Statistical Analysis

- We used methods from scipy.stats to conduct various statistical tests
- First, we tested if the unemployment rates were normally distributed using a Shapiro-Wilk Test

Seasonally Adjusted

ShapiroResult(statistic=0.95, pvalue=2.67e-16)

Not Seasonally Adjusted

ShapiroResult(statistic=0.96, pvalue=4.92e-15)

- Result: Cannot assume normal distribution

Results (Race)

US vs Black vs Hispanic vs White
KruskalResult
(statistic=1502.70, pvalue=0.0)
Black vs Hispanic
MannwhitneyuResult
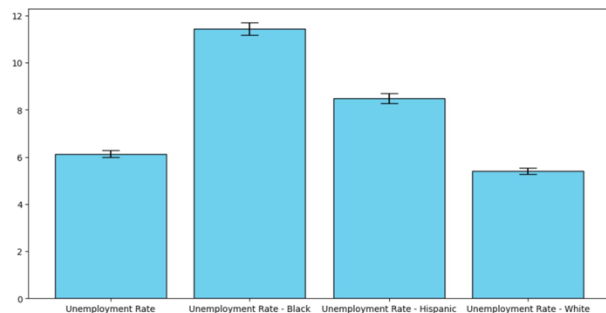(statistic=293437.5, pvalue=1.32e-51)
Black vs White
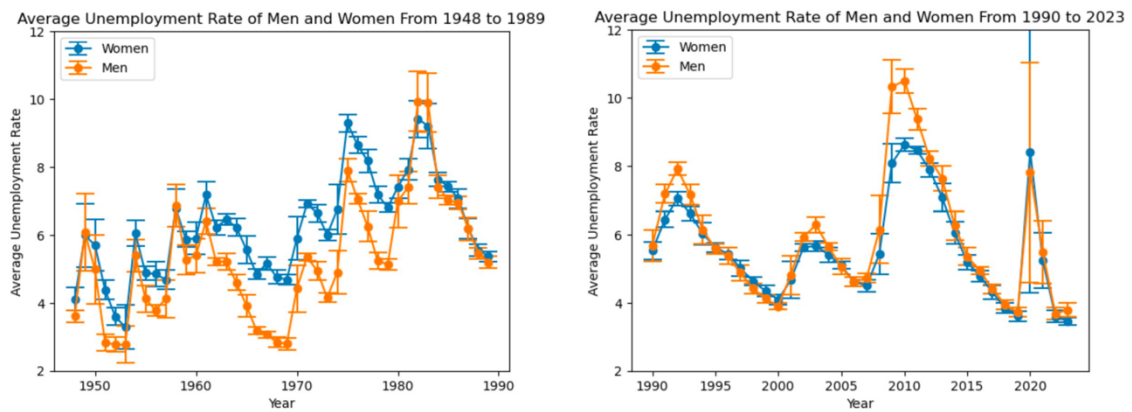MannwhitneyuResult
(statistic=519235.5, pvalue=1.70e-205)
Hispanic vs White
MannwhitneyuResult
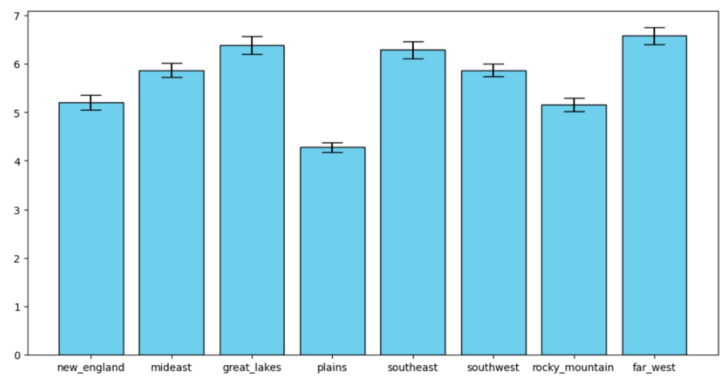(statistic=454900.5, pvalue=2.28e-125)
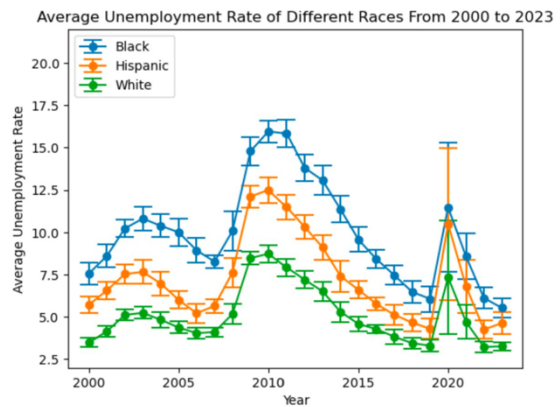
Results (Gender)

Average Unemployment Rate of Men and Women From 1948 to 1989

Average Unemployment Rate of Men and Women From 1990 to 2023

Results (Location)

8 Regions

KruskalResult
(statistic=3961.25, pvalue=0.0)

Results (Race)

Average Unemployment Rate of Different Races From 1973 to 1999

Average Unemployment Rate of Different Races From 2000 to 2023
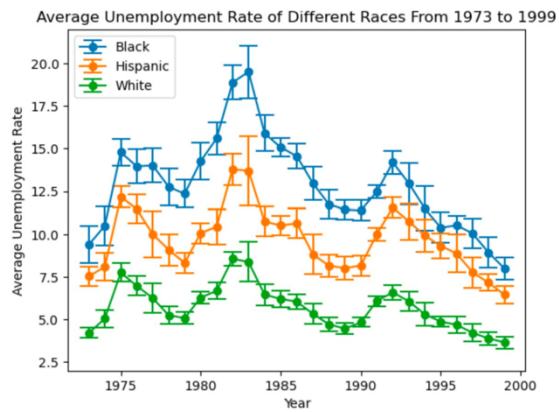
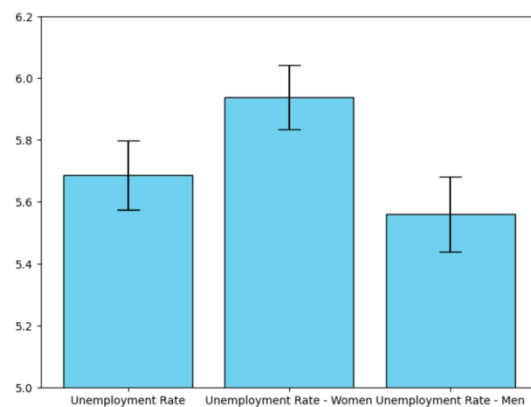# Results (Gender)

US vs Men vs Women
KruskalResult
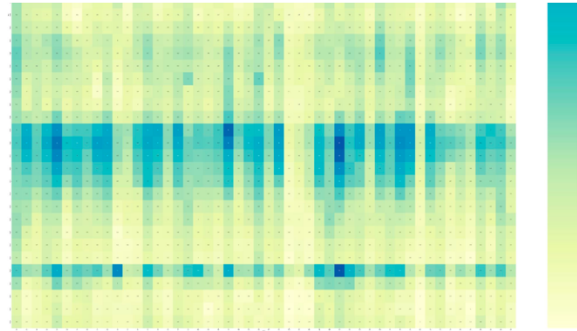(statistic=36.89, pvalue=9.76e-09)

Men vs Women
MannwhitneyuResult
(statistic=492721.0,pvalue=3.20e-09)

Heat Map of All Data

- Compares all states across all years of available data
  - Blue = higher unemployment rate
  - Yellow = lower unemployment rate

Zoomed version
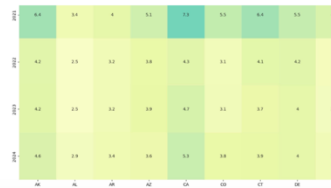
GUI - Tkinter

- Provides a personalized result for unique comparisons
  - GUI window allows users to select Years and States
  - Users can select as many years or states as they wish
- Tkinter library was utilized to achieve this GUI task
  - Results in graphs plotted according to user's input
  - Axis will be adjusted automatically according to the selection criteria

Select States:

AK ☐ AL ☑ AR ☐
AZ ☐ CA ☐ CO ☐
CT ☐ DE ☐ FL ☐
GA ☐ HI ☐ IA ☐
ID ☐ IL ☐ IN ☐
KS ☐ KY ☐ LA ☐
MA ☑ MD ☑ ME ☐
MI ☐ MN ☐ MO ☐
MS ☐ MT ☐ NC ☐
ND ☐ NE ☐ NH ☐
NJ ☐ NM ☐ NV ☐
NY ☐ OH ☐ OK ☐
OR ☐ PA ☐ RI ☐
SC ☐ SD ☐ TN ☐
TX ☐ UT ☐ VA ☐
VT ☐ WA ☐ WI ☐
WV ☐ WY ☐

Select Years:

1976 ☐ 1977 ☐ 1978 ☐
1979 ☐ 1980 ☐ 1981 ☐
1982 ☐ 1983 ☐ 1984 ☐
1985 ☐ 1986 ☐ 1987 ☐
1988 ☐ 1989 ☐ 1990 ☐
1991 ☐ 1992 ☐ 1993 ☐
1994 ☑ 1995 ☑ 1996 ☑
1997 ☐ 1998 ☐ 1999 ☐
2000 ☐ 2001 ☐ 2002 ☐
2003 ☐ 2004 ☐ 2005 ☐
2006 ☐ 2007 ☐ 2008 ☐
2009 ☐ 2010 ☐ 2011 ☐
2012 ☐ 2013 ☐ 2014 ☐
2015 ☐ 2016 ☐ 2017 ☐
2018 ☐ 2019 ☐ 2020 ☐
2021 ☐ 2022 ☐ 2023 ☐
2024 ☐

[Plot Unemployment Rate]

Unemployment Rate by State and Year