Quantum Architecture and Programming
CS F316
BITS PILANI, GOA CAMPUS

ASSIGNMENT 3 - Version 1.0

30 units

In this assignment, the goal is to understand quantum benchmarking. Your task is to study the methods used for analyzing quantum benchmarks and write a report describing what you learned. The report should be a maximum of **four pages** and **11 pt font size**. Include figures as necessary.

Following are the steps that you will follow, and stated alongside are some of the deliverables expected from the submission/report.

- Choose any **two quantum benchmarks** from the suite (such as GHZ, Merlin Bell, QAOA, etc.) and any **three feature vectors** (such as program communication, critical path, entanglement ratio, etc.), discussed in the SupermarQ paper (**https://arxiv.org/abs/2202.11045**).
- Follow the steps to analyse the benchmark based on the Jupyter Notebook document (uploaded on quanta - **Assignment3_QAP.ipynb**).
- Show (plot/draw) and discuss how the selected two benchmarks vary for each of the three feature vectors you have chosen.
- Discuss why the feature vector varies based on your understanding of the benchmark and the feature vectors themselves.

Please refer to quanta for the submission deadline.

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***Open-ended and is not compulsory*:**

Run the benchmarks on the real quantum machine and obtain the scores for different benchmarks. If you need help in this and/or a working notebook file for this purpose, please contact the instructor kunalk@goa.bits-pilani.ac.in