BCB 570: Homework 2

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```
knitr::opts_chunk$set(echo = TRUE, cache = TRUE, message = FALSE)
library(igraph, warn.conflicts = FALSE)
library(ggplot2, warn.conflicts = FALSE)
library(tidyverse, warn.conflicts = FALSE)
library(openxlsx, warn.conflicts = FALSE)
```

#1

Reading in both graphs, merging two graphs via `igraph::union`:

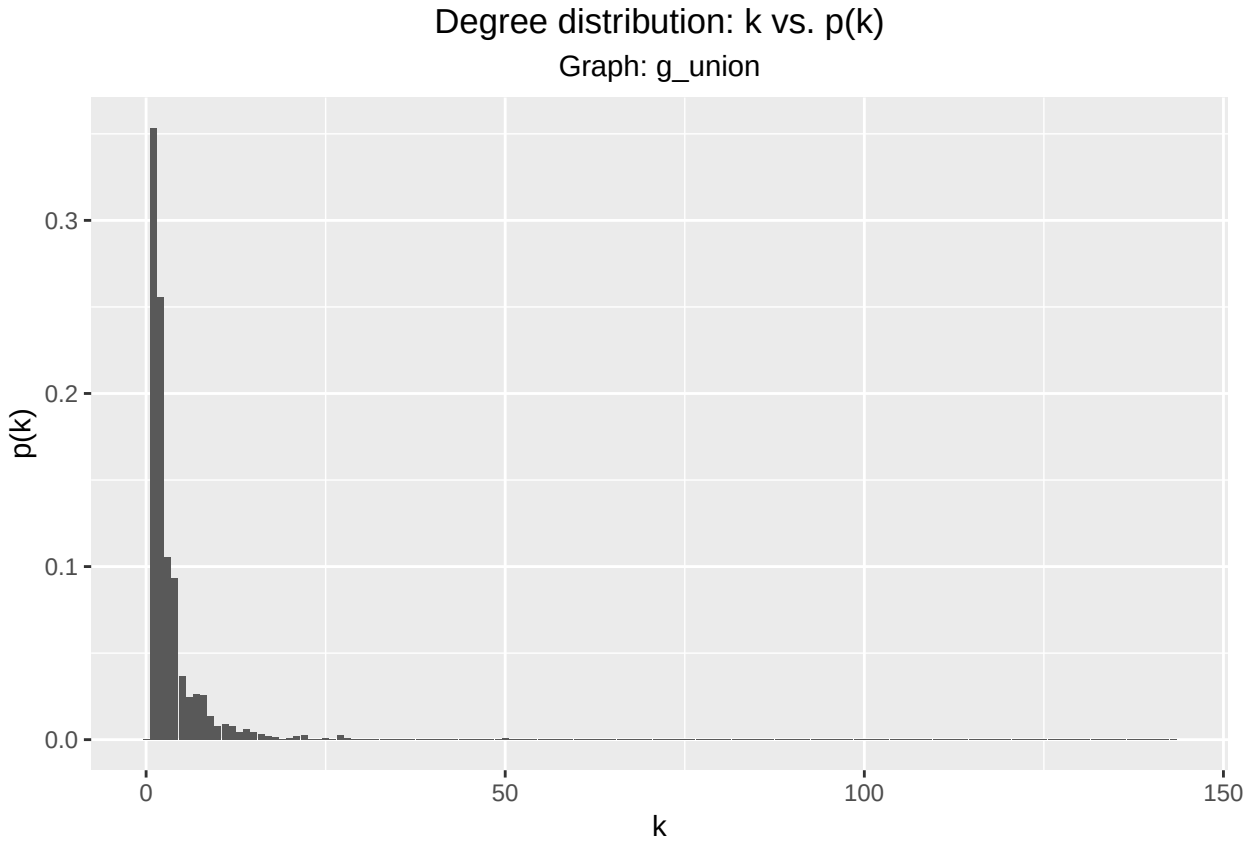
```
g_y2h <- graph_from_data_frame(read.xlsx("./data/hw3/Y2H_uniondata.xlsx"))
g_ccsb <- graph_from_data_frame(read.xlsx("./data/hw3/CCSB_YI1.xlsx"))
g_union <- g_ccsb %u% g_y2h
```

a.

Defining a function to visualize a graph's degree distribution:

```
plot_dd <- function(g){
  g.dd <- data.frame(0:(length(degree_distribution(g)) - 1),
                     degree_distribution(g, cumulative = FALSE))
  colnames(g.dd) <-c("k", "p_k")
  ggplot(g.dd, aes(x = k, y = p_k)) + geom_bar(stat = "identity") +
    labs(x = "k", y = "p(k)", title = "Degree distribution: k vs. p(k)",
         subtitle = paste("Graph:", deparse(substitute(g)))) +
    theme(plot.title = element_text(hjust = 0.5), plot.subtitle = element_text(hjust = 0.5))
}
```

```
plot_dd(g_union)
```



Some graph metrics

Metric	g_y2h	g_ccsb	g_union
Radius	3.48	1.76	5.93
Diameter	11	5	16
Average path lenght	3.48	1.76	5.93
Average clustering coefficient	0.10	0.11	0.10
Global clustering coefficient	0.024	0.021	0.024

b.

c.

#2

#3

a.

b.

c.