Class05

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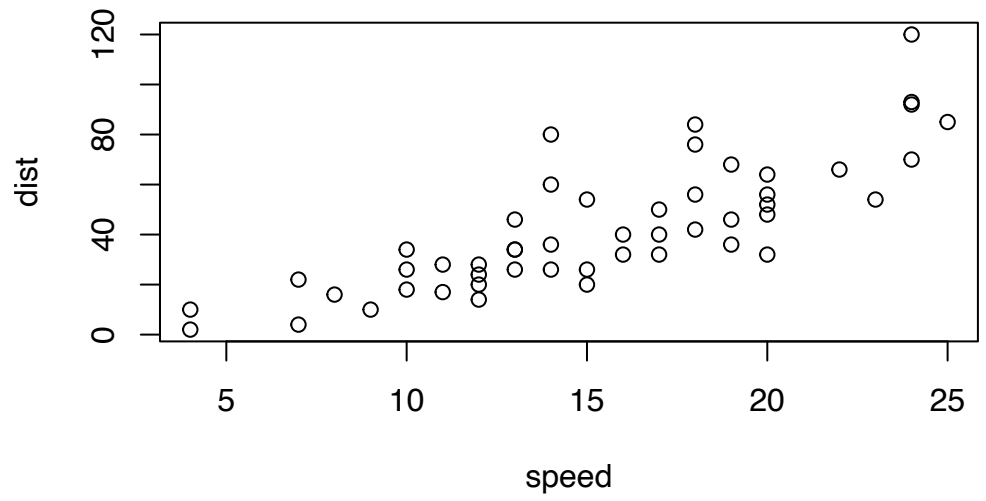
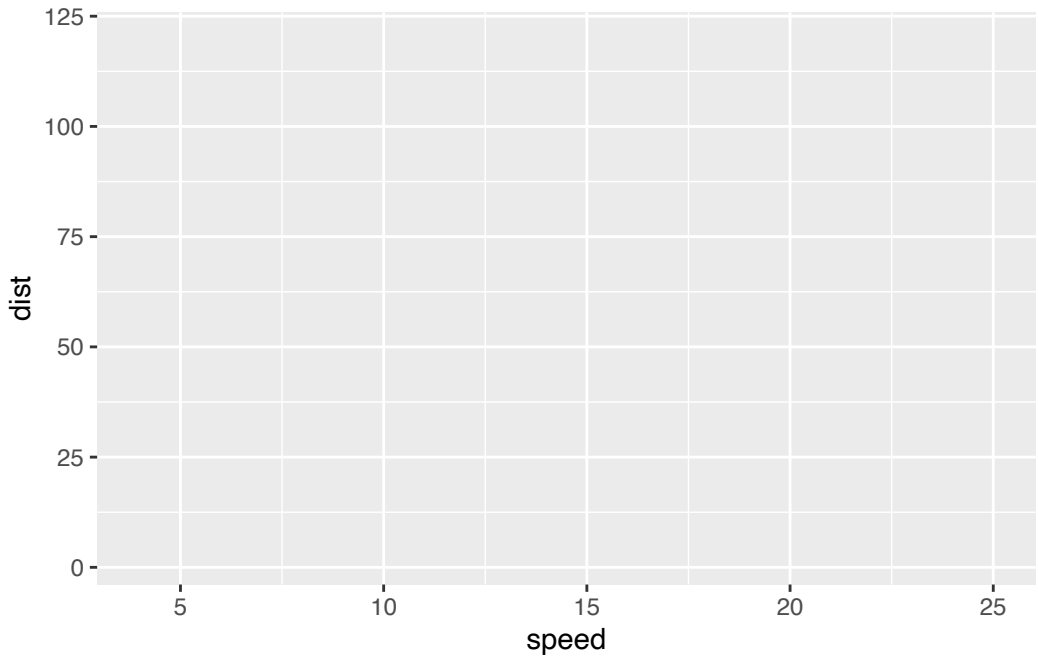
```
View(cars)
```

```
plot(cars)
```

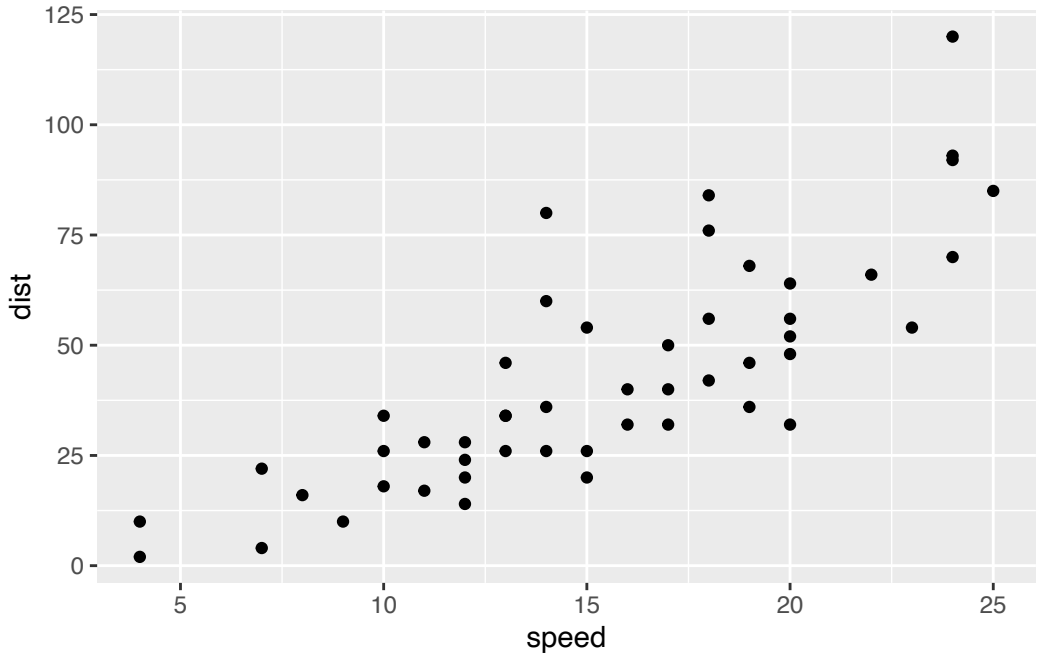



```
library(ggplot2)
ggplot(cars)
```

```
ggplot(cars) +
  aes(x=speed, y=dist)
```



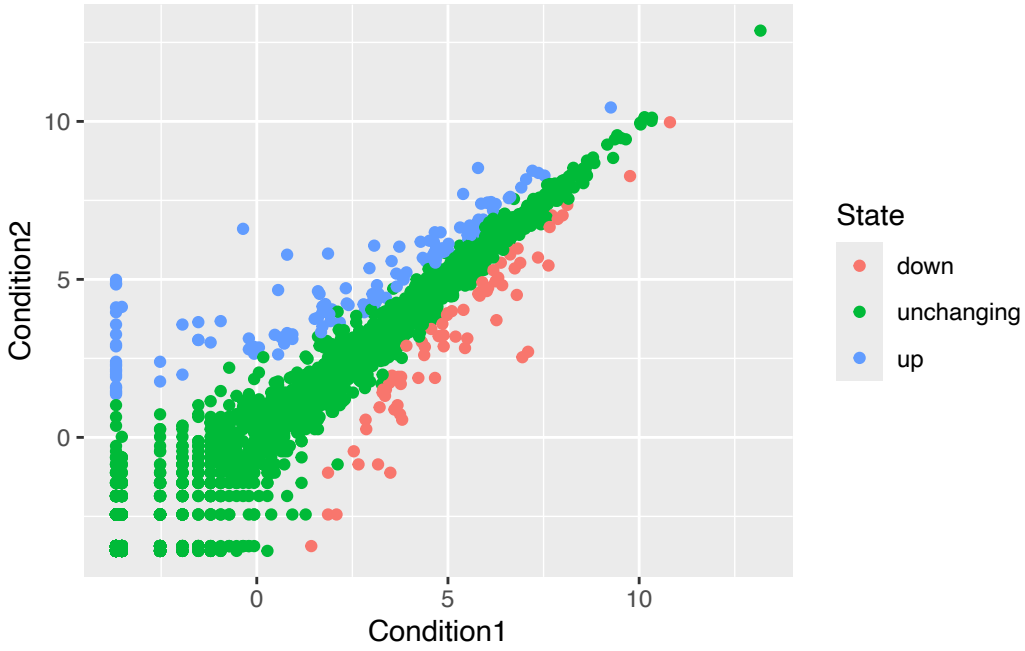
```
ggplot(cars) +
  aes(x=speed, y=dist) +
  geom_point()
```



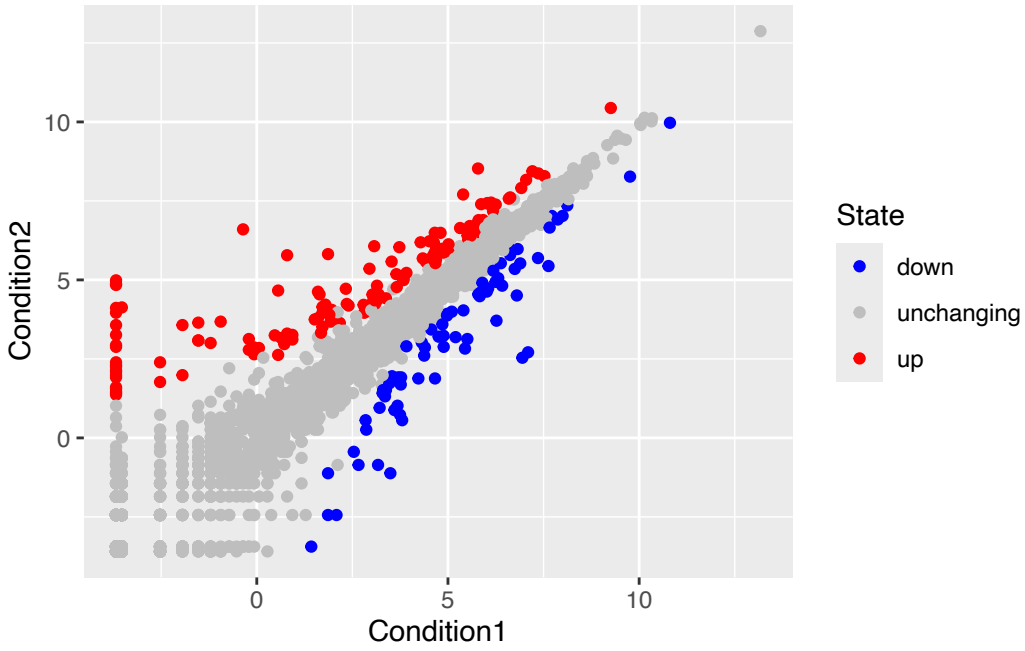

```
url <- "https://bioboot.github.io/bimm143_S20/class-material/up_down_expression.txt"
genes <- read.delim(url)
head(genes)
```

```
        Gene Condition1 Condition2      State
1      A4GNT -3.6808610 -3.4401355 unchanging
2       AAAS  4.5479580  4.3864126 unchanging
3      AASDH  3.7190695  3.4787276 unchanging
4       AATF  5.0784720  5.0151916 unchanging
5       AATK  0.4711421  0.5598642 unchanging
6 AB015752.4 -3.6808610 -3.5921390 unchanging
```

```
p <- ggplot(genes) +
    aes(x=Condition1, y=Condition2, col=State) +
    geom_point()
p
```




```
p + scale_colour_manual( values=c("blue","gray","red") )
```



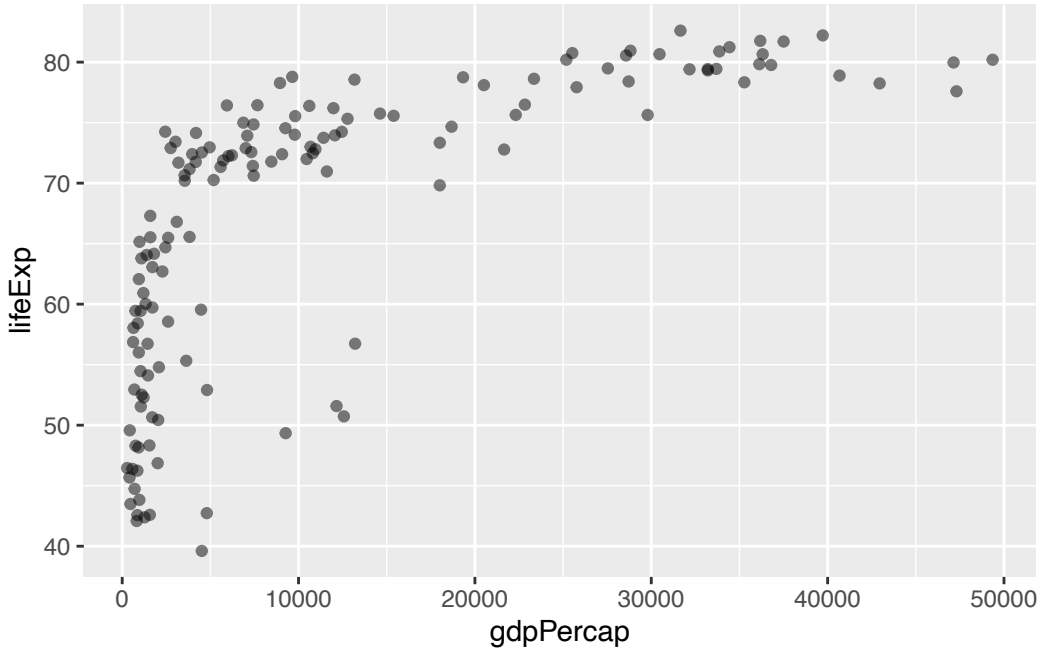
```r
# File location online
url <- "https://raw.githubusercontent.com/jennybc/gapminder/master/inst/extdata/gapminder.t

gapminder <- read.delim(url)
```

```r
# install.packages("dplyr")  ## un-comment to install if needed
library(dplyr)
```

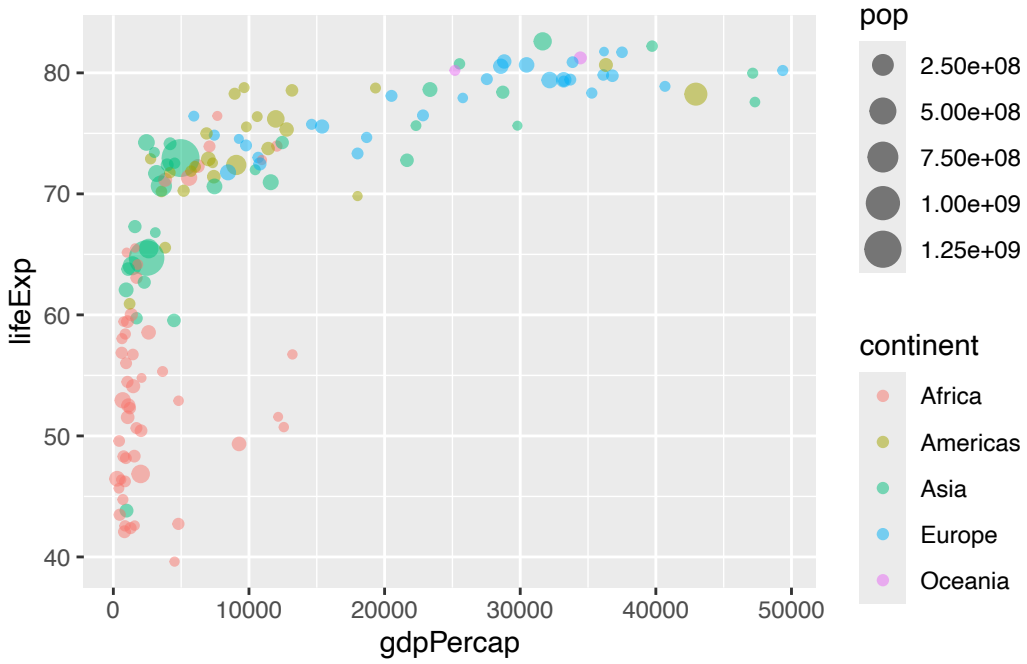
```
Attaching package: 'dplyr'

The following objects are masked from 'package:stats':

    filter, lag

The following objects are masked from 'package:base':

    intersect, setdiff, setequal, union
```

```r
gapminder_2007 <- gapminder %>% filter(year==2007)
```

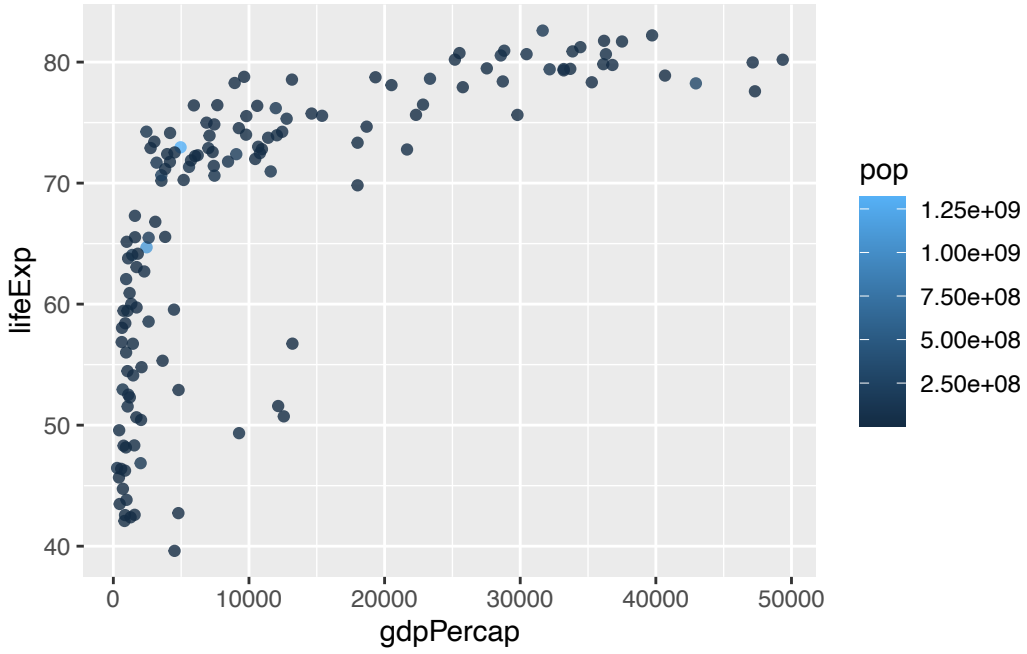
```r
ggplot(gapminder_2007) +
  aes(x=gdpPercap, y=lifeExp) +
  geom_point(alpha=0.5)
```



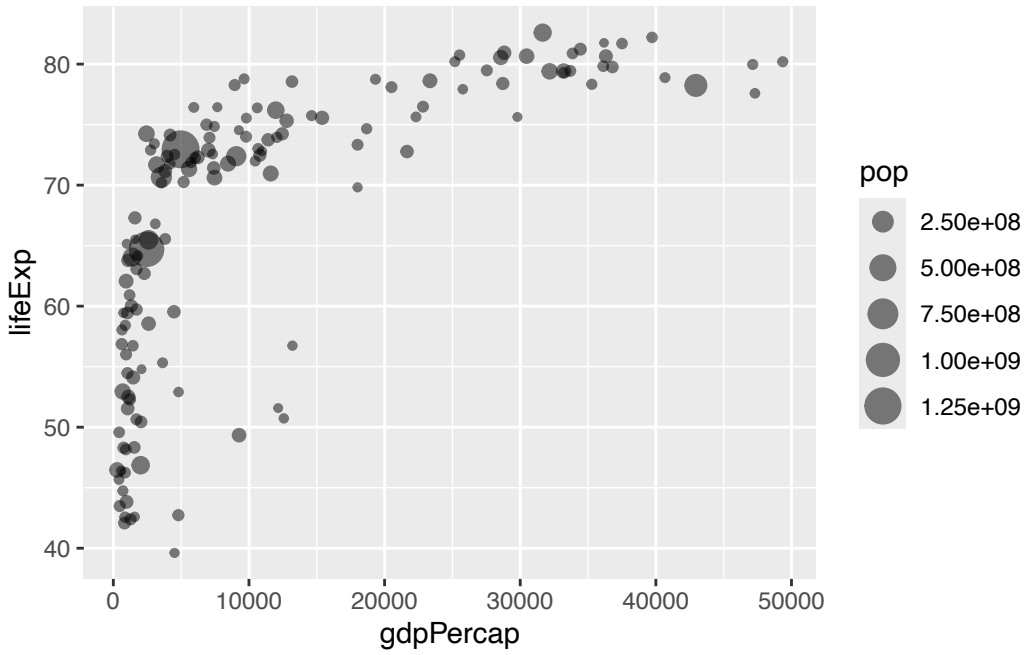

```
ggplot(gapminder_2007) +
  aes(x=gdpPercap, y=lifeExp, color=continent, size=pop) +
  geom_point(alpha=0.5)
```



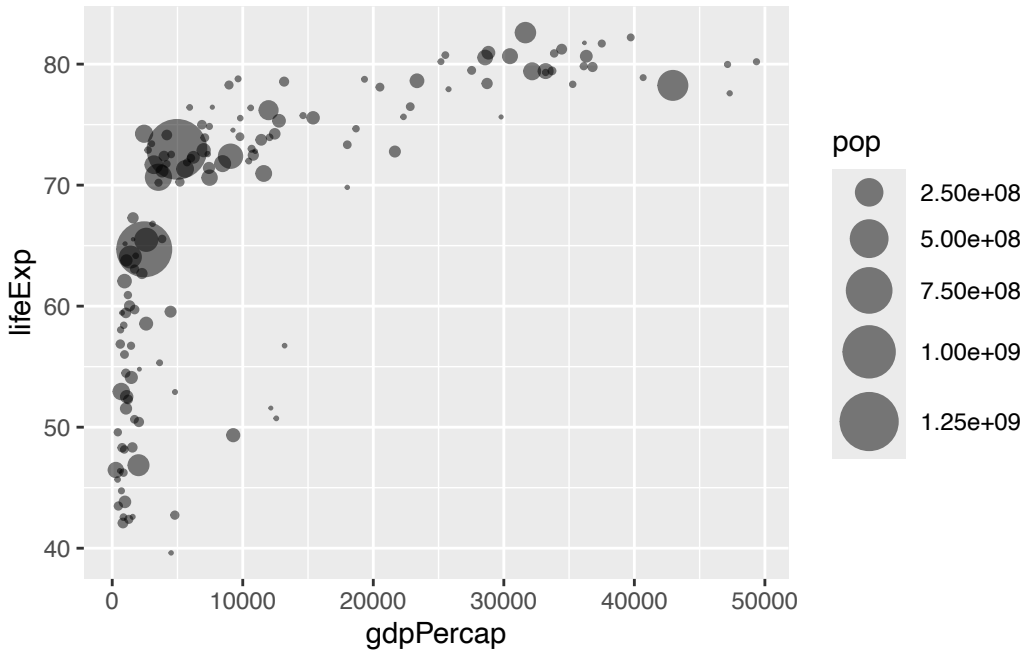
```
ggplot(gapminder_2007) +
  aes(x = gdpPercap, y = lifeExp, color = pop) +
  geom_point(alpha=0.8)
```



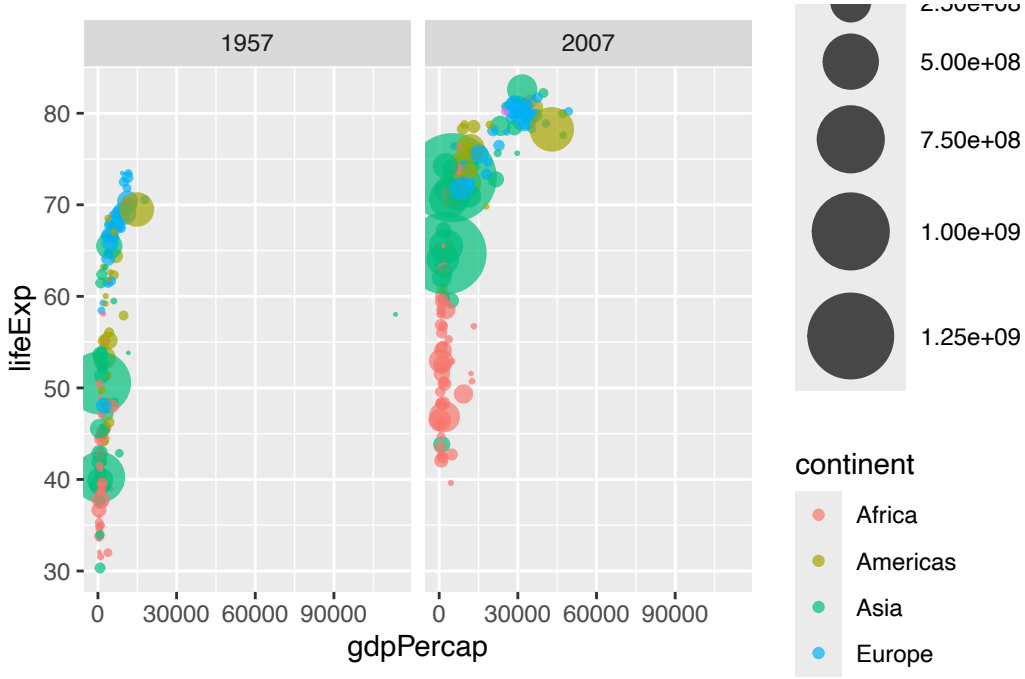

```
ggplot(gapminder_2007) +
  aes(x = gdpPercap, y = lifeExp, size = pop) +
  geom_point(alpha=0.5)
```




```
ggplot(gapminder_2007) +
  geom_point(aes(x = gdpPercap, y = lifeExp,
                 size = pop), alpha=0.5) +
  scale_size_area(max_size = 10)
```



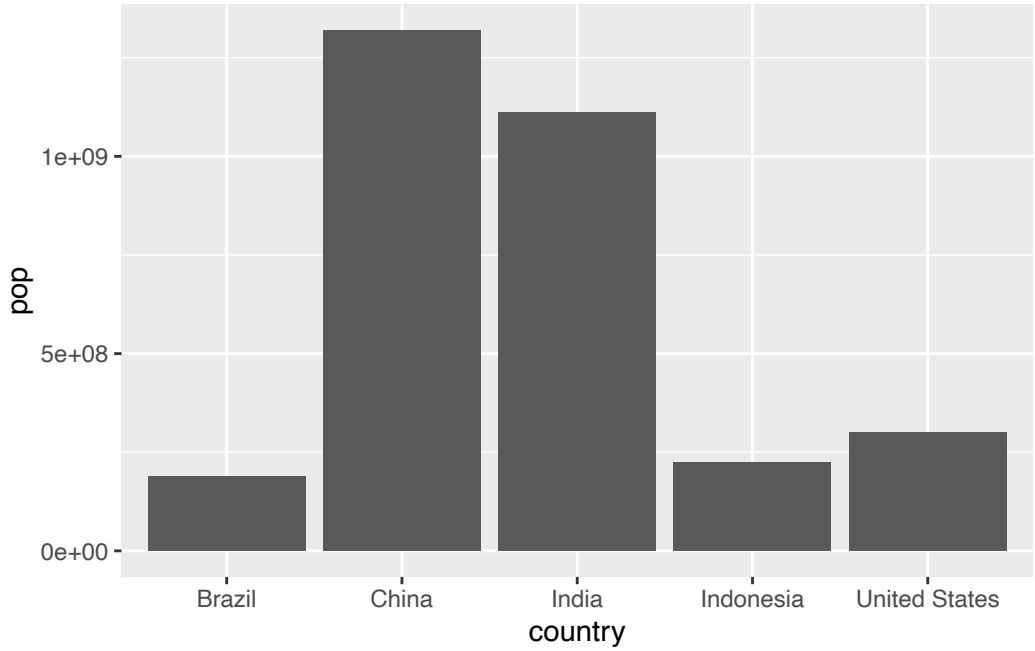

```
gapminder_1957_2007 <- gapminder %>%
  filter(year %in% c(1957, 2007))

ggplot(gapminder_1957_2007) +
  geom_point(aes(x = gdpPercap,
                 y = lifeExp,
                 color = continent,
                 size = pop),
             alpha = 0.7) +
  scale_size_area(max_size = 15) +
  facet_wrap(~year)
```



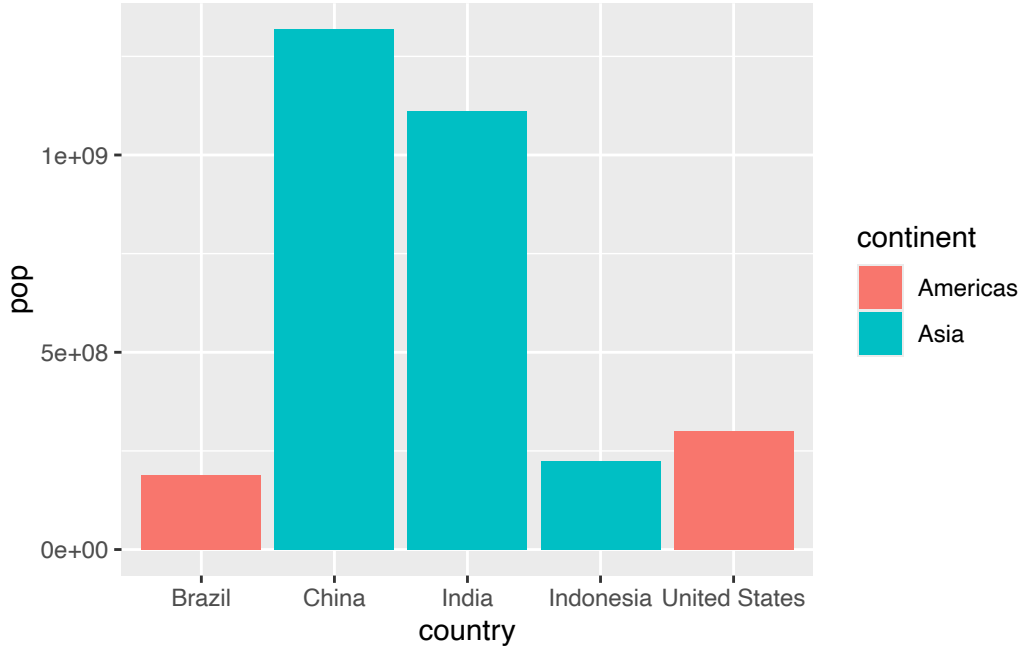

```
gapminder_top5 <- gapminder %>%
  filter(year==2007) %>%
  arrange(desc(pop)) %>%
  top_n(5, pop)

gapminder_top5
```

```
        country continent year lifeExp        pop gdpPercap
1         China      Asia 2007  72.961 1318683096  4959.115
2         India      Asia 2007  64.698 1110396331  2452.210
3 United States  Americas 2007  78.242  301139947 42951.653
4     Indonesia      Asia 2007  70.650  223547000  3540.652
5        Brazil  Americas 2007  72.390  190010647  9065.801
```

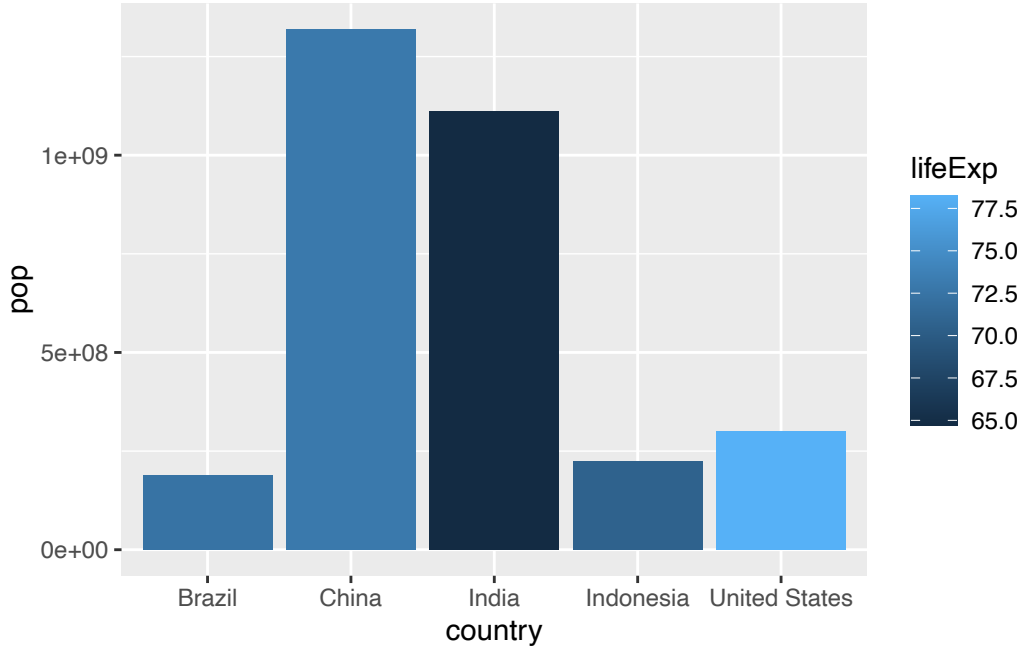
```
ggplot(gapminder_top5) +
  geom_col(aes(x = country, y = pop))
```



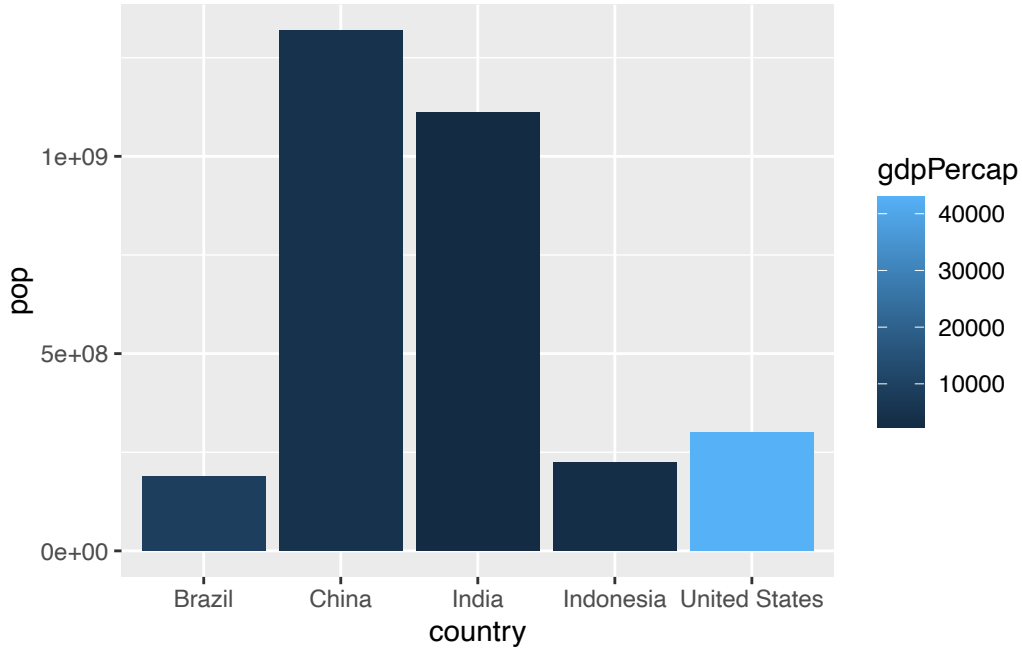

```
ggplot(gapminder_top5) +
  geom_col(aes(x = country, y = pop, fill = continent))
```



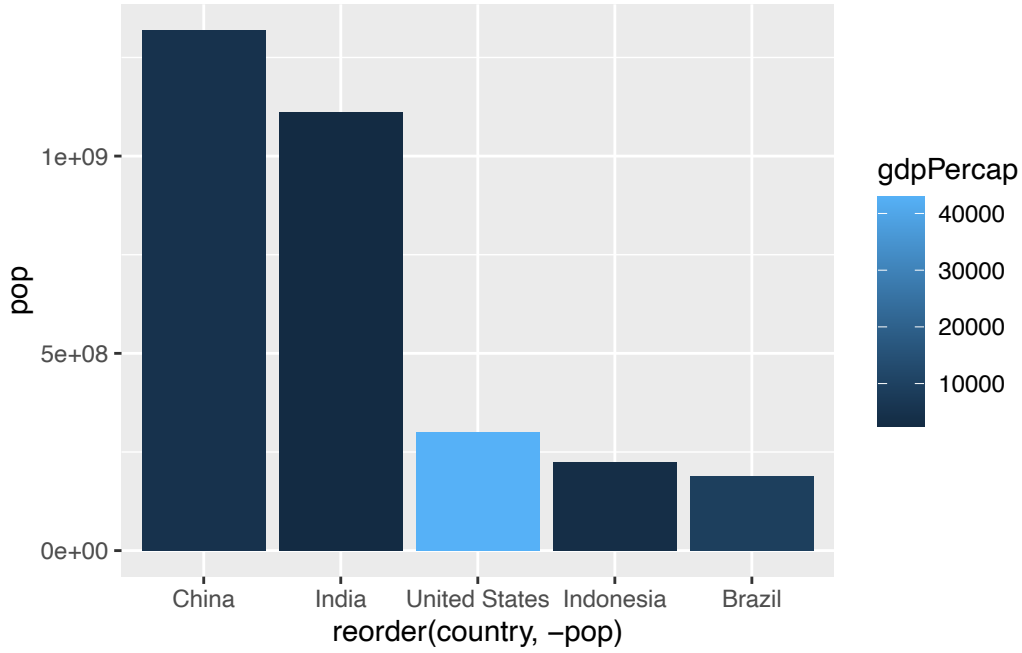
```r
ggplot(gapminder_top5) +
  geom_col(aes(x = country, y = pop, fill = lifeExp))
```



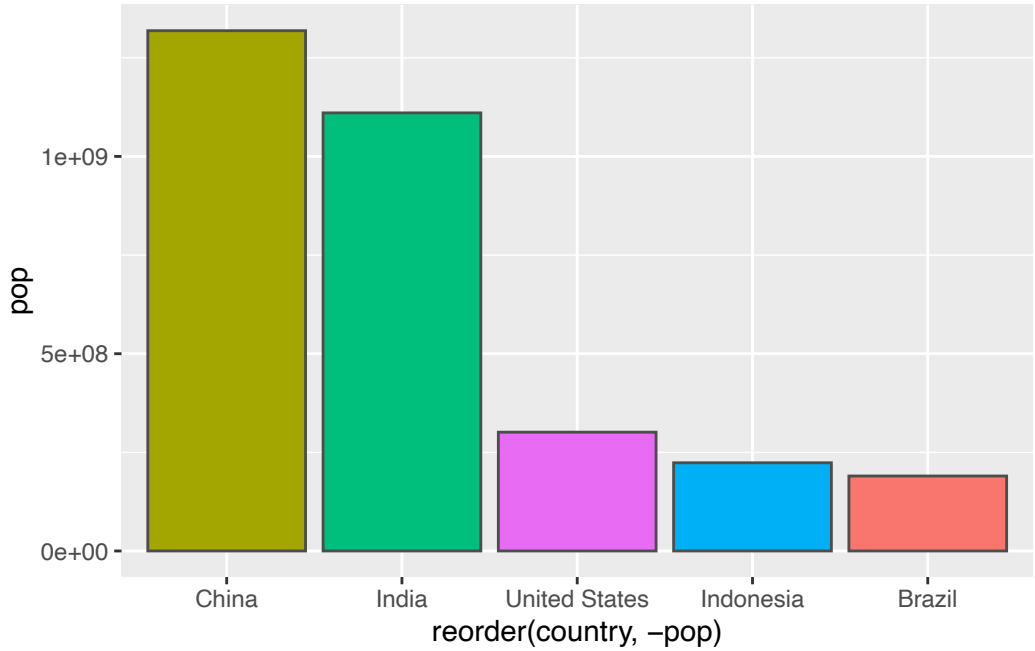

```r
ggplot(gapminder_top5) +
  aes(x=country, y=pop, fill=gdpPercap) +
  geom_col()
```




```
ggplot(gapminder_top5) +
  aes(x=reorder(country, -pop), y=pop, fill=gdpPercap) +
  geom_col()
```



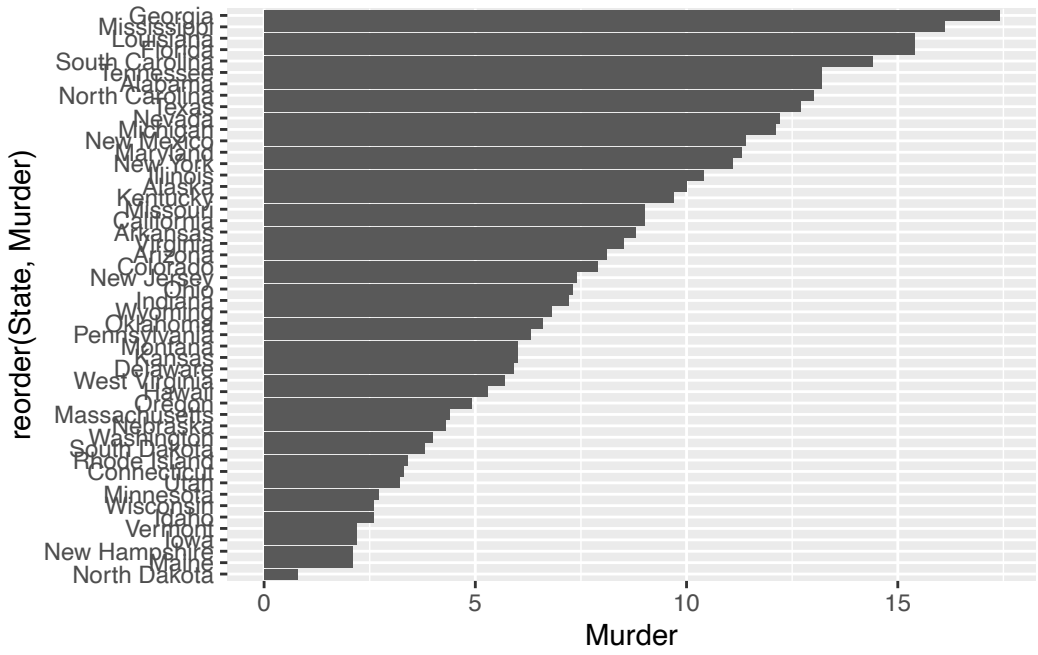
```
ggplot(gapminder_top5) +
  aes(x=reorder(country, -pop), y=pop, fill=country) +
  geom_col(col="gray30") +
  guides(fill="none")
```



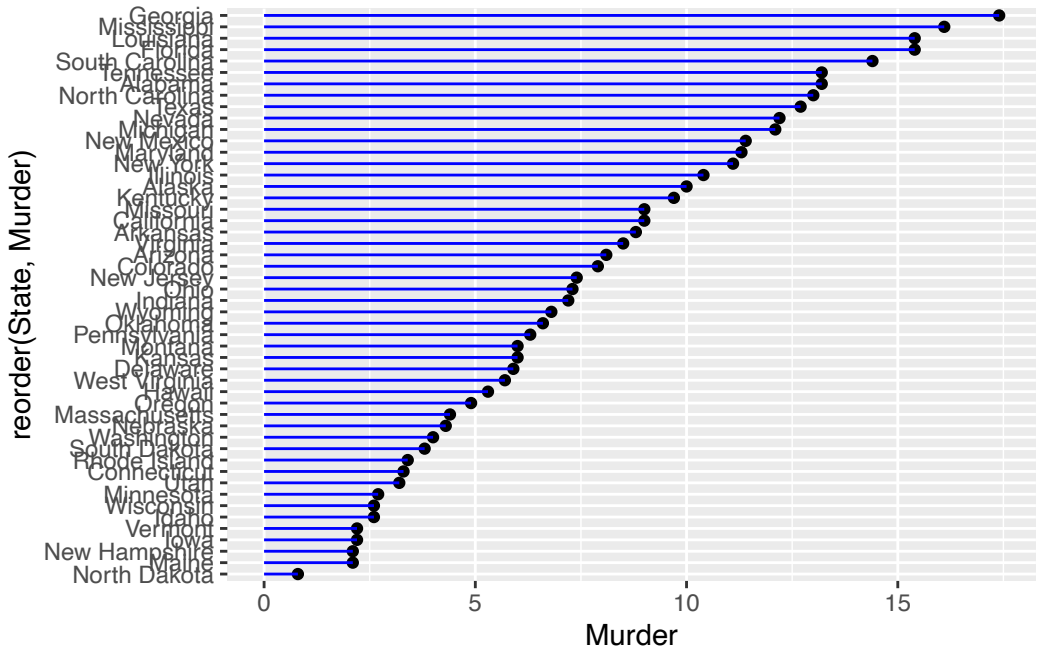

```
head(USArrests)
```

```
           Murder Assault UrbanPop Rape
Alabama      13.2     236       58 21.2
Alaska       10.0     263       48 44.5
Arizona       8.1     294       80 31.0
Arkansas      8.8     190       50 19.5
California    9.0     276       91 40.6
Colorado      7.9     204       78 38.7
```

```
USArrests$State <- rownames(USArrests)
ggplot(USArrests) +
  aes(x=reorder(State,Murder), y=Murder) +
  geom_col() +
  coord_flip()
```




```
ggplot(USArrests) +
  aes(x=reorder(State,Murder), y=Murder) +
  geom_point() +
  geom_segment(aes(x=State,
                   xend=State,
                   y=0,
                   yend=Murder), color="blue") +  coord_flip()
```




```
library(gapminder)
```

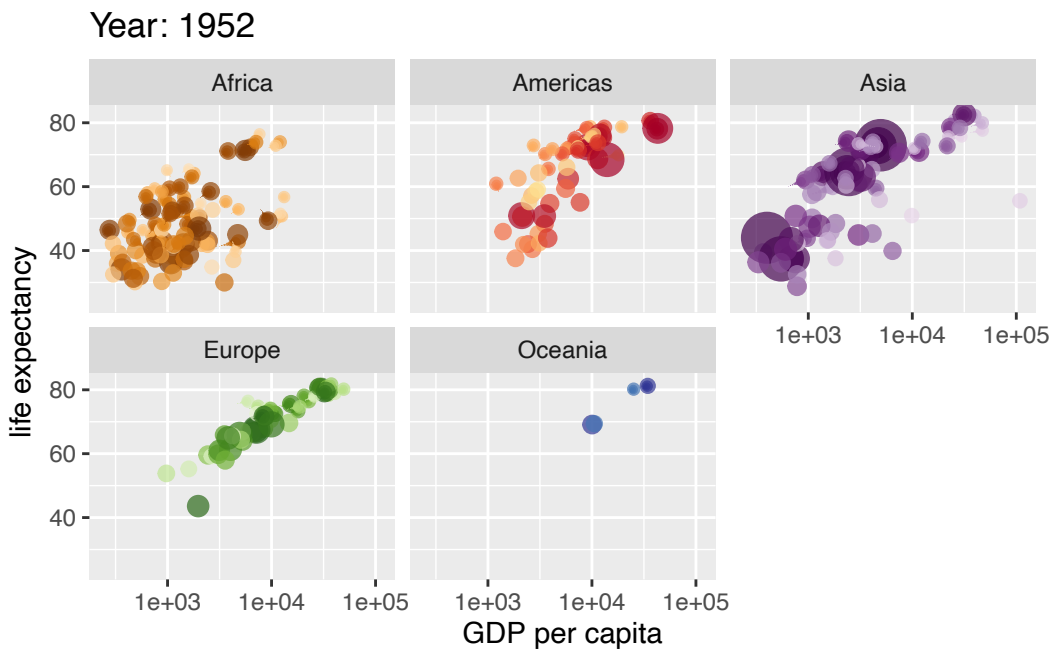
```
Attaching package: 'gapminder'
```

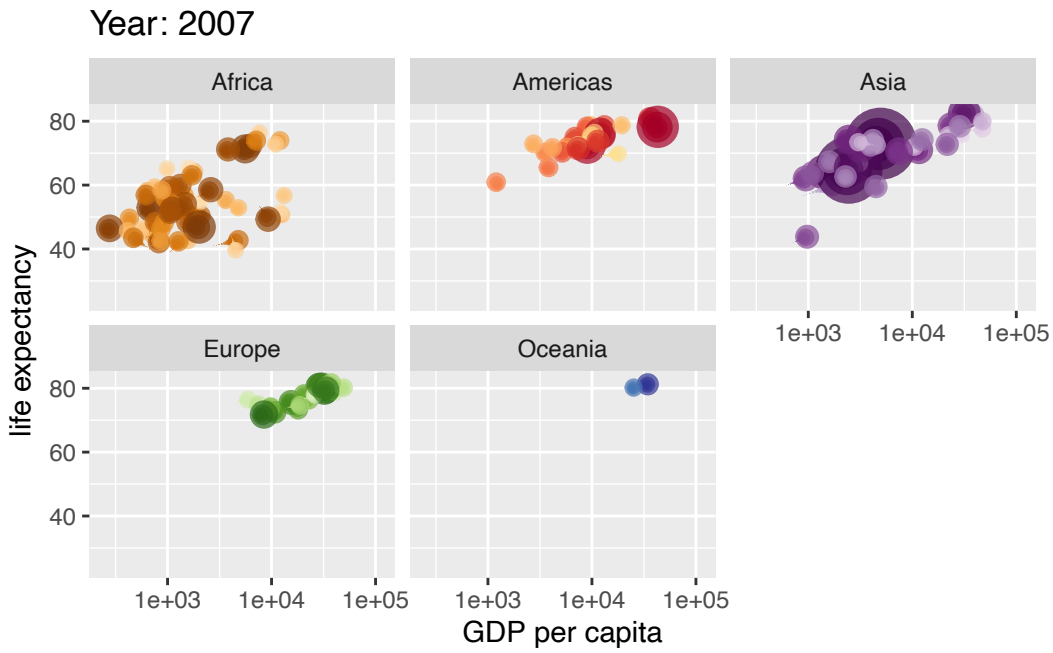
```
The following object is masked _by_ '.GlobalEnv':

    gapminder
```

```
library(gganimate)

# Setup nice regular ggplot of the gapminder data
ggplot(gapminder, aes(gdpPercap, lifeExp, size = pop, colour = country)) +
  geom_point(alpha = 0.7, show.legend = FALSE) +
  scale_colour_manual(values = country_colors) +
  scale_size(range = c(2, 12)) +
  scale_x_log10() +
  # Facet by continent
  facet_wrap(~continent) +
  # Here comes the gganimate specific bits
  labs(title = 'Year: {frame_time}', x = 'GDP per capita', y = 'life expectancy') +
```

```
  transition_time(year) +
  shadow_wake(wake_length = 0.1, alpha = FALSE)
```

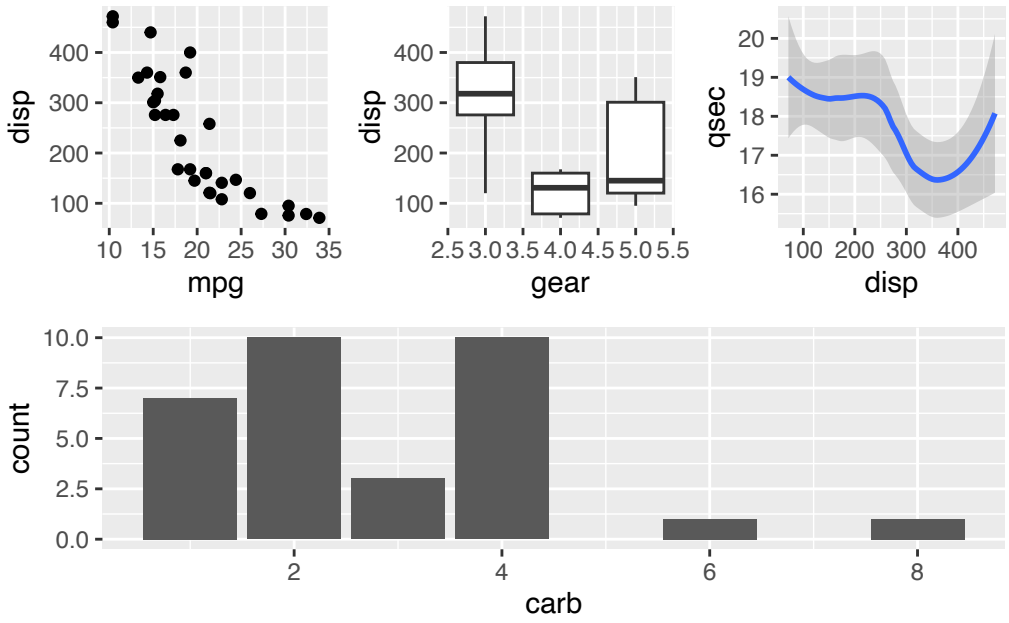
```
Warning in formals(fun): argument is not a function
```






```
library(patchwork)

# Setup some example plots
p1 <- ggplot(mtcars) + geom_point(aes(mpg, disp))
p2 <- ggplot(mtcars) + geom_boxplot(aes(gear, disp, group = gear))
p3 <- ggplot(mtcars) + geom_smooth(aes(disp, qsec))
p4 <- ggplot(mtcars) + geom_bar(aes(carb))

# Use patchwork to combine them here:
(p1 | p2 | p3) /
      p4
```

```
`geom_smooth()` using method = 'loess' and formula = 'y ~ x'
```




```
sessionInfo()
```

```
R version 4.5.1 (2025-06-13)
Platform: aarch64-apple-darwin20
Running under: macOS Sequoia 15.6

Matrix products: default
BLAS:   /Library/Frameworks/R.framework/Versions/4.5-arm64/Resources/lib/libRblas.0.dylib
LAPACK: /Library/Frameworks/R.framework/Versions/4.5-arm64/Resources/lib/libRlapack.dylib;

locale:
[1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8

time zone: America/Los_Angeles
tzcode source: internal

attached base packages:
[1] stats     graphics  grDevices utils     datasets  methods   base

other attached packages:
[1] patchwork_1.3.2  gganimate_1.0.11 gapminder_1.0.1  dplyr_1.1.4
[5] ggplot2_4.0.0
```

```
loaded via a namespace (and not attached):
 [1] Matrix_1.7-3       gtable_0.3.6       jsonlite_2.0.0     compiler_4.5.1
 [5] crayon_1.5.3       tidyselect_1.2.1   splines_4.5.1      progress_1.2.3
 [9] scales_1.4.0       yaml_2.3.10        fastmap_1.2.0      lattice_0.22-7
[13] R6_2.6.1           labeling_0.4.3     generics_0.1.4     knitr_1.50
[17] tibble_3.3.0       pillar_1.11.1      RColorBrewer_1.1-3 rlang_1.1.6
[21] stringi_1.8.7      xfun_0.53          S7_0.2.0           cli_3.6.5
[25] mgcv_1.9-3         withr_3.0.2        magrittr_2.0.4     tweenr_2.0.3
[29] digest_0.6.37      grid_4.5.1         rstudioapi_0.17.1  hms_1.1.3
[33] nlme_3.1-168       lifecycle_1.0.4    prettyunits_1.2.0  vctrs_0.6.5
[37] evaluate_1.0.5     glue_1.8.0         farver_2.1.2       gifski_1.32.0-2
[41] rmarkdown_2.30     tools_4.5.1        pkgconfig_2.0.3    htmltools_0.5.8.1
```