

SIOB 296 Introduction to Programming with R

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Week 02: January 15, 2019

Answer all questions in a script (.R) file. Use comments (# or #').

1. Load the workspace file “Data 02.rdata”. Extract the first twenty elements of the `eye.color` factor to `q1`.

```
str(q1)
```

```
Factor w/ 4 levels "Blue","Green",...: 3 4 3 3 3 3 4 3 4 4 ...
```

2. Convert the factor `q1` to a character vector called `q2`.

```
str(q2)
```

```
chr [1:20] "Brown" "Hazel" "Brown" "Brown" "Brown" "Brown" "Brown" "Hazel" "Brown" ...
```

```
q2
```

```
[1] "Brown" "Hazel" "Brown" "Brown" "Brown" "Brown" "Brown" "Hazel" "Brown" "Hazel"
[10] "Hazel" "Blue" "Hazel" "Brown" "Green" "Blue" "Green" "Blue" "Blue"
[19] "Hazel" "Green"
```

3. Convert the vector `q2` back to a factor (`q3`) with the levels ordered as “Hazel”, “Blue”, “Green”, “Brown”.

```
str(q3)
```

```
Factor w/ 4 levels "Hazel","Blue",...: 4 1 4 4 4 4 1 4 1 1 ...
```

```
q3
```

```
[1] Brown Hazel Brown Brown Brown Brown Hazel Brown Hazel Hazel Blue Hazel
[13] Brown Green Blue Green Blue Blue Hazel Green
Levels: Hazel Blue Green Brown
```

4. Change the levels of `q3` be “Hz”, “Bl”, “Gr”, “Br”.

```
str(q3)
```

```
Factor w/ 4 levels "Hz","Bl","Gr",...: 4 1 4 4 4 4 1 4 1 1 ...
```

```
q3
```

```
[1] Br Hz Br Br Br Br Hz Br Hz Hz Bl Hz Br Gr Bl Gr Bl Bl Hz Gr
Levels: Hz Bl Gr Br
```

5. Reorder the levels of `q3` to “Bl”, “Hz”, “Br”, “Gr”

```
str(q3)
```

```
Factor w/ 4 levels "Bl","Hz","Br",...: 3 2 3 3 3 3 2 3 2 2 ...
```

```
q3
```

```
[1] Br Hz Br Br Br Br Hz Br Hz Hz Bl Hz Br Gr Bl Gr Bl Bl Hz Gr
Levels: Bl Hz Br Gr
```

6. Extract the surface (1m) and every 5 meters of the ctd cast from the `ctd` matrix.

```
str(ctd.10)
```

```
num [1:13, 1:7] 1 5 10 15 20 25 30 35 40 45 ...
- attr(*, "dimnames")=List of 2
 ..$ : chr [1:13] "1m" "5m" "10m" "15m" ...
 ..$ : chr [1:7] "depth" "density" "temp" "salinity" ...
```

```
head(ctd.10)
```

	depth	density	temp	salinity	dox	ph	pct_light
1m	1	23.973	18.78	33.557	7.63	8.20	90.34
5m	5	23.976	18.77	33.556	7.59	8.20	90.43
10m	10	23.979	18.76	33.556	7.68	8.20	90.39
15m	15	24.275	17.18	33.440	7.92	8.20	90.44
20m	20	24.571	15.62	33.359	8.14	8.20	89.91
25m	25	24.684	15.27	33.406	8.07	8.18	89.43

7. Extract a matrix of the temperature, density, and pH for each 10 m (10m, 20m, 30m, etc).

```
head(q7)
```

	temp	density	ph
10m	18.76	23.979	8.20
20m	15.62	24.571	8.20
30m	14.87	24.815	8.13
40m	14.01	25.025	8.05
50m	13.68	25.113	8.01
60m	13.31	25.204	7.98

8. What is the mean temperature in the top 10 meters?

```
[1] 18.772
```

9. Add a column to the original ctd matrix for temperature in Farenheit ($F = (C * 9/5) + 32$)

```
head(ctd)
```

	depth	density	temp	salinity	dox	ph	pct_light	temp.f
60m	60	25.204	13.31	33.545	5.43	7.98	87.88	55.958
59m	59	25.203	13.32	33.546	5.41	7.98	88.01	55.976
58m	58	25.199	13.33	33.544	5.41	7.98	88.25	55.994
57m	57	25.190	13.36	33.541	5.48	7.99	88.56	56.048
56m	56	25.162	13.47	33.533	5.56	8.00	89.01	56.246
55m	55	25.145	13.55	33.531	5.61	8.00	89.19	56.390

10. Remove the “depth” and “pct_light” columns, and put the “temp.f” column after “temp”.

```
head(ctd)
```

	density	temp	temp.f	salinity	dox	ph
60m	25.204	13.31	55.958	33.545	5.43	7.98
59m	25.203	13.32	55.976	33.546	5.41	7.98
58m	25.199	13.33	55.994	33.544	5.41	7.98
57m	25.190	13.36	56.048	33.541	5.48	7.99
56m	25.162	13.47	56.246	33.533	5.56	8.00
55m	25.145	13.55	56.390	33.531	5.61	8.00