**PLACKETT BURMAN DESIGN**

**GROUP MEMBERS:**

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**INTRODUCTION:**

Plackett Burman Design is a statistical method used to identify the importance of a particular variable from a list of variables that influence any process. This method is extensively used designing experiments for bioprocess operations like fermentation where complete knowledge of the system is not available. Design parameters that influence the system in any bioprocess could be physical (like temperature, pressure, agitation, aeration, etc.,), chemical (like the media components – yeast extract, Carbon/Nitrogen ratio, salts, etc.,), or biological (growth rate, cell density, etc.,). This leaves us with too many parameters to consider while optimising the system for maximum yield. Thus, it becomes imperative that we find the parameters that have the most effect on the desired output (say, yield in this case).

But, the major downfall of using Plackett Burman design is that it does not account for the interaction among the variables. Thus, there might be some discrepancy on asserting the most influential variable though it gives a rough idea of possible list of influencing parameters. Also, for this method, high and low values for each parameter have to be ascertained and they have to be used correspondingly for each trial.

**AIM:**

To determine the variable that has the maximum effect on the response of the given system with regard to the given list of input parameters.

**OVERVIEW OF METHODOLOGY:**

* *INPUT:*
  + Number of parameters to be considered
  + Generate matrix – import pyDOE and use pbdesign module
  + Number of dummy variables among the parameters
  + Position of these dummy variables in the list of parameters
  + List of response variable values (say, yield in a fermentation process) corresponding to all the trials that are generated by the user on the basis of the high and low conditions for each parameter as in the matrix generated
* Calculate the variance for all the parameters (including the dummy variables)
* Perform F test for all the parameters
* *OUTPUT:*
  + Arrange F values in increasing order and print the order of importance of the variables on the system