Appendix

The code for the plots present in the result:

```
library(readxl)

island <- read_excel("SeasonallyAdjusted.xlsx" , sheet = "VANCOUVER_ISLAND")
island <- island[182:194, 1:7]

victoria <- read_excel("SeasonallyAdjusted.xlsx" , sheet = "VICTORIA")
victoria <- victoria[182:194, 1:7]

lowermainland <- read_excel("SeasonallyAdjusted.xlsx" , sheet = "LOWER_MAINLAND")
lowermainland <- lowermainland[182:194, 1:7]

greatvancouver <- read_excel("SeasonallyAdjusted.xlsx" , sheet = "GREATER_VANCOUVER")
greatvancouver <- greatvancouver[182:194, 1:7]

fraservalley <- read_excel("SeasonallyAdjusted.xlsx" , sheet = "FRASER_VALLEY")
fraservalley <- fraservalley[182:194, 1:7]

chilliwack <- read_excel("SeasonallyAdjusted.xlsx" , sheet = "CHILLIWACK_AND_DISTRICT")
chilliwack <- chilliwack[182:194, 1:7]

okangan <- read_excel("SeasonallyAdjusted.xlsx" , sheet = "OKANAGAN_VALLEY")
okangan <- okangan[182:194, 1:7]



#types = c("Composite","Single_Family","One_Storey","Two_Storey","Townhouse","Apartmen
t")
types = factor(c("Composite","Single_Family","One_Storey","Two_Storey","Townhouse","Apar
tment"),
               levels = c("Composite","Single_Family","One_Storey","Two_Storey","Townhou
se","Apartment"))

time = factor(c("2020Feb","2020Mar","2020Apr","2020May","2020Jun","2020Jul","2020Aug","2
020Sep","2020Oct","2020Nov","2020Dec","2021Jan","2021Feb"),
              levels = c("2020Feb","2020Mar","2020Apr","2020May","2020Jun","2020Jul","20
20Aug","2020Sep","2020Oct","2020Nov","2020Dec","2021Jan","2021Feb"))

# looking at the hosing price of each property type in each region
```

```
# Vancouver island
plot(c(1:13), as.numeric(unlist(island[,2])), type = "l",
     col = unique(types)[1],
     main = "The housing prise of different property type in Vancouverr island",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(240,300))
lines(c(1:13), as.numeric(unlist(island[,3])),col = unique(types)[2])
lines(c(1:13), as.numeric(unlist(island[,4])),col = unique(types)[3])
lines(c(1:13), as.numeric(unlist(island[,5])),col = unique(types)[4])
lines(c(1:13), as.numeric(unlist(island[,6])),col = unique(types)[5])
lines(c(1:13), as.numeric(unlist(island[,7])),col = unique(types)[6])
legend("topleft", fill = unique(types),
       legend = c(levels(types)),
       cex=0.4)
```

```
# Victoria
plot(c(1:13), as.numeric(unlist(victoria[,2])), type = "l",
     col = unique(types)[1],
     main = "The housing prise of different property type in Victoria",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(200,255))
lines(c(1:13), as.numeric(unlist(victoria[,3])),col = unique(types)[2])
lines(c(1:13), as.numeric(unlist(victoria[,4])),col = unique(types)[3])
lines(c(1:13), as.numeric(unlist(victoria[,5])),col = unique(types)[4])
lines(c(1:13), as.numeric(unlist(victoria[,6])),col = unique(types)[5])
lines(c(1:13), as.numeric(unlist(victoria[,7])),col = unique(types)[6])
legend("topleft", fill = unique(types),
       legend = c(levels(types)),
       cex=0.5)
```

```
# Lower Land
plot(c(1:13), as.numeric(unlist(lowermainland[,2])), type = "l",
     col = unique(types)[1],
     main = "The housing prise of different property type in Lower mainland",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(230,330))
lines(c(1:13), as.numeric(unlist(lowermainland[,3])),col = unique(types)[2])
lines(c(1:13), as.numeric(unlist(lowermainland[,4])),col = unique(types)[3])
lines(c(1:13), as.numeric(unlist(lowermainland[,5])),col = unique(types)[4])
lines(c(1:13), as.numeric(unlist(lowermainland[,6])),col = unique(types)[5])
lines(c(1:13), as.numeric(unlist(lowermainland[,7])),col = unique(types)[6])
legend("topleft", fill = unique(types),
       legend = c(levels(types)),
       cex=0.5)
```

```
# Greatvancouver
plot(c(1:13), as.numeric(unlist(greatvancouver[,2])), type = "l",
     col = unique(types)[1],
     main = "The housing prise of different property type in Great vancouver",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(240,320))
lines(c(1:13), as.numeric(unlist(greatvancouver[,3])),col = unique(types)[2])
lines(c(1:13), as.numeric(unlist(greatvancouver[,4])),col = unique(types)[3])
lines(c(1:13), as.numeric(unlist(greatvancouver[,5])),col = unique(types)[4])
lines(c(1:13), as.numeric(unlist(greatvancouver[,6])),col = unique(types)[5])
lines(c(1:13), as.numeric(unlist(greatvancouver[,7])),col = unique(types)[6])
legend("topleft", fill = unique(types),
       legend = c(levels(types)),
       cex=0.5)
```

```
# Fraservalley
plot(c(1:13), as.numeric(unlist(fraservalley[,2])), type = "l",
     col = unique(types)[1],
     main = "The housing prise of different property type in Fraser Valley",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(240,330))
lines(c(1:13), as.numeric(unlist(fraservalley[,3])),col = unique(types)[2])
lines(c(1:13), as.numeric(unlist(fraservalley[,4])),col = unique(types)[3])
lines(c(1:13), as.numeric(unlist(fraservalley[,5])),col = unique(types)[4])
lines(c(1:13), as.numeric(unlist(fraservalley[,6])),col = unique(types)[5])
lines(c(1:13), as.numeric(unlist(fraservalley[,7])),col = unique(types)[6])
legend("topleft", fill = unique(types),
       legend = c(levels(types)),
       cex=0.5)
```

```
# Chilliwack
plot(c(1:13), as.numeric(unlist(chilliwack [,2])), type = "l",
     col = unique(types)[1],
     main = "The housing prise of different property type in Chilliwack ",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(220,300))
lines(c(1:13), as.numeric(unlist(chilliwack[,3])),col = unique(types)[2])
lines(c(1:13), as.numeric(unlist(chilliwack[,4])),col = unique(types)[3])
lines(c(1:13), as.numeric(unlist(chilliwack[,5])),col = unique(types)[4])
lines(c(1:13), as.numeric(unlist(chilliwack[,6])),col = unique(types)[5])
lines(c(1:13), as.numeric(unlist(chilliwack[,7])),col = unique(types)[6])
legend("topleft", fill = unique(types),
       legend = c(levels(types)),
       cex=0.5)
```

```
# Vancouver island
# Composite
plot(c(1:13), as.numeric(unlist(okangan[,2])), type = "l",
     col = unique(types)[1],
     main = "The housing prise of different property type in Okanagan_Vally",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(180,260))
lines(c(1:13), as.numeric(unlist(okangan[,3])),col = unique(types)[2])
lines(c(1:13), as.numeric(unlist(okangan[,4])),col = unique(types)[3])
lines(c(1:13), as.numeric(unlist(okangan[,5])),col = unique(types)[4])
lines(c(1:13), as.numeric(unlist(okangan[,6])),col = unique(types)[5])
lines(c(1:13), as.numeric(unlist(okangan[,7])),col = unique(types)[6])
legend("topleft", fill = unique(types),
       legend = c(levels(types)),
       cex=0.4)
```

the average price , for each area and the overal average (BC)

```
types_avg = factor(c("Island","Victoria","Lower_Mainland","Greater_Vancouver","Fraser_Va
lly","Chilliwack","OKANAGAN_VALLEY"),  levels = c("Island","Victoria","Lower_Mainland",
"Greater_Vancouver","Fraser_Vally","Chilliwack","OKANAGAN_VALLEY"))

#producing the average accroding to these three region each month
bc_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
  sum = 0
  for (j in 2:7){
    sum = sum + island[i,j] + victoria[i,j] + lowermainland[i,j] + greatvancouver[i,j] +
fraservalley[i,j] +  chilliwack[i,j]
  }
  bc_avg[i] = sum /36
}
#bc_avg

# producing the average housing price each month in the island
island_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
  sum = 0
  for (j in 2:7){
    sum = sum + island[i,j]
  }
  island_avg[i] = sum /6
}
#island_avg

# producing the average housing price each month in the victoria
victoria_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
  sum = 0
  for (j in 2:7){
    sum = sum + victoria[i,j]
  }
  victoria_avg[i] = sum /6
}
#victoria_avg


# producing the average housing prise each month in the lower mainland
lower_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
  sum = 0
  for (j in 2:7){
    sum = sum + lowermainland[i,j]
  }
  lower_avg[i] = sum /6
}
#lower_avg

# producing the average housing prise each month in the greater mainland
great_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
```

```
  sum = 0
  for (j in 2:7){
    sum = sum + greatvancouver[i,j]
  }
  great_avg[i] = sum /6
}
#great_avg

# producing the average housing prise each month in the fraser vally
fraser_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
  sum = 0
  for (j in 2:7){
    sum = sum + fraservalley[i,j]
  }
  fraser_avg[i] = sum /6
}
#fraser_avg

# producing the average housing prise each month in the chilliwack
chilliwack_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
  sum = 0
  for (j in 2:7){
    sum = sum + chilliwack[i,j]
  }
  chilliwack_avg[i] = sum /6
}
#chilliwack_avg



# producing the average housing prise each month in the okanagan
okan_avg = matrix(data = rep(NA), nrow = 13, ncol = 1)
for (i in 1:13 ){
  sum = 0
  for (j in 2:7){
    sum = sum + okangan[i,j]
  }
  okan_avg[i] = sum /6
}
#okan_avg


plot(c(1:13), as.numeric(unlist(okan_avg)), type ="l",
     col = unique(types_avg)[7],
     main = "The average housing price in different area ",
     xlab = "Month (From 2020Feb to 2021Feb)",
     ylab = "Hosuing price",
     ylim = c(180,300))
lines(c(1:13), as.numeric(unlist(island_avg)),col = unique(types_avg)[1])
lines(c(1:13), as.numeric(unlist(victoria_avg)),col = unique(types_avg)[2])
lines(c(1:13), as.numeric(unlist(lower_avg)),col = unique(types_avg)[3])
lines(c(1:13), as.numeric(unlist(great_avg)),col = unique(types_avg)[4])
```

```
lines(c(1:13), as.numeric(unlist(fraser_avg)),col = unique(types_avg)[5])
lines(c(1:13), as.numeric(unlist(chilliwack_avg)),col = unique(types_avg)[6])
legend("topleft", fill = unique(types_avg),
       legend = c(levels(types_avg)),
       cex=0.5)
```