Graphic Design with ggplot2

Concepts of the `{ggplot2}` Package Pt. 2:
Solution Exercise 2

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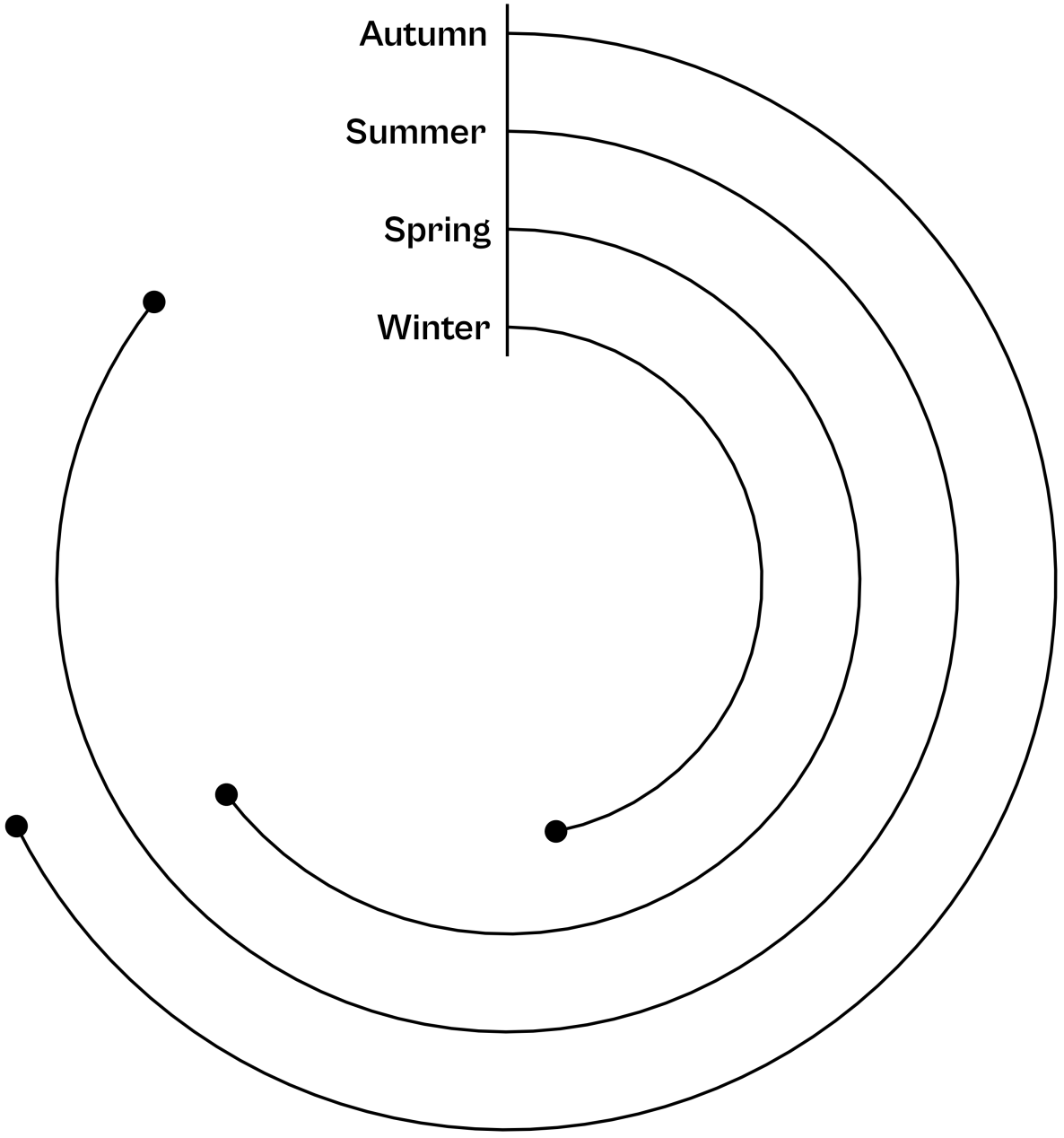
Exercise 2

- Create a circular lollipop plot of reported bike shares per season.
  - The data is not in the right format as there are no totals.
    How can you solve it?
  - Remove all legend elements (with a single line of code).
  - How can you add the labels next to the starting point of each lollipop?
  - How could you add a baseline?


Autumn
Summer
Spring
Winter

Preparation

```
library(tidyverse)

bikes <- readr::read_csv(
  "https://raw.githubusercontent.com/z3tt/graphic-design-ggplot2/main/data/london-bikes-custom.csv",
  col_types = "Dcfffilllddddc"
)

bikes$season <- forcats::fct_inorder(bikes$season)

theme_set(theme_light(base_size = 14, base_family = "Roboto Condensed"))
```

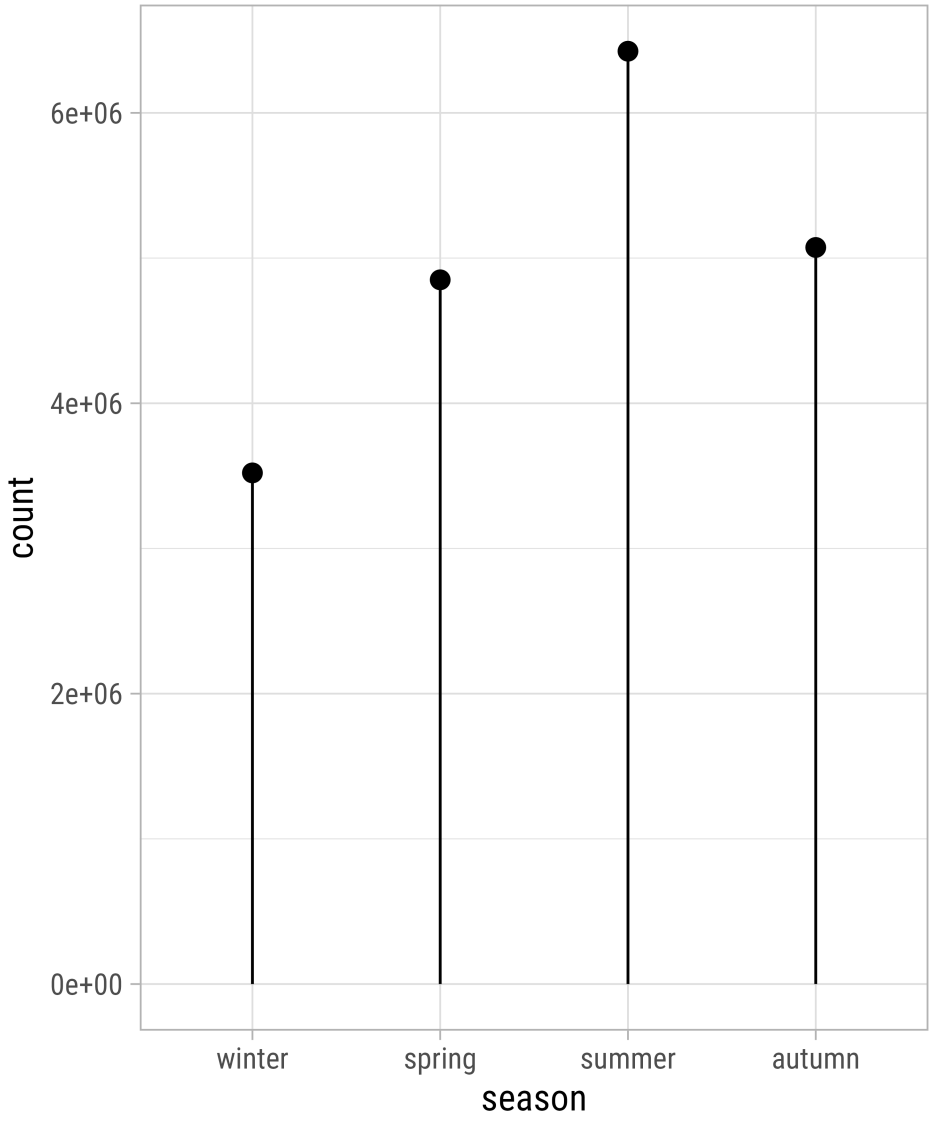
Lollipop Plot with Pre-Calculated Sums

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count))
```

```
# A tibble: 4 x 2
  season   count
  <fct>    <int>
1 winter 3520407
2 spring 4850236
3 summer 6424609
4 autumn 5073040
```

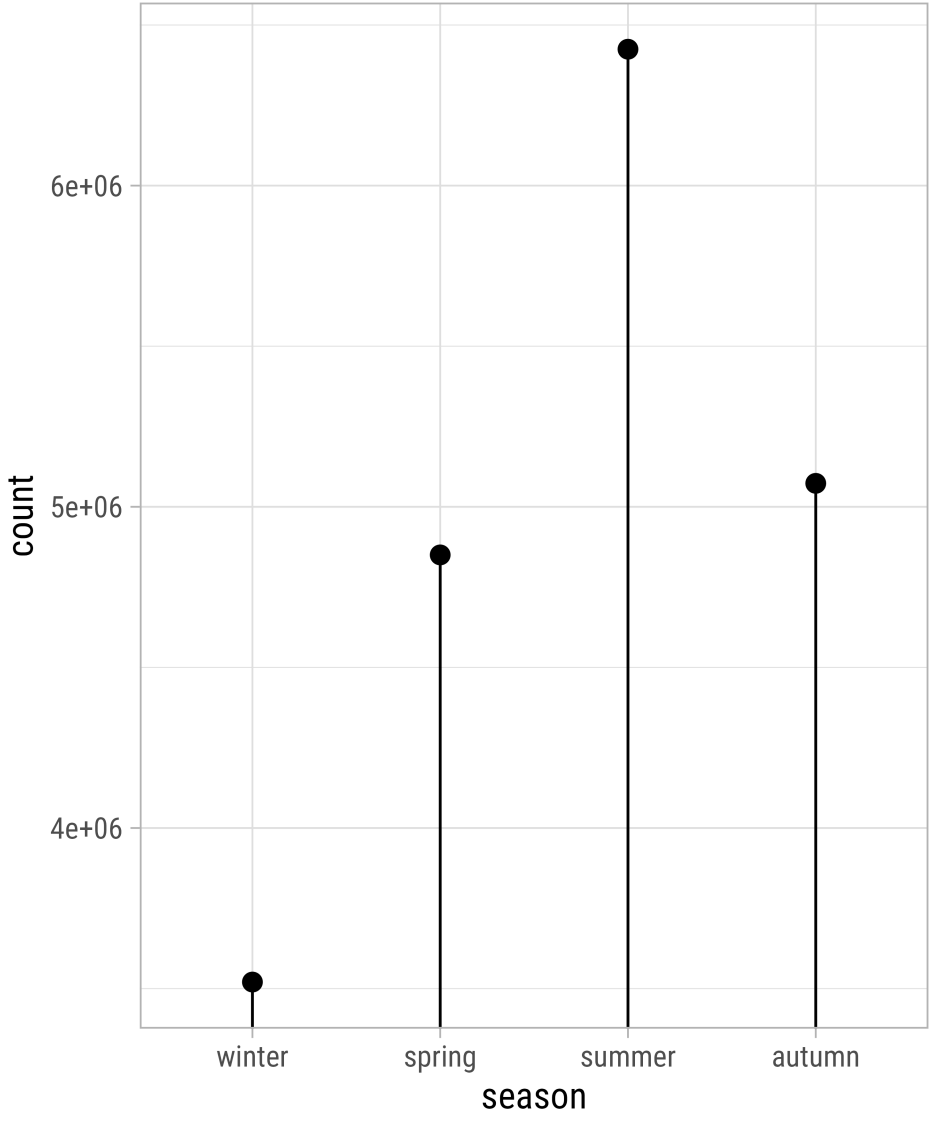
Lollipop Plot with Pre-Calculated Sums

```
1  bikes %>%
2    group_by(season) %>%
3    summarize(count = sum(count)) %>%
4    ggplot(aes(x = season, y = count)) +
5    geom_point(size = 3) +
6    geom_linerange(
7      aes(ymin = 0, ymax = count)
8    )
```



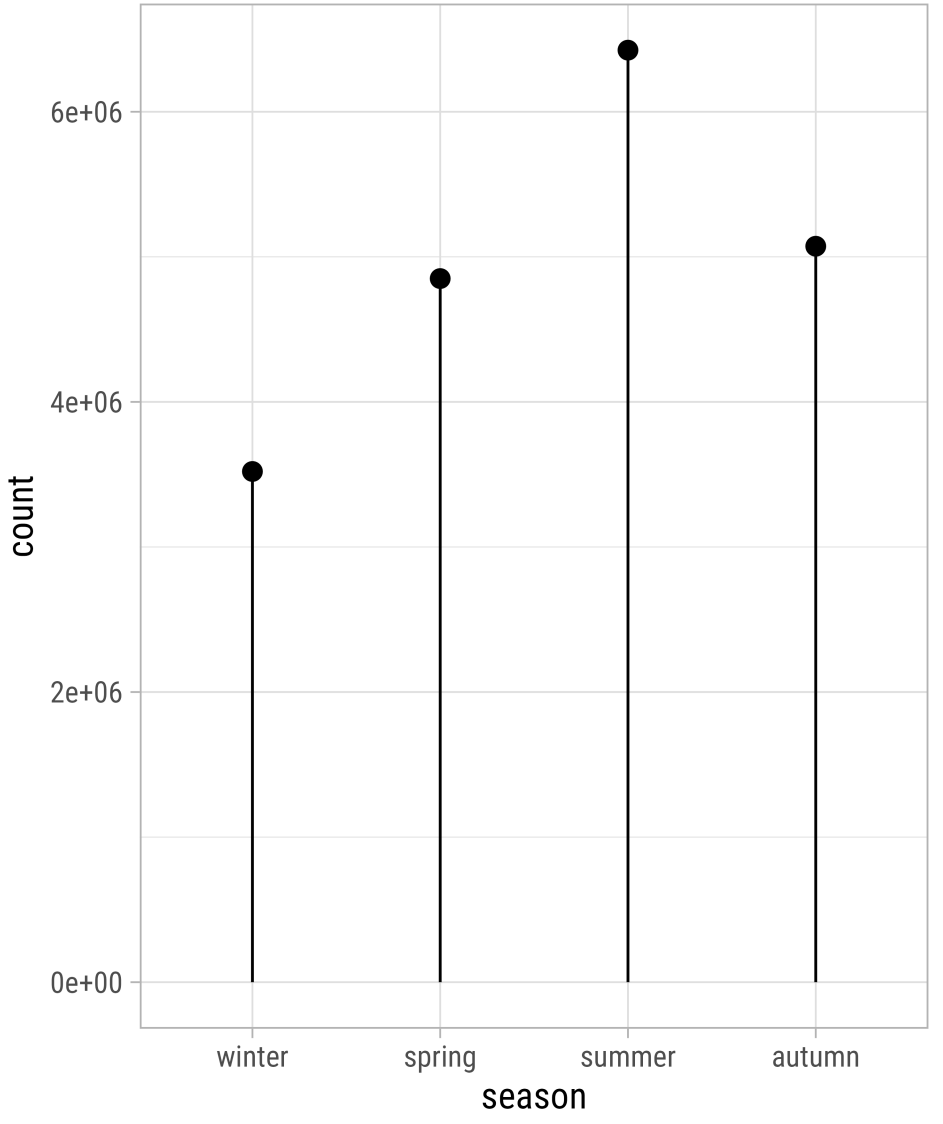
Calculate Sums via `stat_summary()`

```
ggplot(bikes, aes(x = season, y = count)) +
  stat_summary(
    geom = "point", fun = "sum", size = 3
  ) +
  stat_summary(
    geom = "linerange", ymin = 0,
    fun.max = function(y) sum(y)
  )
```



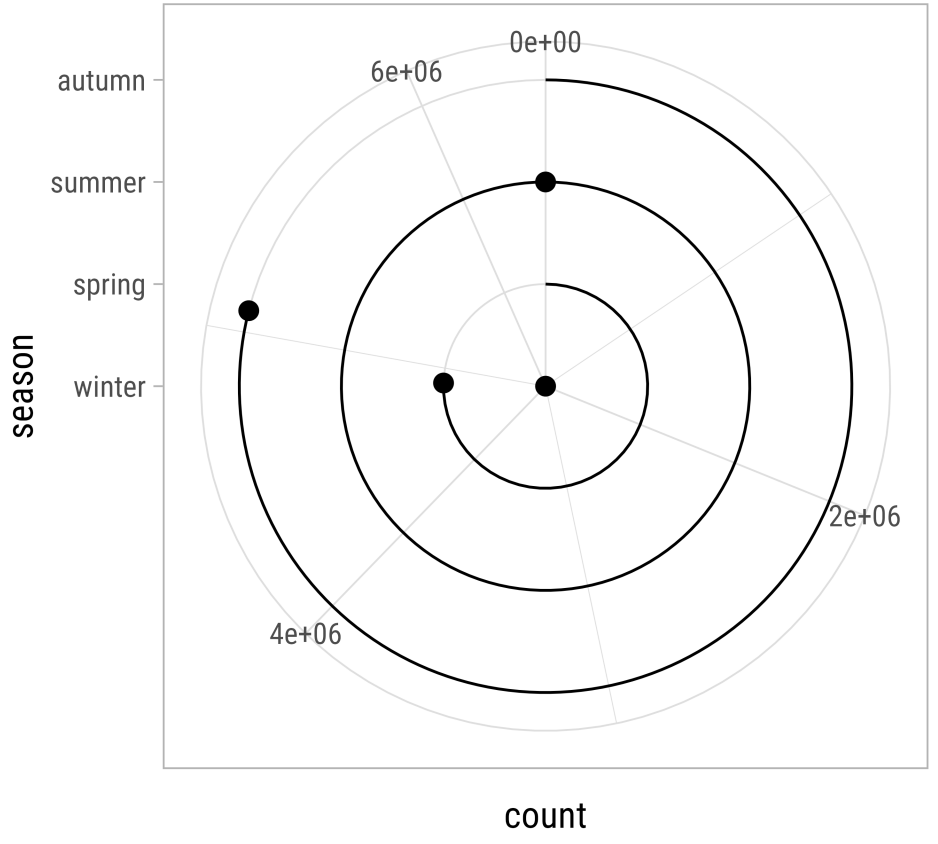
Calculate Sums via `stat_summary()`

```
ggplot(bikes, aes(x = season, y = count)) +
  stat_summary(
    geom = "point", fun = "sum", size = 3
  ) +
  stat_summary(
    geom = "linerange", ymin = 0,
    fun.max = function(y) sum(y)
  ) +
  coord_cartesian(ylim = c(0, NA))
```



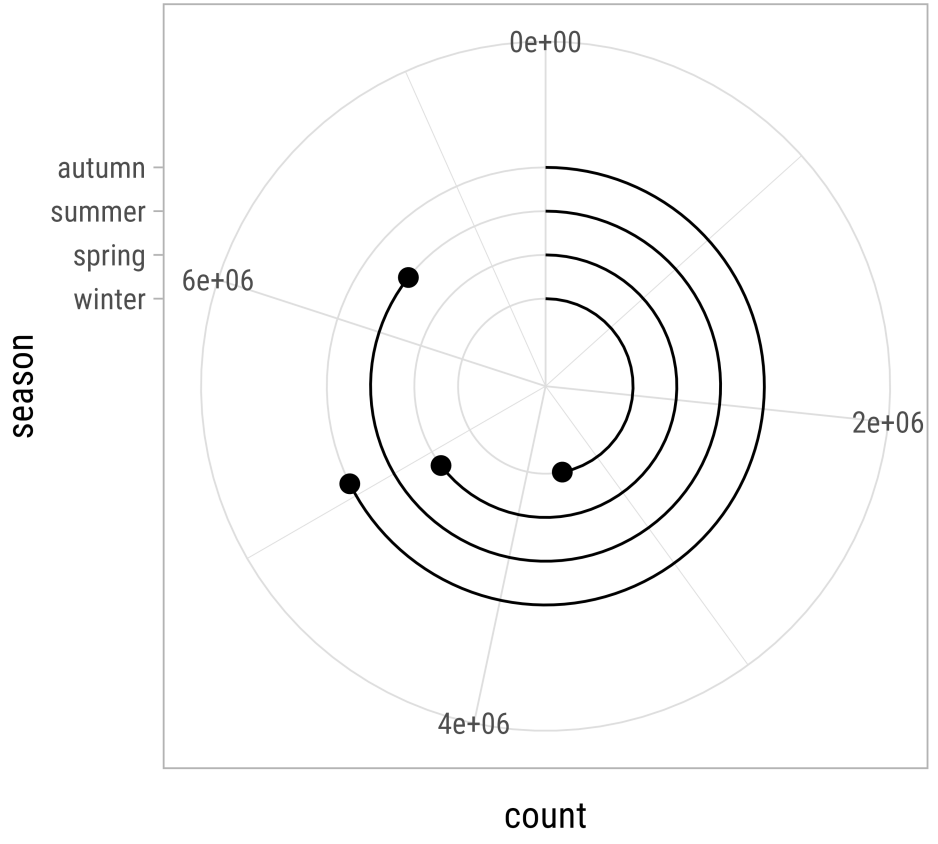
Apply a Polar Coordinate System

```
1  bikes %>%
2    group_by(season) %>%
3    summarize(count = sum(count)) %>%
4    ggplot(aes(x = season, y = count)) +
5    geom_point(size = 3) +
6    geom_linerange(
7      aes(ymin = 0, ymax = count)
8    ) +
9    coord_polar(theta = "y")
```



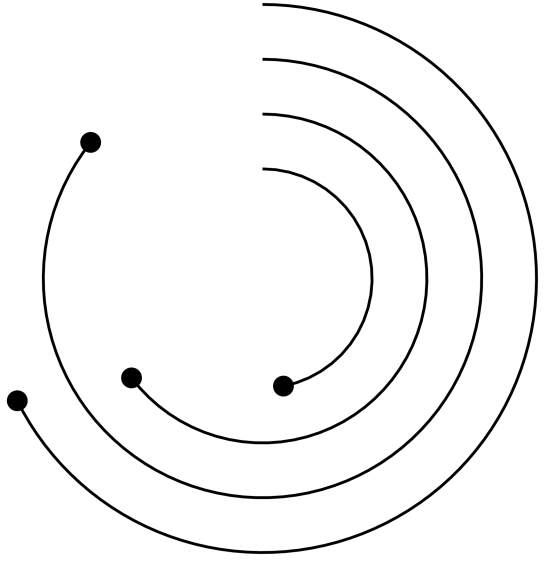
Fix Axis Ranges

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
  )
```



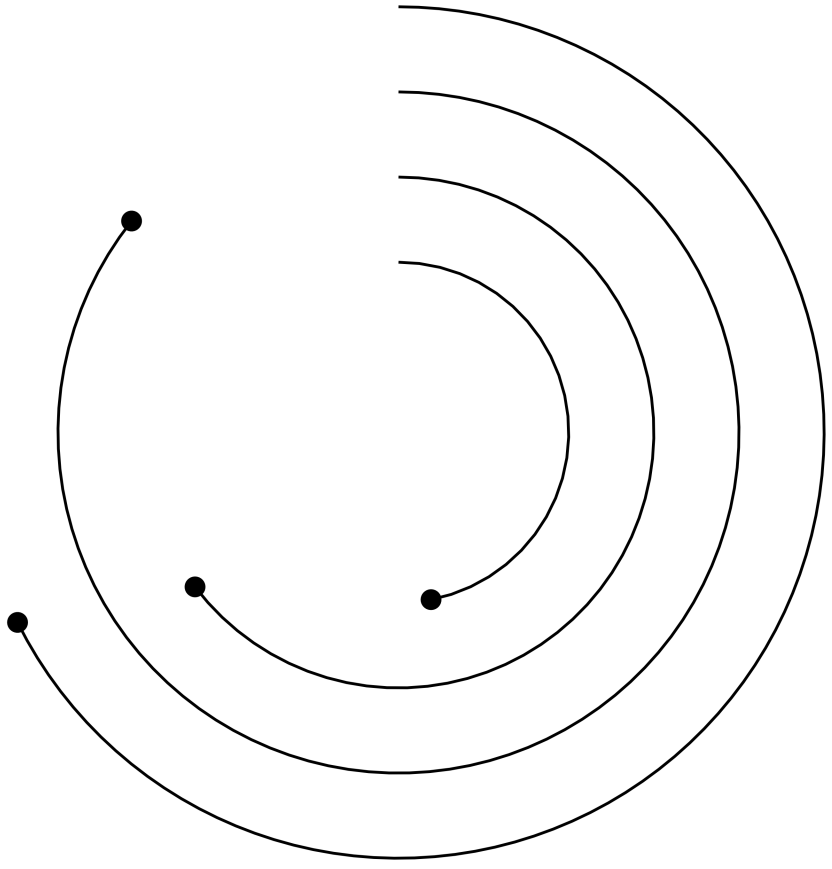
Remove All Theme Components

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
  ) +
  theme_void()
```



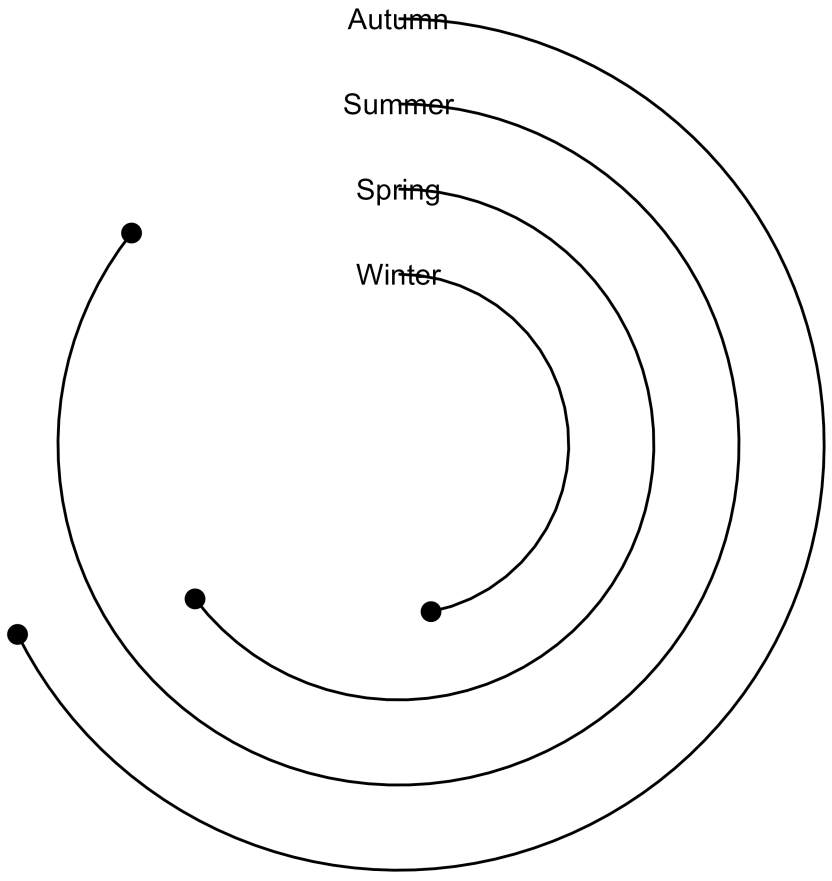
Fix Plot Margin

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
  ) +
  theme_void() +
  theme(plot.margin = margin(rep(-100, 4)))
```



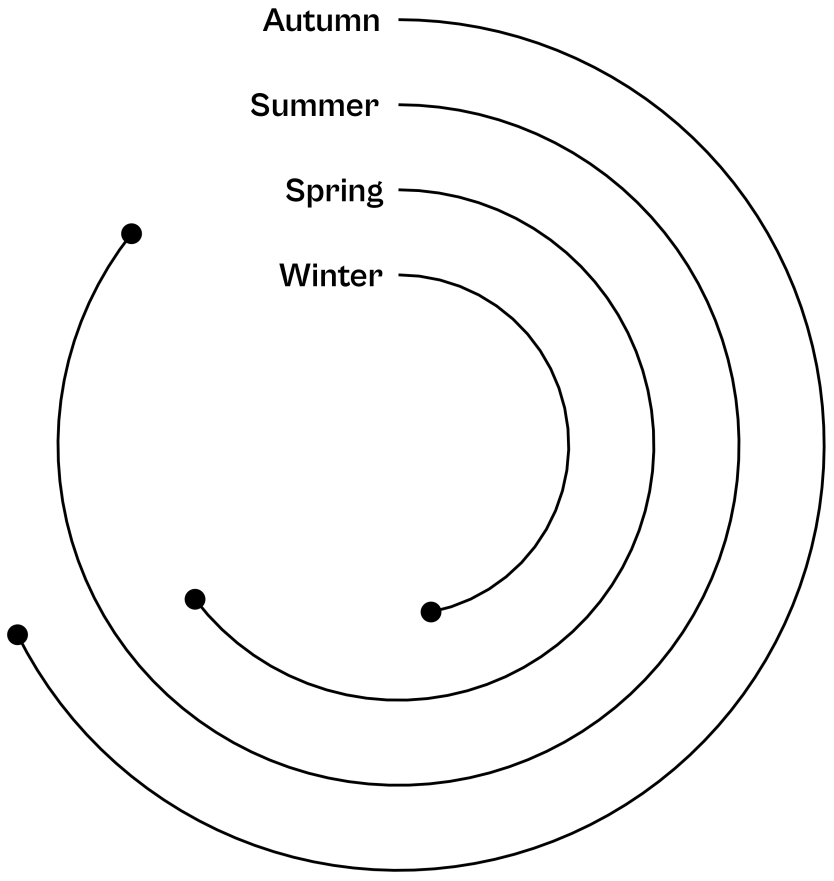
Add “Axis” Text

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  geom_text(
    aes(label = stringr::str_to_title(season),
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
  ) +
  theme_void() +
  theme(plot.margin = margin(rep(-100, 4)))
```



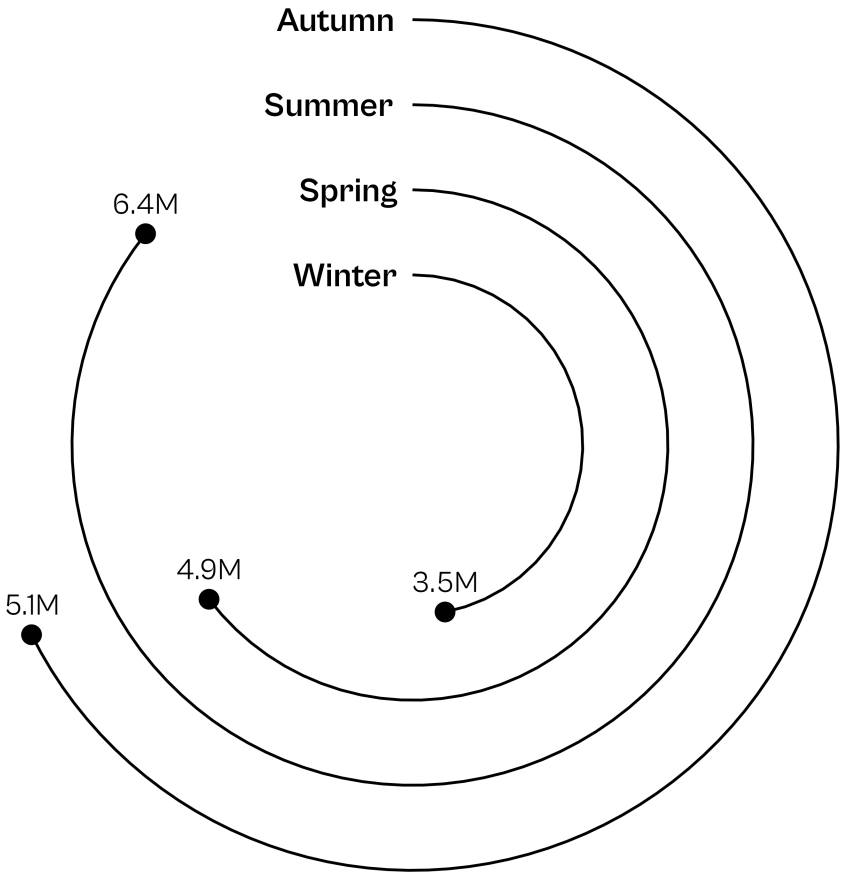
Style “Axis” Text

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  geom_text(
    aes(label = stringr::str_to_title(season),
    family = "Cabinet Grotesk", size = 4.5,
    fontface = "bold", hjust = 1.15
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
  ) +
  theme_void() +
  theme(plot.margin = margin(rep(-100, 4)))
```



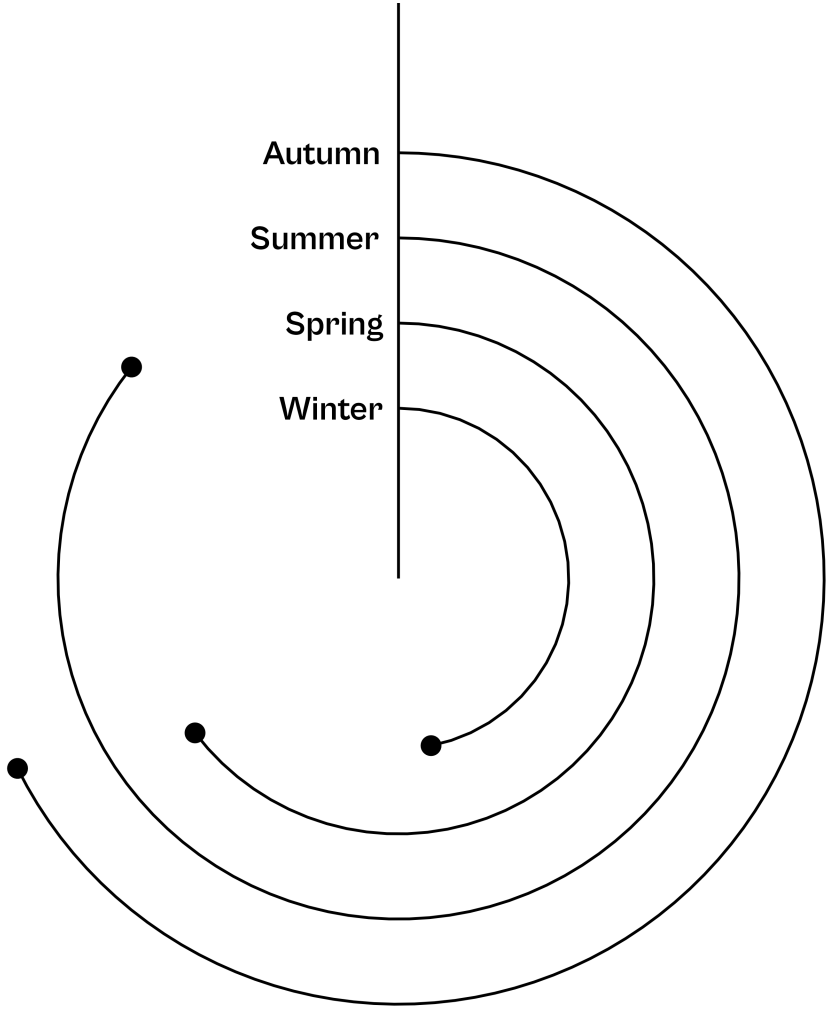
Alternatively: Add Direct Labels

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  geom_text(
    aes(label = stringr::str_to_title(season),
    family = "Cabinet Grotesk", size = 4.5,
    fontface = "bold", hjust = 1.15
  ) +
  geom_text(
    aes(label = paste0(round(count / 10^6, 1),
    size = 4, vjust = -1, family = "Cabinet Gr
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
```



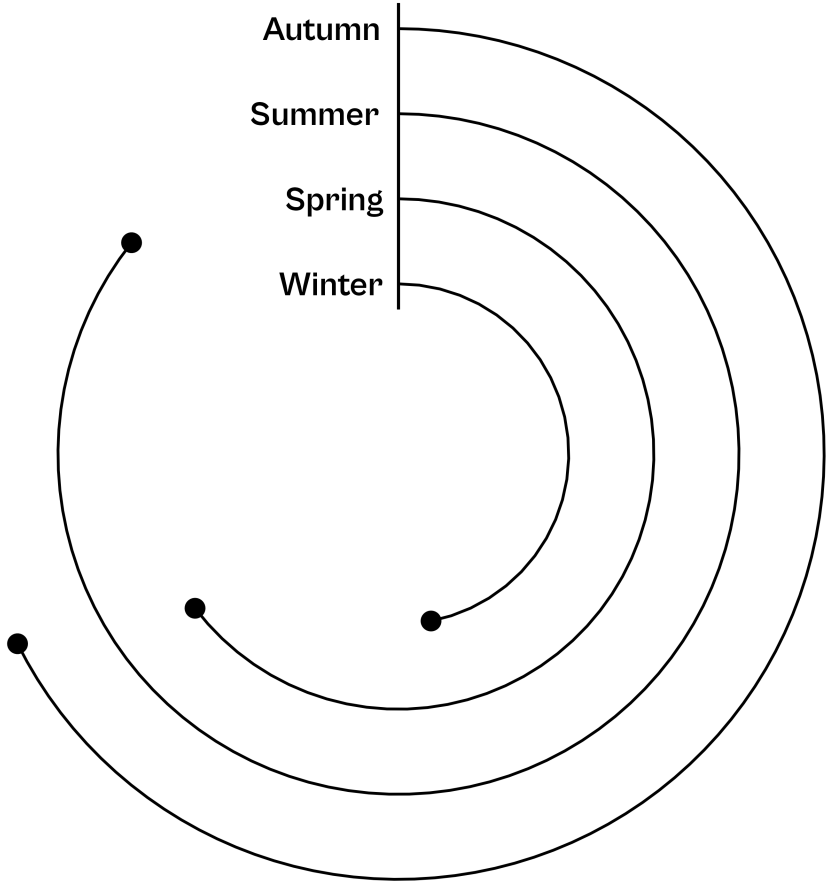
Add a Baseline — *ugly but simple*

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  geom_hline(yintercept = 0) +
  geom_text(
    aes(label = stringr::str_to_title(season),
    family = "Cabinet Grotesk", size = 4.5,
    fontface = "bold", hjust = 1.15
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
  ) +
  theme_void() +
  theme(plot.margin = margin(rep(-100, 4)))
```



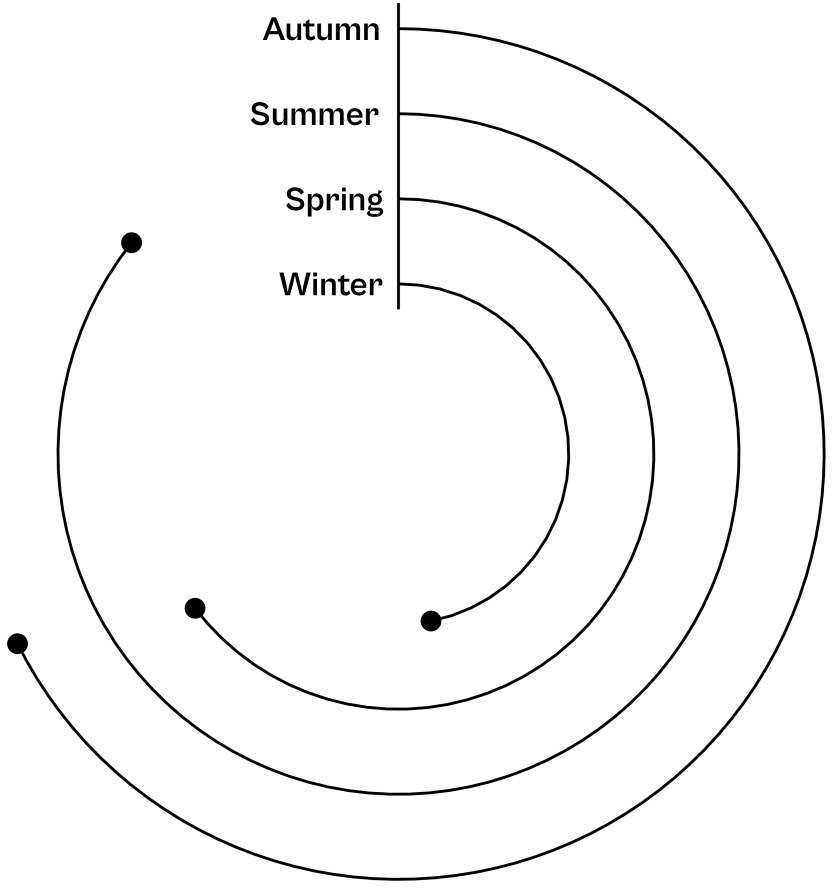
Add a Baseline — *nice but unusual*

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  geom_linerange(
    xmin = .7, xmax = 4.3, y = 0
  ) +
  geom_text(
    aes(label = stringr::str_to_title(season),
    family = "Cabinet Grotesk", size = 4.5,
    fontface = "bold", hjust = 1.15
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
  ) +
```



Add a Baseline — *yeah, that's it!*

```
bikes %>%
  group_by(season) %>%
  summarize(count = sum(count)) %>%
  ggplot(aes(x = season, y = count)) +
  geom_point(size = 3) +
  geom_linerange(
    aes(ymin = 0, ymax = count)
  ) +
  annotate(
    geom = "linerange",
    xmin = .7, xmax = 4.3, y = 0
  )  +
  geom_text(
    aes(label = stringr::str_to_title(season),
    family = "Cabinet Grotesk", size = 4.5,
    fontface = "bold", hjust = 1.15
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
    expand = c(.5, .5)
  ) +
  scale_y_continuous(
    limits = c(0, 7.5*10^6)
```



Solution using `stat_summary()`

```
ggplot(bikes, aes(x = as.numeric(season), y =
  stat_summary(
    geom = "point", fun = "sum", size = 3
  ) +
  stat_summary(
    geom = "linerange", ymin = 0,
    fun.max = function(y) sum(y)
  ) +
  stat_summary(
    geom = "text",
    aes(
      label = stringr::str_to_title(season),
      y = 0
    ),
    family = "Cabinet Grotesk", size = 4.5,
    fontface = "bold", hjust = 1.15
  ) +
  annotate(
    geom = "linerange",
    xmin = .7, xmax = 4.3, y = 0
  ) +
  coord_polar(theta = "y") +
  scale_x_discrete(
```