Purposes:

1. Assess whether students know how to conduct appropriate data analyses on data from a Multi-Environment-Trial.
2. Assess whether students know how to interpret results from data analyses and communicate their interpretations.
3. Assess whether students understand how to make and communicate decisions based on justifiable reasons.

Keywords: Multi-Environment Trial (MET), residual variance, i.i.d. N(0,σ^2) Data transformation,

References:

Review Statistical Inference Analysis of Variance CM

Useful R commands

- getwd()
- setwd()
- read.csv()
- rm()
- attach()
- as.factor()
- lm()
- aov()
- summary()

Results from the EDA on the data in "Review EDA with R ds3.csv" suggest that there are two different types of environments in which the trials were conducted. This could mean that the residual variability, i.e., the variances within environments are not identical among environments. Recall from your introductory statistics, that the residual variability, is assumed to be ~ i.i.d.N(0,σ). The key assumption is i.d, identically distributed variances. Randomization should have addressed independently distributed residuals. Generally for quantitative traits, ε are Normally distributed, but as long as the distribution of ε are distributed as a unimodal distribution, then any deviations from Normality have little impact on inferences. Because the boxplots, by environment, give us some concern we need to validate the assumption about identical distribution of errors before conducting a combined analysis across environments.

- Conduct analyses of variance by environment, then compare the estimated residual variances among all 10 environments. Make a decision about whether a transformation of the data is needed prior to conducting a combined analysis of variance across all environments. It is possible that you will decide to conduct a combined AOV across all environments or across subsets of environments.
    - Present your results in a table and a paragraph justifying your decision.
- Conduct a combined analysis of variance. Make a decision about whether we should rank and select lines for advancement to the next stage of trials. It is possible that additional analyses are needed before decisions can be made. What might those analyses be?
    - Provide an executive recommendation and justification for advancing any lines. It is ok to recommend further analyses before the decision.