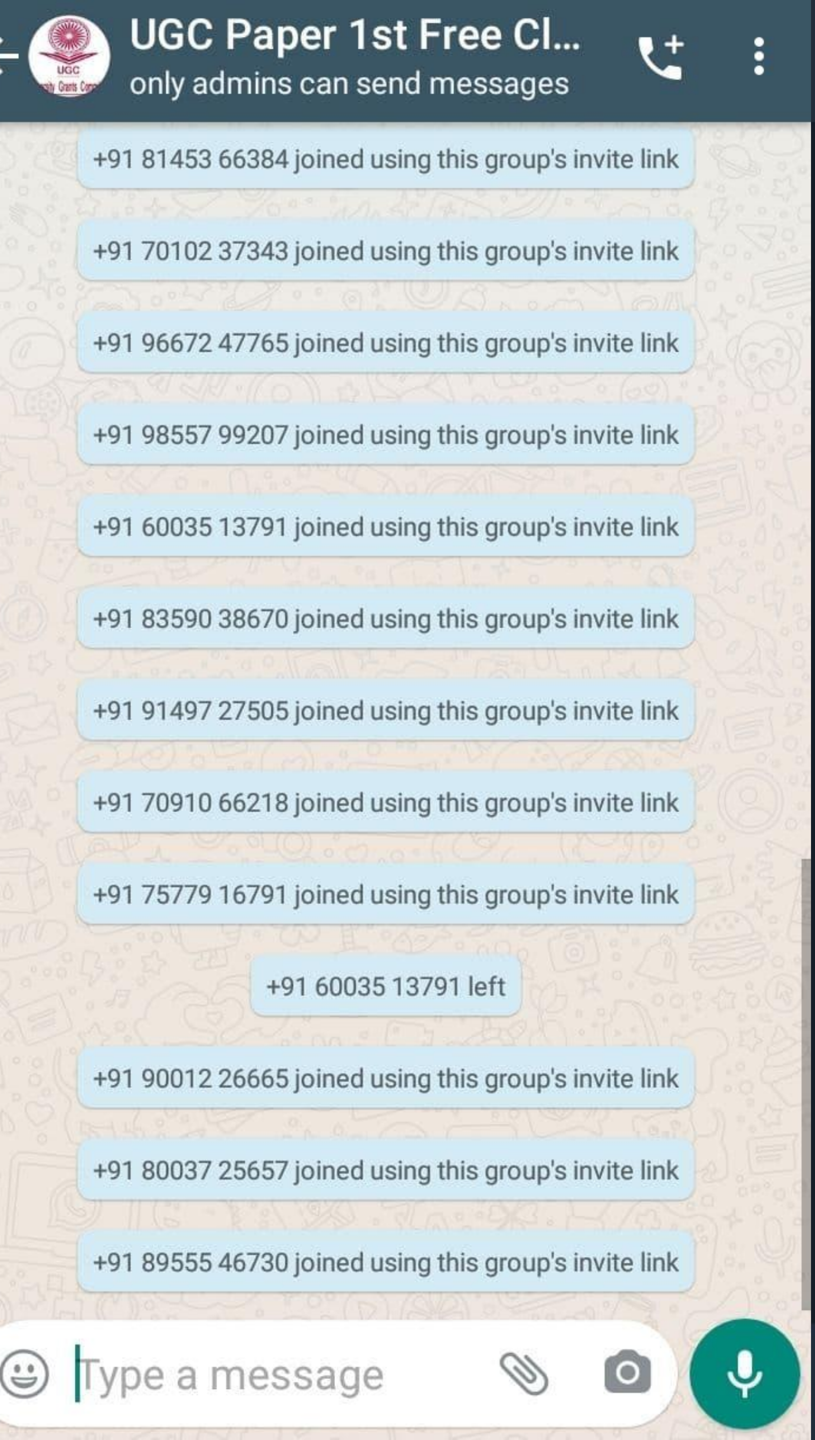
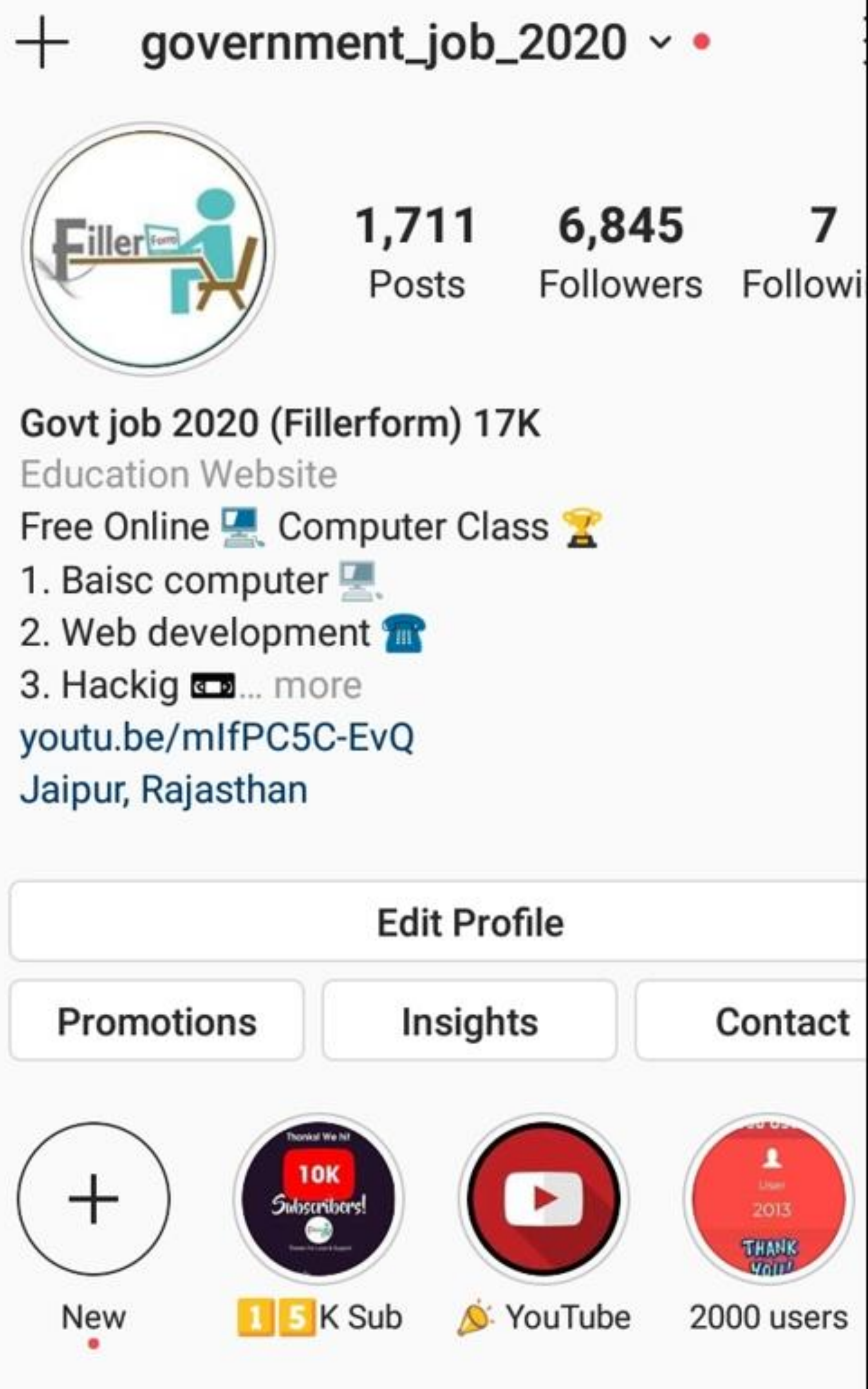
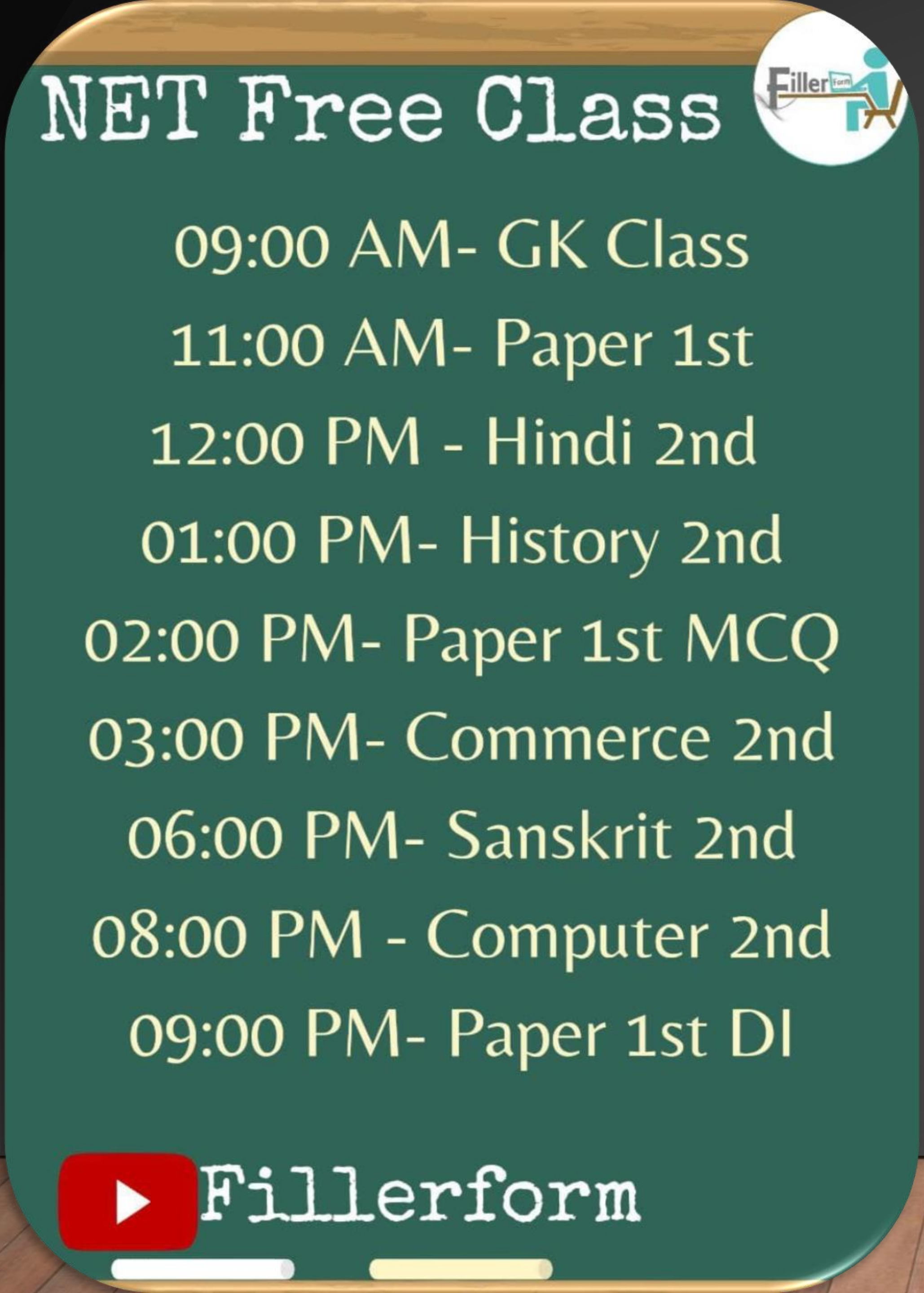
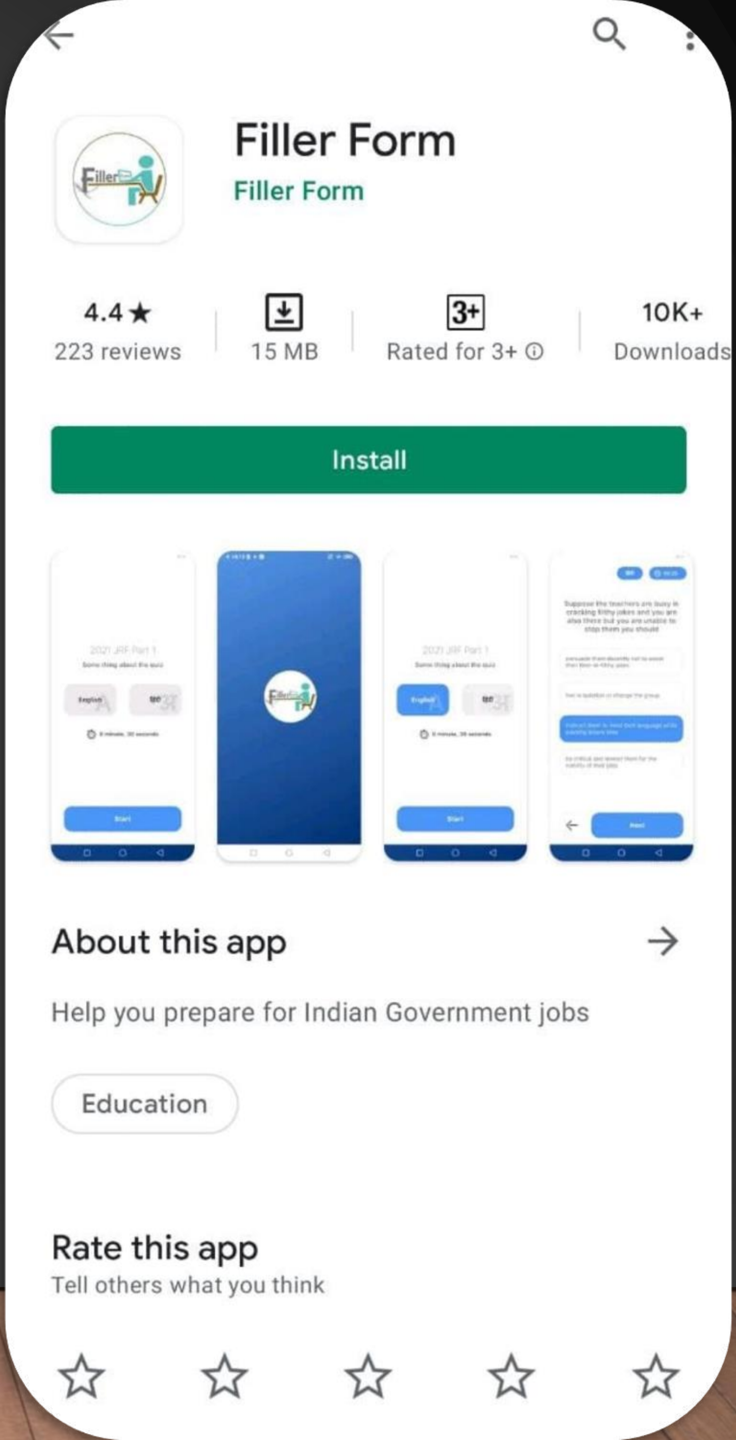

UGC Paper 1st Free Cl...
only admins can send messages
+91 81453 66384 joined using this group's invite link
+91 70102 37343 joined using this group's invite link
+91 96672 47765 joined using this group's invite link
+91 98557 99207 joined using this group's invite link
+91 60035 13791 joined using this group's invite link
+91 83590 38670 joined using this group's invite link
+91 91497 27505 joined using this group's invite link
+91 70910 66218 joined using this group's invite link
+91 75779 16791 joined using this group's invite link
+91 60035 13791 left
+91 90012 26665 joined using this group's invite link
+91 80037 25657 joined using this group's invite link
+91 89555 46730 joined using this group's invite link
Type a message


UGC Paper 1st Free Cl...
120 subscribers
December 28
Channel created
Channel photo changed
UGC
Broadcast


government_job_2020
1,711
Posts
6,845
Followers
7
Govt job 2020 (Fillerform) 17K
Education Website
Free Online Computer Class
1. Baisc computer
2. Web development
3. Hackig ... more
youtu.be/mIfPC5C-EvQ
Jaipur, Rajasthan
Edit Profile
Promotions
Insights
Contact
New
15K Sub
YouTube
2000 users


NET Free Class
09:00 AM- GK Class
11:00 AM- Paper 1st
12:00 PM - Hindi 2nd
01:00 PM- History 2nd
02:00 PM- Paper 1st MCQ
03:00 PM- Commerce 2nd
06:00 PM- Sanskrit 2nd
08:00 PM - Computer 2nd
09:00 PM- Paper 1st DI
Fillerform


Filler Form
Filler Form
4.4 ★
223 reviews
15 MB
3+
Rated for 3+
10K+
Downloads
Install
About this app
Help you prepare for Indian Government jobs
Education
Rate this app
Tell others what you think

8209837844

❑ Discrete Structure and Optimization

Content:

1) Optimization (part -1)

2) Linear Programming Problem

3) **Graphical Solution of LP Problems**

4) **Transportation problem**

What is Linear Programming?

linear programming is a technique that helps us to find the optimum solution for a given problem, an optimum solution is that solution that is the best possible outcome of a given particular problem. In simple terms, it is the method to find out how to do something in the best possible way in given limited resources you need to do the optimum utilization of resources to achieve the best possible result in a particular objective.

LPP

Linear Programming Problems in maths is a system process of finding a maximum or minimum value of any variable in a function, it is also known by the name of optimization problem. LPP is helpful in developing and solving a decision making problem by mathematical techniques.

The problem is generally given in a linear function which needs to be optimized subject to a set of different constraints. Major usage of LPP is in advising the management to to make the most efficient & effective use of the scarce resources.

Different Parts of the LP Model

1. Decision Variable: Variables which are changeable & going to impact the decision function. Like the profit function is effected by both sales and price, now which one of these two is changeable, will be our decision variable.

2. Objective Function: Linear function of the objective, either to Maximize or minimize, like Maximize Profit, sales, production etc. and Minimize Cost, Loss, energy, consumption, wastage etc.

3. Constraints: Any kind of limitation or scarcity explained through a function like Limitations of raw materials, time, funds, equipment's etc. Non-Negative Constraints will also be there which will remain non-negative all the time.

Graphical Solution of LP Problems

Graphical method of linear programming is used for solving LP problems by finding out the maximum or minimum point of the intersection between the objective function line and the feasible region on a graph.

The graphical method is used to optimize LP problems with two variables.

Feasible region:

The closed plain region obtained by the intersection of planes determined by a set of constraints in the LP problem is known as the *feasible region*.

The corner points of the feasible region are known as the *vertices of the feasible region.*

The values of the set of decision variables that satisfy the given constraints is the *feasible solution.*

Solution of a given LP Problem:

1. Formulate the problem using objective function and constraints.
2. Express inequalities as equations.
3. Plot graph from the points obtained from the equations.
4. Determine the valid side of each plane on the graph.
5. Identify the vertices of the feasible region.
6. Evaluate the value of objective function at each of the vertices of the feasible region.
7. Find the vertex at which the objective function attains the optimum (max. or min.) value.
8. Interpret the optimal value.

Exercise:

Find the feasible region determined by the following inequalities. Also, find the vertices of the region.

$x + y \leq 6,$

$2x + y \geq 8,$

$y \geq 0$

Solution:

The corresponding equations of the given inequalities are,

$x + y = 6$ ----(i)

$2x + y = 8$ ----(ii)

$y = 0$ ----(iii)

8233651148

$x + y = 6$ ----(i)
$2x + y = 8$ ----(ii)
$y = 0$ ----(iii)

From equation (i),
When x=0, y=6 and
When y=0, x=6.
So, the boundary line (i) passes through (0,6) and (6,0).

Taking (0,0) as a test point for the inequality;
$0+0 \leq 6$
or, $0 \leq 6$ (True)
$\therefore$ The half-plane determined by $x + y \leq 6$ lies towards origin.

8233651148

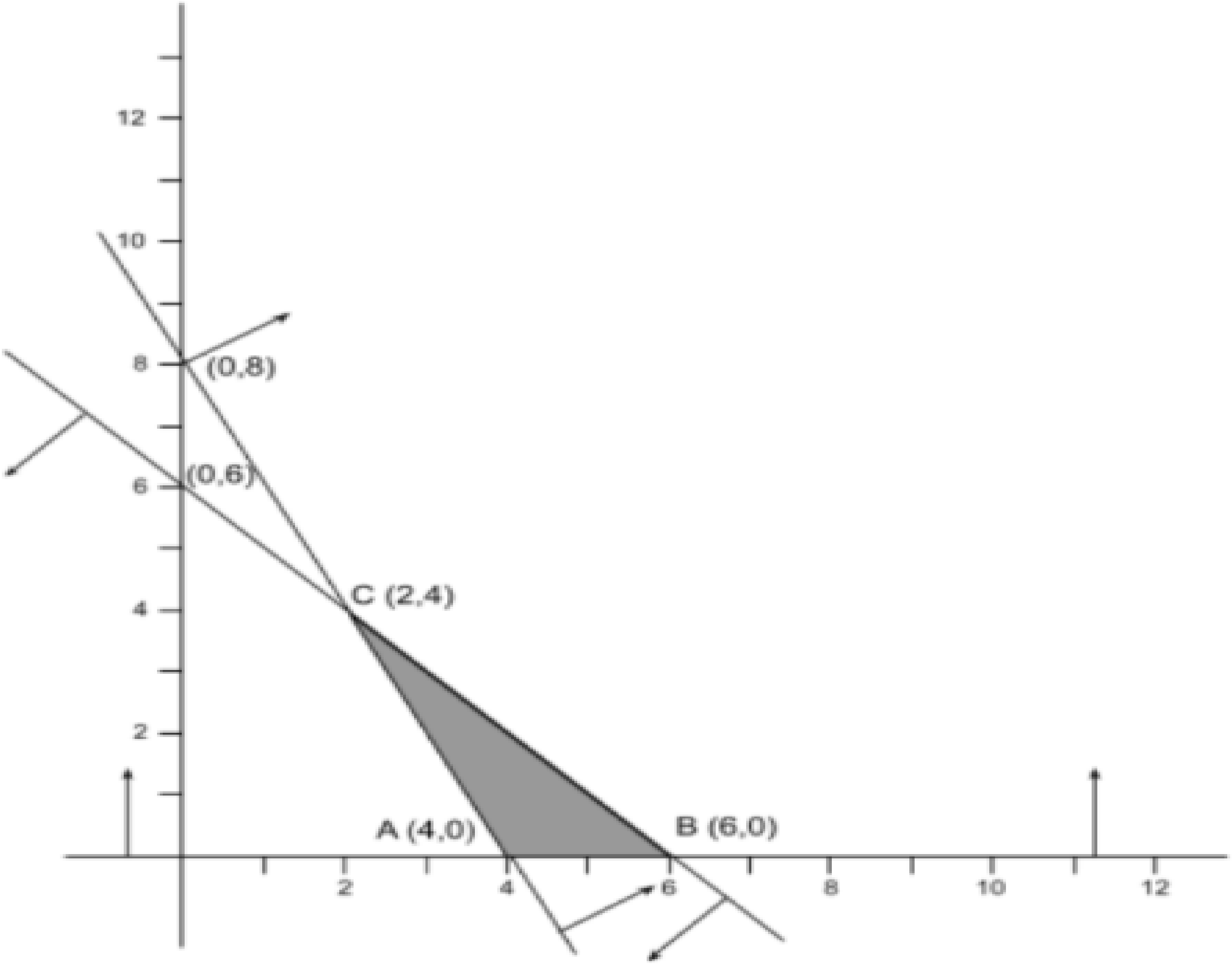
$x + y = 6$ ----(i)
$2x + y = 8$ ----(ii)
$y = 0$ ----(iii)

From equation (ii),
When x=0, y=8 and
When y=0, x=4.
So, the boundary line (ii) passes through (0,8) and (4,0).

Taking (0,0) as a test point for the inequality;
$0+0 \geq 8$
or, $0 \geq 8$ (False)
∴ The half-plane determined by $2x + y \geq 8$ lies away from origin.

From equation (iii),
$y=0$ is the line parallel to X-axis.
∴ The half-plane determined by $y \geq 0$ lies above the X-axis.

The feasible region determined by given inequalities is presented as the shaded region in the graph below:



The vertices of the feasible region ABC are A (4,0), B (6,0) and C (2,4).

Exercise 2:

Maximize and Minimize:

$F(x,y) = 6x + 9y$

subject to,

$2x + y \leq 9$,

$y \geq x$,

$x \geq 1$

Solution:

Given objective function is, $Z = 6x + 9y$

The corresponding equations of the given inequalities are,

$2x + y = 9$ ----(i)

$y = x$ ----(ii)

$x = 1$ ----(iii)

8233651148

From equation (i),

When x=0, y=9 and

When y=0, x= $\frac{9}{2}$

So, the boundary line (i) passes through (0,9) and ($\frac{9}{2}$,0).

Taking (0,0) as a test point for the inequality;

$0+0 \leq 9$

or, $0 \leq 9$ (True)

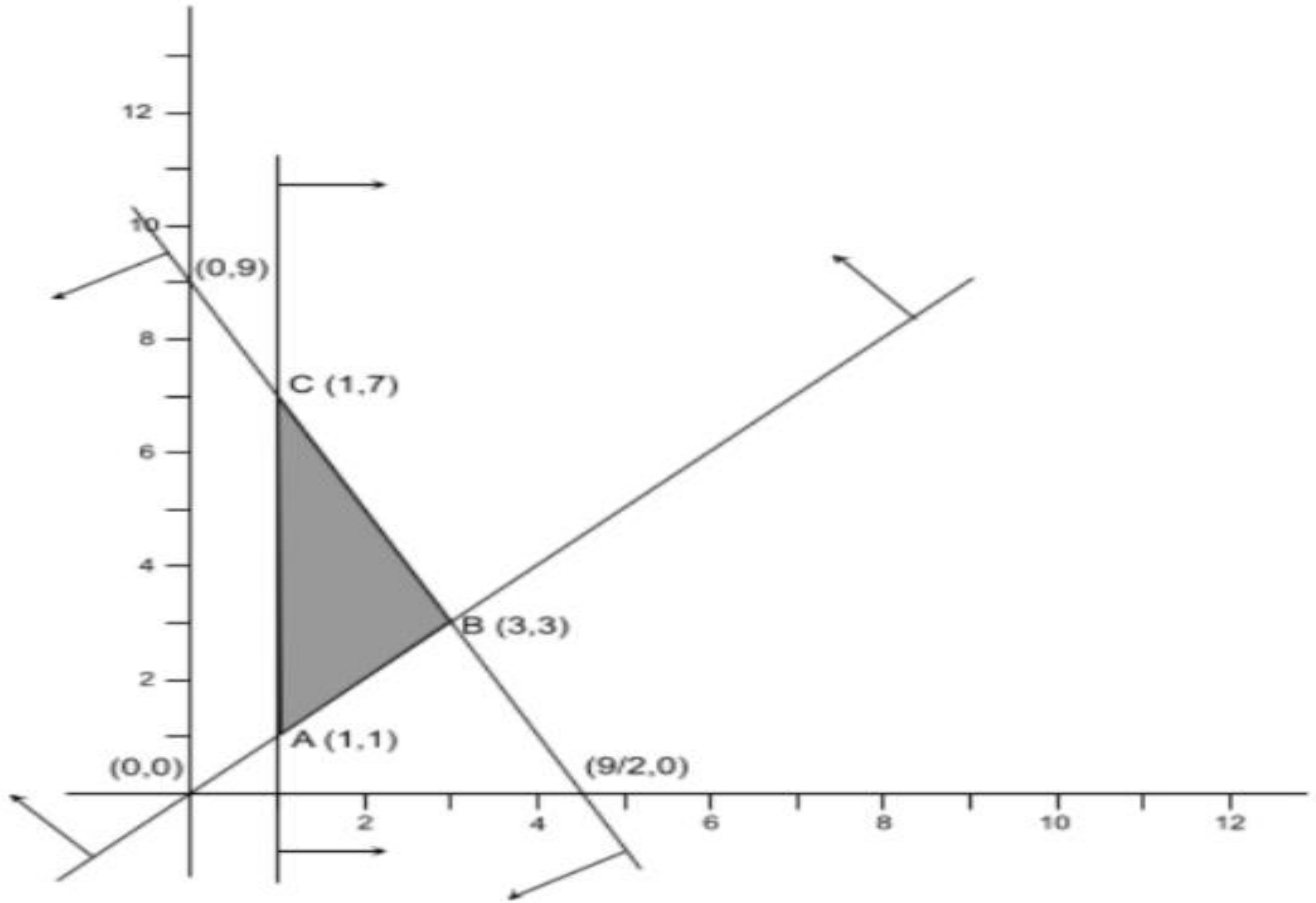
∴ The half-plane determined by $2x + y \leq 9$ lies towards origin.

From equation (ii),
When $x=0$, $y=0$ and
When $y=1$, $x=1$.
So, the boundary line (ii) passes through (0,0) and (1,1).

Taking (1,0) as a test point for the inequality;
$0 \geq 1$ (False)
$\therefore$ The half-plane determined by $y \geq x$ lies away from (1,0).

From equation (iii),
$x=1$ is the line parallel to y-axis.
$\therefore$ The half-plane determined by $x \geq 1$ lies to the right of $x=1$.

The feasible region determined by given inequalities is presented as the shaded region in the graph below:


12
10
8
6
4
2
(0,9)
C (1,7)
B (3,3)
A (1,1)
(0,0)
(9/2,0)
2
4
6
8
10
12

The vertices of the feasible region ABC are A (1,1), B (3,3) and C (1,7).

Evaluation table for the objective function:

Vertices:	x	y	Objective Function: F (x,y) = 6x + 9y	Remarks
A (1,1)	1	1	6.1 + 9.1 = 15	Minimum
B (3,3)	3	3	6.3 + 9.3 = 45	
C (1,7)	1	7	6.1 + 9.7 = 69	Maximum

Hence, the maximum value is 69 at C (1,7) and the minimum value is 15 at A (1,1).

Transportation Problem | Set 1 (Introduction)

Transportation problem is a special kind of **Linear Programming Problem (LPP)** in which goods are transported from a set of sources to a set of destinations subject to the supply and demand of the sources and destination respectively such that the total cost of transportation is minimized. It is also sometimes called as Hitchcock problem.

Types of Transportation problems:

Balanced: When both supplies and demands are equal then the problem is said to be a balanced transportation problem.

Unbalanced: When the supply and demand are not equal then it is said to be an unbalanced transportation problem. In this type of problem, either a dummy row or a dummy column is added according to the requirement to make it a balanced problem. Then it can be solved similar to the balanced problem.

Methods to Solve:

To find the initial basic feasible solution there are three methods:

1. NorthWest Corner Cell Method.
2. Least Call Cell Method.
3. Vogel's Approximation Method (VAM).

Basic structure of transportation problem:

Source	Destination: D1	D2	D3	D4	Supply (s_i)
O1	C_{11}	C_{12}	C_{13}	C_{14}	S_1
O2	C_{21}	C_{22}	C_{23}	C_{24}	S_2
O3	C_{31}	C_{32}	C_{33}	C_{34}	S_3
O4	C_{41}	C_{42}	C_{43}	C_{44}	S_4
Demand (d_j):	d_1	d_2	d_3	d_4	

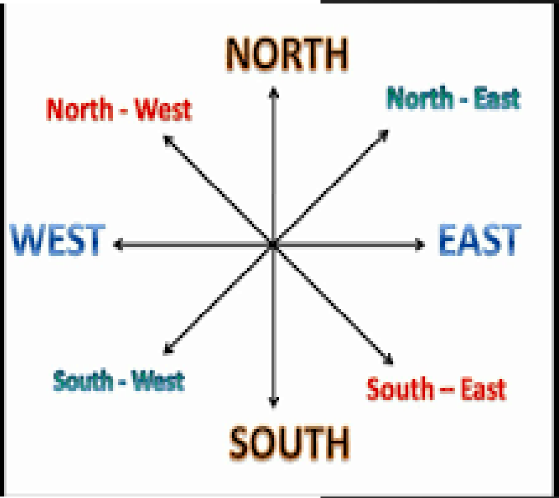
In the above table **D1**, **D2**, **D3** and **D4** are the destinations where the products/goods are to be delivered from different sources **S1**, **S2**, **S3** and **S4**. $\mathbf{S_i}$ is the supply from the source $\mathbf{O_i}$. $\mathbf{d_j}$ is the demand of the destination $\mathbf{D_j}$. $\mathbf{C_{ij}}$ is the cost when the product is delivered from source $\mathbf{S_i}$ to destination $\mathbf{D_j}$.

Transportation Problem | Set 2 (NorthWest Corner Method)

An introduction to Transportation problem has been discussed in the previous article, in this article, finding the initial basic feasible solution using the NorthWest Corner Cell Method will be discussed.

Destination

Source	D1	D2	D3	D4	Supply
O1	3	1	7	4	300
O2	2	6	5	9	400
O3	8	3	3	2	500
Demand:	250	350	400	200	1200



Explanation: Given three sources **O1**, **O2** and **O3** and four destinations **D1**, **D2**, **D3** and **D4**. For the sources **O1**, **O2** and **O3**, the supply is **300**, **400** and **500** respectively. The destinations **D1**, **D2**, **D3** and **D4** have demands **250**, **350**, **400** and **200** respectively.

Solution: According to North West Corner method, **(O1, D1)** has to be the starting point i.e. the north-west corner of the table. Each and every value in the cell is considered as the cost per transportation. Compare the demand for column **D1** and supply from the source **O1** and allocate the minimum of two to the cell **(O1, D1)** as shown in the figure.

The demand for Column **D1** is completed so the entire column **D1** will be canceled. The supply from the source **O1** remains **300 – 250 = 50**.

Destination

Source	D1	D2	D3	D4	Supply
O1	250 3	1	7	4	~~300~~ 50
O2	2	6	5	9	400
O3	8	3	3	2	500
Demand:	~~250~~ 0	350	400	200	1200

Now from the remaining table i.e. excluding column **D1**, check the north-west corner i.e. **(O1, D2)** and allocate the minimum among the supply for the respective column and the rows. The supply from **O1** is **50** which is less than the demand for **D2** (i.e. 350), so allocate **50** to the cell **(O1, D2)**. Since the supply from row **O1** is completed cancel the row **O1**. The demand for column **D2** remain **350 – 50 = 300**.

		Destination				
		D1	D2	D3	D4	Supply
Source	O1	250 3	50 1	7	4	~~300~~ ~~50~~ 0
	O2	2	6	5	9	400
	O3	8	3	3	2	500
Demand:		~~250~~ 0	~~350~~ 300	400	200	1200

From the remaining table the north-west corner cell is **(O2, D2)**. The minimum among the supply from source **O2** (i.e 400) and demand for column **D2** (i.e 300) is **300**, so allocate **300** to the cell **(O2, D2)**. The demand for the column **D2** is completed so cancel the column and the remaining supply from source **O2** is **400 – 300 = 100**.

Destination

Source	D1	D2	D3	D4	Supply
O1	250 3	50 1	7	4	~~300~~ ~~50~~ 0
O2	2	300 6	5	9	~~400~~ 100
O3	8	3	3	2	500
Demand:	~~250~~ 0	~~350~~ ~~300~~ 0	400	200	1200

Now from remaining table find the north-west corner i.e. **(O2, D3)** and compare the **O2** supply (i.e. 100) and the demand for **D2** (i.e. 400) and allocate the smaller (i.e. 100) to the cell **(O2, D2)**. The supply from **O2** is completed so cancel the row **O2**. The remaining demand for column **D3** remains **400 – 100 = 300**.

Destination

Source

	D1	D2	D3	D4	Supply
O1	250 3	50 1	7	4	~~300~~ ~~50~~ 0
O2	2	300 6	100 5	9	~~400~~ ~~100~~ 0
O3	8	3	3	2	500
Demand:	~~250~~ 0	~~350~~ ~~300~~ 0	~~400~~ 300	200	1200

Destination

Source

	D1	D2	D3	D4	Supply
O1	250 3	50 1	7	4	~~300~~ ~~50~~ 0
O2	2	300 6	100 5	9	~~400~~ ~~100~~ 0
O3	8	3	300 3	200 2	~~500~~ ~~200~~ 0
Demand:	~~250~~ 0	~~350~~ ~~300~~ 0	~~400~~ ~~300~~ 0	~~200~~ 0	1200

Note: In the last remaining cell the demand for the respective columns and rows are equal which was cell **(O3, D4)**. In this case, the supply from **O3** and the demand for **D4** was **200** which was allocated to this cell. At last, nothing remained for any row or column.

Now just multiply the allocated value with the respective cell value (i.e. the cost) and add all of them to get the basic solution i.e. **(250 * 3) + (50 * 1) + (300 * 6) + (100 * 5) + (300 * 3) + (200 * 2) = 4400**

Transportation Problem | Set 3 (Least Cost Cell Method)

The **North-West Corner** method has been discussed in the previous article. In this article, the **Least Cost Cell** method will be discussed.

		Destination				
		D1	D2	D3	D4	Supply
Source	O1	3	1	7	4	300
	O2	2	6	5	9	400
	O3	8	3	3	2	500
Demand:		250	350	400	200	1200

Solution: According to the Least Cost Cell method, the least cost among all the cells in the table has to be found which is **1** (i.e. cell **(O1, D2)**).

Now check the supply from the row **O1** and demand for column **D2** and allocate the smaller value to the cell. The smaller value is **300** so allocate this to the cell. The supply from **O1** is completed so cancel this row and the remaining demand for the column **D2** is **350 – 300 = 50**.

Destination

Source	D1	D2	D3	D4	Supply
O1	3	300 / 1	7	4	~~300~~ 0
O2	2	6	5	9	400
O3	8	3	3	2	500
Demand:	250	~~350~~ 50	400	200	1200

Now find the cell with the least cost among the remaining cells. There are two cells with the least cost i.e. **(O2, D1)** and **(O3, D4)** with cost **2**. Lets select **(O2, D1)**. Now find the demand and supply for the respective cell and allocate the minimum among them to the cell and cancel the row or column whose supply or demand becomes **0** after allocation.

Destination

Source

	D1	D2	D3	D4	Supply
O1	3	300 1	7	4	~~300~~ 0
O2	250 2	6	5	9	~~400~~ 150
O3	8	3	3	2	500
Demand:	~~250~~ 0	~~350~~ 50	400	200	1200

Now the cell with the least cost is **(O3, D4)** with cost **2**. Allocate this cell with **200** as the demand is smaller than the supply. So the column gets cancelled.

Destination

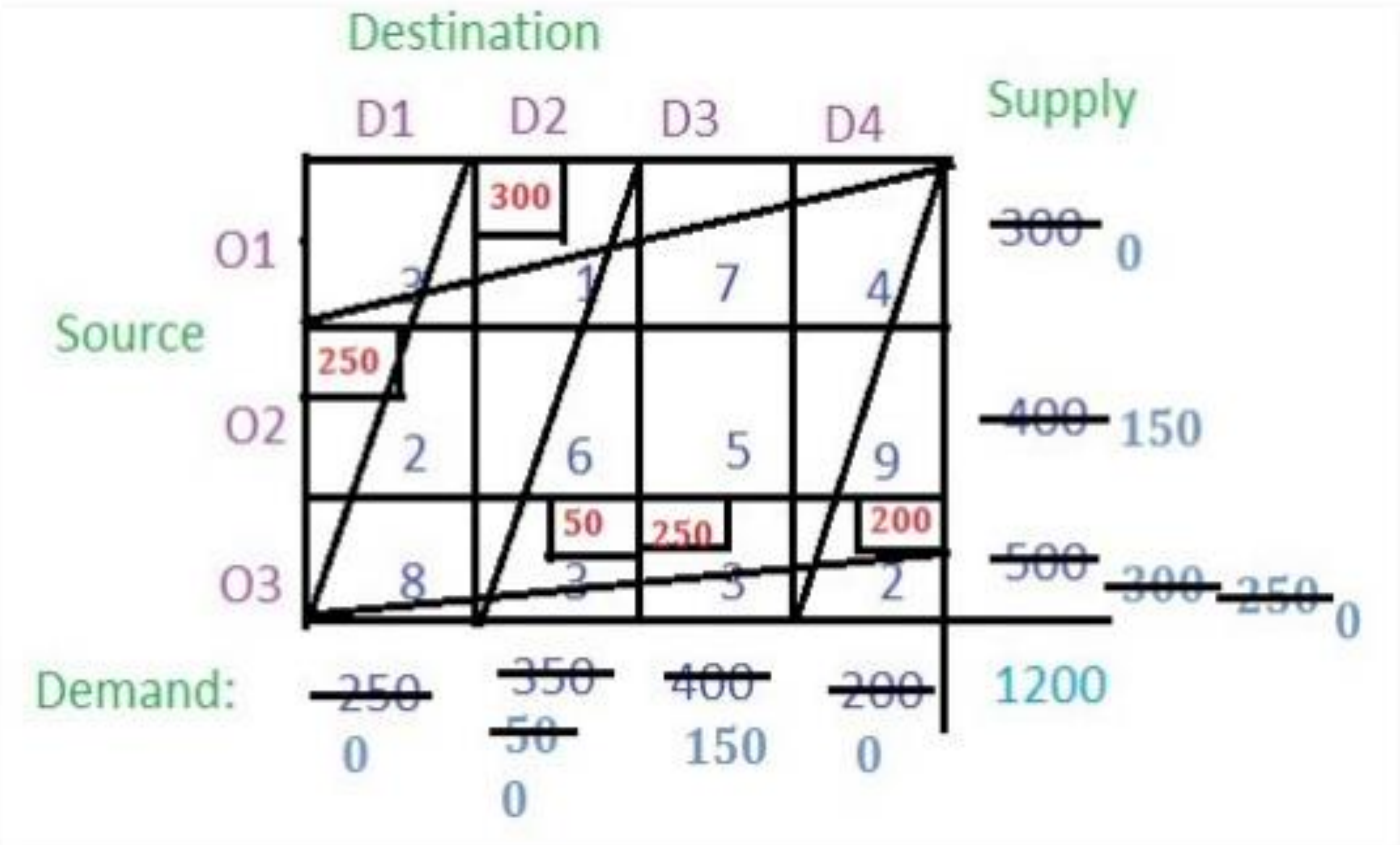
Source	D1	D2	D3	D4	Supply
O1	3	300 1	7	4	~~300~~ 0
O2	250 2	6	5	9	~~400~~ 150
O3	8	3	3	200 2	~~500~~ 300
Demand:	~~250~~ 0	~~350~~ 50	400	~~200~~ 0	1200

There are two cells among the unallocated cells that have the least cost. Choose any at random say **(O3, D2)**. Allocate this cell with a minimum among the supply from the respective row and the demand of the respective column. Cancel the row or column with zero value.

Destination

Source	D1	D2	D3	D4	Supply
O1	3	$\boxed{300}$ 1	7	4	~~300~~ 0
O2	$\boxed{250}$ 2	6	5	9	~~400~~ 150
O3	8	$\boxed{50}$ 3	3	$\boxed{200}$ 2	~~500~~ ~~300~~ 250
Demand:	~~250~~ 0	~~350~~ ~~50~~ 0	400	~~200~~ 0	1200

Now the cell with the least cost is **(O3, D3)**. Allocate the minimum of supply and demand and cancel the row or column with zero value.



The only remaining cell is **(O2, D3)** with cost **5** and its supply is **150** and demand is **150** i.e. demand and supply both are equal. Allocate it to this cell.

Destination

Source	D1	D2	D3	D4	Supply
O1	3	300 1	7	4	~~300~~ 0
O2	250 2	6	150 5	9	~~400~~ ~~150~~ 0
O3	8	50 3	250 3	200 2	~~500~~ ~~300~~ ~~250~~ 0
Demand:	~~250~~ 0	~~350~~ ~~50~~ 0	~~400~~ ~~150~~ 0	~~200~~ 0	1200

Now just multiply the cost of the cell with their respective allocated values and add all of them to get the basic solution i.e. **(300 * 1) + (250 * 2) + (150 * 5) + (50 * 3) + (250 * 3) + (200 * 2) = 2850**

Transportation Problem | Set 4 (Vogel's Approximation Method)

The **North-West Corner** method and the **Least Cost Cell** method has been discussed in the previous articles. In this article, the **Vogel's Approximation** method will be discussed.

Destination

Source	D1	D2	D3	D4	Supply
O1	3	1	7	4	300
O2	2	6	5	9	400
O3	8	3	3	2	500
Demand:	250	350	400	200	1200

Solution:

- For each row find the least value and then the second least value and take the absolute difference of these two least values and write it in the corresponding row difference as shown in the image below. In row **O1**, **1** is the least value and **3** is the second least value and their absolute difference is **2**. Similarly, for row **O2** and **O3**, the absolute differences are **3** and **1** respectively.
- For each column find the least value and then the second least value and take the absolute difference of these two least values then write it in the corresponding column difference as shown in the figure. In column **D1**, **2** is the least value and **3** is the second least value and their absolute difference is **1**. Similarly, for column **D2**, **D3** and **D3**, the absolute differences are **2**, **2** and **2** respectively.

Destination

Source	D1	D2	D3	D4	Supply	Row Difference
O1	3	1	7	4	300	2
O2	2	6	5	9	400	3
O3	8	3	3	2	500	1
Demand:	250	350	400	200	1200	
Column Difference:	1	2	2	2		

- These value of row difference and column difference are also called as penalty. Now select the maximum penalty. The maximum penalty is **3** i.e. row **O2**. Now find the cell with the least cost in row **O2** and allocate the minimum among the supply of the respective row and the demand of the respective column. Demand is smaller than the supply so allocate the column's demand i.e. **250** to the cell. Then cancel the column **D1**.

Destination

Source	D1	D2	D3	D4	Supply	Row Difference
O1	3	1	7	4	300	2
O2	250 2	6	5	9	~~400~~ 150	3
O3	8	3	3	2	500	1
Demand:	~~250~~ 0	350	400	200	1200	
Column Difference:	1	2	2	2		

- From the remaining cells, find out the row difference and column difference.

Destination

Source	D1	D2	D3	D4	Supply	Row Difference	
O1	3	1	7	4	300	2	3
O2	250 2	6	5	9	~~400~~ 150	3	1
O3	8	3	3	2	500	1	1
Demand:	~~250~~ 0	350	400	200	1200		
Column Difference:	1	2	2	2			
	-	2	2	2			

- Again select the maximum penalty which is **3** corresponding to row **O1**. The least-cost cell in row **O1** is **(O1, D2)** with cost **1**. Allocate the minimum among supply and demand from the respective row and column to the cell. Cancel the row or column with zero value.

Destination

Source	D1	D2	D3	D4	Supply	Row Difference	
O1	3	300 1	7	4	~~300~~ 0	2	3
O2	250 2	6	5	9	~~400~~ 150	3	1
O3	8	3	3	2	500	1	1
Demand:	~~250~~ 0	~~350~~ 50	400	200	1200		
Column Difference:	1	2	2	2			
	-	2	2	2			

- Now find the row difference and column difference from the remaining cells.

Destination

Source	D1	D2	D3	D4	Supply	Row Difference		
O1	3	300 1	7	4	~~300~~ 0	2	3	-
O2	250 2	6	5	9	~~400~~ 150	3	1	1
O3	8	3	3	2	500	1	1	1
Demand:	~~250~~ 0	~~350~~ 50	400	200	1200			
Column Difference:	1	2	2	2				
	-	2	2	2				
	-	3	2	7				

- Now select the maximum penalty which is **7** corresponding to column **D4**. The least cost cell in column **D4** is **(O3, D4)** with cost **2**. The demand is smaller than the supply for cell **(O3, D4)**. Allocate **200** to the cell and cancel the column.

Destination

Source

	D1	D2	D3	D4	Supply	Row Difference		
O1	3	300 1	7	4	~~300~~ 0	2	3	-
O2	250 2	6	5	9	~~400~~ 150	3	1	1
O3	8	3	3	200 2	~~500~~ 300	1	1	1
Demand:	~~250~~ 0	~~350~~ 50	400	~~200~~ 0	1200			
Column Difference:	1	2	2	2				
	-	2	2	2				
	-	3	2	7				

- Find the row difference and the column difference from the remaining cells.

Destination

Source	D1	D2	D3	D4	Supply	Row Difference			
O1	3	300 / 1	7	4	~~300~~ 0	2	3	-	-
O2	250 / 2	6	5	9	~~400~~ 150	3	1	1	1
O3	8	3	3	200 / 2	~~500~~ 300	1	1	1	0
Demand:	~~250~~ 0	~~350~~ 50	400	~~200~~ 0	1200				
Column Difference:	1	2	2	2					
	-	2	2	2					
	-	3	2	7					
	-	3	2	-					

- Now the maximum penalty is **3** corresponding to the column **D2**. The cell with the least value in **D2** is **(O3, D2)**. Allocate the minimum of supply and demand and cancel the column.

Destination

Source

	D1	D2	D3	D4	Supply	Row Difference			
O1	2	300 1	7	4	~~300~~ 0	2	3	-	-
O2	250 2	6	5	9	~~400~~ 150	3	1	1	1
O3	8	50 3	3	200 2	~~500~~ ~~300~~ 250	1	1	1	0
Demand:	~~250~~ 0	~~350~~ ~~50~~ 0	400	~~200~~ 0	1200				
Column Difference:	1	2	2	2					
	-	2	2	2					
	-	3	2	7					
	-	3	2	-					

- Now there is only one column so select the cell with the least cost and allocate the value.

Destination

Source	D1	D2	D3	D4	Supply	Row Difference			
O1	3	(300) 1	7	4	~~300~~ 0	2	3	-	-
O2	(250) 2	6	5	9	~~400~~ 150	3	1	1	1
O3	8	(50) 3	(250) 3	(200) 2	~~500~~ ~~300~~ ~~250~~ 0	1	1	1	0
Demand:	~~250~~ 0	~~350~~ ~~50~~ 0	~~400~~ 150	~~200~~ 0	1200				
Column Difference:	1	2	2	2					
	-	2	2	2					
	-	3	2	7					
	-	3	2	-					

Source \ Destination	D1	D2	D3	D4	Supply	Row Difference			
O1	2	300 / 1	7	4	~~300~~ 0	2	3	-	-
O2	250 / 3	6	150 / 5	9	~~400~~ ~~150~~ 0	3	1	1	1
O3	8	50 / 3	250 / 3	200 / 2	~~500~~ ~~300~~ ~~250~~ 0	1	1	1	0
Demand:	~~250~~ 0	~~350~~ ~~50~~ 0	~~400~~ ~~150~~ 0	~~200~~ 0	1200				

Column Difference:	D1	D2	D3	D4
	1	2	2	2
	-	2	2	2
	-	3	2	7
	-	3	2	-

No balance remains. So multiply the allocated value of the cells with their corresponding cell cost and add all to get the final cost i.e. **(300 * 1) + (250 * 2) + (50 * 3) + (250 * 3) + (200 * 2) + (150 * 5) = 2850**

Transportation Problem | Set 5 (Unbalanced)

An introduction to the transportation problem has been discussed in this article. In this article, the method to solve the unbalanced transportation problem will be discussed.

Below transportation problem is an unbalanced transportation problem.

Destination

Source	D1	D2	D3	D4	D5	Supply(S_i)
O1	5	1	8	7	5	15
O2	3	9	6	7	8	25
O3	4	2	7	6	5	42
O4	7	11	10	4	9	35
Demand(d_j):	30	20	15	10	20	95 \ 117

The problem is unbalanced because the sum of all the supplies i.e. **O1**, **O2**, **O3** and **O4** is not equal to the sum of all the demands i.e. **D1**, **D2**, **D3**, **D4** and **D5**.

Solution:

In this type of problem, the concept of a dummy row or a dummy column will be used. As in this case, since the supply is more than the demand so a dummy demand column will be added and a demand of (total supply – total demand) will be given to that column i.e. **117 – 95 = 22** as shown in the image below. If demand were more than the supply then a dummy supply row would have been added.

Destination

Source	D1	D2	D3	D4	D5		Supply(S_i)
O1	5	1	8	7	5	0	15
O2	3	9	6	7	8	0	25
O3	4	2	7	6	5	0	42
O4	7	11	10	4	9	0	35
Demand(d_j):	30	20	15	10	20	22	117 / 117

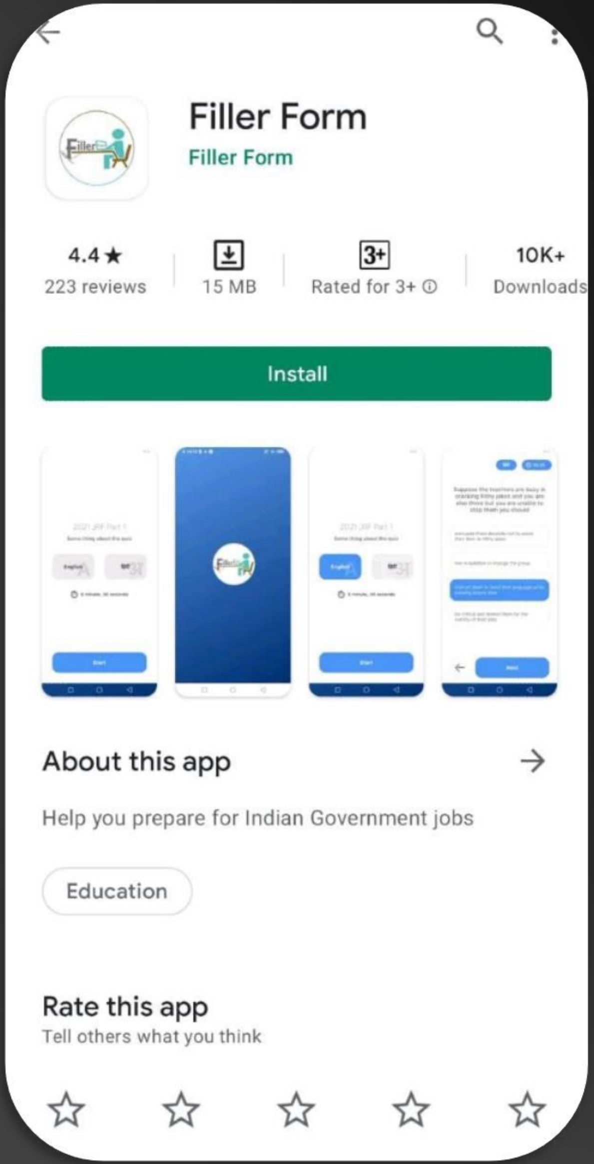
Now that the problem has been updated to a balanced transportation problem, it can be solved using any one of the following methods to solve a balanced transportation problem as discussed in the earlier posts:

8233651148

www.ugc-net.com

How To download Notes

www.ugc-net.com




FEEDBACK

जिसने भी खुद को खर्च
किया है,
DUNIYA ने उसी को
GOOGLE पर SEARCH
किया है।।

www.fillerform.com
fillerform