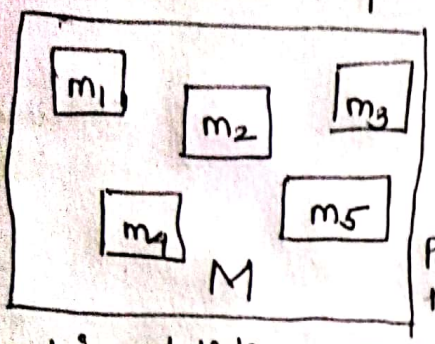
INTRODUCTION TO PARAMETRIC AND NON-PARAMETRIC TEST

Statistics → It is the characteristics of small part of population. i.e, Sample
→ It is a variable and known number

Parameter → It is a fixed measure which describe the target population.
→ It is a fixed and unknown numerical value.



m_n → Sample mean. Small subset of population and their respective mean. Eg - $m_1, m_2, m_3 \dots m_n$.

M → Population mean. Very hard to describe.

Parametric test → When we use mean as center of distribution.
Non parametric test → When we use median as center of distribution

Parametric statistics → That makes assumptions about the parameters of the population distribution from which one's data are drawn.
→ They assume underlying statistical distribution in the data.
→ Several conditions of validity must be met so that result of test is reliable

Non-parametric statistics → They makes no assumption about parameter of a distribution.
→ They do not depend on any distribution.
→ They can be applied even if they do not follow any distributions.

Parametric Test	Non-Parametric
i) Specific assumption are made about population parameter	i) No assumption are made about population.
ii) Require more information for calculation (sample size)	ii) Require less information for calculation
iii) Assume a regular bell shape curve distribution	iii) Do not assume regular bell shape curve
iv) More statistical power	iv) Less powerful
v) Less power (Assumption are made)	v) More power (No assumption made)
vi) Result can be generalized	vi) Cannot be generalized.

Advantage of Non parametric test - i) Easy to learn ii) Based on general conditions.
iii) No specific form of distribution is needed.
iv) Hence also known as distribution free test.

Disadvantage of Non parametric test - i) Low precision ii) Low power iii) False sense of security
iv) A large ~~sample~~ sample require to draw conclusion.

Non-parametric test		Parametric Counterpart	Parametric Counterpart
Wilcoxon Signed test	Compare 1 Median to specific value	Parametric Counterpart	z test 1 sample t test
	Compare 2 Median to specific value	z test 1 sample t test	Paired sample t test (dependent)
Mann-Whitney	Compare 2 Independent median	Paired sample t-test (dependent)	2 sample t test (independent)
Kruskal Wallis	Compare 3 or More median, 1 variable	2 sample t test (independent)	1 way Annova
Friedman	Compare 3 or More median, 2 variable		2 way Annova
Chi-square test of Independence	Test 2 categorical variable for Independence (lack of association)		None