Skill Check 2.1: geom_raster(), geom_tile(), geom_contour()

Mo Hijazi, Tyler Calvert, and Clara Hunt

DATA

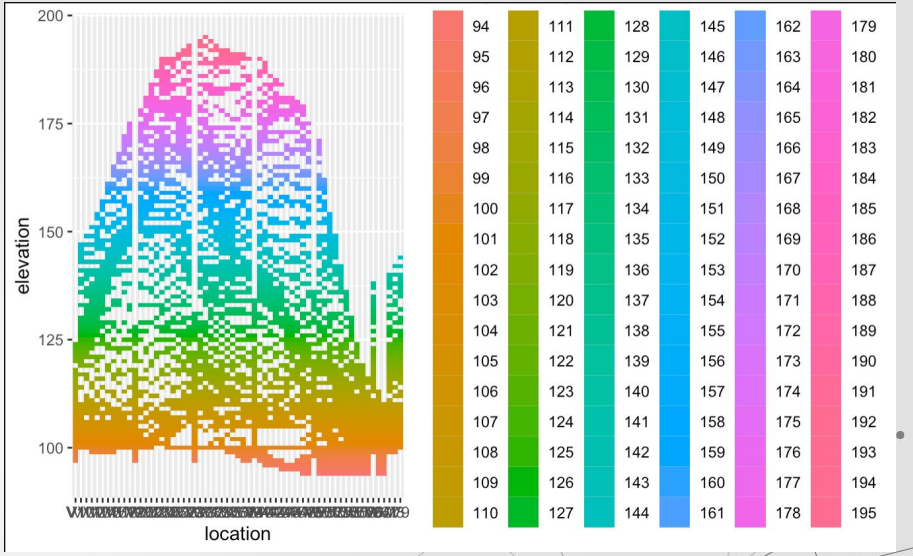
VOLCANO

Topographic Information on Auckland's Maunga Whau (mt. Eden) Volcano.

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14
1	100	100	101	101	101	101	101	100	100	100	101	101	102	102
2	101	101	102	102	102	102	102	101	101	101	102	102	103	103
3	102	102	103	103	103	103	103	102	102	102	103	103	104	104
4	103	103	104	104	104	104	104	103	103	103	103	104	104	104
5	104	104	105	105	105	105	105	104	104	103	104	104	105	105
6	105	105	105	106	106	106	106	105	105	104	104	105	105	106
7	105	106	106	107	107	107	107	106	106	105	105	106	106	107
8	106	107	107	108	108	108	108	107	107	106	106	107	108	108
9	107	108	108	109	109	109	109	108	108	107	108	108	110	111
10	108	109	109	110	110	110	110	109	109	108	110	110	113	116
11	109	110	110	111	111	111	111	110	110	110	112	114	118	121
12	110	110	111	113	112	111	113	112	112	114	116	119	121	124
13	110	111	113	115	114	113	114	114	115	117	119	121	124	126
14	111	113	115	117	116	115	116	117	117	119	121	124	126	128
15	114	115	117	117	117	118	119	119	120	121	124	126	128	131
16	116	118	118	118	120	121	121	122	122	123	125	128	130	134
17	118	120	120	121	122	123	124	124	125	126	127	129	132	135
18	120	121	122	123	124	125	126	127	127	128	130	132	134	137
19	120	122	125	126	126	127	128	129	130	130	132	134	136	139
20	121	124	126	128	129	129	130	131	132	133	135	137	139	143
21	122	125	127	130	130	131	133	134	135	136	137	140	143	147
22	122	125	128	130	132	133	135	136	137	139	140	143	147	152

geom_raster():

```
data("volcano")
VDF <- as.data.frame(volcano)
VDFL <- pivot_longer(VDF,cols = c(1:61),
names_to = "location", values_to = "elevation")

vdf.plot <- ggplot(VDFL, aes(location,
elevation)) +
  geom_raster(mapping =
aes(fill=factor(elevation)))
```



REQUIREMENTS:

- All tiles must be same size
- Numeric
- “Longitude-Latitude” system

Errors:

- Data Frame has no “Longitude-Latitude” system
- Colors are not correlating as they should

geom_raster():

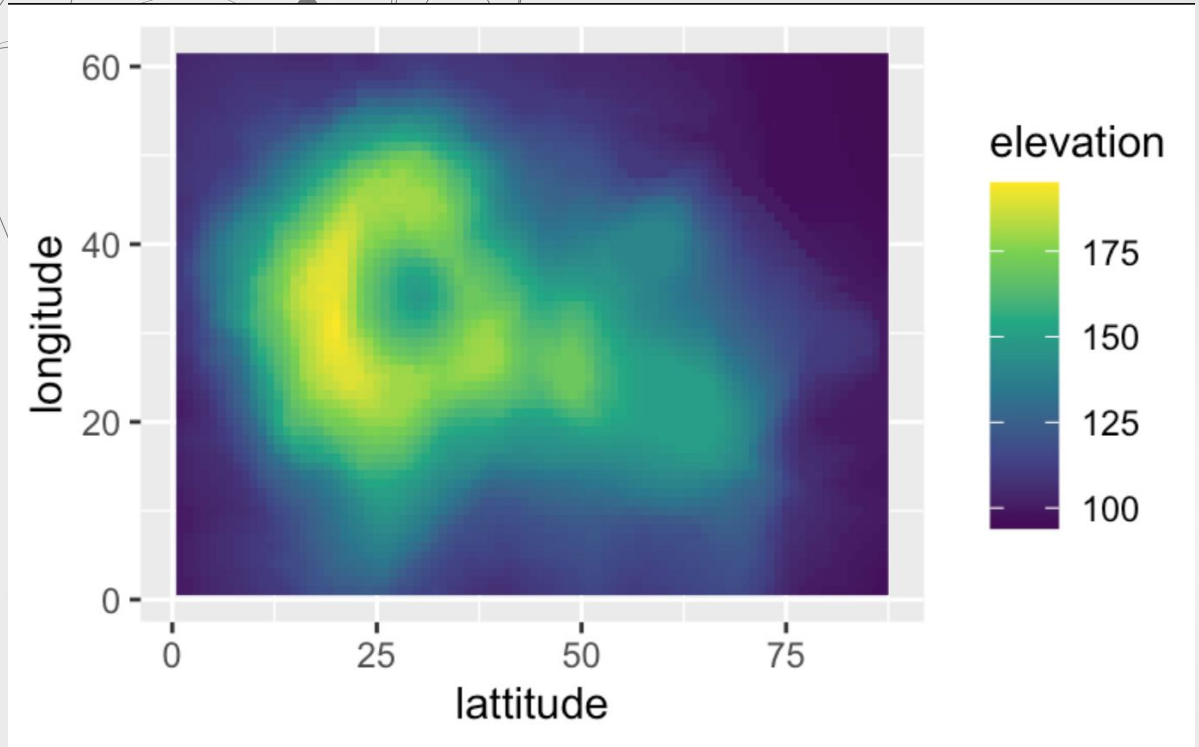
```
volcano_df <- melt(volcano)
colnames(volcano_df) <- c("lattitude",
"longitude", "elevation")

data=volcano_df
ggplot(volcano_df, aes(lattitude, longitude)) +
  geom_raster(aes(fill = elevation)) +
scale_fill_viridis_c()
```

	lattitude	longitude	elevation
1	1	1	100
2	2	1	101
3	3	1	102
4	4	1	103
5	5	1	104
6	6	1	105
7	7	1	105
8	8	1	106
9	9	1	107
10	10	1	108
11	11	1	109
12	12	1	110
13	13	1	110
14	14	1	111
15	15	1	114
16	16	1	116
17	17	1	118
18	18	1	120
19	19	1	120
20	20	1	121
21	21	1	122
22	22	1	122
23	23	1	123

Corrections:

- Creates “longitude-latitude” system

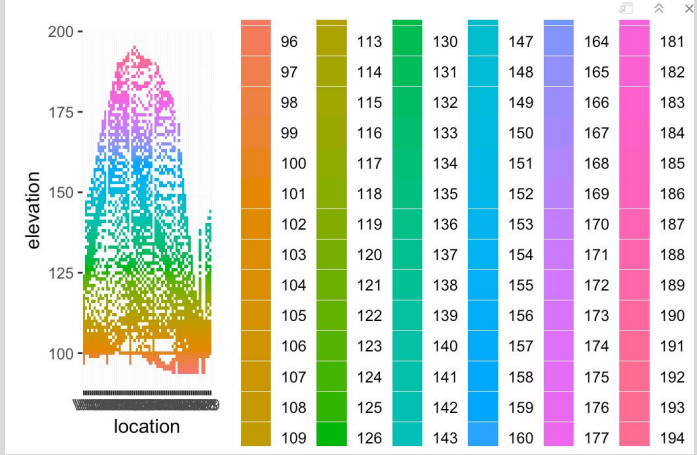
NEW AND IMPROVED GRAPH!



geom_tile():

```
geom_tile(
  mapping = NULL,
  data = NULL,
  stat = "identity",
  position = "identity",
  ...,
  linejoin = "mitre",
  na.rm = FALSE,
  show.legend = NA,
  inherit.aes = TRUE
```

```{r}
# bad geom_tile()
# bad because the data frame does not have elements of elevation
library(ggplot2)
library(tidyr)

data("volcano")

volcano.df <- as.data.frame(volcano)
volcano.df.longer <- pivot_longer(volcano.df, cols=c(1:61),
names_to="location", values_to="elevation")
volcano.df.plot <- ggplot(volcano.data.frame.longer,
aes(location,elevation)) +
geom_tile(mapping=aes(fill=factor(elevation)))
force(volcano.data.frame.plot)
```



Info:

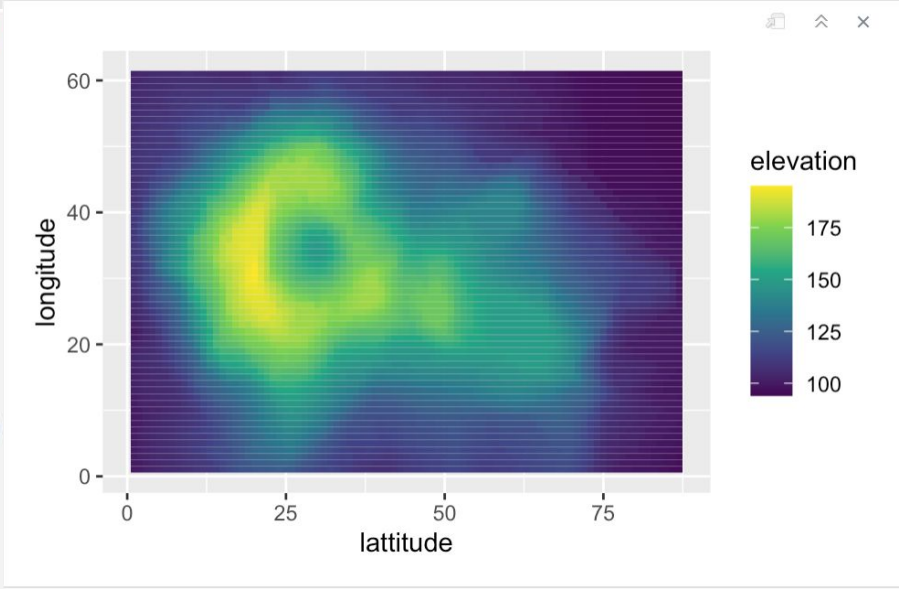
- Function
- Requires numeric data

Errors:

- Simply shows elevation, missing longitude and latitude elements

geom_tile():

```r
# good geom_tile()
library(tidyr)
library(lattice)
library(reshape2)
library(ggplot2)
data("volcano")
volcano.df <- melt(volcano)
colnames(volcano.df) <- c("lattitude", "longitude", "elevation")
ggplot(volcano.df, aes(lattitude, longitude)) +
geom_tile(aes(fill=elevation)) + scale_fill_viridis_c()
```



Corrections:

- Use melt and create a data frame with longitude, latitude, and elevation

geom_contour():

3D matrix to 2D contour

```
> volcano
     [,1] [,2] [,3] [,4
 [1,]  100  100  101  10
 [2,]  101  101  102  10
 [3,]  102  102  103  10
 [4,]  103  103  104  10
 [5,]  104  104  105  10
 [6,]  105  105  105  10
 [7,]  105  106  106  10
 [8,]  106  107  107  10
```

1

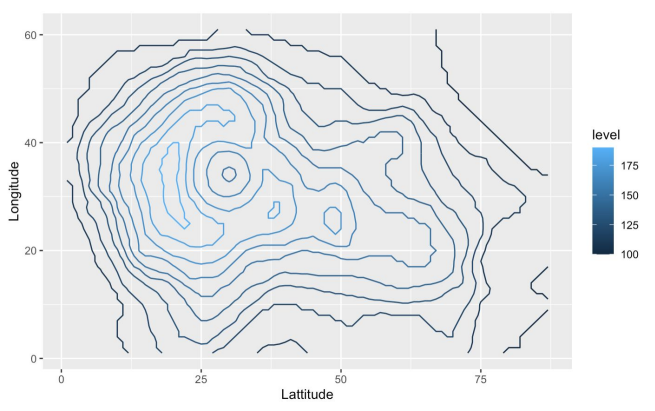
```
> volcano_df
  Var1 Var2 value
1    1    1   100
2    2    1   101
3    3    1   102
4    4    1   103
5    5    1   104
```

2

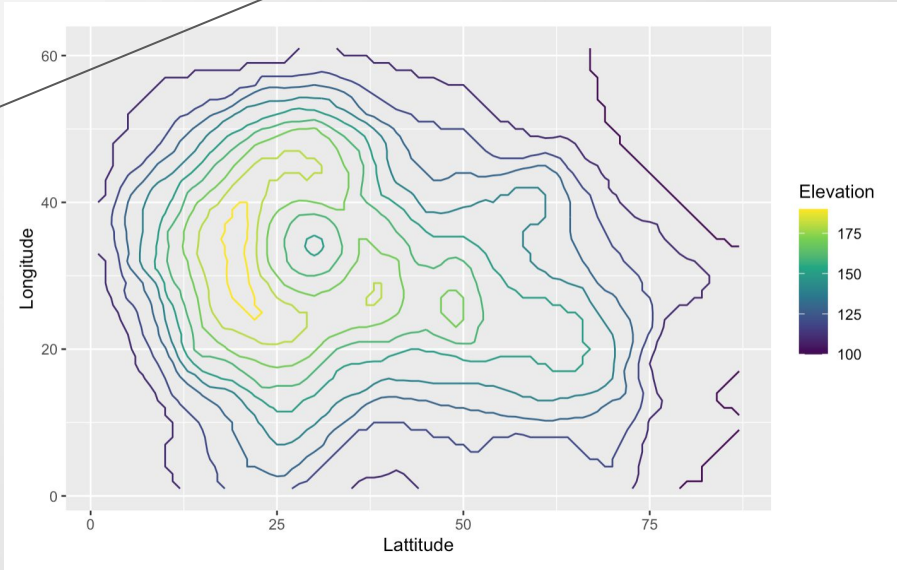
```
> volcano_df
  Lattitude Longitude Elevation
1         1         1       100
2         2         1       101
3         3         1       102
4         4         1       103
5         5         1       104
```

3

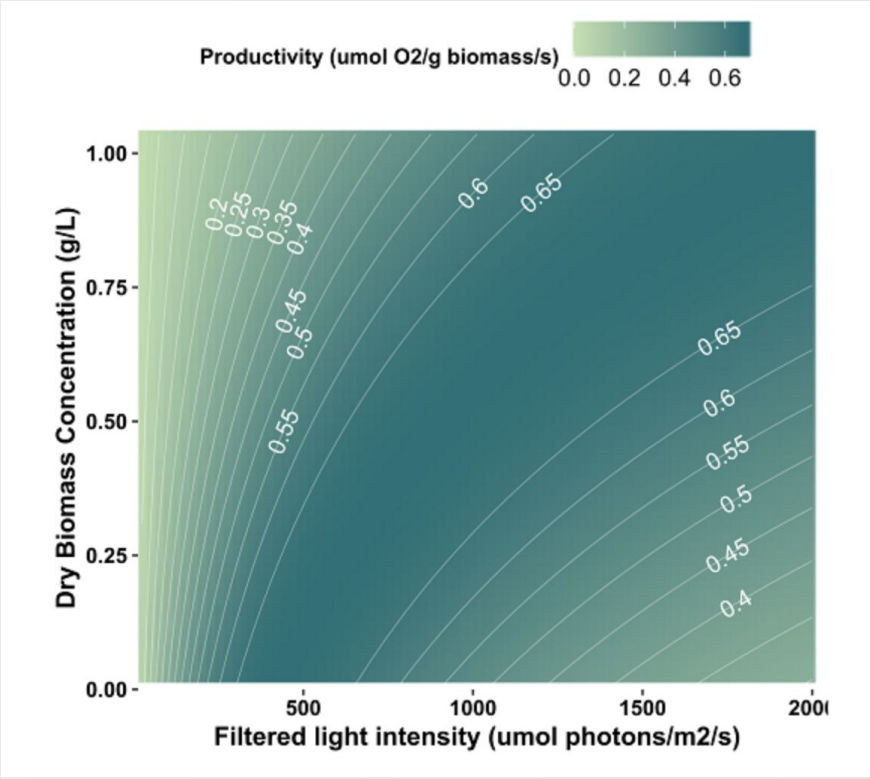
```
1 volcano_df <- melt(volcano)

2 colnames(volcano_df) <- c("Lattitude", "Longitude", "Elevation")

3 ggplot(volcano_df, aes(Lattitude,Longitude)) +

    geom_contour(aes(z=Elevation, col = ..level..)) +

  4 scale_color_viridis_c(name="Elevation")
```



4



NOTE: Contour plot can be used for more than topography …



https://jkzorz.github.io/2020/02/29/contour-plots.html

Source Links:

- https://cran.r-project.org/web/packages/ggplot2/ggplot2.pdf
- https://rdrr.io/cran/ggplot2/man/geom_tile.html
- https://jkzorz.github.io/2020/02/29/contour-plots.html
- https://ggplot2.tidyverse.org/reference/geom_contour.html
- https://seananderson.ca/2013/10/19/reshape/