**Assignment Brief:**

A total of 380 concrete samples were tested for properties including **bulk density, compressive strength, initial modulus of elasticity, and water absorption**. Following parameters were used for the study:

* **Curing Type:** The samples were either dry-cured in open air or wet-cured by placing them in a tank of water.
* **Plasticizer:** Plasticizer was used in the concrete mix for preparing some of the samples.
* **Fine Aggregate Type:** There were a total of 5 types of fine aggregate. These types have been named A, B, C, D, and E.
* **Coarse Aggregate Type:** There were a total of 3 types of coarse aggregates. These types have been named A, B, and C.
* **Water/binder Ratio:** The water/binder ratio ranged between 0.3 and 0.75.
* **Curing Age:** Curing age refers to the number of days after casting when the tests were performed. The samples were tested 7, 14, or 28 days after casting.

**Data:**

The data from the test results along with the parameters are reported in the attached excel file. (Note: A separate excel file has been provided for each student).

**Tasks:**

You need to perform the following tasks. You can use software (such as SPSS) to help you in the statistical analysis tasks:

1. Conduct a critical literature review of the effect of each of the six parameters listed above.
2. Calculate the descriptive statistics of the test data.
3. Perform statistical analysis, draw inferences, discuss your analysis results and draw conclusions. You can use the following guidelines:
   1. Check the data in general and see if there are any outliers. Perform the relevant tests to check the data validity, skewness, bias, etc.
   2. Look at the effect of each parameter on each of the properties. Measure both the size and the significance of the effect. Perform regression analysis to establish any relationships between the parameters and the properties.
   3. Each of the properties i.e. bulk density, compressive strength, modulus of elasticity, and water absorption need to be optimized (bulk density and water absorption should be minimized and compressive strength and modulus of elasticity should be maximized). Recommend the value of each parameter for each of these optimizations.
4. Write a report containing the introduction, the literature review (no more than 4000 words for LR), also include task description, data interpretation, descriptive statistics, inferential statistics, discussion, and conclusions. The report should be concise, to the point, and clearly written. The diagrams and tables should be properly labelled and captioned.
5. Do not forget to include the references to any literature or other sources of information you use for solving this assignment.

**Marking Rubric**

This assignment has a weightage of 40% to be counted towards your final grade. The assignment marks will be awarded as per the following rubric:

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| **S.NO.** | **Criterion** | **Weight** |
| 1 | Introduction, task description, understanding of the assignment brief | 10% |
| 2 | Critical Review of the parameters of the study on concrete quality | 20 % |
| 3 | Calculation and presentation of descriptive statistics | 15% |
| 4 | Statistical analysis and presentation of inferential statistics | 20% |
| 5 | Discussion on the results | 15% |
| 6 | Conclusions drawn and recommendations made | 10% |
| 7 | Structure, language, and presentation | 10% |