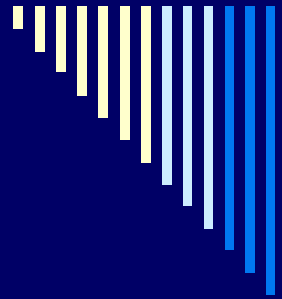# Experimental Software Engineering (ESE)

Basic Principia.
A Descriptive view.

Based on *D. C. Montgomery, Design and Analysis of Experiments*, McGraw-Hill.

DICII – UniRoma2 – Giovanni Cantone

Statistical planning of experiments

☐ Replication

☐ Randomization

☐ Blocking

☐ *Balancing*

Replication

Objective

Obtaining <u>variance</u> as small as due.

Solution

$$\sigma_y^2 = \sigma^2/n$$

Variance decreases inversely to the size of a good replication.

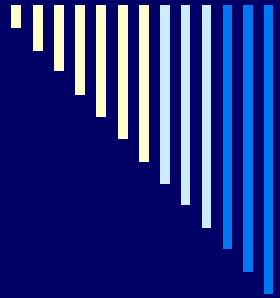Replicating is not the same than repeating measures.

Randomization

Objective

Randomizing errors, averaging on effects of foreign factors.

Solution

Define randomly:

☐ **The underline experimental objects**

☐ **The order of assigning the underline experimental subjects**

DICII – UniRoma2 – Giovanni Cantone

Blocking

Objective

Improve precision by reducing the impact of <u>predictable</u> [<u>measurable</u>] <u>noises</u>.

Solution

Use homogeneous experimental conditions (i.e. one block) for each factor of noise.