# Assignment 3 – Data Visualization

The goal of this assignment is to familiarize yourself with data visualization techniques using Python libraries like matplotlib. You will create scatter plots, bar charts, pie charts, and other visualizations to explore and present insights from the Wisconsin breast cancer dataset.

**Instructions:**

1. **Scatter plot**
   * Load the Wisconsin breast cancer dataset
   * Create a scatter plot to visualize the relationship between the radius (mean) and the texture (mean).
   * X-axis: Radius (mean)
   * Y-axis: texture (mean)
   * Title: "Relationship Between Radius and Texture of Breast Cancer Tumors"
   * Use green as the color for the markers and set the marker size to 10.
   * Use circle markers ('o') for the scatter plot.
   * Adjust the transparency of the markers by setting alpha=0.6.
   * Add grid lines to the plot for better readability.
2. **Bar Chart**
   * Create a bar chart to display the tumor calssification (Target) for different ranges of the average radius. Follow these specific steps:
   * X-axis: Categories representing different classification of tumors.
   * Y-axis: The average radius in each category.
   * Title: "Average radius by Tumor Classification"
   * Create bins for radius.
   * Use a blue color for the bars.
   * Rotate the x-axis labels by 45 degrees for easier reading.

Hint to generate the bins:

**#Bin the 'mean radius'**

bins = [0, 5, 10, 15, 20, 25, 30]

labels = ["0-5","0-10" , "10-15", "15-20", "20-25", "25-30"]

df['radius\_bin'] = pd.cut(df['mean radius'], bins=bins, labels=labels)

**#Compute average radius for each tumor type within each bin**

avg\_radius = df.groupby(['radius\_bin', 'target'])['mean radius'].mean().unstack()

**# positions for bins**

x = range(len(avg\_radius.index))

**# width of bars**

width = 0.35

**#Bar charts**

plt.bar([p - width/2 for p in x], avg\_radius[0], width=width, color='blue', label='Malignant (0)')

plt.bar([p + width/2 for p in x], avg\_radius[1], width=width, color='lightblue', label='Benign (1)')

**Submission:**

* Submit a Jupyter Notebook containing all the visualizations with proper titles, labels, and explanations for each chart.
* Include a brief description (2 -3 lines) of the insights you derived from each visualization.