

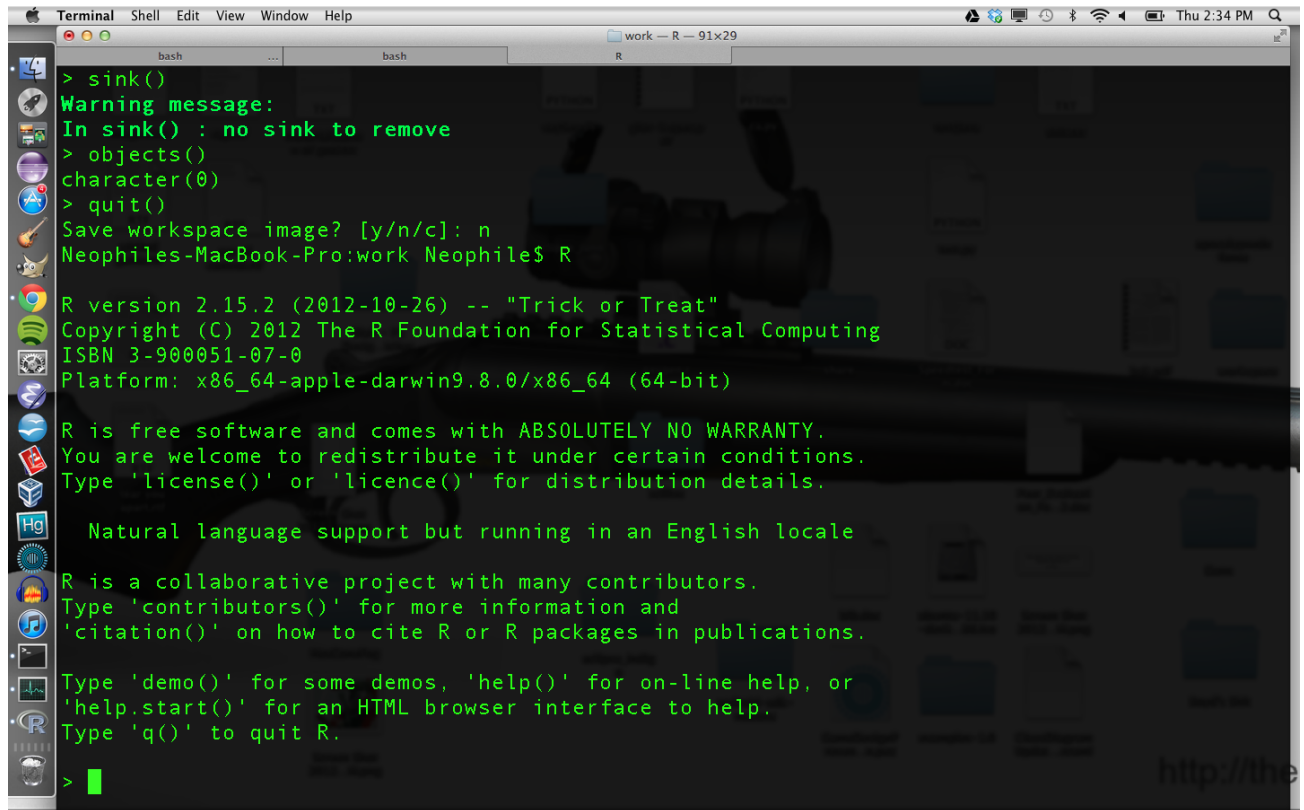
# Project 1

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CSCI 548 - Pattern Recognition

Spring 2013

# 1. Installed R.



```
> sink()
Warning message:
In sink() : no sink to remove
> objects()
character(0)
> quit()
Save workspace image? [y/n/c]: n
Neophiles-MacBook-Pro:work Neophile$ R

R version 2.15.2 (2012-10-26) -- "Trick or Treat"
Copyright (C) 2012 The R Foundation for Statistical Computing
ISBN 3-900051-07-0
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

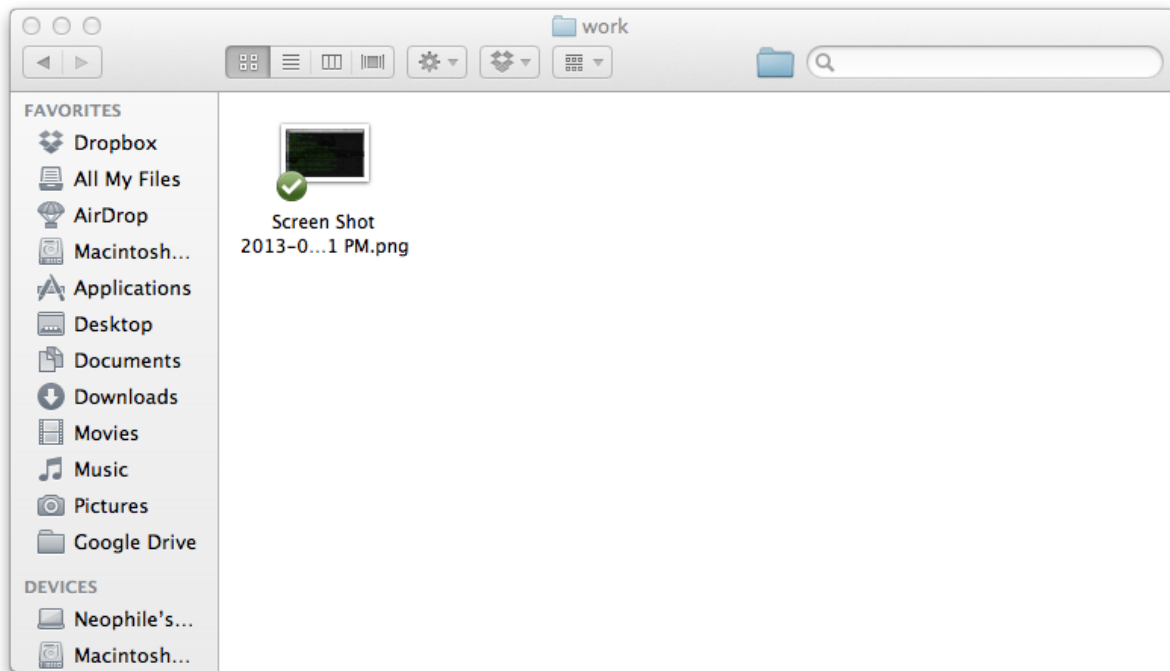
  Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

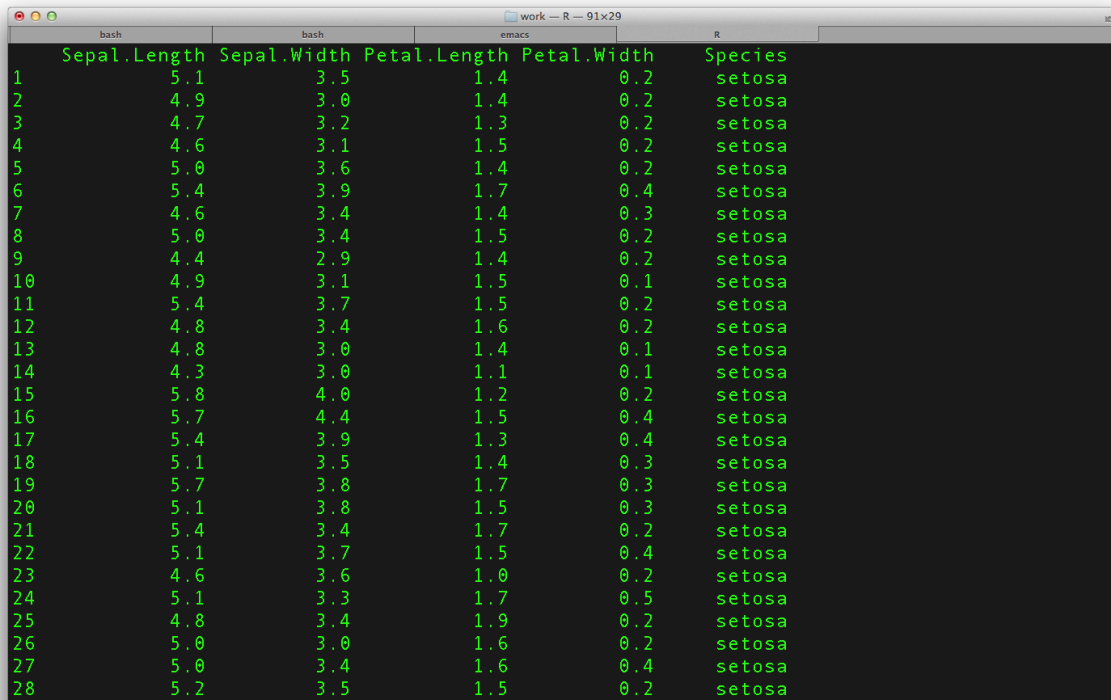
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> █
```

## 2. Created a work directory.



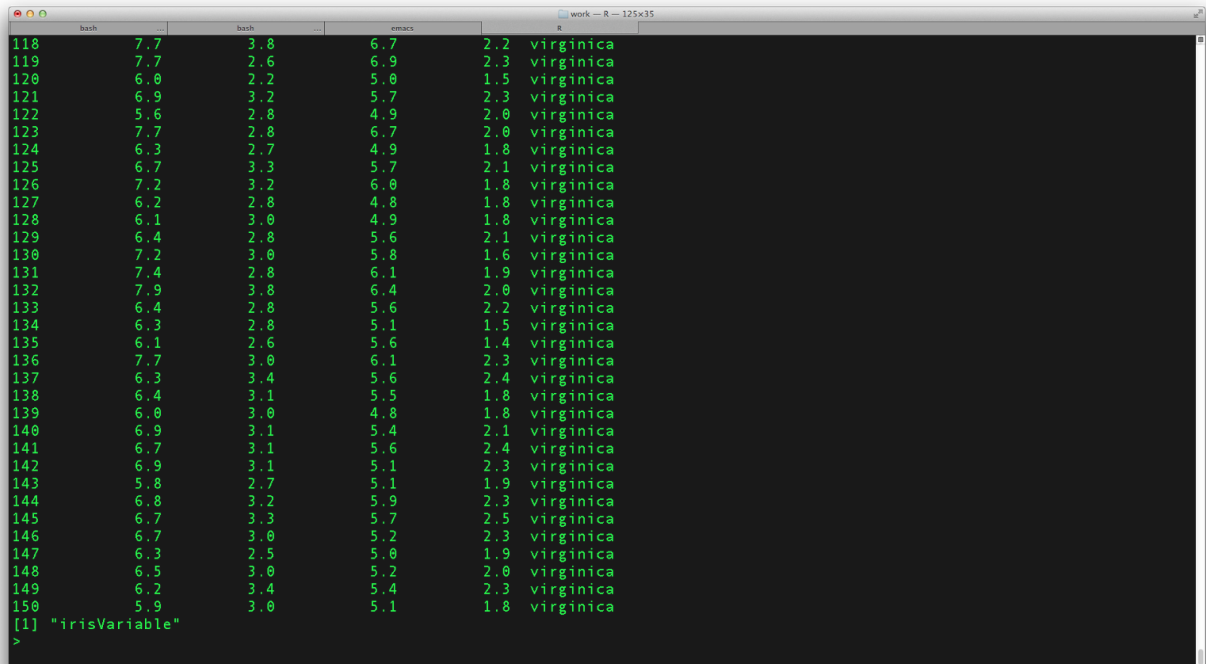
### 3. Loaded Iris data and printed.



The screenshot shows an R console window with the following data:

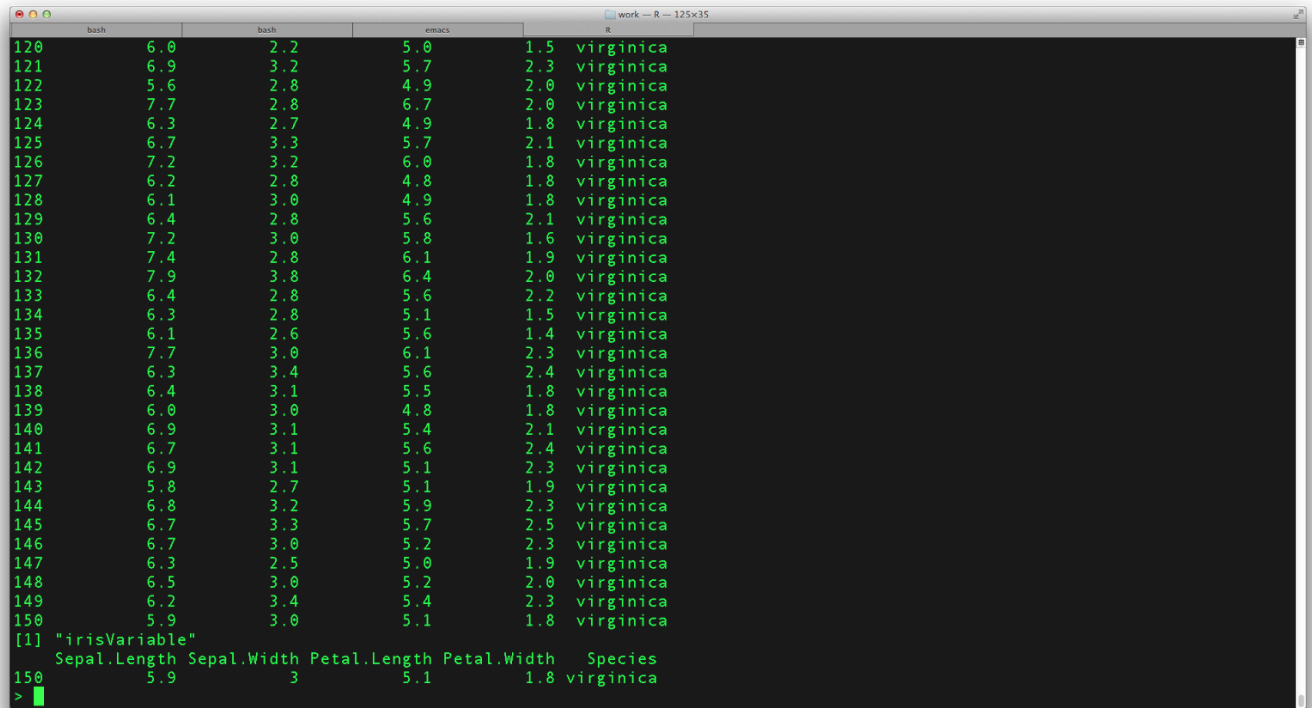
	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
1	5.1	3.5	1.4	0.2	setosa
2	4.9	3.0	1.4	0.2	setosa
3	4.7	3.2	1.3	0.2	setosa
4	4.6	3.1	1.5	0.2	setosa
5	5.0	3.6	1.4	0.2	setosa
6	5.4	3.9	1.7	0.4	setosa
7	4.6	3.4	1.4	0.3	setosa
8	5.0	3.4	1.5	0.2	setosa
9	4.4	2.9	1.4	0.2	setosa
10	4.9	3.1	1.5	0.1	setosa
11	5.4	3.7	1.5	0.2	setosa
12	4.8	3.4	1.6	0.2	setosa
13	4.8	3.0	1.4	0.1	setosa
14	4.3	3.0	1.1	0.1	setosa
15	5.8	4.0	1.2	0.2	setosa
16	5.7	4.4	1.5	0.4	setosa
17	5.4	3.9	1.3	0.4	setosa
18	5.1	3.5	1.4	0.3	setosa
19	5.7	3.8	1.7	0.3	setosa
20	5.1	3.8	1.5	0.3	setosa
21	5.4	3.4	1.7	0.2	setosa
22	5.1	3.7	1.5	0.4	setosa
23	4.6	3.6	1.0	0.2	setosa
24	5.1	3.3	1.7	0.5	setosa
25	4.8	3.4	1.9	0.2	setosa
26	5.0	3.0	1.6	0.2	setosa
27	5.0	3.4	1.6	0.4	setosa
28	5.2	3.5	1.5	0.2	setosa

## 4. Listed variables.



```
118      7.7      3.8      6.7      2.2 virginica
119      7.7      2.6      6.9      2.3 virginica
120      6.0      2.2      5.0      1.5 virginica
121      6.9      3.2      5.7      2.3 virginica
122      5.6      2.8      4.9      2.0 virginica
123      7.7      2.8      6.7      2.0 virginica
124      6.3      2.7      4.9      1.8 virginica
125      6.7      3.3      5.7      2.1 virginica
126      7.2      3.2      6.0      1.8 virginica
127      6.2      2.8      4.8      1.8 virginica
128      6.1      3.0      4.9      1.8 virginica
129      6.4      2.8      5.6      2.1 virginica
130      7.2      3.0      5.8      1.6 virginica
131      7.4      2.8      6.1      1.9 virginica
132      7.9      3.8      6.4      2.0 virginica
133      6.4      2.8      5.6      2.2 virginica
134      6.3      2.8      5.1      1.5 virginica
135      6.1      2.6      5.6      1.4 virginica
136      7.7      3.0      6.1      2.3 virginica
137      6.3      3.4      5.6      2.4 virginica
138      6.4      3.1      5.5      1.8 virginica
139      6.0      3.0      4.8      1.8 virginica
140      6.9      3.1      5.4      2.1 virginica
141      6.7      3.1      5.6      2.4 virginica
142      6.9      3.1      5.1      2.3 virginica
143      5.8      2.7      5.1      1.9 virginica
144      6.8      3.2      5.9      2.3 virginica
145      6.7      3.3      5.7      2.5 virginica
146      6.7      3.0      5.2      2.3 virginica
147      6.3      2.5      5.0      1.9 virginica
148      6.5      3.0      5.2      2.0 virginica
149      6.2      3.4      5.4      2.3 virginica
150      5.9      3.0      5.1      1.8 virginica
[1] "irisVariable"
>
```

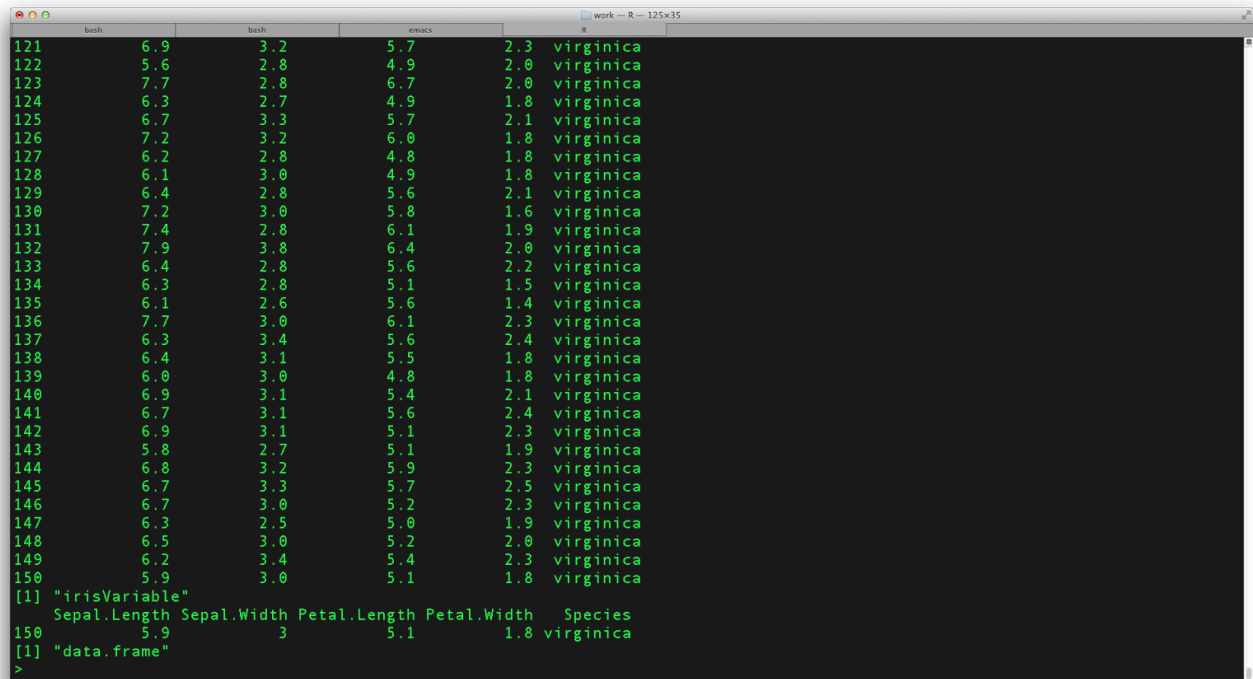
## 5. Printed Last Datarow.



The screenshot shows an R console window with the following output:

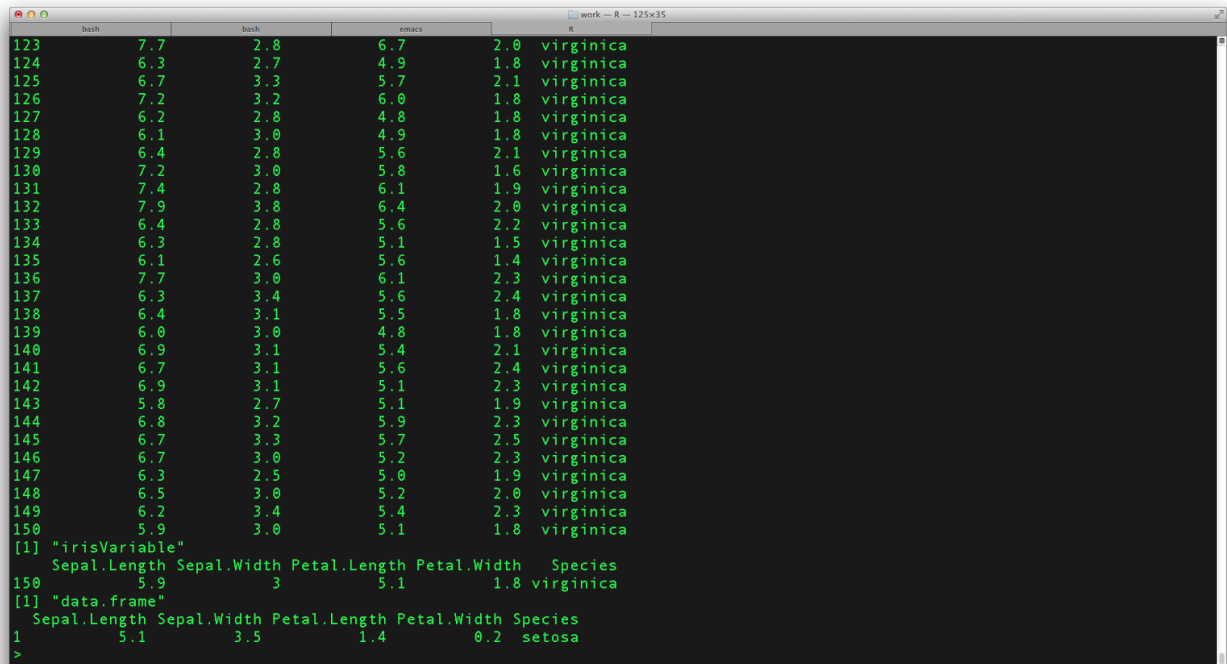
```
120 6.0 2.2 5.0 1.5 virginica
121 6.9 3.2 5.7 2.3 virginica
122 5.6 2.8 4.9 2.0 virginica
123 7.7 2.8 6.7 2.0 virginica
124 6.3 2.7 4.9 1.8 virginica
125 6.7 3.3 5.7 2.1 virginica
126 7.2 3.2 6.0 1.8 virginica
127 6.2 2.8 4.8 1.8 virginica
128 6.1 3.0 4.9 1.8 virginica
129 6.4 2.8 5.6 2.1 virginica
130 7.2 3.0 5.8 1.6 virginica
131 7.4 2.8 6.1 1.9 virginica
132 7.9 3.8 6.4 2.0 virginica
133 6.4 2.8 5.6 2.2 virginica
134 6.3 2.8 5.1 1.5 virginica
135 6.1 2.6 5.6 1.4 virginica
136 7.7 3.0 6.1 2.3 virginica
137 6.3 3.4 5.6 2.4 virginica
138 6.4 3.1 5.5 1.8 virginica
139 6.0 3.0 4.8 1.8 virginica
140 6.9 3.1 5.4 2.1 virginica
141 6.7 3.1 5.6 2.4 virginica
142 6.9 3.1 5.1 2.3 virginica
143 5.8 2.7 5.1 1.9 virginica
144 6.8 3.2 5.9 2.3 virginica
145 6.7 3.3 5.7 2.5 virginica
146 6.7 3.0 5.2 2.3 virginica
147 6.3 2.5 5.0 1.9 virginica
148 6.5 3.0 5.2 2.0 virginica
149 6.2 3.4 5.4 2.3 virginica
150 5.9 3.0 5.1 1.8 virginica
[1] "irisVariable"
      Sepal.Length Sepal.Width Petal.Length Petal.Width Species
150      5.9          3         5.1         1.8 virginica
>
```

## 6. Printed Data Type.



```
121      6.9      3.2      5.7      2.3 virginica
122      5.6      2.8      4.9      2.0 virginica
123      7.7      2.8      6.7      2.0 virginica
124      6.3      2.7      4.9      1.8 virginica
125      6.7      3.3      5.7      2.1 virginica
126      7.2      3.2      6.0      1.8 virginica
127      6.2      2.8      4.8      1.8 virginica
128      6.1      3.0      4.9      1.8 virginica
129      6.4      2.8      5.6      2.1 virginica
130      7.2      3.0      5.8      1.6 virginica
131      7.4      2.8      6.1      1.9 virginica
132      7.9      3.8      6.4      2.0 virginica
133      6.4      2.8      5.6      2.2 virginica
134      6.3      2.8      5.1      1.5 virginica
135      6.1      2.6      5.6      1.4 virginica
136      7.7      3.0      6.1      2.3 virginica
137      6.3      3.4      5.6      2.4 virginica
138      6.4      3.1      5.5      1.8 virginica
139      6.0      3.0      4.8      1.8 virginica
140      6.9      3.1      5.4      2.1 virginica
141      6.7      3.1      5.6      2.4 virginica
142      6.9      3.1      5.1      2.3 virginica
143      5.8      2.7      5.1      1.9 virginica
144      6.8      3.2      5.9      2.3 virginica
145      6.7      3.3      5.7      2.5 virginica
146      6.7      3.0      5.2      2.3 virginica
147      6.3      2.5      5.0      1.9 virginica
148      6.5      3.0      5.2      2.0 virginica
149      6.2      3.4      5.4      2.3 virginica
150      5.9      3.0      5.1      1.8 virginica
[1] "irisVariable"
Sepal.Length Sepal.Width Petal.Length Petal.Width Species
150      5.9          3          5.1          1.8 virginica
[1] "data.frame"
>
```

## 7. Printed First Datarow.

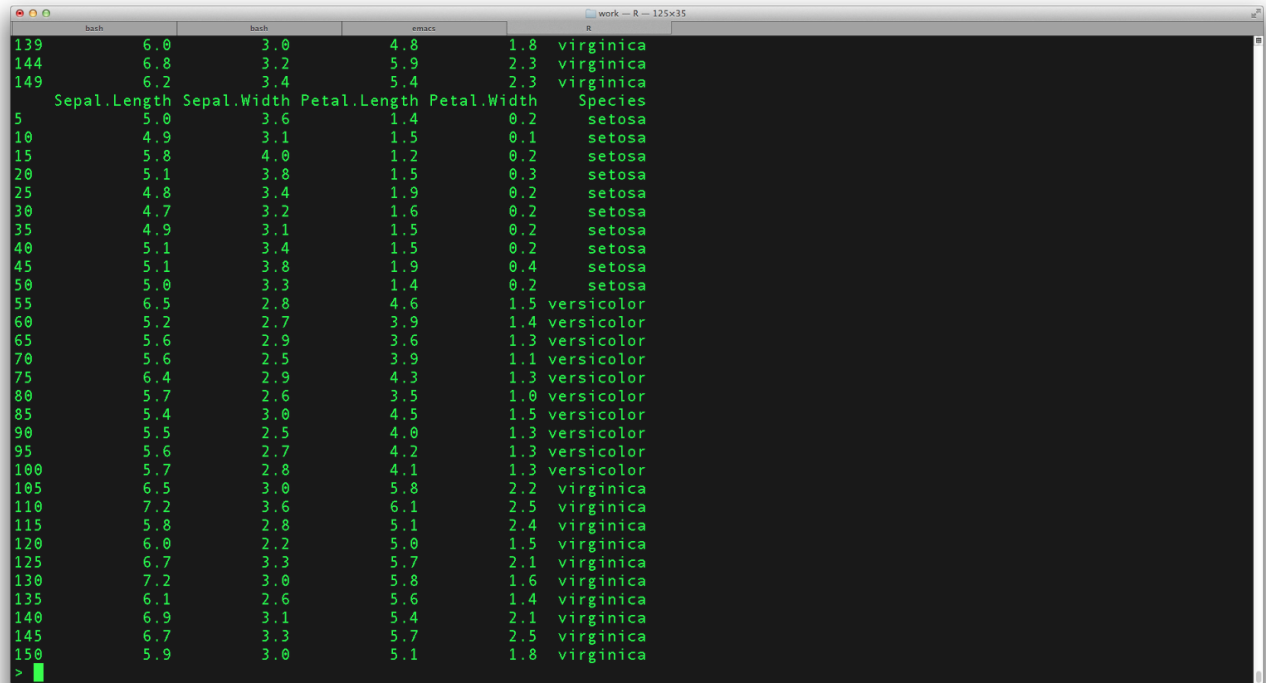


A terminal window titled "work - R -- 125x35" displays R console output. The output shows a list of 150 rows of data from the iris dataset, with columns: Sepal.Length, Sepal.Width, Petal.Length, Petal.Width, and Species. The first row is highlighted in green. Below the list, the first row is printed as a data frame.

```
123      7.7      2.8      6.7      2.0 virginica
124      6.3      2.7      4.9      1.8 virginica
125      6.7      3.3      5.7      2.1 virginica
126      7.2      3.2      6.0      1.8 virginica
127      6.2      2.8      4.8      1.8 virginica
128      6.1      3.0      4.9      1.8 virginica
129      6.4      2.8      5.6      2.1 virginica
130      7.2      3.0      5.8      1.6 virginica
131      7.4      2.8      6.1      1.9 virginica
132      7.9      3.8      6.4      2.0 virginica
133      6.4      2.8      5.6      2.2 virginica
134      6.3      2.8      5.1      1.5 virginica
135      6.1      2.6      5.6      1.4 virginica
136      7.7      3.0      6.1      2.3 virginica
137      6.3      3.4      5.6      2.4 virginica
138      6.4      3.1      5.5      1.8 virginica
139      6.0      3.0      4.8      1.8 virginica
140      6.9      3.1      5.4      2.1 virginica
141      6.7      3.1      5.6      2.4 virginica
142      6.9      3.1      5.1      2.3 virginica
143      5.8      2.7      5.1      1.9 virginica
144      6.8      3.2      5.9      2.3 virginica
145      6.7      3.3      5.7      2.5 virginica
146      6.7      3.0      5.2      2.3 virginica
147      6.3      2.5      5.0      1.9 virginica
148      6.5      3.0      5.2      2.0 virginica
149      6.2      3.4      5.4      2.3 virginica
150      5.9      3.0      5.1      1.8 virginica
[1] "irisVariable"
   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
150      5.9      3      5.1      1.8 virginica
[1] "data.frame"
   Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1      5.1      3.5      1.4      0.2 setosa
>
```



## 8. Using the tapply command.



A terminal window titled "work - R - 125x35" displays the output of the `tapply` command. The output is a table with 5 columns: an index column, and four columns of numerical values (Sepal.Length, Sepal.Width, Petal.Length, Petal.Width), followed by a "Species" column. The data is grouped by species, with "setosa" having 50 rows, "versicolor" having 50 rows, and "virginica" having 50 rows. The terminal has a dark background with green text.

	Sepal.Length	Sepal.Width	Petal.Length	Petal.Width	Species
139	6.0	3.0	4.8	1.8	virginica
144	6.8	3.2	5.9	2.3	virginica
149	6.2	3.4	5.4	2.3	virginica
5	5.0	3.6	1.4	0.2	setosa
10	4.9	3.1	1.5	0.1	setosa
15	5.8	4.0	1.2	0.2	setosa
20	5.1	3.8	1.5	0.3	setosa
25	4.8	3.4	1.9	0.2	setosa
30	4.7	3.2	1.6	0.2	setosa
35	4.9	3.1	1.5	0.2	setosa
40	5.1	3.4	1.5	0.2	setosa
45	5.1	3.8	1.9	0.4	setosa
50	5.0	3.3	1.4	0.2	setosa
55	6.5	2.8	4.6	1.5	versicolor
60	5.2	2.7	3.9	1.4	versicolor
65	5.6	2.9	3.6	1.3	versicolor
70	5.6	2.5	3.9	1.1	versicolor
75	6.4	2.9	4.3	1.3	versicolor
80	5.7	2.6	3.5	1.0	versicolor
85	5.4	3.0	4.5	1.5	versicolor
90	5.5	2.5	4.0	1.3	versicolor
95	5.6	2.7	4.2	1.3	versicolor
100	5.7	2.8	4.1	1.3	versicolor
105	6.5	3.0	5.8	2.2	virginica
110	7.2	3.6	6.1	2.5	virginica
115	5.8	2.8	5.1	2.4	virginica
120	6.0	2.2	5.0	1.5	virginica
125	6.7	3.3	5.7	2.1	virginica
130	7.2	3.0	5.8	1.6	virginica
135	6.1	2.6	5.6	1.4	virginica
140	6.9	3.1	5.4	2.1	virginica
145	6.7	3.3	5.7	2.5	virginica
150	5.9	3.0	5.1	1.8	virginica