# Data Science I

## Getting Started with R Problem Set

1. Given a vector `v` with values `[1, 2, 3, 4, 5]`, what will be the output of the expression `v[v > 3]`?
2. Create a matrix `m` of dimensions $3 \times 3$ with elements from 1 to 9. What will be the output of `m[2,]`?
3. Given a data frame `df` with two columns: `Name` and `Age`. If Name has values `['Tom', 'Jerry', 'Mickey']` and Age has values `[25, 22, 30]`, what will be the output of the expression `df[df$Age > 24,]`?
4. What will be the output of the function call `seq(2, 10, by=3)`?
5. Given a vector `v = c(10, 20, 10, 40, 50)`, what will be the output of `which(v == 10)`?
6. Given the same vector `v`, what will be the output of `sort(v, decreasing = TRUE)`?
7. Using the same vector `v`, what will be the output of `order(v)`?
8. What will be the result of the expression `startsWith("Hello", "He")`?
9. Given a matrix `m` of dimensions $2 \times 3$ with elements from 1 to 6. What will be the output of the expression `m[1, 2] > m[2, 1]`?
10. Identify the logical error in the following code:

```r
x <- c(1, 2, 3, 4, 5)
y <- x[6]
print(y)
```

11. What will be the result of the expression `startsWith("world", "Hello")`?
12. Given a matrix `m` with values:

```
1 2 3
4 5 6
7 8 9
```

What will be the output of `m[2:3, 1:2]`?

13. If `v` is a vector with values [5, 7, 9, 11, 13], what will be the result of `max(v) - min(v)`?
14. Using the previous vector `v`, what will be the output of `v[v < 10 | v > 12]`?
15. Consider a data frame `df` with columns `A`, `B`, and `C`. If `A`' has values `[3, 6, 9]`, `B` has values `[5, 10, 15]`, and `C` has values `[7, 14, 21]`. What will be the output of `df[df$A == 6 & df$B == 10,]`?
16. What will be the output of the expression `seq(3, 30, length.out = 10)`?
17. Given a vector `w` with values `[45, 22, 89, 67, 34]`, what will be the output of `sort(w)[which(w > 50)]`?
18. Identify the logical error in the following code:

```r
x <- c(1, 2, 3, 4, 5)
y <- x[6]
print(y)
```

19. If `z` is a vector with values `[10, 20, 30, 40, 50]`, what will be the result of `z[1] + z[5]`?
20. Given the previous vector `z`, what will be the output of the expression `z[z > 15 & z < 45]`?
21. Using the vector `v` with values [5, 7, 9, 11, 13], what will be the output of `order(v, decreasing = TRUE)[1]`?
22. Consider a matrix `n` with values:

```
3 6 9
12 15 18
21 24 27
```

What will be the output of `n[1,] + n[3,]`?

23. If `u` is a vector with values [2, 4, 8, 16, 32], what will be the result of `u[2] * u[4]`?
24. Given a matrix `p` with dimensions $4 \times 4$ containing values from 1 to 16, what will be the output of `p[2:3, 2:3]`?

25. What will be the output of the function call `seq(1, 1.9, by=0.3)`?

26. Given a vector `q` with values `[40, 10, 30, 20, 50]`, what will be the output of the expression `sort(q)`?

27. Using the same vector `q`, what will be the output of the expression `order(q)`?

28. Given a data frame `df` with a single column `Value` and values `[50, 20, 40, 10, 30]`, if you want to rearrange the rows of the data frame in ascending order based on the `Value` column, which of the following codes should you use?

    a. `df[sort(df$Value), ]`
    b. `df[order(df$Value), ]`
    c. `sort(df$Value)`
    d. `order(df$Value)`

29. If `r` is a vector with values `[-5, -3, 0, 3, 5]`, what will be the result of `sort(r, decreasing = TRUE)`?

30. Using the same vector `r`, what will be the output of `order(r)`?

31. Given a vector `s` with values `["apple", "banana", "cherry"]`, what will be the result of `sort(s)`?

32. Using the same vector `s`, what will be the output of `order(s)`?

33. Consider a vector `t` with values [5, 3, 4, 1, 2]. If you want to get the second smallest value, which of the following codes will give the correct result?

    a. `sort(t)[2]`
    b. `order(t)[2]`
    c. `t[order(t)[2]]`
    d. `t[sort(t)[2]]`

34. Given a vector `u` with values `[2.5, 2.7, 2.3, 2.6]`, what will be the output of `order(u)`?

35. Using the same vector `u`, what will be the result of `sort(u, decreasing = TRUE)`?

36. Identify the error in the following code:

```r
vector <- c(1, 2, 3, 4, 5)
sum(vector = vector)
```

37. Spot the mistake in the code below:

```r
df <- data.frame(Name=c("Anna", "Bob", "Charlie"), Age=c(25, 30, 35))
df$Name[2]
```

38. What's wrong with the following code?

```r
x <- c(5, 10, 15, 20)
mean(x, trim = 2)
```

39. Identify the issue in the following function call:

```r
seq(from = 1, to = 10, by = 0)
```

40. Spot the mistake in this code:

```r
matrix <- matrix(1:12, nrow = 3)
matrix[4, 2]
```