Department of Computer Engineering
Advanced Data Visualization

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Class and Batch	BE CSE DS - Batch K
Aim	Create advanced charts using Tableau / Power BI / R / Python / Plotly or Chart or D3.js to be performed on the dataset - Socio economic data

Dataset Attributes:

- **Country:** The name of the country for which the data is provided.

- **Year:** The year in which the data was recorded.

- **Status:** The development status of the country (e.g., Developing).

- **Life expectancy:** The average number of years a newborn is expected to live, assuming current mortality rates remain constant.

- **Adult Mortality:** The probability of dying between ages 15 and 60, per 1,000 adults.

- **Infant deaths:** The number of deaths of infants under one year per 1,000 live births.

- **Alcohol:** The average annual alcohol consumption per capita (in liters).

- **Percentage expenditure:** The percentage of GDP spent on health care.

- **Hepatitis B:** The percentage of the population vaccinated against Hepatitis B.

- **Measles:** The number of reported cases of measles per 1,000 children.

- **BMI:** The average Body Mass Index (BMI) of the population.

- **Under-five deaths:** The number of deaths of children under five years old per 1,000 live births.

- **Polio:** The percentage of children immunized against polio.

- **Total expenditure:** The total health expenditure as a percentage of GDP.

- **Diphtheria:** The percentage of children vaccinated against diphtheria.

- **HIV/AIDS:** The percentage of the population living with HIV/AIDS.

- **GDP:** The gross domestic product (in USD) of the country.

- **Population**: The total population of the country.

- **Thinness 1-19 years**: The percentage of children aged 1-19 years who are underweight.

- **Thinness 5-9 years:** The percentage of children aged 5-9 years who are underweight.

- **Income composition of resources**: A measure of how income is distributed in the population (usually expressed as a ratio).

- **Schooling:** The average number of years of schooling received by adults aged 25 and older.

Dataset Sample:

```
..       Country  Year      Status  Life expectancy  Adult Mortality  \
0    Afghanistan  2015  Developing             65.0            263.0
1    Afghanistan  2014  Developing             59.9            271.0
2    Afghanistan  2013  Developing             59.9            268.0
3    Afghanistan  2012  Developing             59.5            272.0
4    Afghanistan  2011  Developing             59.2            275.0

   infant deaths  Alcohol  percentage expenditure  Hepatitis B  Measles   ... \
0             62     0.01               71.279624         65.0      1154  ...
1             64     0.01               73.523582         62.0       492  ...
2             66     0.01               73.219243         64.0       430  ...
3             69     0.01               78.184215         67.0      2787  ...
4             71     0.01                7.097109         68.0      3013  ...

   Polio  Total expenditure  Diphtheria  HIV/AIDS        GDP  Population  \
0    6.0               8.16        65.0       0.1  584.259210  33736494.0
1   58.0               8.18        62.0       0.1  612.696514    327582.0
2   62.0               8.13        64.0       0.1  631.744976  31731688.0
3   67.0               8.52        67.0       0.1  669.959000   3696958.0
4   68.0               7.87        68.0       0.1   63.537231   2978599.0

   thinness  1-19 years  thinness 5-9 years  \
0                  17.2                17.3
1                  17.5                17.5
2                  17.7                17.7
...
3                          0.463         9.8
4                          0.454         9.5

[5 rows x 22 columns]
```
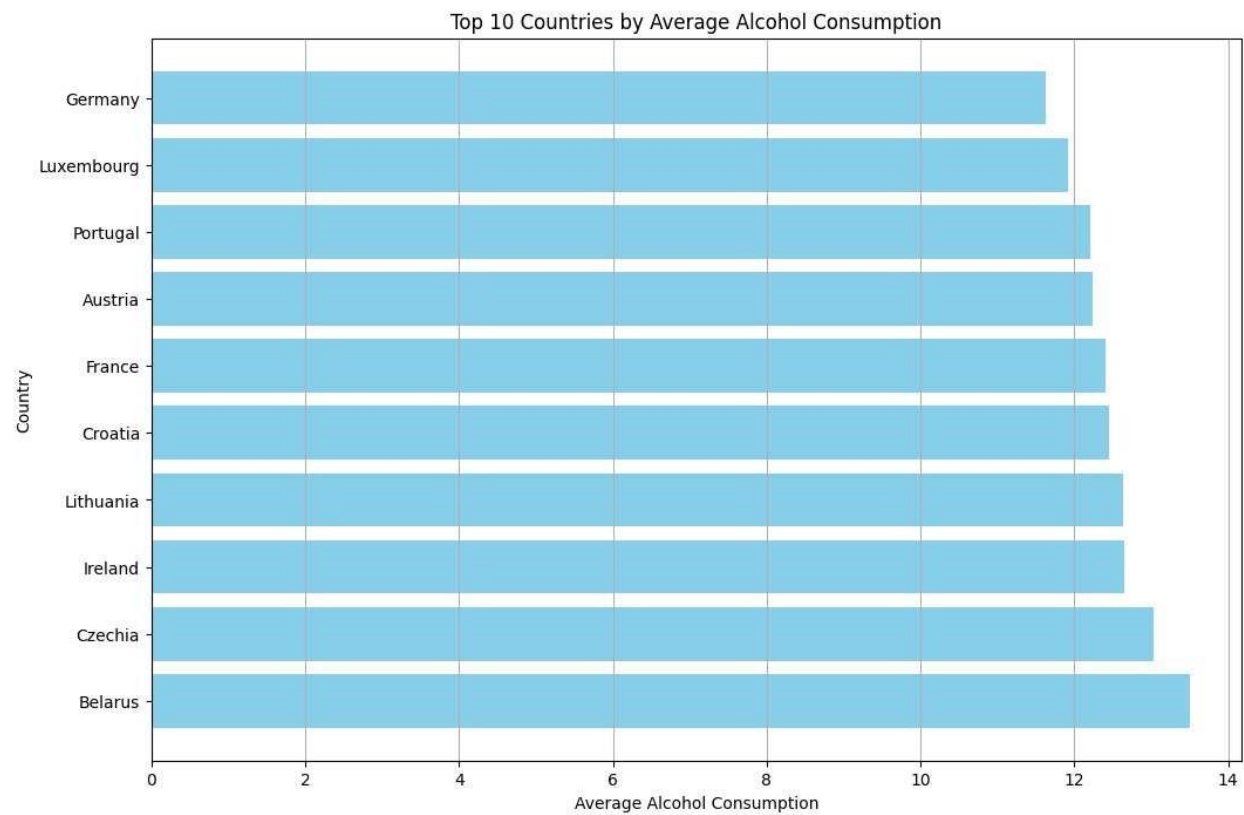
Bar Chart (changes in average alcohol consumption over time):

Average Alcohol Consumption by Year
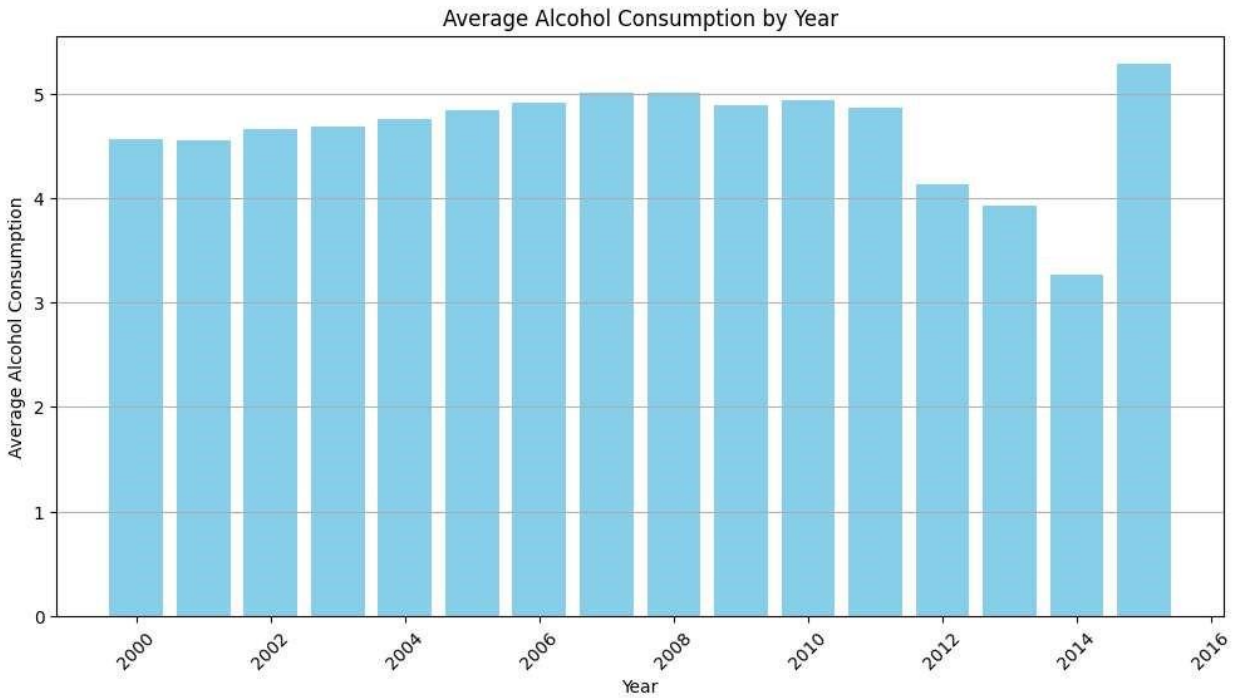
-       The chart reveals a general trend of increasing alcohol consumption over the years.
- Economic downturns from 2012-2014 likely led to reduced alcohol consumption due to decreased disposable income.
- The increase in 2015 may be attributed to economic recovery, changes in social norms, or increased marketing efforts by the alcohol industry.

**Bar Chart (Top 10 Countries by Average Alcohol Consumption):**

Top 10 Countries by Average Alcohol Consumption

☐ The bar chart reveals Belarus as the country with the highest average alcohol consumption, followed by Czechia and Ireland. Germany, Luxembourg, and Portugal also rank among the top consumers.

**Scatter plot (relationship between total expenditure and alcohol consumption):**

Total Expenditure vs. Alcohol Consumption
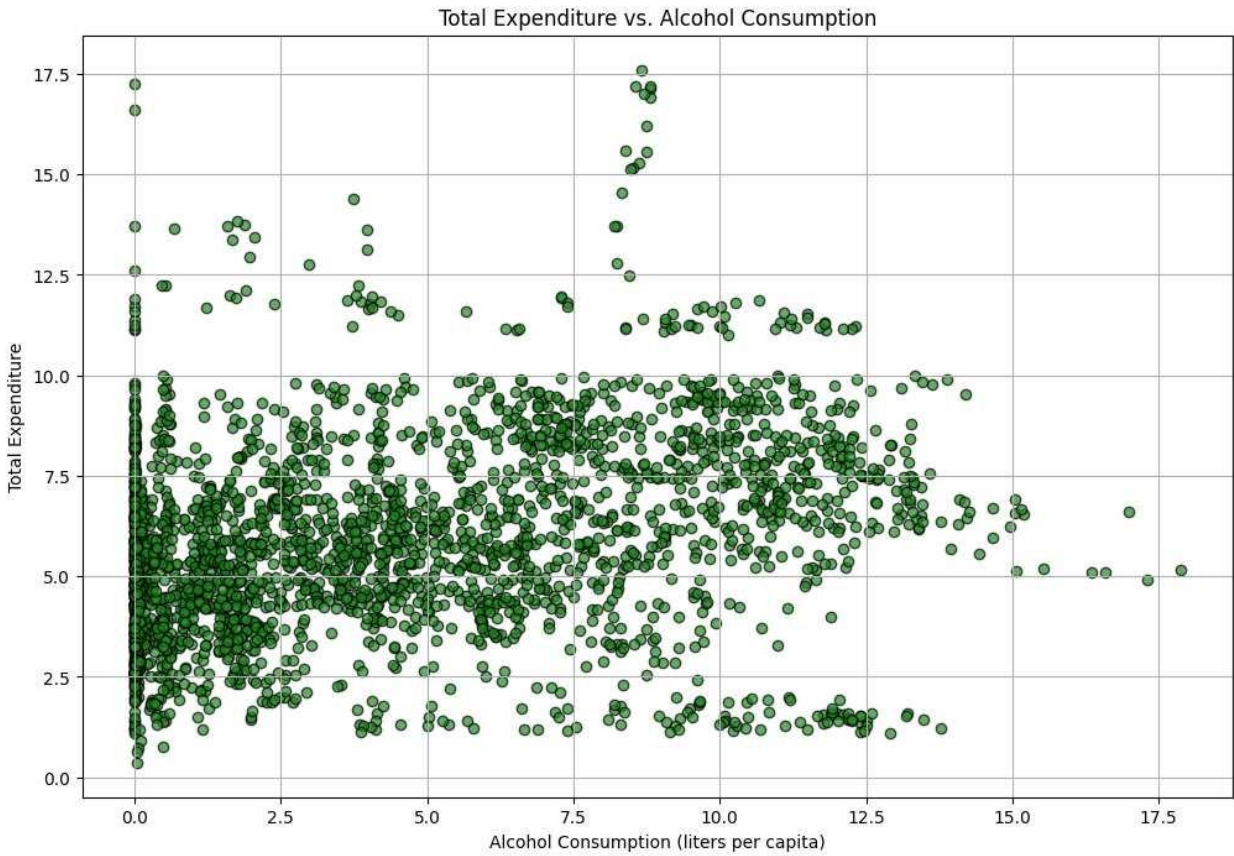
☐ There appears to be a weak positive correlation between total expenditure and alcohol consumption. This suggests that, in general, as total expenditure increases, there is a slight tendency for alcohol consumption to also increase.

Violin plot :

Distribution of Life Expectancy by Country Status
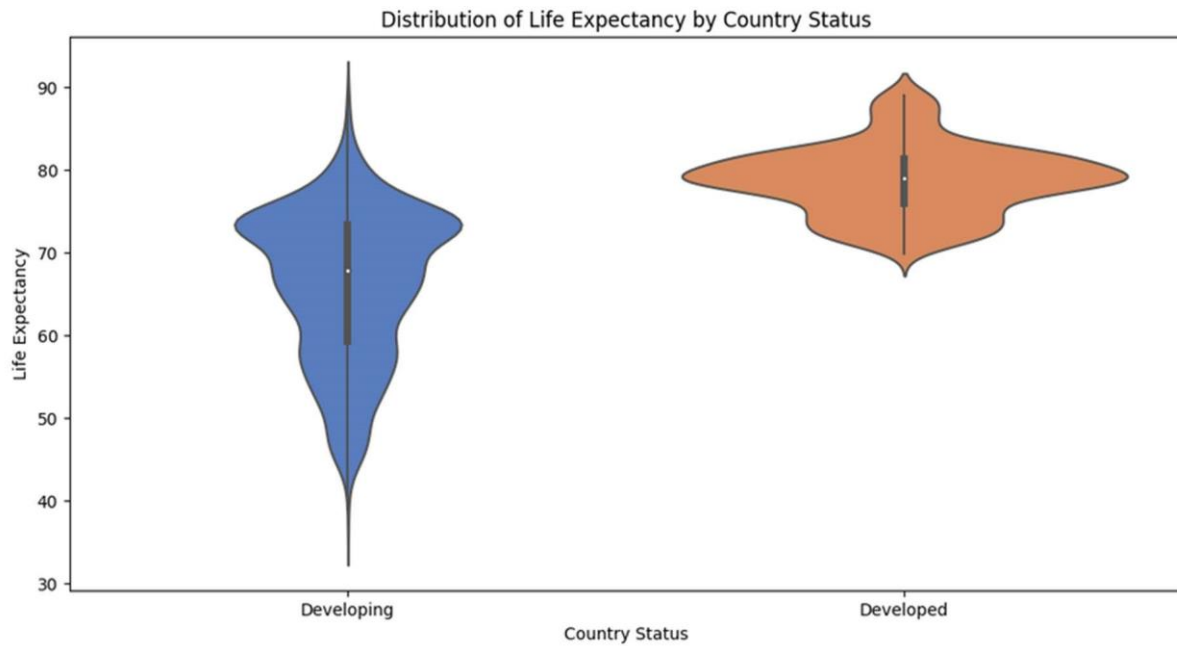
- The violin plot visualizes the distribution of adult mortality rates across the top 10 alcohol-consuming countries.
- The violin plot reveals variations in the distribution of adult mortality rates among the top 10 alcohol-consuming countries.
- Some countries, like Belarus and Lithuania, show a wider range of adult mortality rates, indicating greater variability within their populations.
- Other countries, such as France and Germany, have a more concentrated distribution of adult mortality rates, suggesting a more consistent pattern.

Violin Plot –

Distribution of Hepatitis B by Country
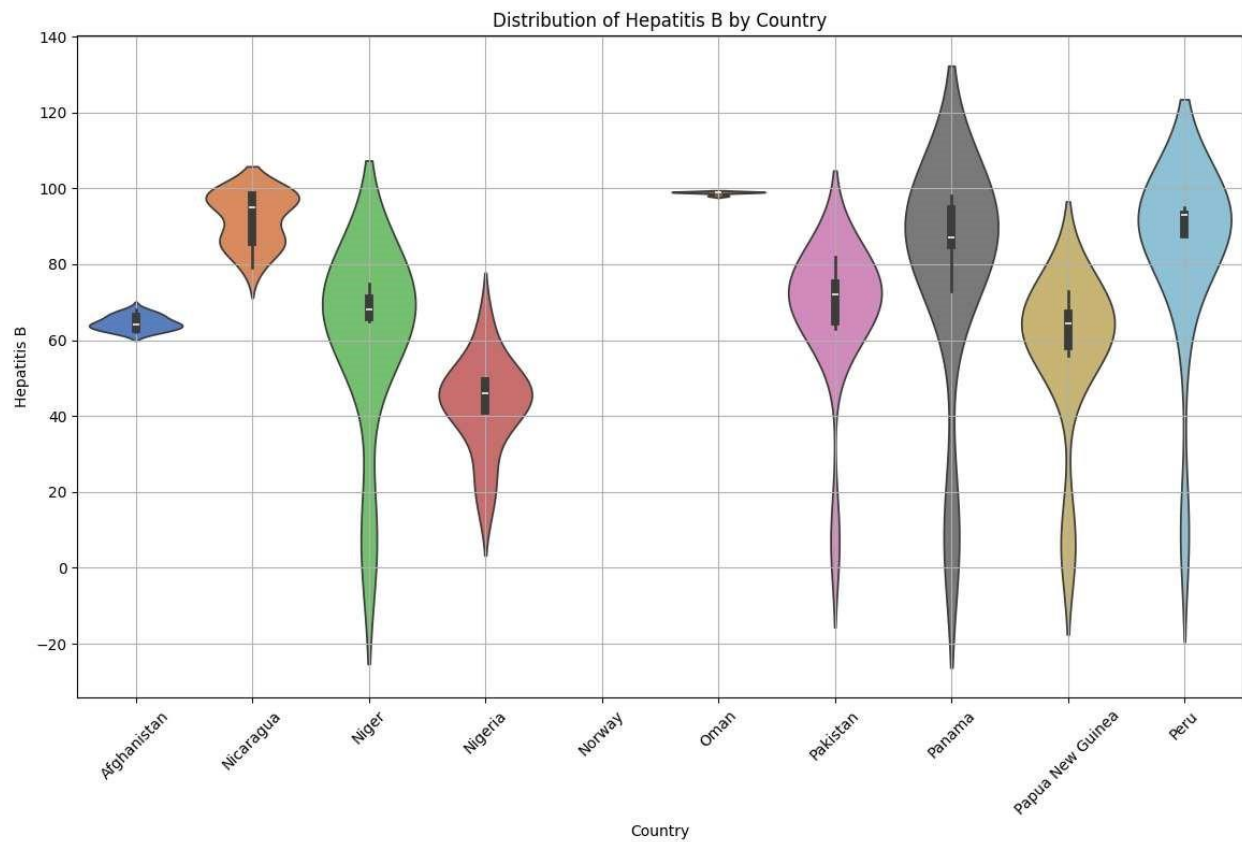
- ☐ The violin plot visualizes the distribution of Hepatitis B prevalence across different countries.
- ☐ The plot reveals significant variations in Hepatitis B prevalence among the countries.
- ☐ Some countries, like Pakistan and Peru, show a wider range of Hepatitis B cases, indicating greater variability within their populations.
- ☐ Other countries, such as Afghanistan and Norway, have a more concentrated distribution of Hepatitis B cases, suggesting a more consistent pattern.

Bar Chart (Average Alcohol Consumption by Country development Status):
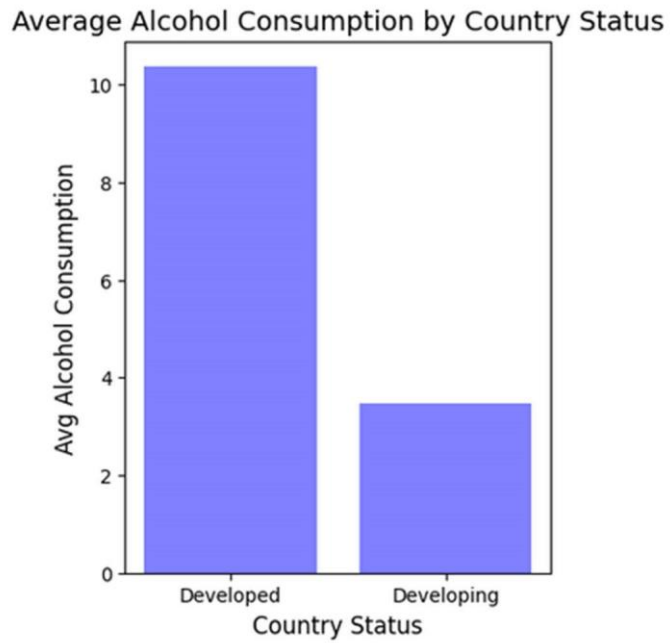
- The above bar chart displays the average alcohol consumption by Country status. - Developed countries on average consume 11 liters of alcohol.
- On other hand, developing countries have an average alcohol consumption of 3.7 liters.

Box plot (Alcohol Consumption by Country development Status):

Distribution of Alcohol Consumption by Country Status
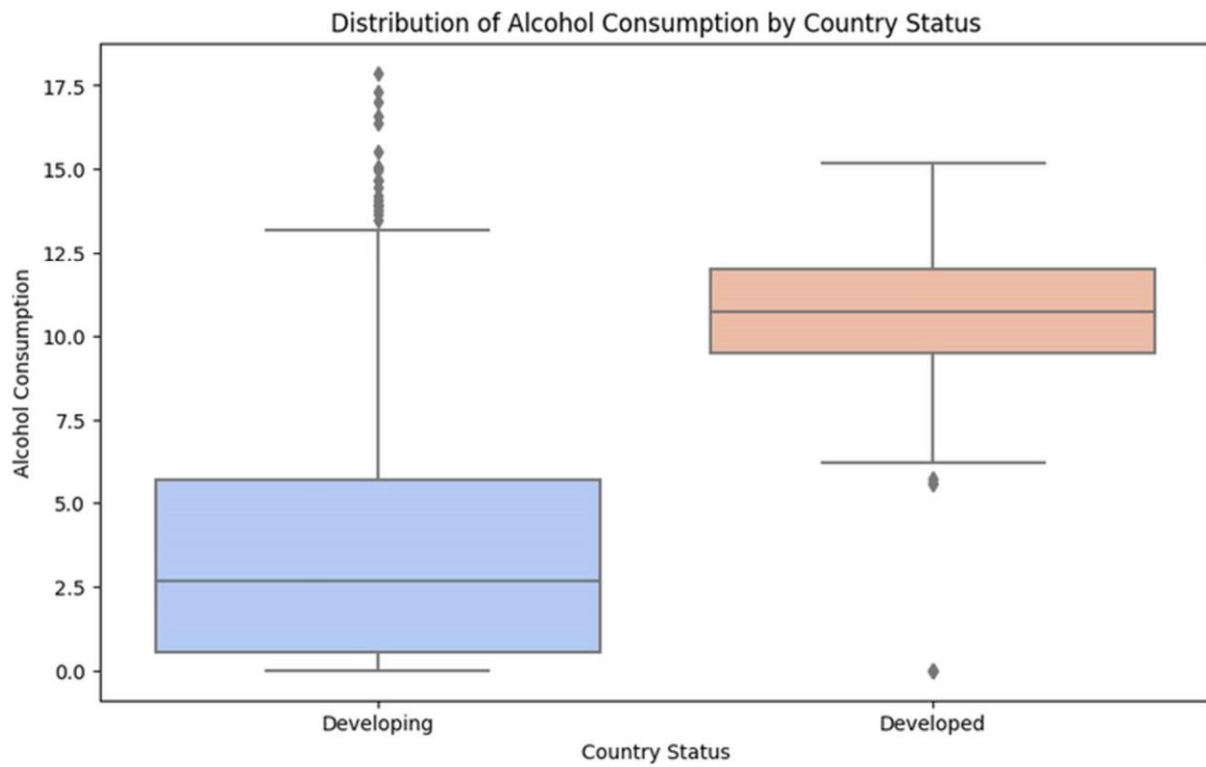
- From the above box plot we can see developing countries have a median alcohol consumption of 2.6 liters and 10.1 liters for developed countries
- For Developing countries, the 25th percentile lies at 0.7 liters and the 75th percentile lies at 5.8 liters.
- For Developed countries, the 25th percentile lies at 10 liters and the 75th percentile lies at 12.4 liters.

Regression Plot:

Regression Plot of Life Expectancy vs. Schooling
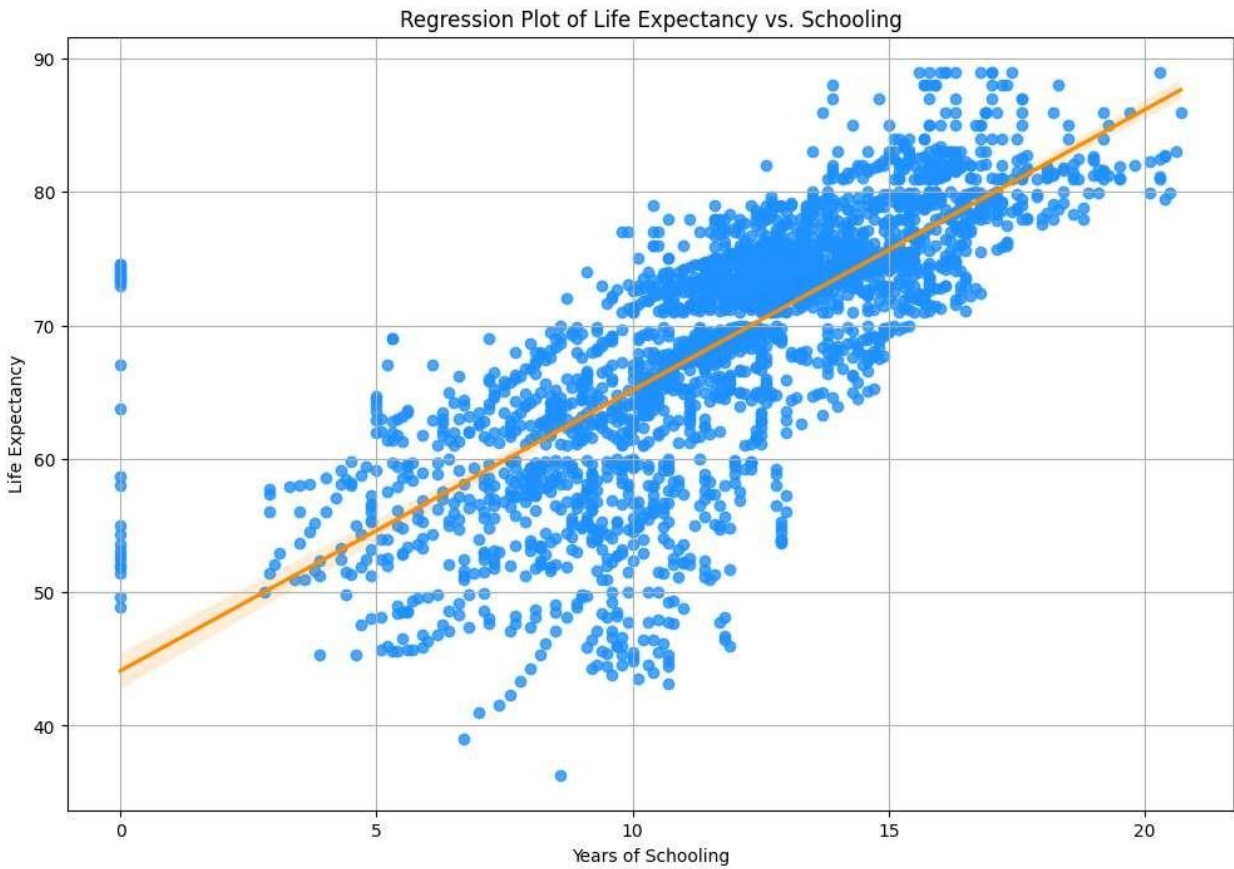
- The regression line slopes upward, indicating a positive relationship between schooling and life expectancy. As the years of schooling increase, the life expectancy tends to increase as well.
- The relationship appears to be approximately linear, suggesting a consistent rate of change in life expectancy for each additional year of schooling.