# P02 Student Instructions – Box Plot, Regression, T‑Test & Chi‑Square

**Objectives:** - Visualise data using box plots - Perform simple linear regression - Conduct two‑sample t‑test and compute a confidence interval - Carry out a chi‑square test

**Prerequisites:** Understanding of basic statistics and charts **Estimated Time:** 3 hours **Learning Outcomes:** - Create and interpret box plots - Compute regression line parameters (slope and intercept) - Carry out t‑test for independent samples and interpret the test statistic - Calculate chi‑square statistic for categorical data

**Dataset Description:** | Column | Type | Description | |——-|——|————-| | X | float64 | Synthetic column | | Y | float64 | Synthetic column | | Group | object | Synthetic column | | Response | float64 | Synthetic column | | Category | object | Synthetic column |

**Tasks and Steps:** 1. Load the synthetic dataset 2. Create a box plot for the Response variable 3. Compute a simple linear regression line for Y versus X 4. Separate Response by Group A and Group B; perform a two‑sample t‑test 5. Tabulate the Category column counts and compute the chi‑square statistic 6. Report your findings

**Formulas / Methods:** - Slope and Intercept: derived via least squares method - T‑test statistic: (t = rac{ar{x}\_1 - ar{x}\_2}{}) - Chi‑square: (^2 = rac{(O - E)^2}{E})

**Submission Checklist:** - Box plot image - Regression parameters (slope, intercept) calculated - T‑test statistic with degrees of freedom - Chi‑square statistic computed

**मराठी सारांश (Marathi Summary):** या प्रात्यक्षिकात आपण बॉक्स प्लॉट तयार करणार, रेषीय प्रतिगमन साधणार, दोन नमुना t‑चाचणी करणार आणि वर्गीकृत डेटा साठी काई स्क्वेअर परीक्षण करणार आहोत.