This assignment fulfils the objective of hands-on learning of design and analysis of algorithms, to cater to real-world problems. These cover algorithms based on a variety of design techniques, namely, Divide and Conquer (D&C), Greedy Algorithms, Graph Algorithms, and Dynamic Programming.

# Process

- Each student team of two must work on a project topic. The list of project topics will be provided in a spreadsheet. Each project topic has details on the tasks, the experiments to be run, the learning objectives, suggested datasets, and several other details.
  - Each project topic has a set of 3 tasks and a set of 3 experiments.
  - All tasks must be accomplished, as demonstrated through the set of experiments.
  - A starter dataset is provided, which could be used, or a real-world dataset (from Kaggle, etc.) could be used from the suggested datasets or similar ones that the team decides on. The choice of data must be discussed in the report.
- Each team gets a chance to select a project from the project list by the choice-finalization deadline. The team will be allocated a project from the top 3 they email to the instructor. The choice will be allocated on a **first-come, first-served basis**.
  - A project, given as Project ID, will be worked on only by one team.
  - If all 3 suggested projects are already taken, then the supervisor lets the team know. The allocations will be updated from time to time on Moodle.
- The topics concerning the projects given in the list are intended to be completed in lectures before October 2025.
- All submissions must be made on Moodle. It is sufficient if one of the team members submits for the team. Both students are welcome to make submissions. However, only one will be graded with the assumption that both are going to be the same. Any deviations from this assumption may be emailed to the instructor.

# Deliverables

The expected deliverables are a project report, source code, and (optionally) a presentation.
The project report must discuss the following items:

1. problem statement/motivation,
2. description of the approach and method used,
3. complexity analysis (both time and space) in detail,
4. description of experiments and datasets used,
5. results and discussion, including correctness, validation, and performance,
6. challenges faced and lessons learned.
7. (Advisable) GitHub project link for the source code and its supporting files (as mentioned below).

The source code must be a clean and well-commented implementation of the algorithm, and should be submitted with the following supporting files: a README file with instructions or scripts to run the code, and test cases in text format/JSON files, including example inputs. It is advisable that a GitHub project link be given in the report for the source code instead of separate source files.
The optional presentation can be in 5-6 slides summarizing the project, a video demonstration of the working of the code, etc. This will only need to be included in the submission, and there will be no class presentation (oral) or viva voce for this.

## Timeline

The timeline for this exercise is as follows:

- September/13/2025 (Saturday): Release of assignment description and project list.
- September/15/2025 (Monday), 11:59 pm IST: Finalization of choice of project by teams via email to jnair.work@gmail.com
- September/16/2025 (Tuesday): Announcement of final team-project mapping on Moodle.
- October/19/2025 (Sunday), 11:59 pm IST: Assignment submission on Moodle.

The team list is given in Table 1.

Table 1: Team ID - Project ID mapping

| Team ID | Team Name | Student-1 | Roll# | Student-2 | Roll# | Project ID |
|---|---|---|---|---|---|---|
| T01 | DND | Darsh Jain | bmat2317 | Devansh Dhar Dwivedi | bmat2350 | Pxx |
| T02 | Kenshi | Muhammed Shameel K V | bmat2330 | Shiva Sanjay Semwal | bmat2340 | Pxx |
| T03 | P=NP | Korou Khundrakpam | bmat2324 | Kalmanje Avyaktha Achar | bmat2321 | Pxx |
| T04 | DDSP | Shrayan Pramanik | bmat2342 | Debatra Das | bmat2318 | Pxx |
| T05 | Readers | Kaustubh Dineshkumar Dubey | bmat2323 | Rajvardhan Singh Sisodiya | bmat2335 | Pxx |
| T06 | Arun Icecream | Tanay Jain | bmat2355 | Pranav | bmat2333 | Pxx |
| T07 | Full marks please | Akshat Mishra | bmat2306 | Advait Sunder | bmat2304 | Pxx |
| T08 | Mstat Buddies | Kunal Rajpoot | bmat2325 | Lavanis A | bmat2353 | Pxx |
| T09 | AlgoRythms | Yuvraj Singh Rajpurohit | bmat2348 | Mayukh Vellala | bmat2329 | Pxx |
| T10 | Team DAA Code Crafters | Bodhideep Joardar | bmat2315 | Arkapriyo Hore | bmat2313 | Pxx |
| T11 | Sarkari Bondhu | Anis Kumar Sarkar | bmat2309 | Sarbartha Sarkar | bmat2337 | Pxx |
| T12 | Z2 | Naveen Kumar G | bmat2331 | Treanungkur Mal | bmat2356 | Pxx |
| T13 | Nanchaku | Vishal Vikram Parth | bmat2347 | Pushpender Chauhan | bmat2334 | Pxx |
| T14 | Algorithm Architects | Aritrabha Majumdar | bmat2311 | Aanchal Saraf | bmat2301 | Pxx |
| T15 | Bro Code | Ayan Pal | bmat2314 | Shrajal Kushwaha | bmat2341 | Pxx |
| T16 | Quilo | Disha Kumari | bmat2218 | Arjina Jana | bmat2312 | Pxx |
| T17 | VISA | Vijit Tripathi | bmat2346 | Sarvesh Soni | bmat2338 | Pxx |
| T18 | Hello World | Shankha Suvra Dam | bmat2339 | Kangna Chirag Patel | bmat2322 | Pxx |
| T19 | while TRUE; | Adrija Chatterjee | bmat2303 | Suryansh Shailesh Shirbhate | bmat2344 | Pxx |
| T20 | Almost Coders | Daibik Barik | bmat2316 | Samadrita Bhattacharya | bmat2336 | Pxx |
| T21 | Shock | Shreyash Vaish | bmat2354 | Divyanshu Gupta | bmat2219 | Pxx |
| T22 | Somda's team | Somendra Singh Kharola | bmat2240 | Sasapu Lokeswar Rao | bmat2237 | Pxx |
| T23 | Bihar-Haryana | Sushant Aditya | bmat2345 | Harsh Sharma | bmat2351 | Pxx |
| T24 | Keshav Andy Team | Keshav Narayan R | bmat2352 | Andy Marion Guerra | bmat2308 | Pxx |
| T25 | Saketh & Anant | Anant Umesh Kerur | bmat2307 | Challa Saketh Sarma | bmat2216 | Pxx |
| T26 | Die Tum Tum | Arya Biswas | bmat2349 | Madhubala Senthilnathan | bmat2327 | Pxx |
| T27 | Kal theke porte boshbo | Nirjhar Laskar | bmat2332 | Agaman Banerjee | bmat2305 | Pxx |