CSC 120 (R Section) — Quiz #3 Answers — 2015-03-13

Question 1: [32 marks] In the four blank spaces below, write the output that R will produce:

```
> set.seed(654321)
> runif(1)
[1] 0.09940678
> runif(1)
[1] 0.509636
> runif(1)
[1] 0.9208333
> set.seed(654321)
> v <- rep(1,5)
> v

ANSWER: 1 1 1 1 1

> if (runif(1) < 0.2) v[1] <- 0 else v[5] <- 0
> v

ANSWER: 0 1 1 1 1

> if (runif(1) < 0.5) v[2] <- 0 else v[4] <- 0
> v

ANSWER: 0 1 1 0 1

> v[3] <- runif(1)
> v

ANSWER: 0 1 0.9208333 0 1
```

Question 2: [32 marks] In the three blank spaces below, write the output that R will produce:

```
> M <- matrix (seq (0.1, 0.9, length=9), nrow=3, ncol=3)
> rownames(M) <- c("mary","fred","sam")
> colnames(M) <- c("x","y","z")
> M

ANSWER:
   x y z
mary 0.1 0.4 0.7
fred 0.2 0.5 0.8
sam  0.3 0.6 0.9

> M["mary","z"]

ANSWER: 0.7

> M["fred",2:3]

ANSWER:
   y z
0.5 0.8
Question 3: [36 marks] Write down a definition for a function called `fill_in_renter` that takes as its only argument a data frame that has variables `renter` and `student`, both of which are logical variables, whose values are TRUE, or FALSE, or NA if the value is missing. The data frame may also have other variables. This function should return a data frame that is like its argument, except that any occurrences of NA for the `renter` variable are replaced by TRUE if the value of the `student` variable in that row is TRUE, and by FALSE if the value of the `student` variable is FALSE, and if both `renter` and `student` in a row are NA, the value of `renter` is set to TRUE or FALSE randomly, with equal probabilities for these two values.

Here is an example:

```
> df
  renter student age
 1  TRUE   TRUE  25
 2  NA     TRUE  19
 3 FALSE   TRUE  NA
 4 FALSE   FALSE 31
 5 NA     FALSE  42
 6 NA     NA     29
> fill_in_renter(df)
  renter student age
 1  TRUE   TRUE  25
 2  TRUE   TRUE  19
 3 FALSE   TRUE  NA
 4 FALSE   FALSE 31
 5 FALSE   FALSE 42
 6  TRUE   NA   29
```

Note that the value of `renter` in the last row above was filled in randomly, so in another call of `fill_in_renter(df)`, it might be FALSE rather than TRUE.

ANSWER:

```r
fill_in_renter <- function (df) {
  for (i in 1:nrow(df)) {
    if (is.na(df$renter[i])) {
      if (is.na(df$student[i]))
        df$renter[i] <- runif(1) < 0.5
      else
        df$renter[i] <- df$student[i]
    }
    df$renter[i] <- df$student[i]
  }
  df
}
```