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Monday — 9 - 11
Wed — 10 - 11
Thurs — 10 - 11

4 - credits

100 → 25 (Theory) 25 (Project) 50 (Paper)

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4 January 2021 (Lecture - 1)

LPP - Linear Programming Problems

1) TORA
2) LP Assistant
3) Excel

} Softwares for LPP
↳ Inbuilt Methods

The Real Life Problem
| ← Mathematical Modelling
Mathematical Problem
| ← Methods
Solve by Alg.

LPP → Divide into 2 Parts
Modelling Methods

Modelling

Diet Problem

1) Optimize cost f^n
2) Constraints

Goal → minimize the cost of food but we need to meet the daily minimum nut. requirement

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Foods : Apple, Banana, Orange, Eggs, Carrot
Nutritions : Vitamin C, Protein, Iron

Food		Protein	Vit. C	Iron	Price
~~Food~~	~~1~~	~~0.4~~	~~6~~	~~0.4~~	~~8~~
Apple	1	0.4	6	0.4	8
Banana	1	1.2	10	0.6	10
Orange	1	0.6	3	0.4	3
Eggs	2	0.6	1	0.2	20
Carrot	1	12.2	0	2.6	15
Min Req.		70	50	12	

Protein in g/unit
Vit. C in mg/unit
Iron in mg/unit
Price in ₹

Modelling

Variables : A, B, O, ~~D~~, E, C → carrot
↳ Apple, ↳ Banana, ↳ Orange, ↳ Eggs

= # ~~of~~ units of food daily req.

Cost function → $Z = 8A + 10B + 3O + 20E + 15C$
(Iron (O))

we need to minimize this fn

Constraints → $0.4A + 1.2B + 0.6O + 0.6E + 12.2C \longrightarrow (70) \rightarrow$ min.

$\therefore 0.4A + 1.2B + 0.6O + 0.6E + 12.2C \geq 70$

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$6A + 10B + 3O + E + 0C \geq 50$

$0.4A + 0.CB + 0.4O + 0.2E + 2.6C \geq 12$

$A, B, O, E, C \geq 0$

This Model is LPP Model
- Linear eqns
- Objective fns

Product Mix Problem

Products A & B
Resources R_1 & R_2

for each unit of product A, we require 1 units of R_1 & 3 units of R_2

For each unit of product B → 1 unit R_1, 2 units of R_2

Manufacture has
5 unit of R_1 & 12 Unit of R_2 } Availability

Maximize Profit

Profit on A is ₹6 per unit
" " B " ₹5 " "

Goal is to maximize the profit

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Products	R_1	R_2	Profit (per unit)
A	1	3	6
B	1	2	5
Available :	5	12	

x = # of units of A produced } Decision
y = # of units of B produced } Variables

$Z = 6x + 5y$
↳ Minimize
subject to constraints } LP Model

$x + y \leq 5$
$3x + 2y \leq 12$
$x, y \geq 0$
↳ Non-negativity restrictions (Always in LPP)

Objective function

Variables → Decision Variables → in LPP
eg, x, y above