The following information is used in the questions on this page.

The `iris` data in the `datasets` package is a famous data set that gives the measurements (in centimeters) of the variables sepal length, sepal width, petal length, and petal width, respectively, for 50 flowers from each of 3 species of iris. The species are *Iris setosa*, *versicolor*, and *virginica*.

Consider the following working code and output:

```
> str(iris)
'data.frame':    150 obs. of  5 variables:
 $ Sepal.Length: num  5.1 4.9 4.7 4.6 5 5.4 4.6 5 4.4 4.9 ...
 $ Sepal.Width : num  3.5 3 3.2 3.1 3.6 3.9 3.4 3.4 2.9 3.1 ...
 $ Petal.Length: num  1.4 1.4 1.3 1.5 1.4 1.7 1.4 1.5 1.4 1.5 ...
 $ Petal.Width : num  0.2 0.2 0.2 0.2 0.2 0.4 0.3 0.2 0.2 0.1 ...
 $ Species     : Factor w/ 3 levels "setosa","versicolor",..: 1 1 1 1 1 1 1 1 1 1
...
```



```
numeric_vars <- colnames(iris)[1:4]

> numeric_vars
[1] "Sepal.Length" "Sepal.Width"  "Petal.Length" "Petal.Width"
```



```
output <- matrix(NA, nrow = nlevels(iris$Species), ncol = length(numeric_vars))
rownames(output) <- levels(iris$Species)
colnames(output) <- numeric_vars
for (i in seq_along(levels(iris$Species))) {
    for (j in seq_along(numeric_vars)) {
        output[i, j] <-
        mean(iris[iris$Species == levels(iris$Species)[i], numeric_vars[j]])
    }
}

> output
           Sepal.Length Sepal.Width Petal.Length Petal.Width
setosa            5.006       3.428        1.462       0.246
versicolor        5.936       2.770        4.260       1.326
virginica         6.588       2.974        5.552       2.026
```