CodeVita
The TCS Global Coding Contest

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02 Hr 44 Min 51 Sec

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Coding Area

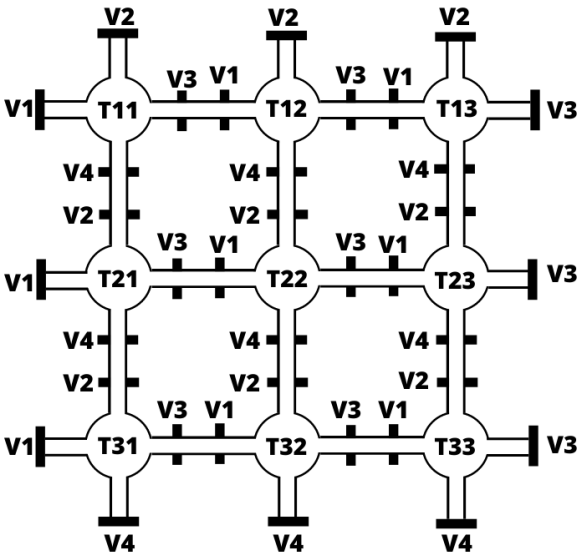
A B C D E F

ONLINE EDITOR (F)

Tank Network

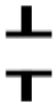
Problem Description

There are M*N underground water tanks, which are arranged in M rows and N columns. Tanks are labelled as Tij, where i is the row number and j is the column number (1 <= i <= M and 1 <= j <= N). Each tank is of certain depth beginning from the ground level (measured in feet). Each tank has four valves situated at a certain depth from ground level. All 4 valves can be at different depth from the ground level. Valves are orthogonal to each other. Valves of each tank are labelled as V1, V2, V3 and V4. Valves may be open or closed. If a valve is closed, no water flows out through it. If a valve is open, water flows out through it. Each valve is connected to the valve of nearby tank using connection tubes (or it is terminated if there is no tank nearby). All tanks are of same shape. For all tanks, 1 liter water occupy 1 foot height of the tank. For example, below diagram depicts a 3*3 tank network with all tanks empty.

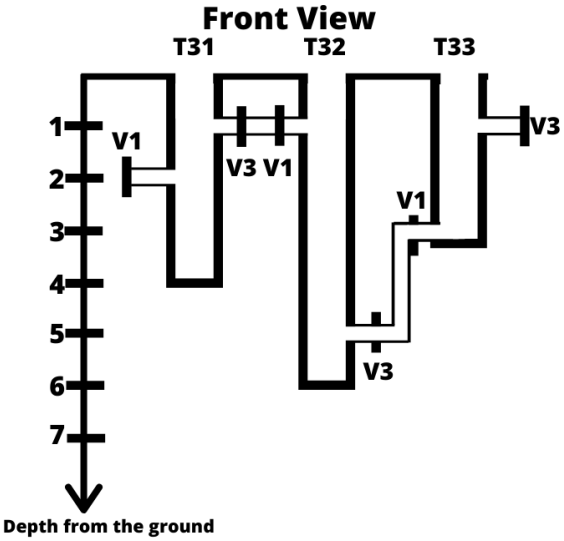


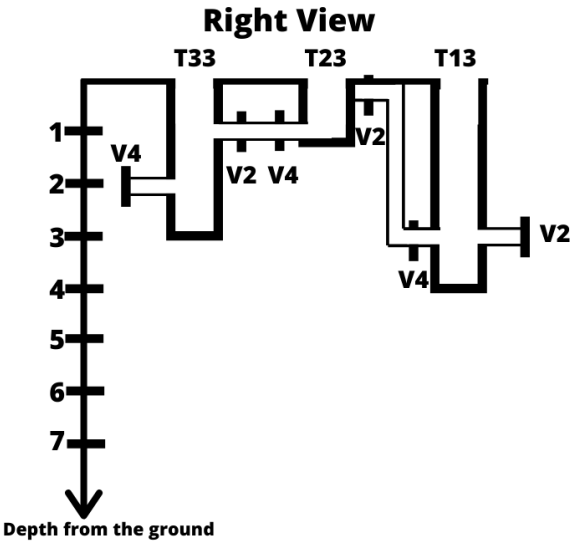
Front

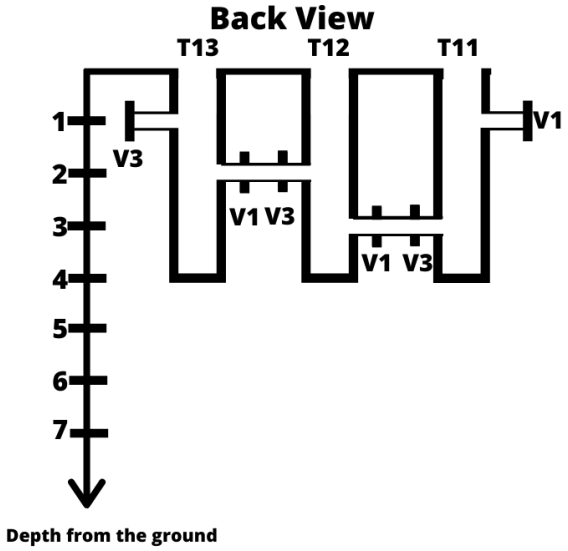
Denotes Closed valve

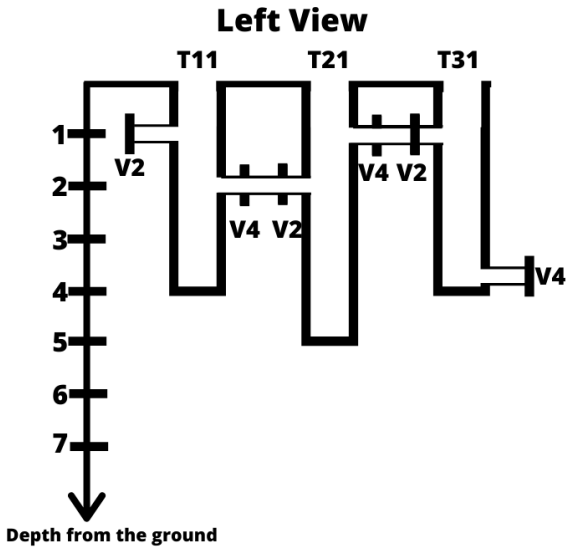


Denotes Open valve


Front View
T31
T32
T33
1
2
3
4
5
6
7
V1
V3 V1
V1
V3
V3
Depth from the ground


Right View
T33
T23
T13
1
2
3
4
5
6
7
V4
V2 V4
V2
V2
V4
Depth from the ground





When water starts filling into the tank, the valves attached to different tanks will determine the flow of water within the tank network.

You need to find the amount of water (in liters) required to fill a given tank (say, T_{xy} - x^{th} row and y^{th} column) to a particular height h, given details about tank dimensions. You can ignore the amount of water getting filled in valves and connection tubes.

Constraints

1 <= m <= 350

1 <= n <= 350

1 <= depth of tank <= 100

0 <= position of valve <= 100

Input

First line contains 2 space separated integers denoting M and N.

Next M lines, each contains N space separated integers forming an M*N matrix denoting the depth (in feet) of each tank.

First integer of first line in this M*N block denotes the depth of $Tank_{11}$, second integer denotes the depth of $Tank_{12...}$

First integer of second line in this M*N block denotes the depth of $Tank_{21}$, second integer denotes the depth of $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the depth of $Tank_{M1}$, second integer denotes the depth of $Tank_{M2...}$

Next M lines, each contains N-space separated integers forming an M*N matrix denoting the depth (in feet) at which valve V1 of each tank is situated.

First integer of first line in this M*N block denotes the depth of valve V1 for $Tank_{11}$, second integer denotes the depth of valve V1 for $Tank_{12...}$

First integer of second line in this M*N block denotes the depth of valve V1 for $Tank_{21}$, second integer denotes the depth of valve V1 for $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the depth of valve V1 for $Tank_{M1}$, second integer denotes the depth of valve V1 for $Tank_{M2...}$

Next M lines, each contains N space separated integers forming an M*N matrix denoting the depth (in feet) at which valve V2 of each tank is situated.

First integer of first line in this M*N block denotes the depth of valve V2 for $Tank_{11}$, second integer denotes the depth of valve V2 for $Tank_{12...}$

First integer of second line in this M*N block denotes the depth of valve V2 for $Tank_{21}$, second integer denotes the depth of valve V2 for $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the depth of valve V2 for $Tank_{M1}$, second integer denotes the depth of valve V2 for $Tank_{M2...}$

Next M lines, each contains N space separated integers forming an M*N matrix denoting the depth (in feet) at which valve V3 of each tank is situated.

First integer of first line in this M*N block denotes the depth of valve V3 for $Tank_{11}$, second integer denotes the depth of valve V3 for $Tank_{12...}$

First integer of second line in this M*N block denotes the depth of valve V3 for $Tank_{21}$, second integer denotes the depth of valve V3 for $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the depth of valve V3 for $Tank_{M1}$, second integer denotes the depth of valve V3 for $Tank_{M2...}$

Next M lines, each contains N-space separated integers forming an M*N matrix denoting the depth (in feet) at which valve V4 of each tank is situated.

First integer of first line in this M*N block denotes the depth of valve V4 for $Tank_{11}$, second integer denotes the depth of valve V4 for $Tank_{12...}$

First integer of second line in this M*N block denotes the depth of valve V4 for $Tank_{21}$, second integer denotes the depth of valve V4 for $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the depth of valve V4 for $Tank_{M1}$, second integer denotes the depth of valve V4 for $Tank_{M2...}$

Next M lines, each contain N space separated integers forming an M*N matrix denoting whether the status of valve V1 i.e. { open (0), closed (1) }.

First integer of first line in this M*N block denotes the status of valve V1 for $Tank_{11}$, second integer denotes the status of valve V1 for $Tank_{12...}$

First integer of second line in this M*N block denotes the status of valve V1 for $Tank_{21}$, second integer denotes the status of valve V1 for $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the status of valve V1 for $Tank_{M1}$, second integer denotes the status of valve V1 for $Tank_{M2...}$

Next M lines, each contain N space separated integers forming an M*N matrix denoting whether the status of valve V2 i.e. { open (0), closed (1) }.

First integer of first line in this M*N block denotes the status of valve V2 for $Tank_{11}$, second integer denotes the status of valve V2 for $Tank_{12...}$

First integer of second line in this M*N block denotes the status of valve V2 for $Tank_{21}$, second integer denotes the status of valve V2 for $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the status of valve V2 for $Tank_{M1}$, second integer denotes the status of valve V2 for $Tank_{M2...}$

Next M lines, each contain N space separated integers forming an M*N matrix denoting whether the status of valve V3 i.e. { open (0), closed (1) }.

First integer of first line in this M*N block denotes the status of valve V3 for $Tank_{11}$, second integer denotes the status of valve V3 for $Tank_{12...}$

First integer of second line in this M*N block denotes the status of valve V3 for $Tank_{21}$, second integer denotes the status of valve V3 for $Tank_{22...}$

.

.

First integer of M^{th} line in this M*N block denotes the status of valve V3 for $Tank_{M1}$, second integer denotes the status of valve V3 for $Tank_{M2}$...

Next M lines, each contain N space separated integers forming an M*N matrix denoting whether the status of valve V1 i.e. { open (0), closed (1) }.

First integer of first line in this M*N block denotes the status of valve V4 for $Tank_{11}$, second integer denotes the status of valve V4 for $Tank_{12}$...

First integer of second line in this M*N block denotes the status of valve V4 for $Tank_{21}$, second integer denotes the status of valve V4 for $Tank_{22}$...

.

.

First integer of M^{th} line in this M*N block denotes the status of valve V4 for $Tank_{M1}$, second integer denotes the status of valve V4 for $Tank_{M2}$...

Next line contain space separated 3 integers denoting x, y and h i.e. tank T_{xy} filled to depth h

Output

Single line containing an integer denoting the amount of water in liters.

Time Limit

1

Examples

Example 1

Input

2 2

3 4

4 3

1 2

2 3

1 3

2 1

3 1

1 1

2 3

4 2

1 0

1 0

1 1

1 0

0 1

0 1

0 0

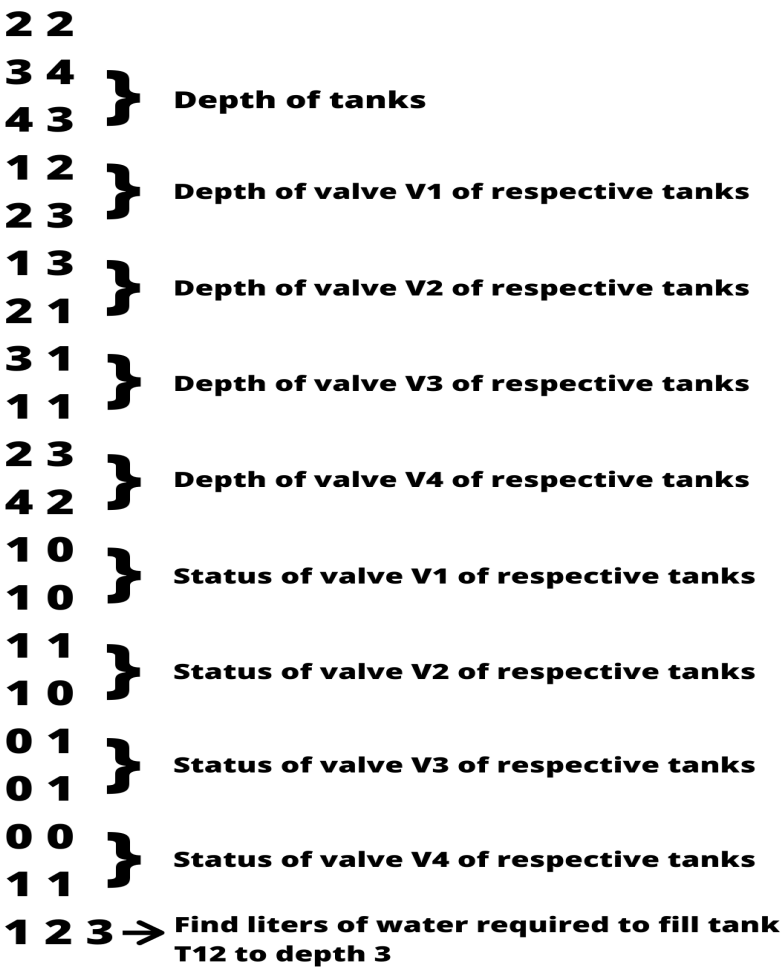
1 1

1 2 3

Output

5

Explanation :



From first input line it's clear that there are four tanks - T_{11}, T_{12}, T_{21}, Tank $_{22}$, arranged in 2 rows and 2 columns.

From input lines 2 and 3, its clear that the depths of T_{11} is 3 feet, T_{12} is 4 feet, T_{21} is 4 feet and Tank $_{22}$ is 3 feet.

From input lines 4 and 5, its clear that valve V1 of T_{11} is located at a depth of 1 foot, that of T_{12} is at 2 feet, that of T_{21} is at 2 feet, and that of Tank $_{22}$ is at 3 foot.

From input lines 6 and 7, its clear that valve V2 of T_{11} is located at a depth of 1 foot, that of T_{12} is at 3 feet, that of T_{21} is at 2 feet, and that of Tank $_{22}$ is at 1 foot.

From input lines 8 and 9, its clear that valve V3 of T_{11} is located at a depth of 3 feet, that of T_{12} is at 1 feet, that of T_{21} is at 1 foot, and that of Tank $_{22}$ is at 1 foot.

From input lines 10 and 11, its clear that valve V4 of T_{11} is located at a depth of 2 feet, that of T_{12} is at 3 feet, that of T_{21} is at 4 foot, and that of Tank $_{22}$ is at 2 foot.

From input lines 12 and 13, its clear that the valve V1 of T_{11} is closed, that of T_{12} is opened, that of T_{21} is closed, and that of Tank $_{22}$ is opened.

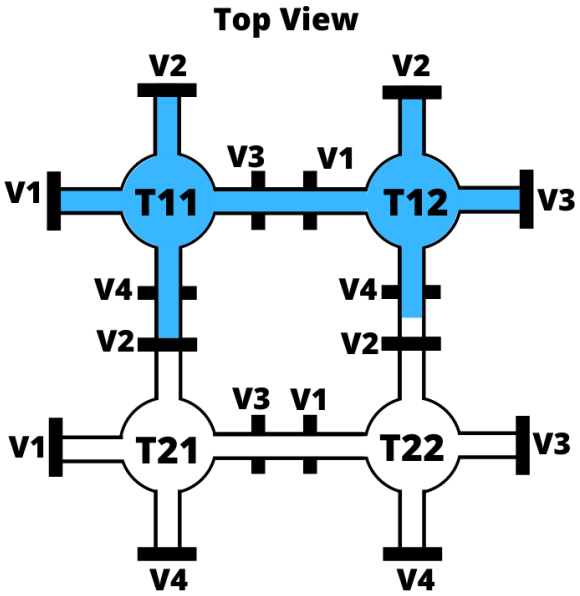
From input lines 14 and 15, its clear that the valve V2 of T_{11} is closed, that of T_{12} is closed, that of T_{21} is closed, and that of Tank $_{22}$ is opened.

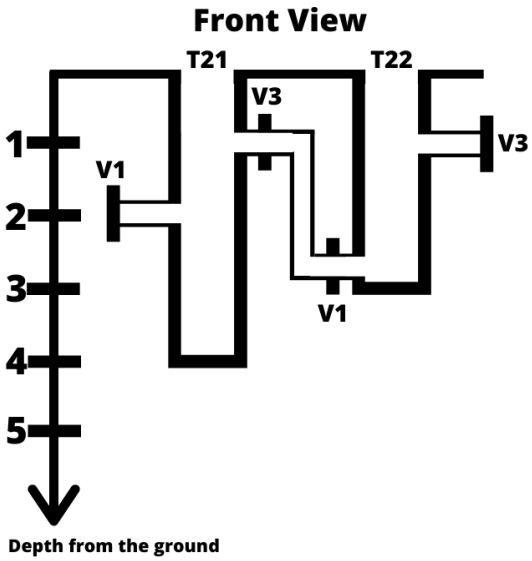
From input lines 16 and 17, its clear that the valve V3 of T_{11} is opened, that of T_{12} is closed, that of T_{21} is opened, and that of Tank $_{22}$ is closed.

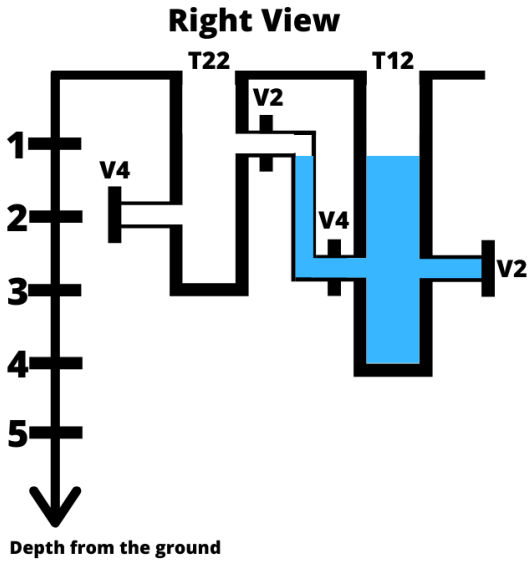
From input lines 18 and 19, its clear that the valve V4 of T_{11} is opened, that of T_{12} is opened, that of T_{21} is closed, and that of Tank $_{22}$ is closed.

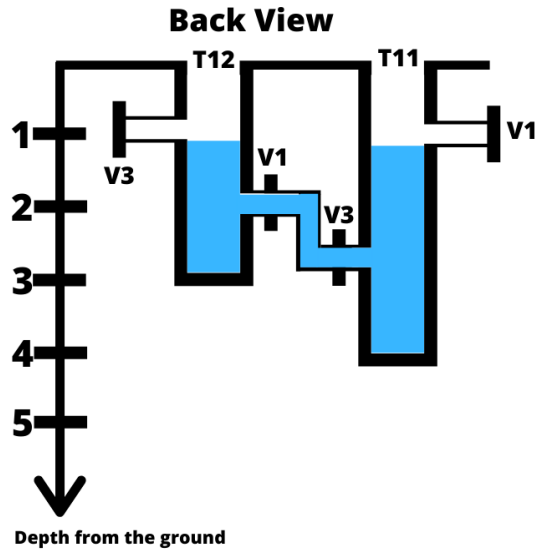
From input line 20, its clear that we need to find the amount of water required to fill the tank T_{12} for a height of 3 feet.

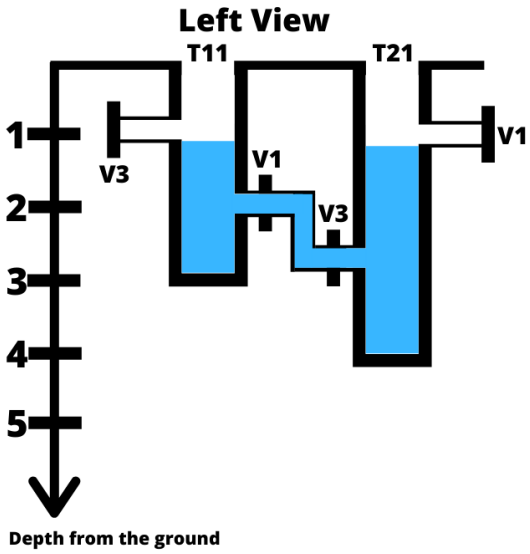
After filling the tank T_{12} to 3 feet, the tank network might look like below figure (shaded colour denotes water).




Front View
T21
T22
V3
V3
V1
V1
1
2
3
4
5
Depth from the ground


Right View
T22
T12
V2
V4
V4
V2
1
2
3
4
5
Depth from the ground





From the above diagram, it's clear that tanks T_{12} and T_{11} got filled with 3 and 2 liters of water respectively. So, total 5 liters of water is required to fill the tank T_{12} to a height of 3 feet.

Example 2

Input

3 3

6 6 6

6 6 6

6 6 6

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 1 1

1 0 0

1 0 0

1 0 0

1 1 1

0 0 0

0 0 0

0 0 1

0 0 1

0 0 1

0 0 0

0 0 0

1 1 1

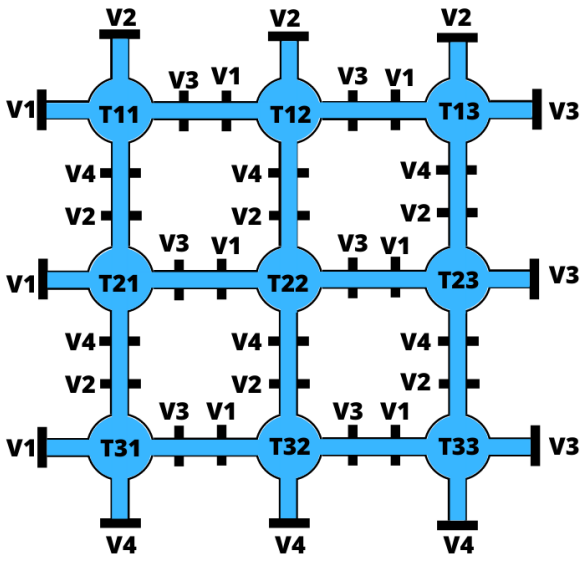
1 2 6

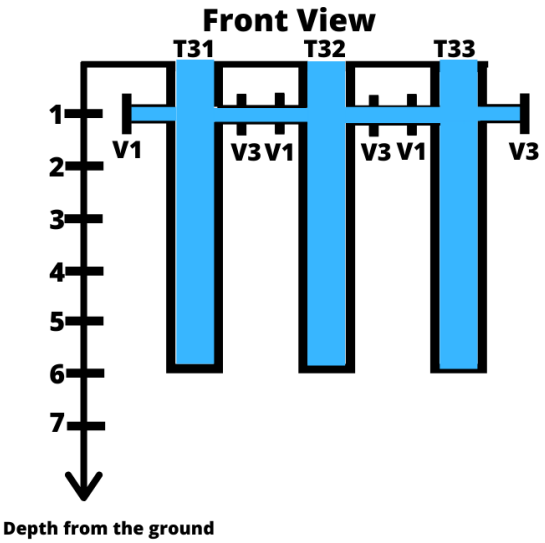
Output

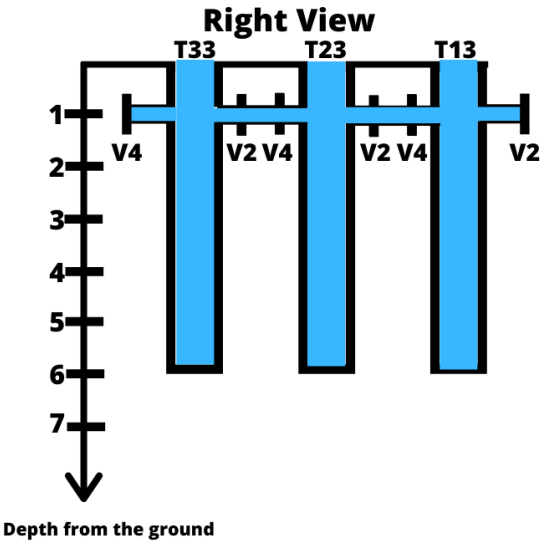
54

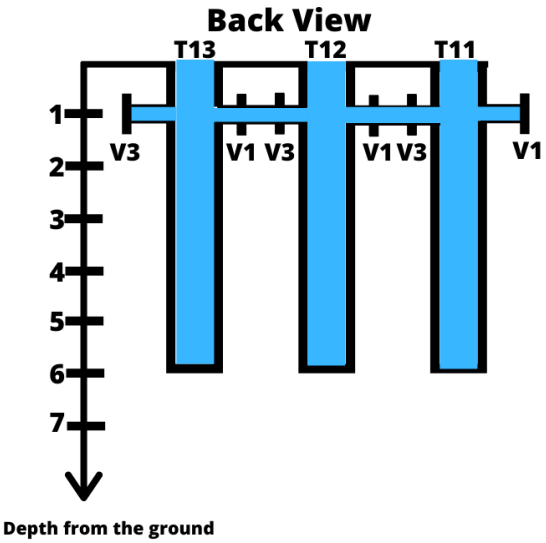
Explanation :

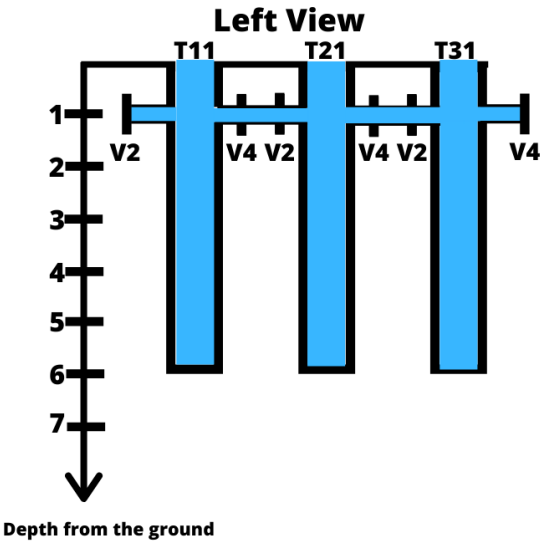
After filling the tank T_{12} to 6 feet, the tank network might look like below figure




Front View
T31
T32
T33
1
2
3
4
5
6
7
V1
V3 V1
V3 V1
V3
Depth from the ground


Right View
T33
T23
T13
1
2
3
4
5
6
7
V4
V2 V4
V2 V4
V2
Depth from the ground





From the above diagram, it's clear that all tanks got filled with 6 liters of water. So, total 54 liters of water is required to fill the tank T_{12} to a height of 6 feet.

Upload Solution [Question : F]

☐ I, **dheeraj chaudhary** confirm that the answer submitted is my own. ☐ Took help from online sources (attributions)

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