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 edj-boston Week 1 quiz 5c79e07 on Apr 14, 2014

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History







# Quiz

Attempts	Score
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## Question 1

R was developed by statisticians working at...

### Answer

The University of Auckland

### Explanation

The R language was developed by Ross Ihaka and Robert Gentleman who were statisticians at the University of Auckland in New Zealand.

## Question 2

The definition of free software consists of four freedoms (freedoms 0 through 3). Which of the following is NOT one of the freedoms that are part of the definition?

### Answer

The freedom to sell the software for any price.

### Explanation

This is not part of the free software definition. The free software definition does not mention anything about selling software (although it does not disallow it).

## Question 3

In R the following are all atomic data types EXCEPT

### Answer

matrix

### Explanation

'matrix' is not an atomic data type in R.

## Question 4

---

If I execute the expression `x <- 4` in R, what is the class of the object 'x' as determined by the `class()` function?

### Answer

numeric

### Explanation

```
> x <- 4
> class(x)
[1] "numeric"
```

## Question 5

---

What is the class of the object defined by `x <- c(4, TRUE)`?

### Answer

numeric

### Explanation

The numeric class is the "lowest common denominator" here and so all elements will be coerced into that class.

R does automatic coercion of vectors so that all elements of the vector are the same data class.

```
> x <- c(4, TRUE)
> class(x)
[1] "numeric"
```

## Question 6

---

If I have two vectors `x <- c(1,3, 5)` and `y <- c(3, 2, 10)`, what is produced by the expression `cbind(x, y)`?

### Answer

a 3 by 2 numeric matrix

### Explanation

The 'cbind' function treats vectors as if they were columns of a matrix. It then takes those vectors and binds them together column-wise to create a matrix.

```
> x <- c(1,3, 5)
> y <- c(3, 2, 10)
> cbind(x, y)
      x y
[1,] 1  3
[2,] 3  2
[3,] 5 10
```

## Question 7

---

A key property of vectors in R is that

### Answer

elements of a vector all must be of the same class

## Question 8

---

Suppose I have a list defined as `x <- list(2, "a", "b", TRUE)`. What does `x[[1]]` give me?

## Answer

a numeric vector containing the element 2

## Explanation

```
> x <- list(2, "a", "b", TRUE)
> x[[1]]
[1] 2
> class(x[[1]])
[1] "numeric"
```

## Question 9

---

Suppose I have a vector `x <- 1:4` and a vector `y <- 2`. What is produced by the expression `x + y`?

## Answer

a numeric vector with elements 3, 4, 5, 6.

## Explanation

```
> x <- 1:4
> y <- 2
> x + y
[1] 3 4 5 6
> class(x + y)
[1] "numeric"
```

## Question 10

---

Suppose I have a vector `x <- c(17, 14, 4, 5, 13, 12, 10)` and I want to set all elements of this vector that are greater than 10 to be equal to 4. What R code achieves this?

## Answer

```
x[x >= 11] <- 4
```

## Explanation

You can create a logical vector with the expression `x >= 11` and then use the `[]` operator to subset the original vector `x`.

```
> x <- c(17, 14, 4, 5, 13, 12, 10)
> x[x >= 11] <- 4
> x
[1] 4 4 4 5 4 4 10
```

## Question 11

---

In the dataset provided for this Quiz, what are the column names of the dataset?

## Answer

Ozone, Solar.R, Wind, Temp, Month, Day

## Explanation

You can get the column names of a data frame with the `'names()'` function.

```
> hw1 = read.csv('hw1_data.csv')
> names(hw1)
```

```
[1] "Ozone" "Solar.R" "Wind" "Temp" "Month" "Day"
```

## Question 12

Extract the first 2 rows of the data frame and print them to the console. What does the output look like?

### Answer

```
      Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5    1
2      36     118  8.0   72     5    2
```

### Explantion

You can extract the first two rows using the `[]` operator and an integer sequence to index the rows.

```
> hw1 = read.csv('hw1_data.csv')
> hw1[c(1,2),]
      Ozone Solar.R Wind Temp Month Day
1      41     190  7.4   67     5    1
2      36     118  8.0   72     5    2
```

## Question 13

How many observations (i.e. rows) are in this data frame?

### Answer

153

### Explanation

You can use the `'nrows()'` function to compute the number of rows in a data frame.

```
> hw1 = read.csv('hw1_data.csv')
> nrow(hw1)
[1] 153
```

## Question 14

Extract the last 2 rows of the data frame and print them to the console. What does the output look like?

### Answer

```
      Ozone Solar.R Wind Temp Month Day
152     18     131  8.0   76     9   29
153     20     223 11.5   68     9   30
```

### Explanation

The `'tail()'` function is an easy way to extract the last few elements of an R object.

```
> hw1 = read.csv('hw1_data.csv')
> tail(hw1,2)
      Ozone Solar.R Wind Temp Month Day
152     18     131  8.0   76     9   29
153     20     223 11.5   68     9   30
```

## Question 15

What is the value of Ozone in the 47th row?

## Answer

21

## Explanation

The single bracket [ operator can be used to extract individual rows of a data frame.

```
> hw1 = read.csv('hw1_data.csv')
> hw1[15,]
      Ozone Solar.R Wind Temp Month Day
15      18      65 13.2   58     5  15
```

## Question 16

---

How many missing values are in the Ozone column of this data frame?

## Answer

37

## Explanation

The 'is.na' function can be used to test for missing values.

```
> hw1 = read.csv('hw1_data.csv')
> sub = subset(hw1, is.na(Ozone))
> nrow(sub)
[1] 37
```

## Question 17

---

What is the mean of the Ozone column in this dataset? Exclude missing values (coded as NA) from this calculation.

## Answer

42.1

## Explanation

The 'mean' function can be used to calculate the mean.

```
> hw1 = read.csv('hw1_data.csv')
> sub = subset(hw1, !is.na(Ozone), select = Ozone)
> apply(sub, 2, mean)
      Ozone
42.12931
```

## Question 18

---

Extract the subset of rows of the data frame where Ozone values are above 31 and Temp values are above 90. What is the mean of Solar.R in this subset?

## Answer

212.8

## Explanation

You need to construct a logical vector in R to match the question's requirements. Then use that logical vector to subset the data frame.

```
> hw1 = read.csv('hw1_data.csv')
> sub = subset(hw1, Ozone > 31 & Temp > 90, select = Solar.R)
> apply(sub, 2, mean)
Solar.R
212.8
```

## Question 19

What is the mean of "Temp" when "Month" is equal to 6?

### Answer

79.1

### Explanation

```
> hw1 = read.csv('hw1_data.csv')
> sub = subset(hw1, Month == 6, select = Temp)
> apply(sub, 2, mean)
Temp
79.1
```

## Question 20

What was the maximum ozone value in the month of May (i.e. Month = 5)?

### Answer

115

### Explantion

```
> hw1 = read.csv('hw1_data.csv')
> sub = subset(hw1, Month == 5 & !is.na(Ozone), select = Ozone)
> apply(sub, 2, max)
Ozone
115
```

