Case Study – 2

1.In an Economic analysis, data is collected on the monthly unemployment rates of a country over many years. Use time-series decomposition to separate the unemployment data into its trend, seasonal, and residual components. Visualize and interpret each component, and discuss how the decomposition helps in understanding the cyclical behavior of unemployment and identifying any long-term changes in the unemployment rate.

|  |  |  |
| --- | --- | --- |
| Month | Economic Condition | Unemployment Rate |
| Jan | Good | 10.7% |
| Feb | Good | 9.8% |
| March | Good | 10.2% |
| April | Good | 11.2 |
| May | Fair | 15.75% |
| Jun | Fair | 17.8% |
| July | Good | 19.4% |
| August | Bad | 25.6% |
| Sep | Fair | 18.6% |
| Oct | Good | !5.6% |
| Nov | Bad | 26.7% |
| Dec | Fair | 19.5% |

2. Create a mosaic plot for the below dataset and analyse its efficiency

|  |  |  |
| --- | --- | --- |
| SCHOOL | GRADE LEVEL | NUMBER OF STUDENTS |
| A | Grade 1 | 25 |
| A | Grade 2 | 30 |
| A | Grade 3 | 20 |
| B | Grade 1 | 22 |
| B | Grade 2 | 28 |
| B | Grade 3 | 18 |
| C | Grade 1 | 20 |
| C | Grade 2 | 25 |
| C | Grade 3 | 15 |
| D | Grade 1 | 28 |
| D | Grade 2 | 32 |
| D | Grade 3 | 24 |

**3. Visualize the graphs**

1. Create a time series plot to visualize the relationship between temperature and precipitation.
2. Analyze the plot and discuss any seasonal or weather patterns that emerge from the data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Station A**  **Temperature** | **Station A**  **Precipitation** | **Station B**  **Temperature** | **Station B**  **Precipitation** |
| 01/01/2024 | 25.0 | 0.1 | 23.5 | 0.2 |
| 02/01/2024 | 24.5 | 0.0 | 22.8 | 0.3 |
| 03/01/2024 | 26.2 | 0.3 | 25.0 | 0.1 |
| 04/01/2024 | 23.8 | 0.2 | 22.5 | 0.0 |
| 05/01/2024 | 25.5 | 0.1 | 24.5 | 0.4 |
| 06/01/2024 | 23.0 | 0.4 | 21.8 | 0.2 |

4. The Internet In real Time – Take 5 years of Internet users with different varieties of browsers make the data visualized with more interactively.

|  |  |  |
| --- | --- | --- |
| **Year** | **Browser** | **Users** |
| 2019 | Chrome | 22.7M |
| 2020 | Chrome | 25.8M |
| 2022 | Chrome | 28.7M |
| 2023 | Chrome | 30.5M |
| 2024 | Chrome | 35.2M |

5. The Most Common Jobs by State, 5 years of data about the most common jobs and depict it by year, job wise, and job seekers.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Job Sector** | **Job Seekers Rate** | **Selection Rate** |
| 2019 | IT | 95% | 25% |
| 2020 | Government Job | 97% | 12% |
| 2022 | Customer care | 98% | 45% |
| 2023 | Bank | 82% | 20% |
| 2024 | Games | 74% | 35% |