FAQ

Module-5	
Question 1.	**What is the main difference between the original Simplex Method and its variants like the Dual Simplex and Revised Simplex?**
Answer	The original Simplex Method is designed to solve linear programming problems by iteratively moving along the edges of the feasible region to find the optimal solution. Its variants have been developed to address specific types of problems or improve computational efficiency. • **Dual Simplex:** While the Simplex method is designed for feasible starting solutions, the Dual Simplex method is crafted for situations where the solution is infeasible but optimal. It's particularly useful when certain constraints are violated and adjustments are required. • **Revised Simplex:** The main goal here is computational efficiency. Instead of working with the entire tableau (as in the traditional Simplex), the Revised Simplex works with a subset of columns, making it faster and more memory-efficient, especially for large-scale problems.
Question 2.	**How can Excel's Solver handle linear programming**

	problems like those solved by the Simplex Method?
Answer	Excel's Solver is a versatile tool that can tackle various optimization problems, including linear programming. When you set up a linear programming problem in Excel, you essentially define your objective function, decision variables, and constraints using spreadsheet cells. Solver adjusts the decision variables to find the maximum or minimum value for the objective function while adhering to the given constraints. When using Solver for linear programming, you'd typically choose the Simplex LP solving method, allowing Solver to use the Simplex algorithm to find the optimal solution.
Question 3.	**How does Network Analysis in optimization differ from typical Network Analysis in fields like social media or telecommunications?**
Answer	Network Analysis, in its essence, is the study of networks. While the foundational principles remain consistent, the applications and objectives can vary significantly across domains. • In **optimization**, Network Analysis focuses on finding the most efficient way to achieve a particular goal, such as determining the shortest path in a transportation network, or maximising flow in supply chain networks. The networks here often represent tangible systems with constraints, costs,

	and capacities. ● In fields like **social media or telecommunications**, Network Analysis might aim to understand the structure and dynamics of social or communication networks, identify influential nodes (like key influencers), or optimise data transmission routes. These networks often represent intangible relationships and interactions.
Question 4.	**What are some real-world applications of Network Analysis in optimization?**
Answer	Network Analysis in optimization has numerous real-world applications: ● **Transportation:** Finding the shortest or most cost-effective route between destinations. ● **Supply Chain:** Optimising the flow of goods across distribution networks to minimise costs or delivery times. ● **Telecommunications:** Designing efficient communication networks and routing data packets to minimise latency. ● **Project Management:** Using techniques like the Critical Path Method to optimise project timelines.
Question 5.	**How does Python's NetworkX library aid in Network Analysis and what are its key features?**
Answer	NetworkX is a comprehensive Python library designed for

	the creation, manipulation, and study of complex networks. Some of its key features include:
	
	    ● **Flexibility:** Can handle both undirected and directed graphs.
	
	    ● **Algorithms:** Provides a rich collection of standard graph algorithms, such as shortest path calculations, clustering, and network flow analyses.
	
	    ● **Data Structures:** Offers versatile data structures for representing graphs, facilitating easy manipulations.
	
	    ● **Visualisation:** While not a primary graphics tool, NetworkX can work in conjunction with libraries like Matplotlib to visualise networks.
	
	Using NetworkX, data scientists can effectively study large-scale network structures and derive insightful conclusions relevant to various fields of application.