**Design and Analysis of Algorithms**

**Theory - Learning Portfolio**

**Home Page – Introduction**

Give an introduction for the course. Reflect on the following questions: (and not restricted to)

* What is the course about?
* What kind of data structures and algorithms have you studied?
* How do you connect the course with real time applications?

**Course Project Introduction**

* Provide the details of problem space and how it was arrived at. Summarize the findings from white paper. Reflect on city design and how business cases were identified.
* Provide problem definition and team details
* Provide business cases that each member is working on

**Course Learning Reflections**

Each Team Member will further provide the following in separate pages. Each student will logically divide the sections and sub sections as per their understanding.

* What are the kinds of problems we see in the nature? (iteration, recursion, backtracking)
* What is space and time efficiency? Why are they important? Explain the different class of problems and orders of growth
* Take away from different design principles from chapter 2 (can use the notes provided)
* The hierarchical data and how different tree data structures solve and optimize over the problem scenarios (tree, bst, avl, 2-3, red-black, heap, trie)
* The need of array query algorithms and their implications. Their applications and principles need to be discussed
* Differentiate between tree and graphs and their traversals. The applications of each
* Deliberate on sorting and searching algorithms, the technique behind each and they connect to real world
* Discuss the importance of graph algorithms with respect to spanning trees and shortest paths
* Discuss about the different studied algorithm design techniques.

Following are questions that can be answered while the sections and sub sections are formed (all need not be answered. They are only the questions to think ahead).

* How do you determine the most efficient approach when solving a complex problem?
* Reflect on a situation where you need to balance multiple conflicting constraints in a design. What approach did you take?
* What criteria do you use to evaluate the effectiveness of a solution?
* How can you adapt an existing solution to address a new or unforeseen challenge?
* What strategies do you use to identify patterns or structures in complex datasets or problems?
* How do you decide when to prioritize simplicity over optimization in a solution?
* Reflect on how breaking down a problem into smaller components can help you approach it more effectively.
* Reflect on the trade-offs while choosing between different approaches to solve a problem.
* How do you identify and address potential limitations or weaknesses in a proposed solution?
* Reflect on how applying knowledge from one context can help you solve a problem in a different context.
* How do you decide when to innovate versus relying on tried-and-tested solutions?