SIOB 296 Introduction to Programming with R

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Homework

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

1. Load the workspace file "Data 2.rdata". Extract the first twenty elements of the `eye.color` factor to `q1`.

```
 Factor w/ 4 levels "Blue","Green",..: 4 4 1 4 1 2 4 4 2 1 ...
```

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

```
 [1] "Hazel" "Hazel" "Blue"  "Hazel" "Blue"  "Green" "Hazel" "Hazel"
 [9] "Green" "Blue"  "Green" "Hazel" "Blue"  "Green" "Blue"  "Brown"
[17] "Brown" "Hazel" "Blue"  "Green"
```

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

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

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

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

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

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

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

```
    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
30m    30  24.815 14.87   33.464 7.15 8.13     86.84
35m    35  24.973 14.26   33.498 6.41 8.06     88.96
40m    40  25.025 14.01   33.501 6.22 8.05     89.31
45m    45  25.091 13.76   33.519 5.93 8.02     89.40
50m    50  25.113 13.68   33.525 5.80 8.01     89.43
55m    55  25.145 13.55   33.531 5.61 8.00     89.19
60m    60  25.204 13.31   33.545 5.43 7.98     87.88
```

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

```
     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
```