Computer Application in Public Finance **Instructor: Chien-Hao Fu**

W8 Programming Assignment

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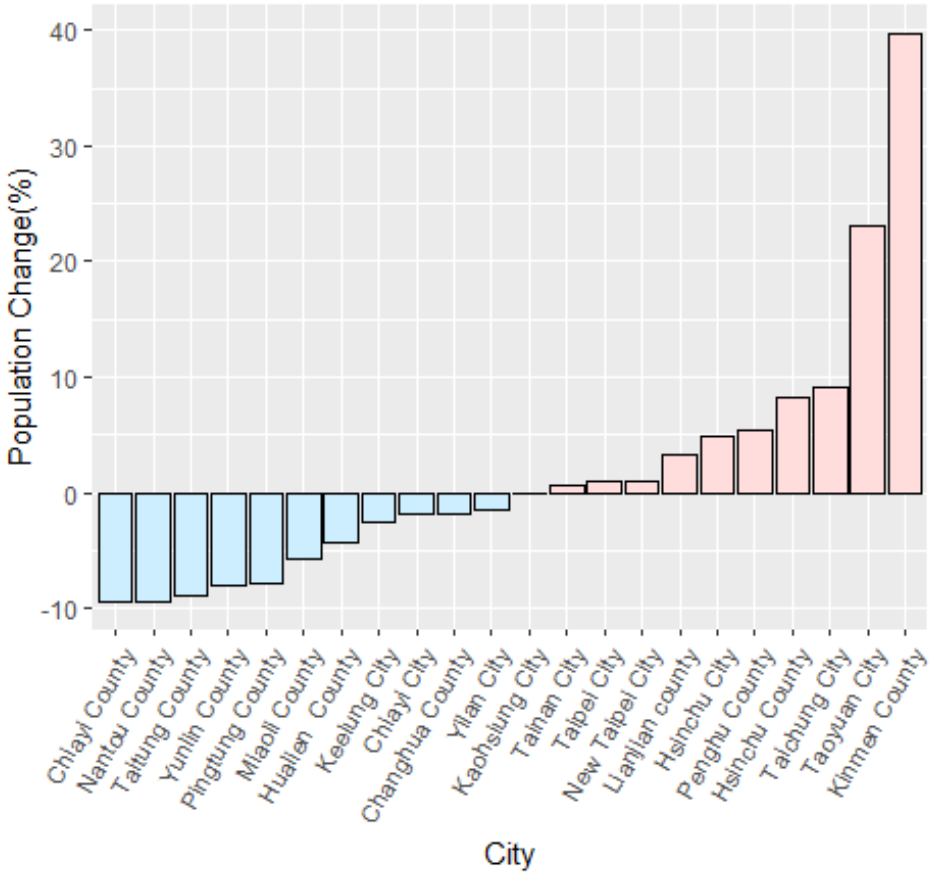
Part I: Rank each city by their per capita tax revenue (平均每人稅賦) within the geographical areas (North, Central, South, East, and Islands) and complete the following table:

City	Area	Ranking	City	Area	Ranking
Taipei City	North	1	Chiayi City	South	4
New Taipei City	North	6	Chiayi County	South	5
Keelung City	North	3	Tainan City	South	2
Taoyuan City	North	5	Kaohsiung City	South	1
Hsinchu City	North	2	Pingtung County	South	3
Hsinchu County	North	4	Hualien County	East	1
Yilan County	North	7	Taitung County	East	2
Miaoli County	Central	2	Penghu County	Islands	3
Taichung City	Central	3	Kinmen County	Islands	1
Changhua County	Central	4	Lienchiang County	Islands	2
Nantou County	Central	5			
Yunlin County	Central	1			

Part II: Create an ordered, colorized chart to visualize the population changes by city in 2015. Attach your plot here:



Submit your source Codes for Part I and Part II here:

```
library(tidyverse)

setwd(getwd())
source('W4_Solution.R')

#part 1
sub_data2015%>%
  group_by(area)%>%
  mutate(rank=min_rank(desc(tax_incidence)))%>%
  arrange(area,rank)%>%
  view()


#part 2
sub_data2015<-mutate(sub_data2015,pos=(pop_change>0))

ggplot(sub_data2015,aes(x=reorder(city,pop_change),y=pop_change,fill=pos))+
  geom_col(color='black')+
  theme(axis.text.x=element_text(angle=60,hjust=1))+
  labs(x='City',y='Population Change(%)')+
  scale_fill_manual(values=c('#CCEEFF','#FFDDDD'),guide=FALSE)
```