**Exercise 3**

**Solution:**

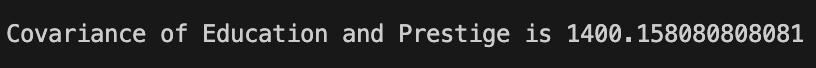
1. Calculate and report the covariance for salary and education.



1. Calculate and report covariance for salary and prestige.

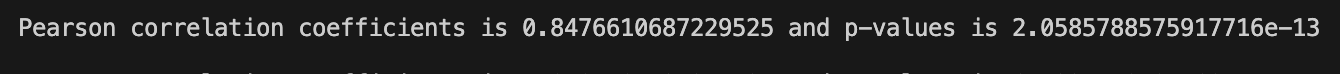


1. Calculate and report covariance for education and prestige.



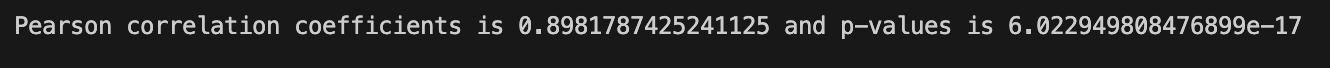
4. Calculate and report Pearson’s correlation coefficients and the p-values for salary and

education.



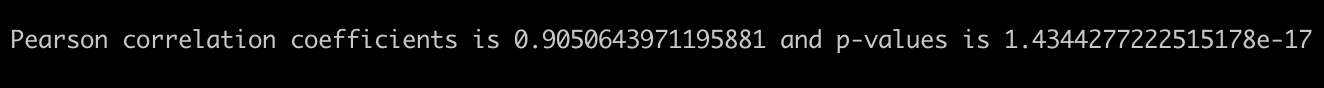
5. Calculate and report Pearson’s correlation coefficients and the p-values for salary and

prestige.



6. Calculate and report Pearson’s correlation coefficients and the p-values for education

and prestige.



7. For each of the calculated correlation coefficients, explain the following:

a. The strength and direction of the correlation.

b. The statistical significance of the test (p-value) and emphasize if we can trust

the correlation test or if the test cannot be trusted.

**Answer:**

1. For Salary and Education
2. The correlation coefficient of salary and education is **0.8476** which indicates salary and education have a strong correlation.
3. The statistical significance of the test (p-value) for salary and education is **2.0585788575917716e-13** which is less than the threshold value of 0.05. This indicates we can trust the correlation test. This means the correlation is highly statistically significant.
4. For Salary and Prestige
5. The correlation coefficient of salary and prestige is **0.8981** which indicates salary and prestige have a strong correlation.
6. The statistical significance of the test (p-value) for salary and prestige is **6.022949808476899e-17** which is less than the threshold value of 0.05. This indicates we can trust the correlation test. This means the correlation is highly statistically significant.
7. For Education and Prestige
8. The correlation coefficient of education and prestige is **0.9050** which indicates education and prestige have a strong correlation.
9. The statistical significance of the test (p-value) for education and prestige is **1.4344277222515178e-17** which is less than the threshold value of 0.05. This indicates we can trust the correlation test. This means the correlation is highly statistically significant.

8. Pearson’s correlation coefficient or covariance can be used to measure the

direction of the relationship between two variables (e.g., education and salary). Explain

which measure is better and why.

**Answer:** When comparing Pearson’s correlation coefficient and covariance to measure the relationship between two variables, such as education and salary, Pearson's correlation coefficient is generally considered more informative, better, and universally applicable. Covariance is scale-dependent, making its values hard to compare across different contexts due to its sensitivity to the units of the variables.

On the other hand, Pearson's correlation coefficient provides a dimensionless measure that ranges from -1 to 1, where 1 represents a perfect positive linear relationship, -1 a perfect negative linear relationship, and 0 indicates no linear relationship. This standardization allows for easy interpretation of both the direction and strength of the relationship between two variables, independent of their scales.

Pearson’s correlation coefficient is preferred for its ease of interpretation and its ability to facilitate direct comparisons and relationship strengths across different studies or datasets, making it a more insightful tool for understanding the dynamics between two variables.