# IBM HR Analytics Employee Attrition & Performance

To analyze employee attrition using the fictional dataset created by IBM data scientists, we can explore various factors that contribute to turnover. This dataset includes variables such as education, job satisfaction, performance ratings, and work-life balance. Here’s how to structure your analysis based on the provided dataset and the insights you wish to uncover.

## Factors in the Dataset

### Key Variables

**Education**: Levels range from 'Below College' to 'Doctor'.

**Environment Satisfaction**: Rated from 'Low' to 'Very High'.

**Job Involvement**: Ranges from 'Low' to 'Very High'.

**Job Satisfaction**: Also rated from 'Low' to 'Very High'.

**Performance Rating**: Scored from 'Low' to 'Outstanding'.

**Relationship Satisfaction**: Rated from 'Low' to 'Very High'.

**Work-Life Balance**: Categories include 'Bad', 'Good', 'Better', and 'Best'.

## Analysis Questions

To gain insights into employee attrition, consider exploring the following questions:

1. Distance from Home by Job Role and Attrition
   * **Analyze how distance from home affects attrition rates across different job roles.**
   * **This can be visualized using a bar chart or box plot.**
2. Average Monthly Income by Education and Attrition
   * **Compare average monthly salaries for different education levels and their corresponding attrition rates.**
   * **A grouped bar chart can effectively illustrate this comparison.**

### Analyzing Factors Contributing to Attrition

#### 1. ****Distance from Home by Job Role and Attrition****

* **Hypothesis:** Employees with longer commutes may be more likely to leave due to increased stress and time away from family.
* **Analysis:**
  + Group employees by job role.
  + Calculate the average distance from home for each group.
  + Compare attrition rates between groups with shorter and longer commutes.
  + Use statistical tests (e.g., t-test, ANOVA) to determine if differences in attrition rates are significant.

#### 2. ****Average Monthly Income by Education and Attrition****

* **Hypothesis:** Employees with higher education levels may have higher expectations for salary and benefits, and may be more likely to leave if they feel underpaid.
* **Analysis:**
  + Group employees by education level.
  + Calculate the average monthly income for each group.
  + Compare attrition rates between groups with different education levels.
  + Use statistical tests (e.g., t-test, ANOVA) to determine if differences in attrition rates are significant.

### Additional Analysis Questions

To gain a more comprehensive understanding of employee attrition, consider exploring these additional questions:

* **Relationship between job satisfaction and attrition:** Is there a correlation between low job satisfaction and higher attrition rates?
* **Impact of work-life balance on attrition:** Do employees with poor work-life balance have higher attrition rates?
* **Influence of performance ratings on attrition:** Are employees with consistently low performance ratings more likely to leave?
* **Effect of environment satisfaction on attrition:** Does a positive work environment reduce attrition rates?
* **Comparison of attrition rates across different departments or teams:** Are certain departments or teams more susceptible to attrition?

### Statistical Techniques

To analyze these questions effectively, you can employ various statistical techniques, including:

* **Descriptive statistics:** Calculate means, medians, modes, and standard deviations to summarize the data.
* **Correlation analysis:** Measure the strength and direction of relationships between variables.
* **Regression analysis:** Model the relationship between a dependent variable (attrition) and independent variables (e.g., job satisfaction, work-life balance).
* **Hypothesis testing:** Use statistical tests to determine if observed differences between groups are statistically significant.

By carefully analyzing these factors and using appropriate statistical techniques, you can gain valuable insights into the drivers of employee attrition and develop targeted retention strategies to improve employee satisfaction and reduce turnover.