ace     hearts    1
```

```
facecard <- deck5$face %in% c("king", "queen", "jack")
facecard
```

```
## [1] TRUE TRUE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE TRUE TRUE TRUE FALSE FALSE FALSE FALSE FALSE
## [23] FALSE FALSE FALSE FALSE TRUE TRUE TRUE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE TRUE TRUE TRUE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
which(facecard)
```

```
## [1] 1 2 3 14 15 16 27 28 29 40 41 42
```

```
deck5[facecard, ]
```

```
##      face      suit value
## 1 king    spades   13
## 2 queen   spades   12
## 3 jack    spades   11
## 14 king    clubs   13
## 15 queen   clubs   12
## 16 jack    clubs   11
## 27 king   diamonds  13
## 28 queen   diamonds  12
## 29 jack    diamonds  11
## 40 king    hearts   13
## 41 queen   hearts   12
## 42 jack    hearts   11
```

```
deck5[facecard, "value"]
```

```
## [1] 13 12 11 13 12 11 13 12 11 13 12 11
```

```
deck5$value[facecard] <- 10
head(deck5, 13)
```

```
##      face      suit value
## 1 king    spades   10
## 2 queen   spades   10
## 3 jack    spades   10
## 4 ten     spades   10
## 5 nine    spades    9
## 6 eight   spades    8
## 7 seven   spades    7
## 8 six     spades    6
## 9 five    spades    5
## 10 four   spades    4
## 11 three   spades    3
## 12 two     spades    2
## 13 ace     spades    1
```

Missing Information

```
1 + NA
```

```
## [1] NA
```

```
NA == 1
```

```
## [1] NA
```

```
c(1, 2, NA) == c(1, 2, 3)
```

```
## [1] TRUE TRUE  NA
```

na.rm

```
c(NA, 1:50)
```

```
## [1] NA  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22  
## [24] 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45  
## [47] 46 47 48 49 50
```

```
mean(c(NA, 1:50))
```

```
## [1] NA
```

```
mean(c(NA, 1:50), na.rm = TRUE)
```

```
## [1] 25.5
```

is.na

```
NA == NA
```

```
## [1] NA
```

```
c(1, 2, 3, NA) == NA
```

```
## [1] NA NA NA NA
```

```
vec <- c(1, 2, 3, NA)  
is.na(vec)
```

```
## [1] FALSE FALSE FALSE  TRUE
```

```
which(is.na(vec))
```

```
## [1] 4
```

```
ace <- deck$face == "ace"  
deck$value[ace] <- NA  
deck
```

```
##      face      suit value
## 1   king    spades   13
## 2  queen    spades   12
## 3   jack    spades   11
## 4    ten    spades   10
## 5   nine    spades    9
## 6  eight    spades    8
## 7  seven    spades    7
## 8    six    spades    6
## 9   five    spades    5
## 10  four    spades    4
## 11 three    spades    3
## 12  two     spades    2
## 13  ace     spades   NA
## 14  king    clubs   13
## 15  queen    clubs   12
## 16  jack    clubs   11
## 17   ten    clubs   10
## 18  nine    clubs    9
## 19  eight    clubs    8
## 20  seven    clubs    7
## 21   six    clubs    6
## 22  five    clubs    5
## 23  four    clubs    4
## 24  three    clubs    3
## 25   two     clubs    2
## 26  ace     clubs   NA
## 27  king  diamonds  13
## 28  queen  diamonds  12
## 29  jack  diamonds  11
## 30   ten  diamonds  10
## 31  nine  diamonds    9
## 32  eight  diamonds    8
## 33  seven  diamonds    7
## 34   six  diamonds    6
## 35  five  diamonds    5
## 36  four  diamonds    4
## 37  three  diamonds    3
## 38   two  diamonds    2
## 39  ace   diamonds   NA
## 40  king   hearts   13
## 41  queen   hearts   12
## 42  jack   hearts   11
## 43   ten   hearts   10
## 44  nine   hearts    9
## 45  eight   hearts    8
## 46  seven   hearts    7
## 47   six   hearts    6
## 48  five   hearts    5
## 49  four   hearts    4
## 50  three   hearts    3
## 51   two   hearts    2
## 52  ace    hearts   NA
```

```
deck[ace, "value"] <- 14
deck3 <- deck
deck3 <- shuffle(deck)
deck3
```

```
##      face      suit value
## 4   ten    spades    10
## 17  ten    clubs     10
## 35  five  diamonds    5
## 33  seven  diamonds    7
## 38  two   diamonds    2
## 29  jack  diamonds   11
## 3   jack  spades     11
## 1   king  spades     13
## 25  two   clubs       2
## 28  queen diamonds   12
## 47  six   hearts      6
## 20  seven   clubs      7
## 34  six   diamonds    6
## 5   nine   spades      9
## 21  six    clubs       6
## 50  three  hearts      3
## 39  ace   diamonds   14
## 26  ace    clubs     14
## 7   seven  spades      7
## 51  two    hearts      2
## 11  three  spades      3
## 31  nine  diamonds     9
## 37  three  diamonds     3
## 9   five   spades      5
## 52  ace   hearts     14
## 8   six    spades      6
## 6   eight  spades      8
## 13  ace    spades     14
## 10  four   spades      4
## 30  ten    diamonds   10
## 12  two    spades      2
## 43  ten    hearts     10
## 46  seven  hearts      7
## 44  nine   hearts      9
## 36  four   diamonds    4
## 24  three  clubs       3
## 19  eight  clubs       8
## 14  king   clubs     13
## 18  nine   clubs       9
## 23  four   clubs       4
## 15  queen  clubs     12
## 16  jack   clubs     11
## 40  king   hearts     13
## 49  four   hearts      4
## 32  eight  diamonds    8
## 22  five   clubs       5
## 45  eight  hearts      8
## 48  five   hearts      5
## 27  king   diamonds   13
## 2   queen  spades     12
## 42  jack   hearts     11
## 41  queen  hearts     12
```

```
ace3 <- deck3$face == "ace"
ace3
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [12] FALSE FALSE FALSE FALSE FALSE TRUE TRUE FALSE FALSE FALSE
## [23] FALSE FALSE TRUE FALSE FALSE TRUE FALSE FALSE FALSE FALSE
## [34] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [45] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
```

```
deck3[ace3, "face"]
```

```
## [1] "ace" "ace" "ace" "ace"
```

```
deck3$value[deck3$face == "ace"]
```

```
## [1] 14 14 14 14
```

```
deck3$value[ace3] <- NA
deck3
```

```
##      face      suit value
## 4    ten    spades    10
## 17   ten    clubs    10
## 35   five  diamonds    5
## 33  seven  diamonds    7
## 38   two   diamonds    2
## 29   jack  diamonds   11
## 3    jack   spades   11
## 1    king   spades   13
## 25   two    clubs     2
## 28  queen  diamonds   12
## 47   six    hearts     6
## 20  seven    clubs     7
## 34   six    diamonds    6
## 5    nine    spades     9
## 21   six     clubs     6
## 50  three   hearts     3
## 39   ace    diamonds   NA
## 26   ace     clubs   NA
## 7    seven   spades     7
## 51   two     hearts     2
## 11  three   spades     3
## 31   nine   diamonds     9
## 37  three   diamonds     3
## 9    five    spades     5
## 52   ace     hearts   NA
## 8     six    spades     6
## 6    eight   spades     8
## 13   ace     spades   NA
## 10   four    spades     4
## 30   ten     diamonds   10
## 12   two     spades     2
## 43   ten     hearts    10
## 46  seven    hearts     7
## 44   nine    hearts     9
## 36   four    diamonds    4
## 24  three    clubs     3
## 19  eight    clubs     8
## 14   king    clubs    13
## 18   nine    clubs     9
## 23   four    clubs     4
## 15  queen    clubs    12
## 16   jack    clubs    11
## 40   king    hearts    13
## 49   four    hearts     4
## 32  eight    diamonds    8
## 22   five     clubs     5
## 45  eight    hearts     8
## 48   five    hearts     5
## 27   king    diamonds   13
## 2    queen   spades    12
## 42   jack    hearts    11
## 41  queen    hearts    12
```

```
ls()
```

```
## [1] "a"          "ace"          "ace3"          "b"
## [5] "c"          "deal"         "deck"          "deck2"
## [9] "deck3"      "deck4"        "deck5"         "facecard"
## [13] "h"          "l"            "N"             "q"
## [17] "queen_spades" "queenOfSpades" "s"             "shuffle"
## [21] "vec"         "w"
```

```
save.image(file = "./r_modifying_values.RData")
```

Save