Report the χ2 statistic and the statistical significance of the test. Also, explain the

results and what they mean. What does the value of χ2 statistic mean? Is it good or

bad? Is the test statistically significant?

**Chi-squared Test:**

Chi-squared (χ²) test is a statistical method used to determine if there is a significant association between two categorical variables. In this case, we are examining the relationship between happy/happiness (yes/no) and employment categories (students, laborers, preachers, physicians, housewives, teachers, lawyers, musicians).

**Chi-squared Test Result:**

**Degrees of Freedom (dof):** 7

**χ² statistic**: 936.1394782304601

**p-value:** 7.523435335099551e-198 (very close to 0)

A screenshot of a computer

Description automatically generated

*Screenshot of the result.*

**Interpretation:**

**χ² Statistic:** The chi‐square (χ 2) test can be used to evaluate the strength of the relationship between two categorical variables. This is a measure of the extent of the deviation of the observed frequencies from the frequencies that would be expected.

A larger χ² statistic indicates a greater discrepancy between observed and expected frequencies. A high χ² statistic means a **low correlation** between the categorical variables. Since we have χ² statistic value of *936.139* which is high, this means *employment categories (students, laborers, preachers, physicians, housewives, teachers, lawyers, musicians)* are **weakly correlated** to *happiness*. There is a large difference between the observed and the expected values denoted by χ² statistic value of 936.139, this indicates a **bad** ability (deviation) to make correct predictions based on *employment categories (students, laborers, preachers, physicians, housewives, teachers, lawyers, musicians)*.

**Statistical Significance of the test (p-value):** The p-value of the test is *7.523435335099551e-198* which is extremely close to zero, and is much smaller than the significance level of 0.05. This means the **test is highly statistically significant**, indicating variables happiness and employment categories are not independent. They are related (associated). In this case, the p-value is close to zero( < 0.05) also suggests that the observed differences in responses of happiness (yes/no) across different employment categories *categories (students, laborers, preachers, physicians, housewives, teachers, lawyers, musicians)* are unlikely to be due to some random chance.