

Scales, guides, and themes

Data Visualisation mini-course

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Start



IDEAS
START
HERE

Chris Knight

Catch-up

```
library('gapminder')
library('ggplot2')

## load some new data
load(url('http://bit.ly/gss_data'))
ls()
```

```
## [1] "gss_sm"
```

```
p <- ggplot(gapminder, aes(x = year, y = gdpPercap))
```

Scales, guides, and themes

- Scale

Every aesthetic has a scale – if you want to adjust the scale use a `scale_` function

- Guide

Many scales are linked with a legend or a *guide* – if you want to adjust these use the `guides()` function

- Theme

Plots comprise a number of features that are not directly related to the data

- grid lines
- background
- legend placement
- typeface

To adjust these features use the `theme()` function or a pre-set theme e.g. `theme_bw()`

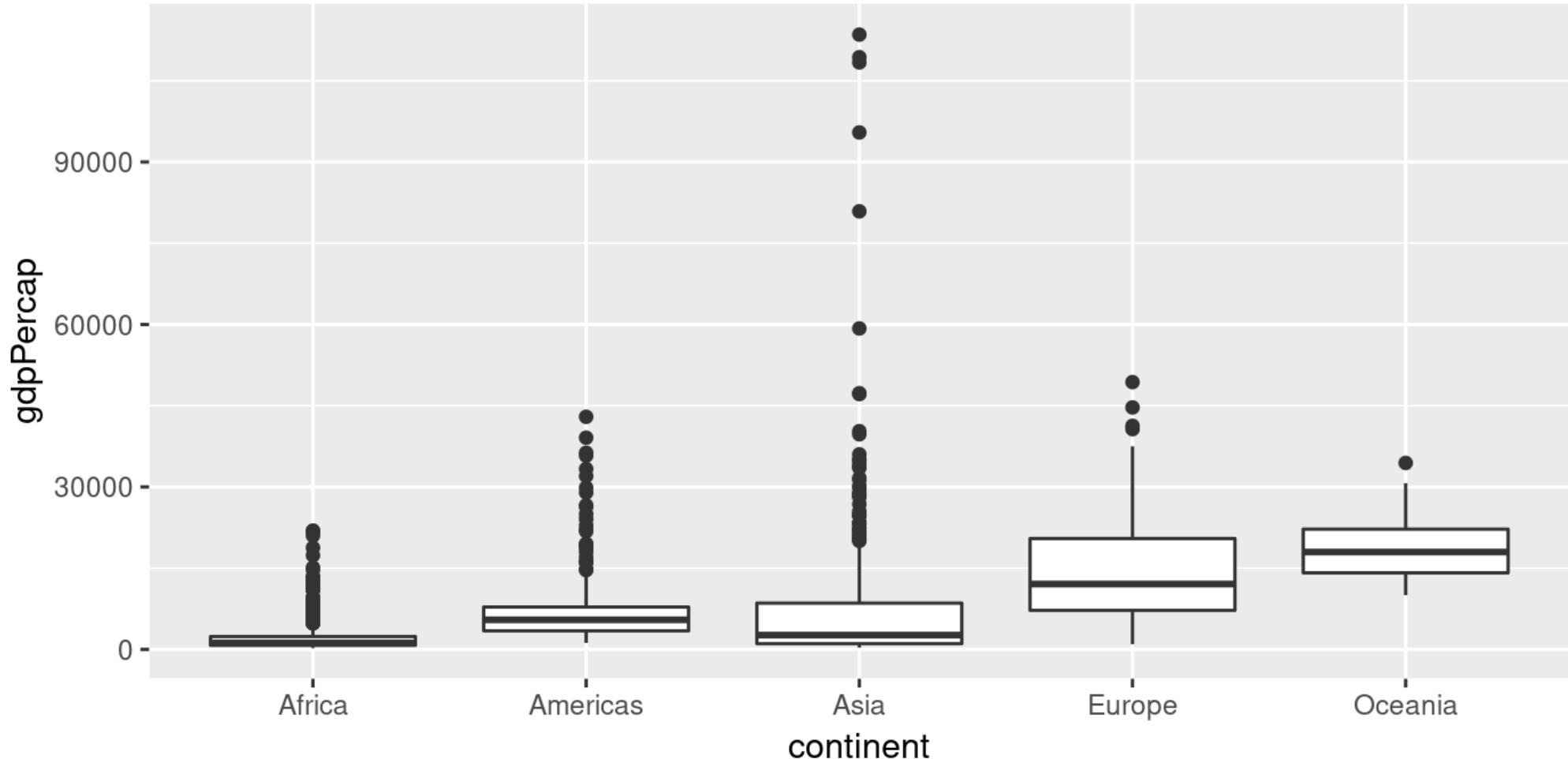
Scales



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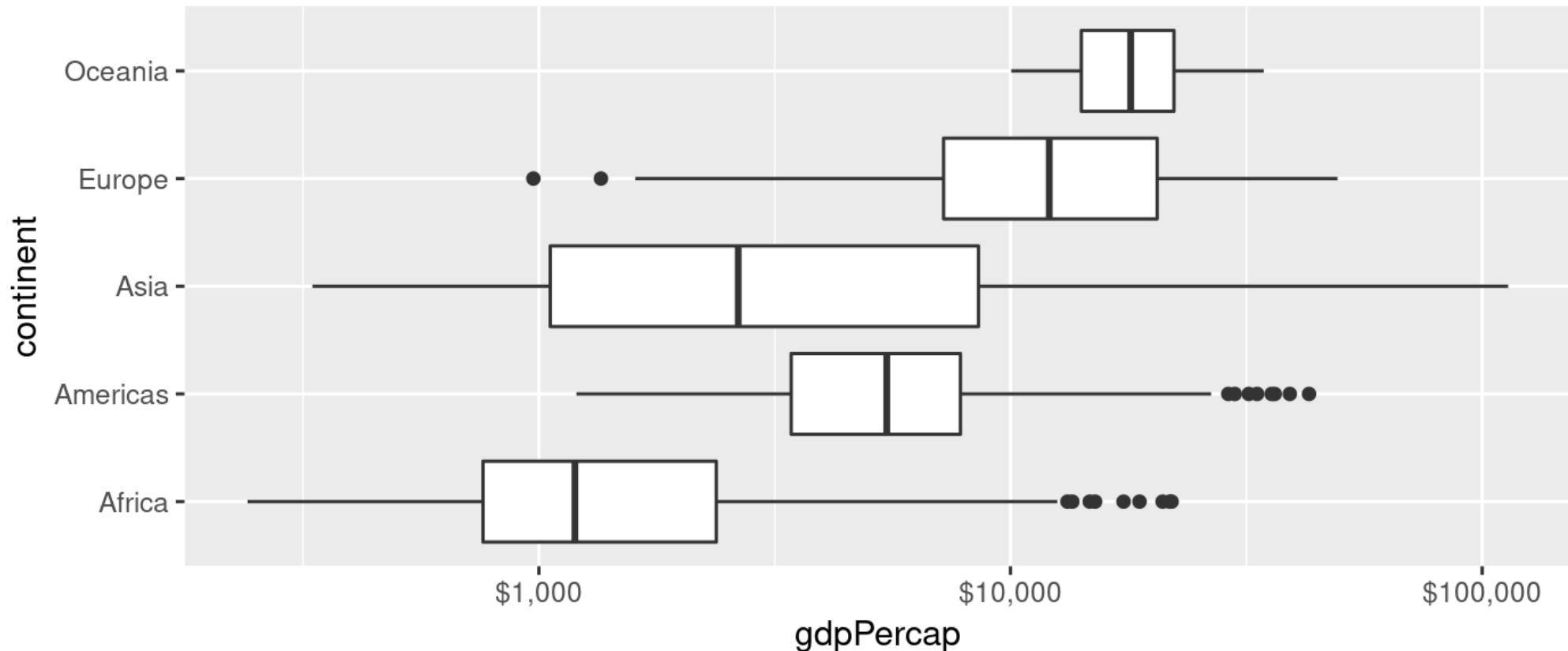
Scales

```
ggplot(gapminder, aes(x = continent, y = gdpPercap)) + geom_boxplot()
```



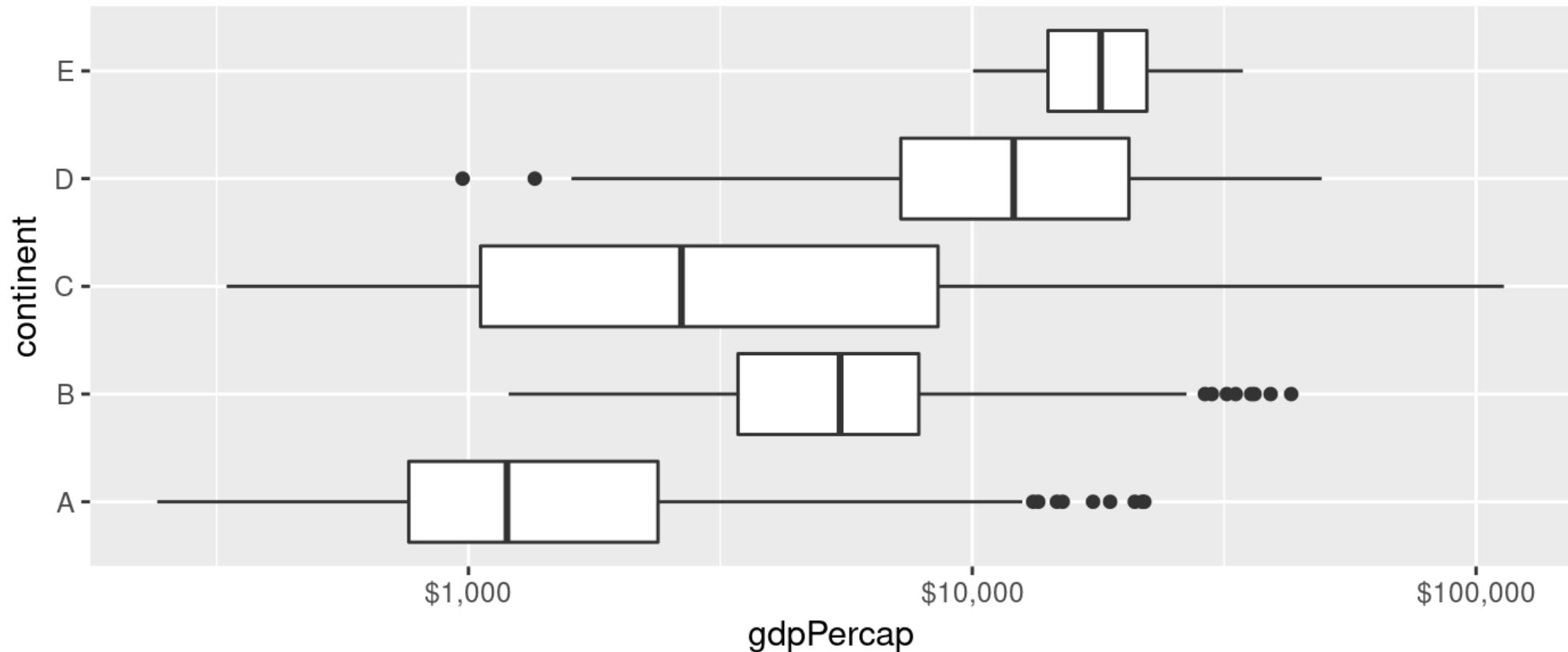
Scales

```
ggplot(gapminder, aes(x = continent, y = gdpPercap)) + geom_boxplot() +  
  scale_y_log10(labels = scales::dollar) + coord_flip()
```



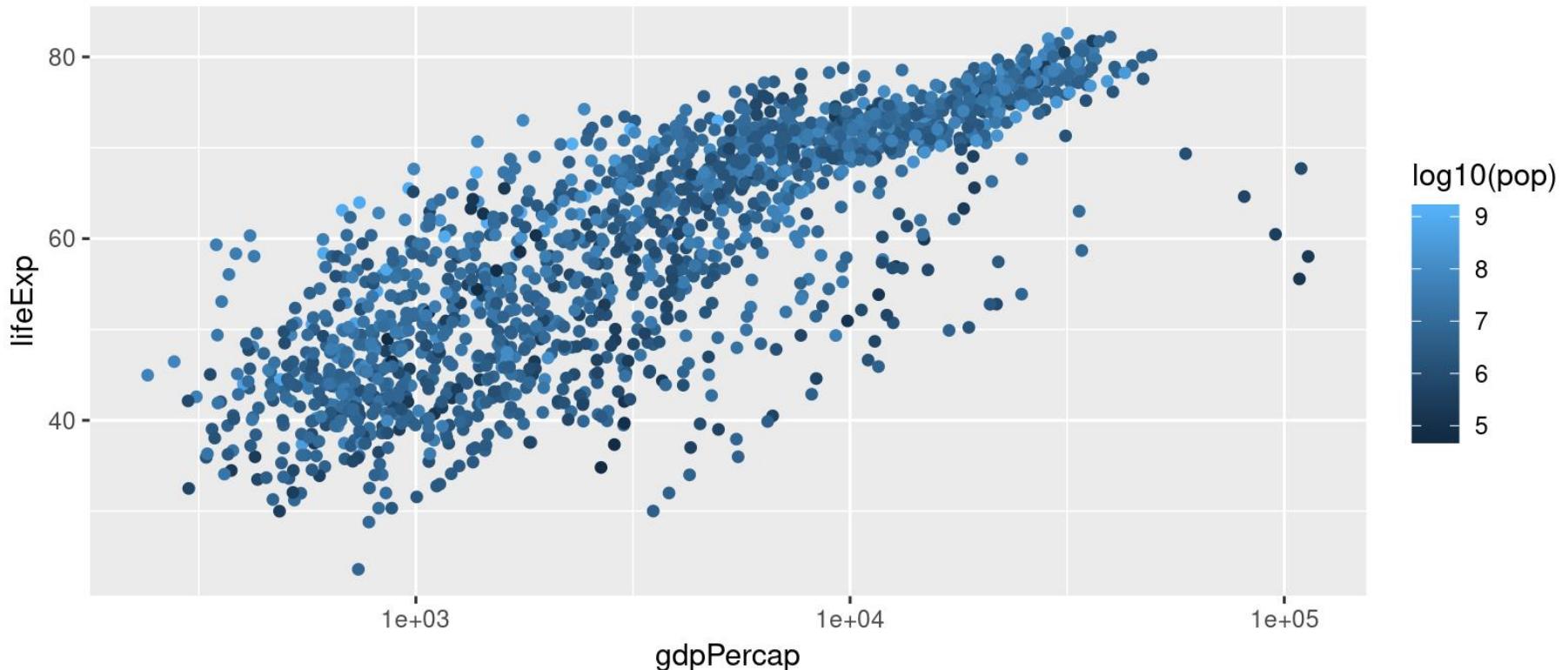
Scales

```
ggplot(gapminder, aes(x = continent, y = gdpPercap)) + geom_boxplot() +  
  scale_y_log10(labels = scales::dollar) + coord_flip() +  
  scale_x_discrete(labels = LETTERS[1:5])
```



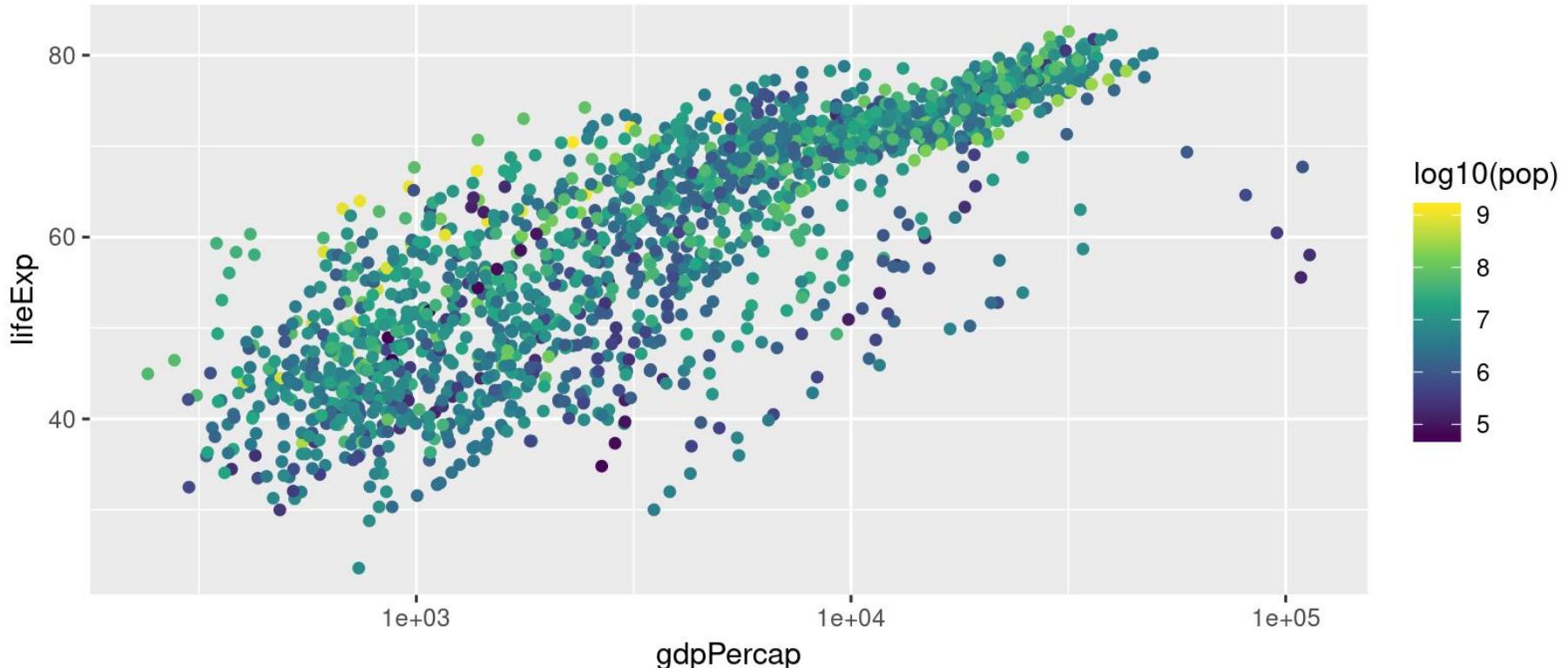
Continuous colour scales

```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) +  
  geom_point(mapping = aes(colour = log10(pop))) + scale_x_log10()
```



Continuous colour scales

```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) +  
  geom_point(mapping = aes(colour = log10(pop))) + scale_x_log10() +  
  scale_colour_viridis_c()
```



Scales

Each type of mapping has an associated scale

`scale_MAPPING_KIND()`

`scale_x_continuous()` for a continuous x-axis scale

`scale_y_discrete()` for a discrete scale

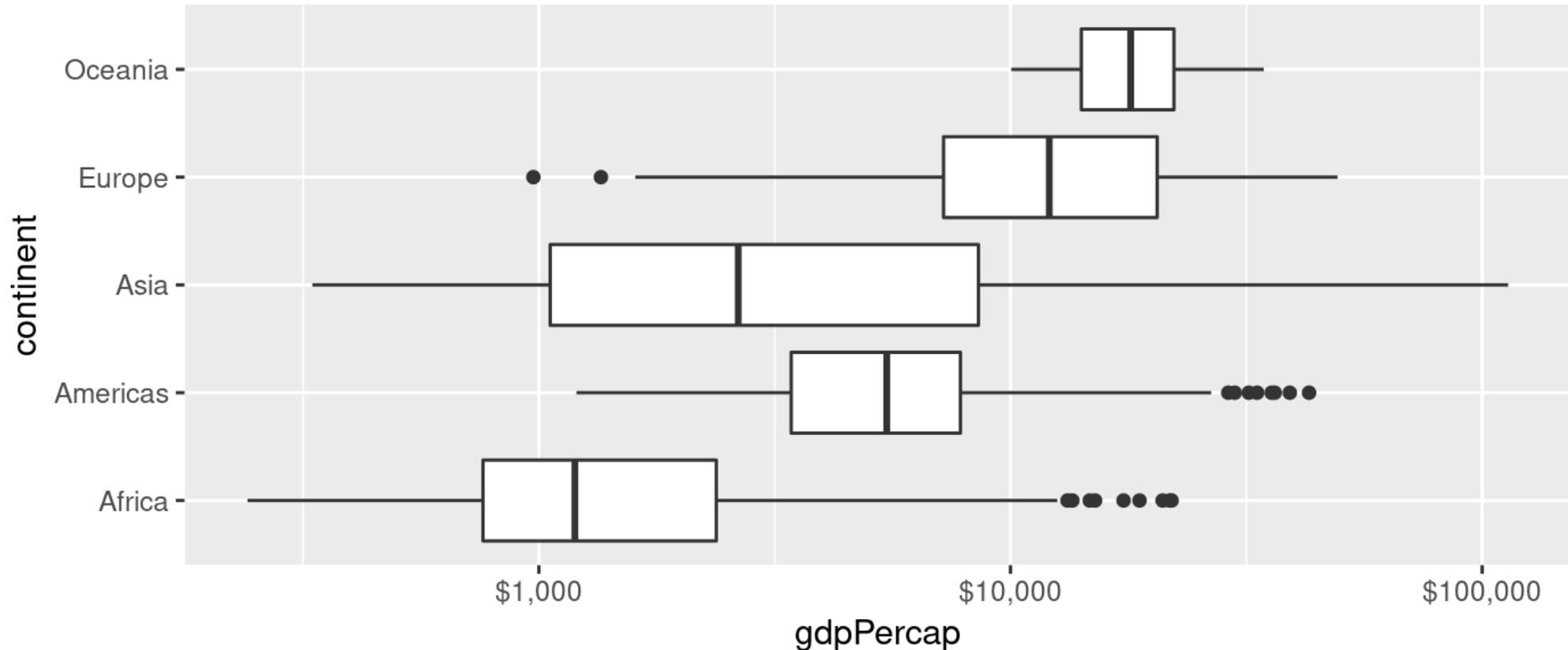
Scales can transform data – the `trans` argument allows for many popular/common transformations

Scales apply transformation **before** any statistical transformation / calculation

If you want to apply a transformation after the stat use `coord_trans()`

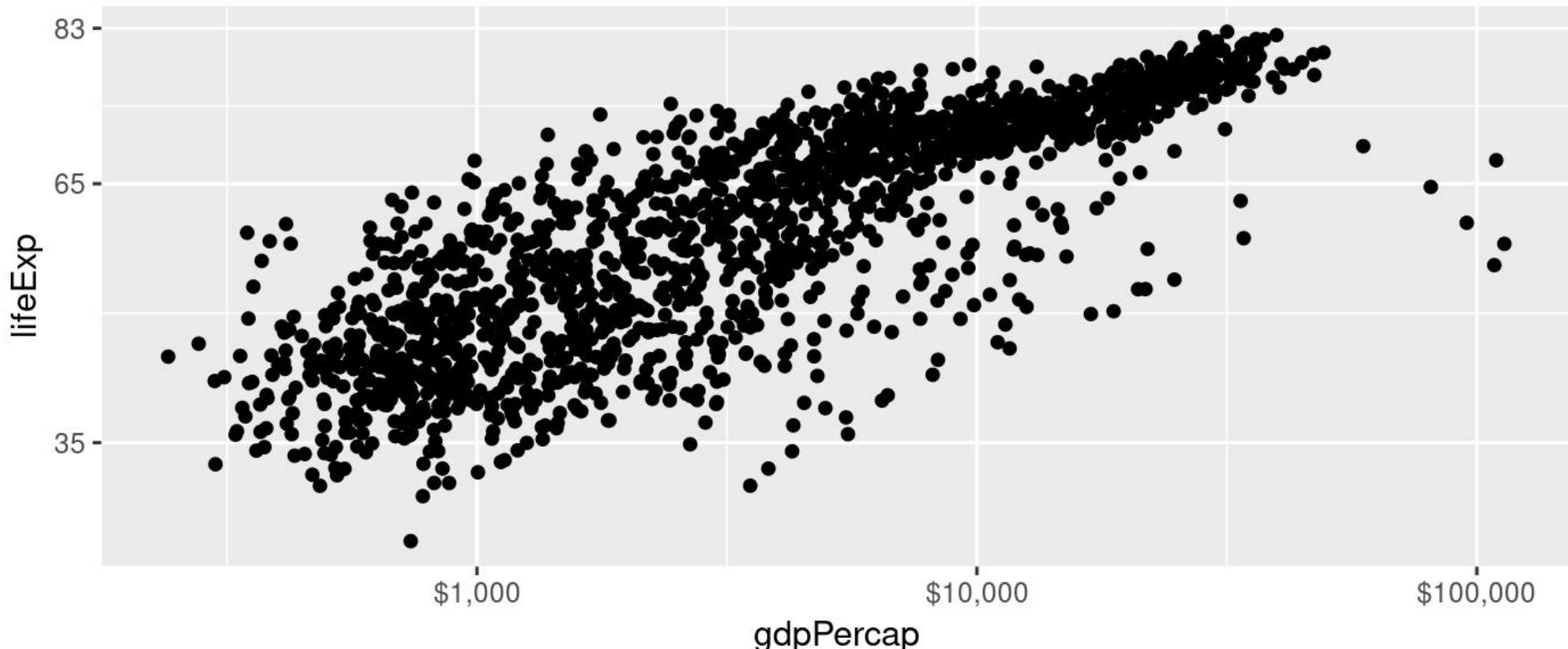
Scales and transforms

```
ggplot(gapminder, aes(x = continent, y = gdpPercap)) + geom_boxplot() +  
  scale_y_continuous(trans = 'log10', labels = scales::dollar) + coord_flip()
```



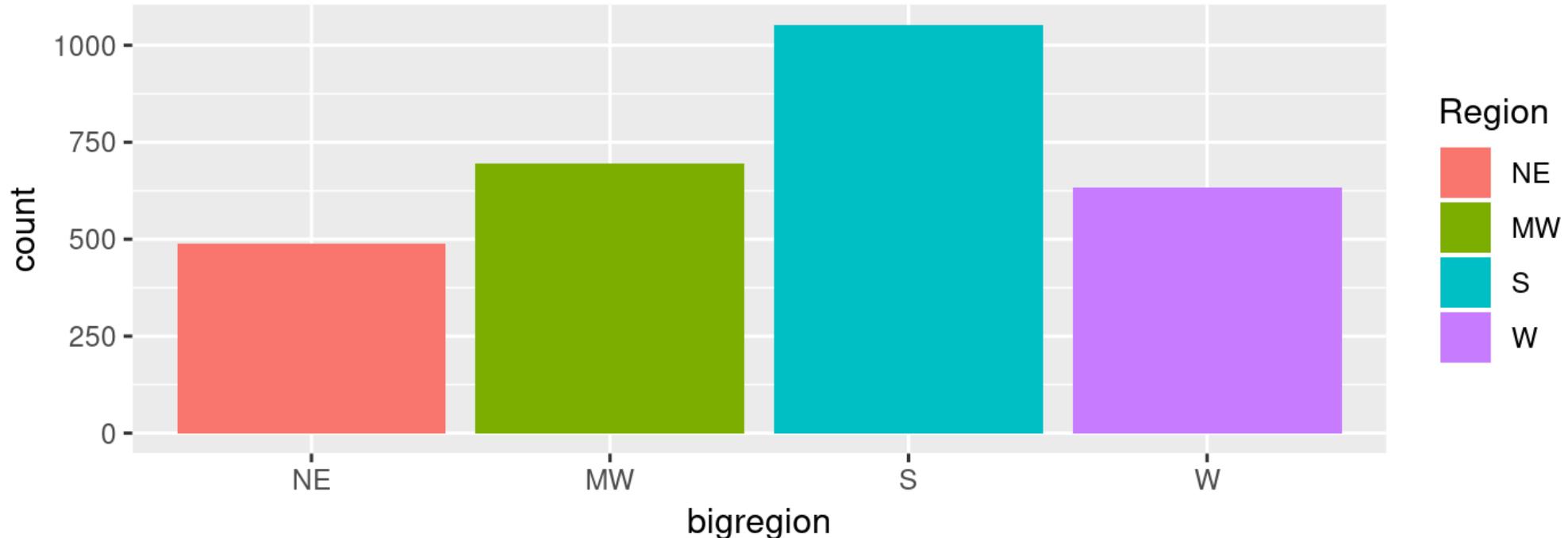
Scales and breaks

```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) + geom_point() +  
  scale_x_continuous(trans = 'log10', labels = scales::dollar) +  
  scale_y_continuous(breaks = c(35, 65, 83))
```



Scales and breaks

```
lab <- c('NE', 'MW', 'S', 'W')  
ggplot(gss_sm, aes(x = bigregion, fill = bigregion)) + geom_bar() +  
  scale_fill_discrete(name = 'Region', labels = lab) +  
  scale_x_discrete(labels = lab)
```



Guides



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Guides — offer finer control over legends

Add to the plot using the `guides()` function

`guide_legend()` is for discrete legends

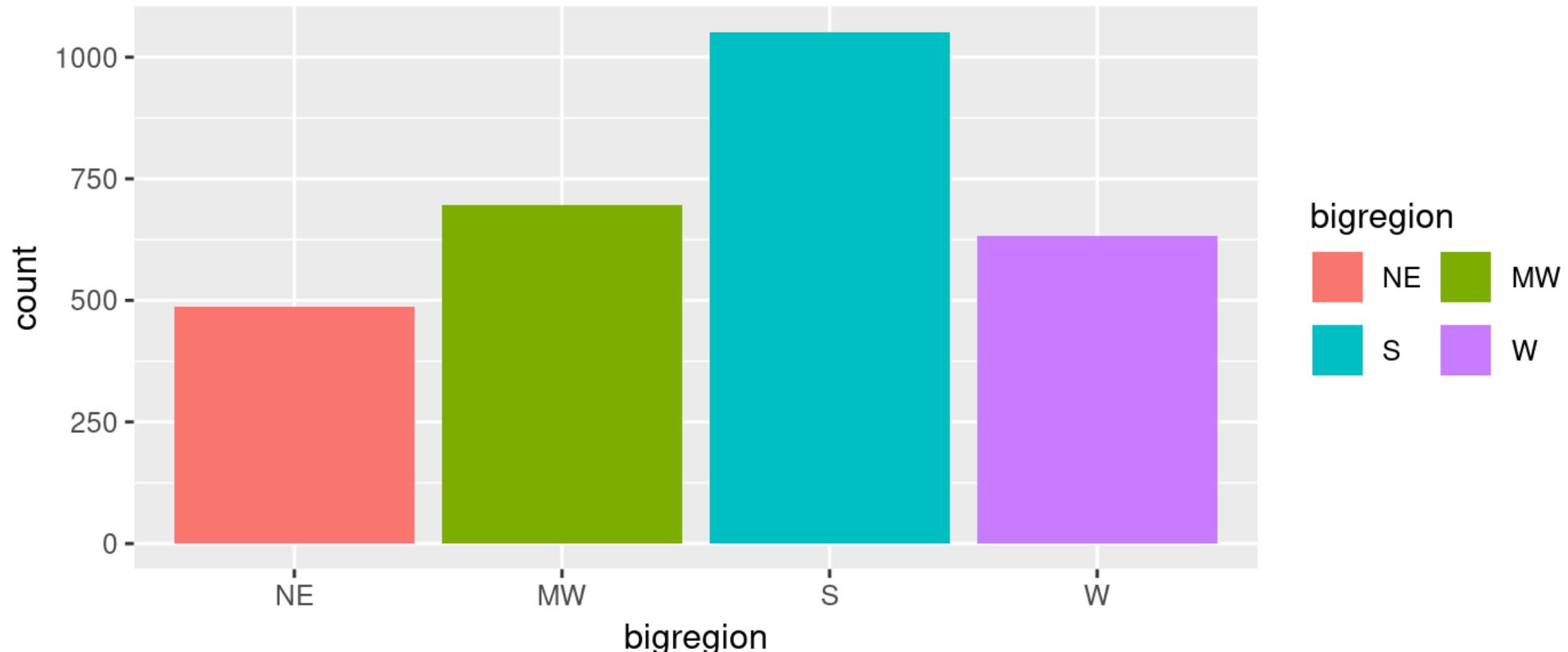
`guide_colourbar()` is for continuous colour ranges

Guides – offer finer control over legends

```
lab <- c('NE', 'MW', 'S', 'W')
ggplot(gss_sm, aes(x = bigregion, fill = bigregion)) + geom_bar() +
  scale_fill_discrete(labels = lab) + scale_x_discrete(labels = lab) +
  guides(fill = FALSE)
```

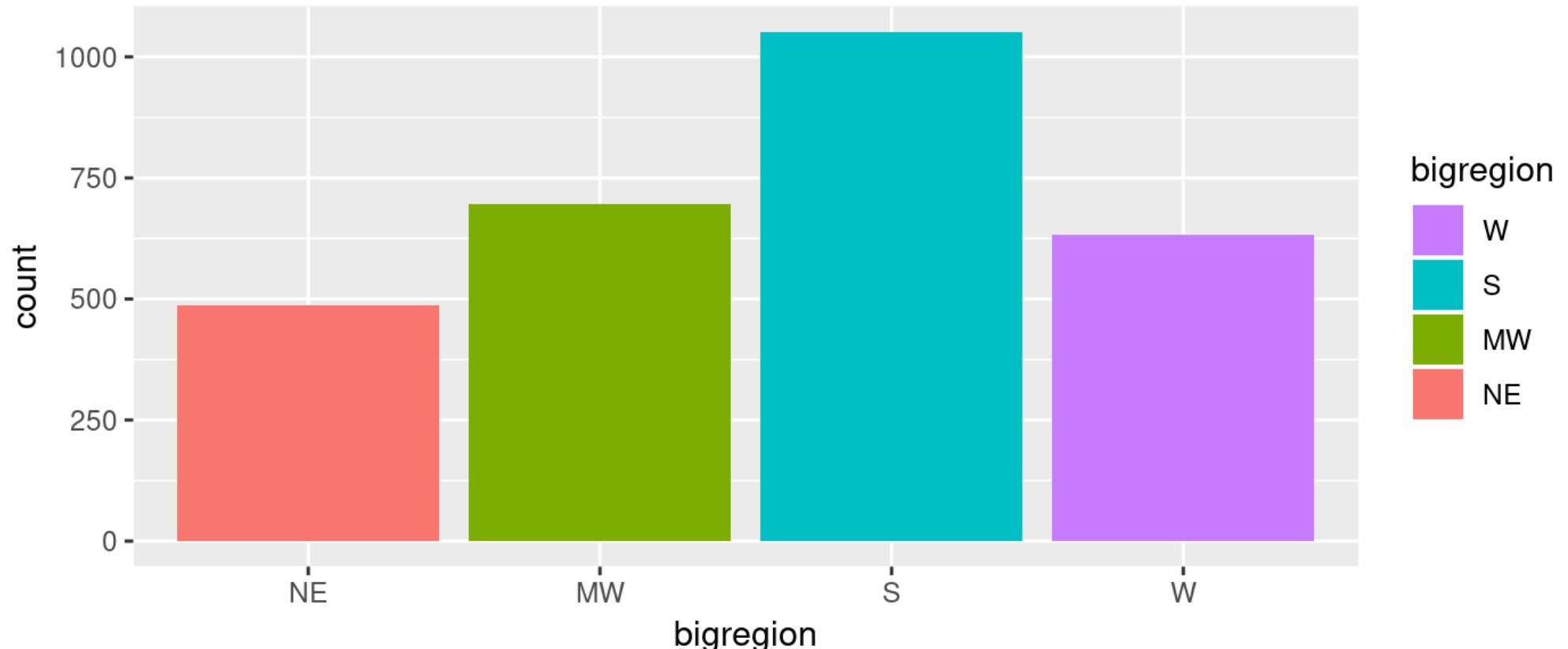
Guides – offer finer control over legends

```
ggplot(gss_sm, aes(x = bigregion, fill = bigregion)) + geom_bar() +  
  scale_fill_discrete(labels = lab) + scale_x_discrete(labels = lab) +  
  guides(fill = guide_legend(ncol = 2, byrow = TRUE))
```



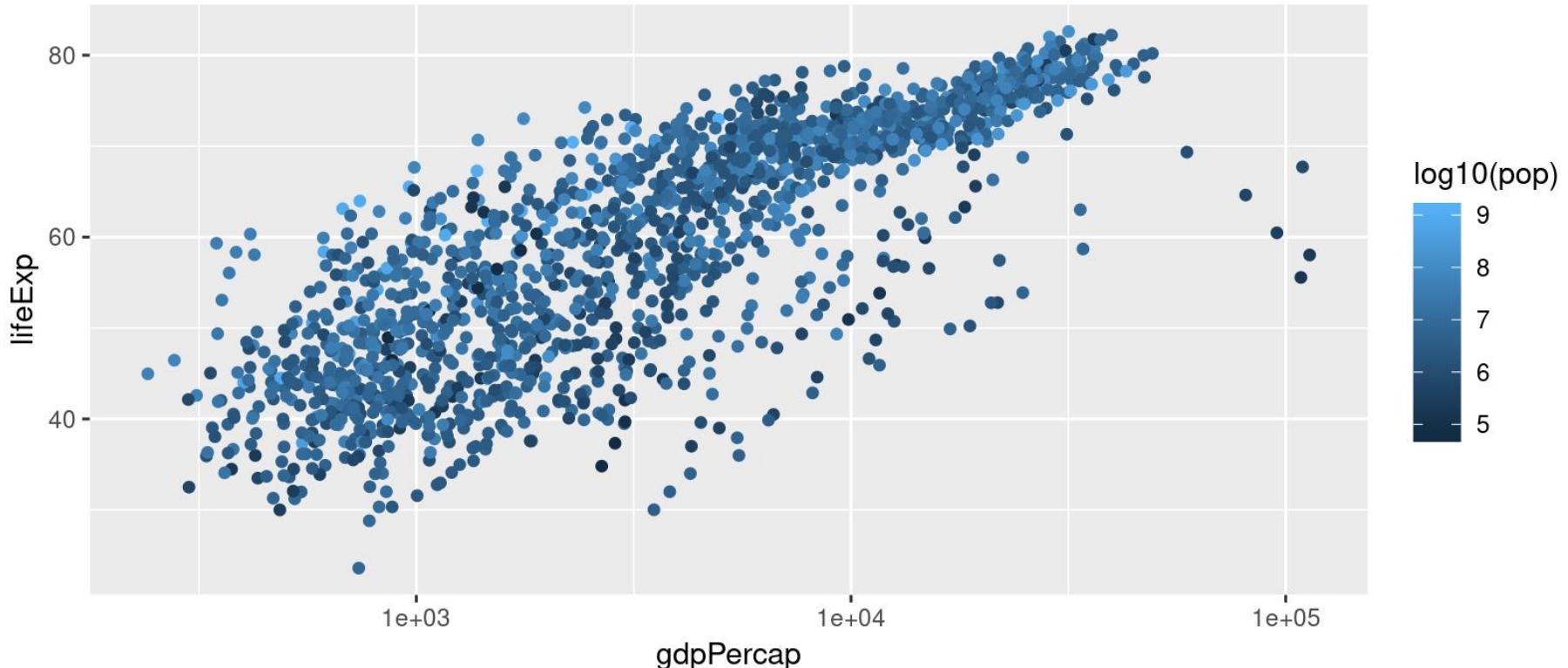
Guides – offer finer control over legends

```
ggplot(gss_sm, aes(x = bigregion, fill = bigregion)) + geom_bar() +  
  scale_fill_discrete(labels = lab) + scale_x_discrete(labels = lab) +  
  guides(fill = guide_legend(reverse = TRUE))
```



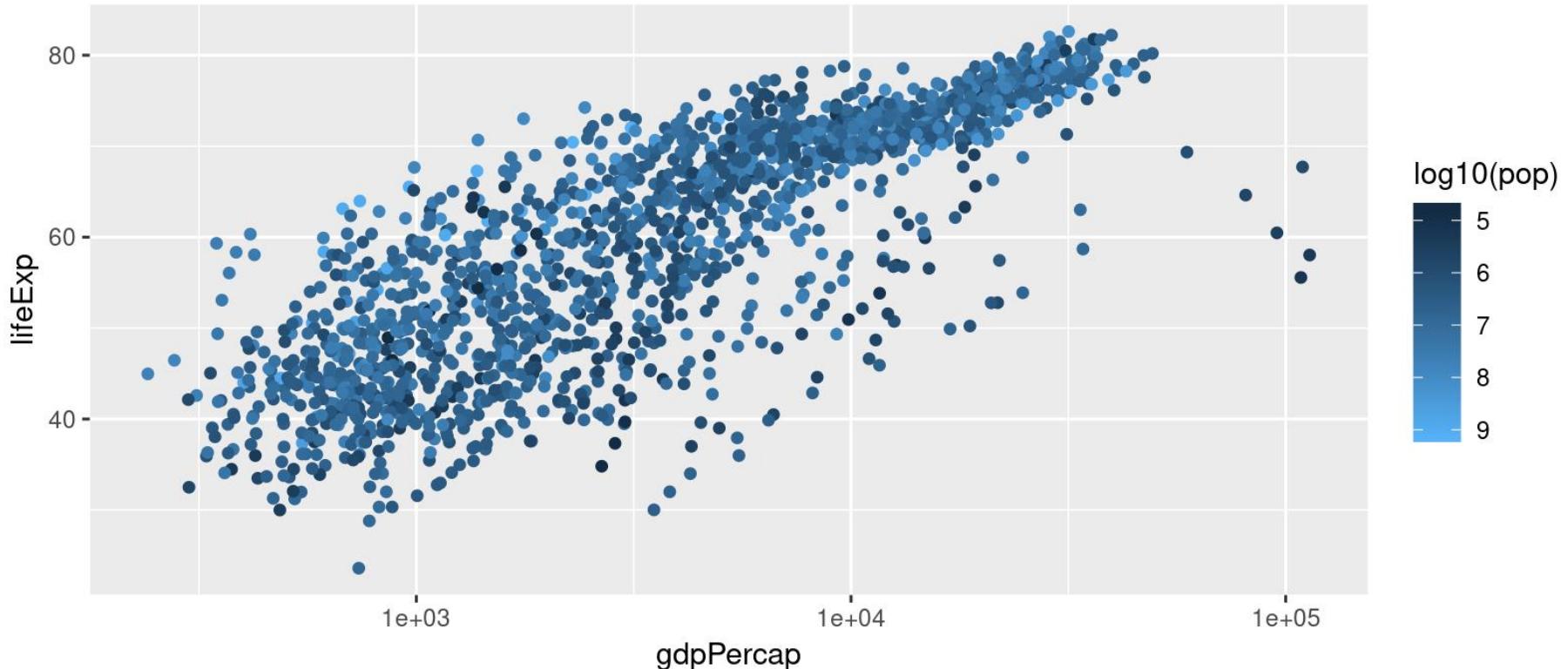
Guides – `guide_colourbar()`

```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) +  
  geom_point(mapping = aes(colour = log10(pop))) + scale_x_log10() +  
  guides(colour = guide_colourbar(reverse = FALSE))
```



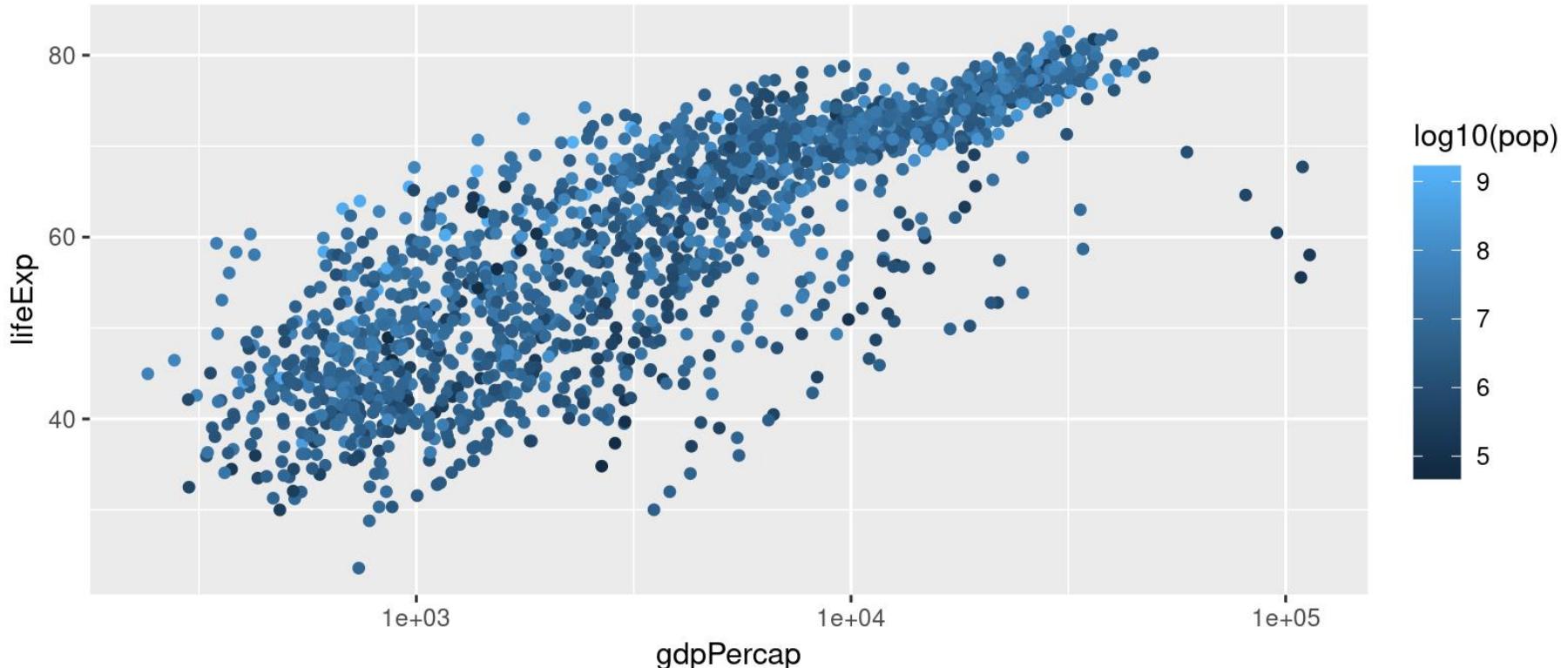
Guides – `guide_colourbar()`

```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) +  
  geom_point(mapping = aes(colour = log10(pop))) + scale_x_log10() +  
  guides(colour = guide_colourbar(reverse = TRUE))
```



Guides – `guide_colourbar()`

```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) +  
  geom_point(mapping = aes(colour = log10(pop))) + scale_x_log10() +  
  guides(colour = guide_colourbar(barheight = unit(4, 'cm')))
```



Themes



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Moving the legend

```
ggplot(gapminder, aes(x = gdpPercap, y = lifeExp)) +  
  geom_point(mapping = aes(colour = log10(pop))) + scale_x_log10() +  
  theme(legend.position = 'top')
```

