CAT 2017 Question Paper with Solution
Slot 2 DILR

1.

|||Common|||

Direction: Study the following information carefully and answer the questions that follow.

Funky Pizzaria was required to supply pizzas to three different parties. The total number of pizzas it had to deliver was 800, 70% of which were to be delivered to Party 3 and the rest were equally divided between Party 1 and Party 2.

Pizzas could be of the Thin Crust (T) or Deep Dish (D) variety and come in either Normal Cheese (NC) or Extra Cheese (EC) versions. Hence, there are four types of pizzas: T-NC, T-EC, D-NC, and D-EC. Partial information about proportions of T and NC pizzas ordered by the three parties is given below:

	Thin Crust (T)	Normal Cheese (C)
Party 1	0.6	
Party 2	0.55	0.3
Party 3		0.65
	0.375	0.52

|||End|||
How many Thin Crust pizzas were to be delivered to Party 3?
A. 398
B. 162
C. 196
D. 364

Answer: B

Solution:

	T		D		
Party	NC	EC	NC	EC	
1	a	72 – a	d	48 – d	120
2	b	66 - b	36 – b	18 + b	120
3	c	162 - c	364 – c	34 + c	560
	300		500		800

Therefore, Thin Crust pizzas delivered to Party 3 = c + 162 – c = 162.

2. How many Normal Cheese pizzas were required to be delivered to Party 1?

A. 104
B. 84
C. 16
D. 196

Answer: C

Solution:

	T		D		
Party	NC	EC	NC	EC	
1	a	72 – a	d	48 – d	120
2	b	66 - b	36 – b	18 + b	120
3	c	162 - c	364 – c	34 + c	560
	300		500		800

Total Normal Cheese pizzas delivered to the three parties = 52% (800) = 416
From the table,

416 = (a + b + c) + (d +36 –b + 364 – c)

416 = 400 + a + d

⇒ a + d = 16

So, Party 1 ordered 16 Normal Cheese pizzas.

3. For Party 2, if 50% of the Normal Cheese pizzas were of Thin Crust variety, what was the difference between the numbers of T- EC and D-EC pizzas to be delivered to Party 2?

A. 18
B. 12
C. 30
D. 24

Answer: B

Solution:

	T		D		
Party	NC	EC	NC	EC	
1	a	72 – a	d	48 – d	120
2	b	66 - b	36 – b	18 + b	120
3	c	162 - c	364 – c	34 + c	560
	300		500		800

It is given that

Of the 36 NC pizzas delivered to Party 2, 50%, i.e., 18 were Thin Crust.

∴ b = 18.

Difference between 66 – b and 18 + b = 48 –2b = 48 – 36 = 12

4. Suppose that a T-NC pizza cost as much as a D-NC pizza, but 3/5th of the price of a D-EC pizza. A D-EC pizza costs Rs. 50 more than a T-EC pizza, and the latter costs Rs. 500.

If 25% of the Normal Cheese pizzas delivered to Party 1 were of the Deep-Dish variety, then what was the total bill for Party 1?

A. Rs. 59480
B. Rs. 59840
C. Rs. 42520
D. Rs. 45240

Answer: A

Solution:

	T		D		
Party	NC	EC	NC	EC	
1	a	72 – a	d	48 – d	120
2	b	66 - b	36 – b	18 + b	120
3	c	162 - c	364 – c	34 + c	560
	300		500		800

a + d = 16

Further, we're told that of the 16 NC pizzas delivered to party 1, 25% are of the Deep-Dish variety.

Hence, d = 4 and a = 12. The following gives the cost of each type of pizza.

T-EC pizza = Rs. 500

D-EC pizza = Rs. 550

T-NC pizza = Rs. 330

D-NC pizza = Rs. 330

Total pizza bill for Party 1 = 12 (330) + 60(500) + 4(330) + 44(550) = 59,480

###TOPIC###Data Interpretation||Tables||Tables###

5.

|||Common|||

Direction: Study the following information carefully and answer the questions that follow.

There were seven elective courses – E1 to E7 - running in a specific term in a college. Each of the 300 students enrolled had chosen just one elective from among these seven. However, before the start of the term, E7 was withdrawn as the instructor concerned had left the college. The students who had opted for E7 were allowed to join any of the remaining electives. Also, the students who had chosen other electives were given one chance to change their choice. The table below captures the movement of the students from one elective to another during this process. Movement from one elective to the same elective simply means no movement. Some numbers in the table got accidentally erased; however, it is known that these were either 0 or 1

		To Elective					
		E1	E2	E3	E4	E5	E6
From Elective	E1	9	5	10	1	4	2
	E2		34	8		2	2
	E3	2	6	25			2
	E4		3	2	14		4
	E5		5			30	
	E6		7	3		2	9
	E7	4	16	30	5	5	41

Further, the following are known:

1) Before the change process there were 6 more students in E1 than in E4, but after the reshuffle, the number of students in E4 was 3 more than that in E1.

2) The number of students in E2 increased by 30 after the change process.

3) Before the change process, E4 had 2 more students than E6, while E2 had 10 more students than E3.

|||End|||
How many elective courses among E1 to E6 had a decrease in their enrollments after the change process?
A. 4
B. 1
C. 2
D. 3

Answer: C

Solution:

From 2,
E2 after shifting = 76. So, E2, before the change process, must have been 76 – 30, i.e., 46. Hence, the two empty cells can be filled with 0 each across the row E2.

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25			2	
	E4		3	2	14		4	
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	101
	Total		76					300

From 1, before change E1 = E4 + 6. Now, E1 (before) = 31.
E4 (before) must be more than 3 + 2 + 14 + 4, i.e., 23. This indicates that the two empty cells across E4 must be 1 and 1.

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25			2	
	E4	1	3	2	14	1	4	25
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	101
	Total		76					300

From 1, E1 = E4 - 3 (after the change).
E1 (afterwards) can be 16 or 17 or 18. If E4 (column) = 20, the total number of zeroes will cross 4. Hence, this is not possible.
E4 must be 21. Hence, E1 (afterwards) will be 18. Therefore, there must be 3 zeroes in E4 and one "1" in column E4. All the remaining entries will be "1".

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25	0	1	2	36
	E4	1	3	2	14	1	4	25
	E5	1	5	1	0	30	1	38
	E6	1	7	3	1	2	9	23
	E7	4	16	30	5	5	41	101
	Total	18	76	79	21	45	61	300

A total of 2 electives (E1, E4) among E1 to E6 had a decrease in their enrollments after the change process.

6. After the change process, which of the following is the correct sequence of number of students in the six electives E1 to E6?

A. 19, 76, 79, 21, 45, 60
B. 19, 76, 78, 22, 45, 60
C. 18, 76, 79, 23, 43, 61
D. 18, 76, 79, 21, 45, 61

Answer: D

Solution:

From 2,
E2 after shifting = 76. So, E2 before the change process must have been 76 – 30, i.e., 46. Hence, the two empty cells can be filled with 0 each across the row E2.

		To Elective						
		E1	**E2**	**E3**	**E4**	**E5**	**E6**	**Total**
From Elective	**E1**	9	5	10	1	4	2	**31**
	E2	**0**	34	8	**0**	2	2	**46**
	E3	2	6	25			2	
	E4		3	2	14		4	
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	**101**
	Total		**76**					**300**

From 1, before change E1 = E4 + 6. Now, E1 (before) = 31.
E4 (before) must be more than 3 + 2 + 14 + 4, i.e., 23. This indicates that the two empty cells across E4 must be 1 and 1.

		To Elective						
		E1	**E2**	**E3**	**E4**	**E5**	**E6**	**Total**
From Elective	**E1**	9	5	10	1	4	2	**31**
	E2	**0**	34	8	**0**	2	2	**46**
	E3	2	6	25			2	
	E4	**1**	3	2	14	**1**	4	**25**
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	**101**
	Total		**76**					**300**

From 1, E1 = E4 - 3 (after the change).
E1 (afterwards) can be 16 or 17 or 18. If E4 (column) = 20, the total number of zeroes will cross 4. Hence, this is not possible.

E4 must be 21. Hence, E1 (afterwards) will be 18. Therefore, there must be 3 zeroes in E4 and one "1" in column E4. All the remaining entries will be "1".

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25	0	1	2	36
	E4	1	3	2	14	1	4	25
	E5	1	5	1	0	30	1	38
	E6	1	7	3	1	2	9	23
	E7	4	16	30	5	5	41	101
	Total	18	76	79	21	45	61	300

After the change process, the correct sequence of number of students in the six electives E1 to E6

⇒ 18, 76, 79, 21, 45 and 61.

7. After the change process, which course among E1 to E6 had the largest change in its enrollment as a percentage of its original enrollment?

A. E1
B. E2
C. E3
D. E6

Answer: D

Solution:

From 2,
E2 after shifting = 76. So, E2 before the change process must have been 76 – 30, i.e., 46. Hence, the two empty cells can be filled with 0 each across the row E2.

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25			2	
	E4		3	2	14		4	
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	101
	Total		76					300

From 1, before change E1 = E4 + 6. Now, E1 (before) = 31.
E4 (before) must be more than 3 + 2 + 14 + 4, i.e., 23. This indicates that the two empty cells across E4 must be 1 and 1.

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25			2	
	E4	1	3	2	14	1	4	25
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	101
	Total		76					300

From 1, E1 = E4 - 3 (after the change).
E1 (afterwards) can be 16 or 17 or 18. If E4 (column) = 20, the total number of zeroes will cross 4. Hence, this is not possible.
E4 must be 21. Hence, E1 (afterwards) will be 18. Therefore, there must be 3 zeroes in E4 and one "1" in column E4. All the remaining entries will be "1".

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25	0	1	2	36
	E4	1	3	2	14	1	4	25
	E5	1	5	1	0	30	1	38
	E6	1	7	3	1	2	9	23
	E7	4	16	30	5	5	41	101
	Total	18	76	79	21	45	61	300

The maximum change occurs in E6, i.e., from 23 to 61, approximately 165%.

8. Later, the college imposed a condition that if after the change of electives, the enrollment in any elective (other than E7) dropped to less than 20 students, all the students who had left that course will be required to re-enroll for that elective.

Which of the following is a correct sequence of electives in the decreasing order of their final enrollments?

A. E2, E3, E6, E5, E1, E4
B. E3, E2, E6, E5, E4, E1
C. E2, E5, E3, E1, E4, E6
D. E2, E3, E5, E6, E1, E3

Answer: A

Solution:

From 2,
E2 after shifting = 76. So, E2 before the change process must have been 76 – 30, i.e., 46. Hence, the two empty cells can be filled with 0 each across the row E2.

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25			2	
	E4		3	2	14		4	
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	101
	Total		76					300

From 1, before change E1 = E4 + 6. Now, E1 (before) = 31.
E4 (before) must be more than 3 + 2 + 14 + 4, i.e., 23. This indicates that the two empty cells across E4 must be 1 and 1.

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25			2	
	E4	1	3	2	14	1	4	25
	E5		5			30		
	E6		7	3		2	9	
	E7	4	16	30	5	5	41	101
	Total		76					300

From 1, E1 = E4 -3 (after the change).
E1 (afterwards) can be 16 or 17 or 18. If E4 (column) = 20, the total number of zeroes will cross 4. Hence, this is not possible.
E4 must be 21. Hence, E1 (afterwards) will be 18. Therefore, there must be 3 zeroes in E4 and one "1" in column E4. All the remaining entries will be "1".

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	9	5	10	1	4	2	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25	0	1	2	36
	E4	1	3	2	14	1	4	25
	E5	1	5	1	0	30	1	38
	E6	1	7	3	1	2	9	23
	E7	4	16	30	5	5	41	101
	Total	18	76	79	21	45	61	300

Total number of persons in E1 after shifting is at most 19. All 31 people stayed back in E1. Hence, no one shifted to E2, E3, E4, E5 and E6. In this scenario, the total number of persons is as shown below.

		To Elective						
		E1	E2	E3	E4	E5	E6	Total
From Elective	E1	31	0	0	0	0	0	31
	E2	0	34	8	0	2	2	46
	E3	2	6	25	0	1	2	36
	E4	1	3	2	14	1	4	25
	E5	1	5	1	0	30	1	38
	E6	1	7	3	1	2	9	23
	E7	4	16	30	5	5	41	101
	Total	40	71	69	20	41	59	300

The correct sequence of electives in decreasing order of their final enrollments is E2, E3, E6, E5, E1, E4.

###TOPIC###Data Interpretation||Tables||Tables###

9.

|||Common|||

Direction: Study the following information carefully and answer the questions that follow.

An old woman had the following assets:

(a) Rs. 70 lakh in bank deposits

(b) 1 house worth Rs. 50 lakh

(c) 3 flats, each worth Rs. 30 lakh

(d) Certain number of gold coins, each worth Rs. 1 lakh

She wanted to distribute her assets among her three children: Neeta, Seeta, and Geeta.

The house, any of the flats, or any of the coins were not to be split. That is, the house went entirely to one child; a flat went to one child and similarly, a gold coin went to one child.

|||End|||
Among the three, Neeta received the least amount in bank deposits, while Geeta received the highest. The value of the assets was distributed equally among the children, as were the gold coins.

How much did Seeta receive in bank deposits (in lakhs of rupees)?

A. 30
B. 40
C. 20
D. 10

Answer: C

Solution:

Total amount (in lakh Rs.) distributed by the old woman = 70 + 50 + 90, i.e., 210 + Gold coins worth Rs.1 lakh each

Each one should get Rs.70 lakh.
Neeta - 2 flats (Rs. 60 lakh) + Rs. 10 lakh (bank deposit)
Seetha – House (Rs. 50 lakh) + Rs. 20 lakh (bank deposit)
Geeta - 1 flat (Rs. 30 lakh) + Rs 40. lakh (bank deposit)

10. Among the three, Neeta received the least amount in bank deposits, while Geeta received the highest. The value of the assets was distributed equally among the children, as were the gold coins.

How many flats did Neeta receive?

Answer:

Solution:

Total amount (in lakh Rs.) distributed by the old woman = 70 + 50 + 90, i.e., 210 + Gold coins worth Rs.1 lakh each

Each one should get Rs.70 lakh.
Neeta - 2 flats (Rs. 60 lakh) + Rs. 10 lakh (bank deposit)
Seetha – House (Rs. 50 lakh) + Rs. 20 lakh (bank deposit)
Geeta - 1 flat (Rs. 30 lakh) + Rs. 40 lakh (bank deposit)

11. The value of the assets distributed among Neeta, Seeta, and Geeta was in the ratio of 1:2:3, while the gold coins were distributed among them in the ratio of 2:3:4 . One child got all three flats and she did not get the house. One child, other than Geeta, got Rs. 30 lakh in bank deposits.

How many gold coins did the old woman have?

A. 72
B. 90
C. 180
D. 216

Answer: B

Solution:

Total amount (in lakh Rs.) distributed by the old woman = 70 + 50 + 90, i.e., 210 + Gold coins worth Rs.1 lakh each.

The gold coins were distributed in the ratio 2:3:4.
Let the number of gold coins received by Neeta, Seeta, and Geeta be 2a, 3a, and 4a, respectively.
The total assets were distributed in the ratio 1:2:3.
Hence, Seeta received one-third of the total property and one-third of the gold coins.
Hence, $\frac{1}{3}$ (Bank deposits + house + flats) = Rs.70 lakhs

One child got all the three flats, and she did not get the house. One child other than Geeta got Rs.30 lakhs in bank deposits.
Hence, Seeta cannot get all the three flats, because her share is Rs.70 lakhs + $\frac{1}{3}$ (gold coins).

Therefore, Seeta should receive one house and bank deposits of Rs.20 lakhs.
Neeta should get Rs.30 lakhs in bank deposits.
Hence, Geeta should get Rs.20 lakhs in bank deposits.

All the three flats should be received by Geeta.
$\frac{3a+2a}{70+3a} = \frac{1}{2}$
a = 10
Number of gold coins = 90

12. The value of the assets distributed among Neeta, Seeta, and Geeta was in the ratio of 1:2:3, while the gold coins were distributed among them in the ratio of 2:3:4. One child got all three flats and she did not get the house. One child, other than Geeta, got Rs. 30 lakh in bank deposits.

How much did Geeta get in bank deposits (in lakhs of rupees)?

Answer: 20

Solution:

Total amount (in lakh Rs.) distributed by the old woman = 70 + 50 + 90, i.e., 210 + Gold coins worth Rs.1 lakh each.

The gold coins were distributed in the ratio 2 : 3 : 4.
Let the number of gold coins received by Neeta, Seeta, and Geeta be 2a, 3a, and 4a, respectively.
The total assets were distributed in the ratio 1:2:3.
Hence, Seeta received one-third of the total property and one-third of the gold coins.
Hence, $\frac{1}{3}$ (Bank deposits + house + flats) = Rs.70 lakhs

One child got all the three flats, and she did not get the house. One child other than Geeta got Rs. 30 lakhs in bank deposits.
Hence, Seeta cannot get all the three flats, because her share is Rs. 70 lakhs + $\frac{1}{3}$ (gold coins).

Therefore, Seeta should receive one house and bank deposits of Rs. 20 lakhs.
Neeta should get Rs. 30 lakhs in bank deposits.
Hence, Geeta should get Rs.20 lakhs in bank deposits.

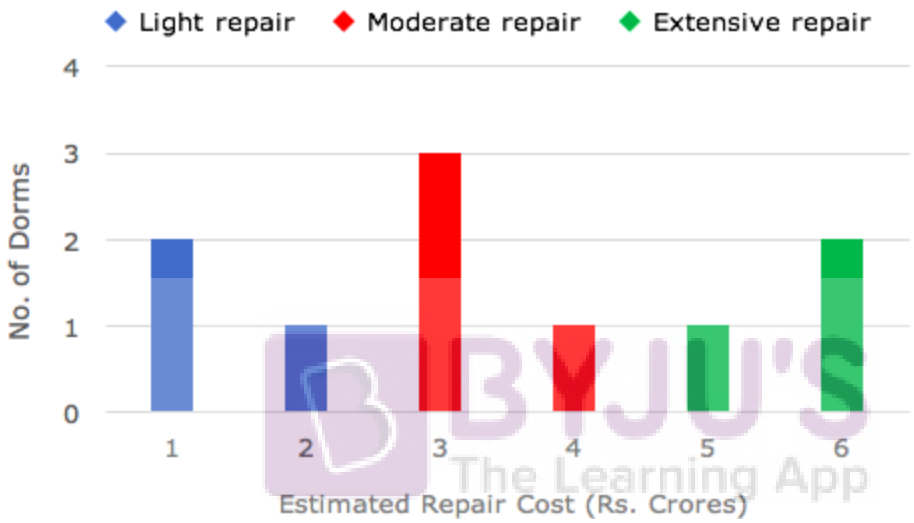
###TOPIC###Data Interpretation||Caselets||Caselets###

13.

|||Common|||

Direction: Analyse the graph/s given below and answer the questions that follow.

At a management school, the oldest 10 dorms, numbered 1 to 10, need to be repaired urgently, The following diagram represents the estimated repair costs (in Rs. crores) for the 10 dorms. For any dorm, the estimated repair cost (in Rs. crores) is an integer. Repairs with estimated cost Rs. 1 or 2 crores are considered light repairs, repairs with estimated cost Rs. 3 or 4 crores are considered moderate repairs and repairs with estimated cost Rs. 5 or 6 crores are considered extensive repairs.



Further, the following are known:

1) Odd-numbered dorms do not need light repair; even-numbered dorms do not need moderate repair and dorms, whose numbers are divisible by 3, do not need extensive repair.

2) Dorms 4 to 9 all need different repair costs, with Dorm 7 needing the maximum and Dorm 8 needing the minimum.

|||End|||
Which of the following is NOT necessarily true?
A. Dorm 1 needs a moderate repair.
B. Repairs for Dorm 5 will cost no more than Rs. 4 crores.
C. Dorm 7 needs extensive repairs.
D. Repairs for Dorm 10 will cost no more than Rs. 4 crores.

Answer: D

Solution:

No. of dorms	Cost of repair for each dorm (in Rs. crore)	Total cost
2	1	2
1	2	2
3	3	9
1	4	4
1	5	5
2	6	12

Hence, the total amount needed is Rs. 34 crore.

Dorms 4 to 9 have different repair costs.
Dorm 7 needs the maximum repair cost and Dorm 8 needs the minimum repair cost. From the other conditions given, we have the following table with partial data.

Dorm Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Repair Type	H/M	L /H	M	L/H	M/H	L	M/H	L/H	M	L /H
Conclusion (Rs. in Crores)	3	1/6	3	5	3/4	2	6	1	4/3	6/1

L = Light repair

M = Moderate repair

H = Extensive repair

If Dorm 5 needs Rs. 3 crore then Dorm 9 needs Rs.4 crore, while if Dorm 5 needs Rs. 4 crore then Dorm 9 needs Rs. 3 crore for repairs.
If Dorm 2 needs Rs.1 crore then Dorm 10 needs 6 Crore, while if dorm 2 needs Rs.6 crore then dorm 10 needs Rs.1 crore to repair.

From the options, Dorm 1 needing a moderate repair is possibly true.
Dorm 5 not needing more than Rs. 4 crore is true.
Hence, repairs for Dorm 10 not costing more than Rs. 4 crore is not necessarily true as it may require Rs. 6 crore or Rs. 1 crore.

Choice (4)

14. What is the total cost of repairing the odd-numbered dorms (in Rs. crores)?

Answer: 19

Solution:

Solution:

No. of dorms	Cost of repair for each dorm (in Rs. crore)	Total cost
2	1	2
1	2	2
3	3	9
1	4	4
1	5	5
2	6	12

Hence, the total amount needed is Rs. 34 crore.

Dorms 4 to 9 have different repair costs.
Dorm 7 needs the maximum repair cost and Dorm 8 needs the minimum repair cost. From the other conditions given, we have the following table with partial data.

Dorm Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Repair Type	H/M	L /H	M	L/H	M/H	L	M/H	L/H	M	L /H
Conclusion (Rs. in Crores)	3	1/6	3	5	3/4	2	6	1	4/3	6/1

L = Light repair

M = Moderate repair

H = Extensive repair

The total cost for the odd-numbered dorms are 3 + 3 + 3 + 6 + 4 or 3 + 3 + 4 + 6 + 3, i.e., Rs.19 crore.

15. Suppose that:

1) 4 of the 10 dorms needing repairs are women's dorms and need a total of Rs. 20 crores for repair.

2) Only one dorm out of dorms 1 to 5 is a women's dorm.

What is the cost for repairing Dorm 9 (in Rs. crores)?

Answer: 3

Solution:

No. of dorms	Cost of repair for each dorm (in Rs. crore)	Total cost

2	1	2
1	2	2
3	3	9
1	4	4
1	5	5
2	6	12

Hence, the total amount needed is Rs. 34 crore.

Dorms 4 to 9 have different repair costs.
Dorm 7 needs the maximum repair cost and Dorm 8 needs the minimum repair cost. From the other conditions given, we have the following table with partial data.

Dorm Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Repair Type	H/M	L /H	M	L/H	M/H	L	M/H	L/H	M	L /H
Conclusion (Rs. in Crores)	3	1/6	3	5	3/4	2	6	1	4/3	6/1

L = Light repair

M = Moderate repair

H = Extensive repair

Given that, 4 of the 10 dorms are women's dorms which need Rs. 20 crore for repairs. From dorms 1 to 5, there is only one women's dorm.

This is possible with repairing costs of Rs. 6, Rs. 6, Rs. 5 and Rs. 3 crore.
Among the first 5 dorms, dorm 4 should be a women's dorm.
Dorms 7 and Dorm 10 can be repaired for Rs. 6 crores.
Dorms 1, 3, 5 or 9 can be repaired for Rs. 3 crores. But dorms 1, 3 or 5 are not women's dorms. So, it must be Dorm 9.

Hence, the repair cost for Dorm 9 is Rs. 3 crore.

16. Suppose that:

1) 4 of the 10 dorms needing repair are women's dorms and need a total of Rs. 20 crores for repair.

2) Only one dorm out of dorms 1 to 5 is a women's dorm.

Which of the following is a women's dorm?

A. Dorm 2
B. Dorm 5
C. Dorm 8
D. Dorm 10

Answer: D

Solution:

No. of dorms	Cost of repair for each dorm (in Rs. crore)	Total cost
2	1	2
1	2	2
3	3	9
1	4	4
1	5	5
2	6	12

Hence, the total amount needed is Rs. 34 crore.

Dorms 4 to 9 have different repair costs.
Dorm 7 needs the maximum repair cost and Dorm 8 needs the minimum repair cost. From the other conditions given, we have the following table with partial data.

Dorm Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Repair Type	H/M	L /H	M	L/H	M/H	L	M/H	L/H	M	L /H
Conclusion (Rs. in Crores)	3	1/6	3	5	3/4	2	6	1	4/3	6/1

L = Light repair

M = Moderate repair

H = Extensive repair

Given that, 4 of the 10 dorms are women's dorms which need Rs. 20 crore for repairs. From dorms 1 to 5, there is only one women's dorm.

This is possible with repairing costs of Rs. 6 crore, Rs. 6 crore, Rs. 5 crore and Rs. 3 crore.
Among the first 5 dorms, Dorm 4 should be a women's dorm.
Dorms 7 and 10 can be Rs. 6 crores.
Dorms 1, 3, 5 or 9 can be Rs. 3 crores. But 1, 3 or 5 are not women's dorms. So, it must be dorm 9.

So women's dorms are Dorm 4 (Rs. 5 crore), 7 (Rs. 6 crore), 9 (Rs. 3 crore) and 10 (Rs. 6 crore).

Hence, Dorm 10 should be a women's dorm.

###TOPIC###Data Interpretation||Bar Charts||Bar Charts###

17.

|||Common|||

Direction: Study the following information carefully and answer the questions that follow.

A tea taster was assigned to rate teas from six different locations - Munnar, Wayanad, Ooty, Darjeeling, Assam, and Himachal. These teas were placed in six cups, numbered 1 to 6, not necessarily in the same order. The tea taster was asked to rate these teas on the strength of their flavour on a scale of 1 to 10. He gave a unique integer rating to each tea. Some other information is given below:

1) Cup 6 contained the tea from Himachal.

2) The tea from Ooty got the highest rating, but it was not in Cup 3.

3) The rating of the tea in Cup 3 was double the rating of the tea in Cup 5.

4) Only two cups got ratings in even numbers.

5) Cup 2 got the minimum rating and this rating was an even number.

6) The tea in Cup 3 got a higher rating than that in Cup 1.

7) The rating of the tea from Wayanad was more than the rating of tea from Munnar, but less than that of the tea from Assam.

|||End|||
What was the second highest rating given?

Answer: 7

Solution:

The tea with the highest rating is ranked 1 and the tea with the lowest rating is ranked 6.
From (2) and (5),

Ranking	Place	Cup No	Rating
1	Ooty		
2			
3			
4			
5			
6		Cup 2	

From 4, only two cups have been given even-numbered ratings and from 5, one of them is Cup 2.
From 3, the rating of the tea in Cup 3, is an even number.
Therefore, the rating of the tea in Cup 5 must be an odd number.

From 6, Cup 3's rating is more than that of the tea in Cup 5, Cup 2, and Cup 1.
Hence, the tea in Cup 3 is either ranked 2 or 3.
It cannot be 1 since the tea from Ooty is not in Cup 3 and it has the highest rating.

From 5, the rating for the tea in Cup 2 can either be 2 or 4. No other even number can be assigned to the tea in Cup 2.

If the tea in Cup 2 has a rating of 4, the minimum possible rating for the tea in Cup 5 = 5.
The tea in Cup 3 has a rating of 10. This is not possible as the highest rating is not given to the tea in Cup 3.

Hence, the tea in Cup 2 has a rating of 2.

The tea in Cup 5 has a rating of 3 (odd number less than 5).
Therefore, the rank of the tea in Cup 5 = 5 and the tea in Cup 3's rating = 6.

There are only two even ratings that are given to the tea in Cup 3 and Cup 2.
Hence, between the ratings 3 and 6, only one rating, i.e., 5 is possible.
Tea in Cup 1's rating < Cup 3's rating.
Hence, the only possibility is that tea in Cup 1's rating = 5 and the tea in Cup 3's rating = 6.

From (1), Cup 6 contained the tea from Himachal, and it got the second highest rating. The rating must be an odd number greater than 6 and less than 10. Hence, 7 is the only possible number. It cannot be 9 because the tea from Ooty must be given a rating of 10 but there are only two even ratings.

Cup 4 has the tea from Ooty, whose rating should be an odd number greater than 7 and less than 10, i.e., 9.

The final table will be as follows:

Ranking	Place	Cup No	Rating
1	Ooty	Cup 4	9
2	Himachal	Cup 6	7
3		Cup 3	6
4		Cup 1	5
5		Cup 5	3
6		Cup 2	2

The second highest rating is given to the tea from Himachal which is 7.

18. Which cup contained the tea from Ooty?

Answer: 4

Solution:

The tea with the highest rating is ranked 1 and the tea with the lowest rating is ranked 6.
From (2) and (5),

Ranking	Place	Cup No	Rating
1	Ooty		
2			
3			
4			
5			
6		Cup 2	

From (4), only two cups have been given even-numbered ratings and from (5) one of them is Cup 2.
From 3, the rating of the tea in Cup 3, is an even number.
Therefore, the rating of the tea in Cup 5 must be an odd number.

From 6, Cup 3's rating is more than those in Cup 5, Cup 2 and Cup 1.
Hence, the ranking of Cup 3 is either 2 or 3.
It cannot be 1 since the tea from Ooty is not in Cup 3 and it has the highest rating.

From 5, Cup 2's rating can either be 2 or 4. No other even number can be assigned to the tea in Cup 2.

If the tea in Cup 2's rating is 4, the minimum possible rating for the tea in Cup 5 = 5.
The tea in Cup 3's rating = 10. This is not possible as the highest rating is not given to the tea in Cup 3.

Hence, the tea in Cup 2 has a rating of 2.

The tea in Cup 5 has a rating of 3 (odd number less than 5).
Therefore, the rank of the tea in Cup 5 = 5 and the tea in Cup 3's rating = 6.

There are only two even ratings that are given to the tea in Cup 3 and Cup 2.
Hence, between the ratings 3 and 6, only one rating, i.e., 5 is possible.
Tea in Cup 1's rating < Cup 3's rating.
Hence, the only possibility is that the tea in Cup 1's rating = 5 and the tea in Cup 3's rating = 6.

From (1), Cup 6 contained tea from Himachal, and it got the second highest rating. The rating must be an odd number greater than 6 and less than 10. Hence, 7 is the only possible number. It cannot be 9 because the tea from Ooty must be given a rating of 10 but there are only two even ratings.

Cup 4 has the tea from Ooty, whose rating should be an odd number greater than 7 and less than 10, i.e., 9.

The final table will be as follows:

Ranking	Place	Cup No	Rating
1	Ooty	Cup 4	9
2	Himachal	Cup 6	7
3		Cup 3	6
4		Cup 1	5
5		Cup 5	3
6		Cup 2	2

The number of the cup that contained the tea from Ooty is Cup 4.

19. If the tea from Munnar did not get the minimum rating, what was the rating of the tea from Wayanad?

A. 3
B. 5
C. 1
D. 6

Answer: B

Solution:

The tea with the highest rating is ranked 1 and the tea with the lowest rating is ranked 6.
From (2) and (5),

Ranking	Place	Cup No	Rating
1	Ooty		
2			
3			
4			
5			
6		Cup 2	

From (4), only two cups have been given even numbered ratings and from (5) one of them is Cup 2.
From 3, the rating for the tea in Cup 3 is an even number.
Therefore, the rating for the tea in Cup 5 must be an odd number.

From 6, the rating for the tea in Cup 3 is more than the ratings for the teas in Cup 5, Cup 2, and Cup 1.
Hence, the ranking of the tea in Cup 3 is either 2 or 3.
It cannot be 1 since the tea from Ooty is not in Cup 3 and it has the highest rating.

From 5, the rating for the tea in Cup 2is either 2 or 4. No other even number can be assigned to the tea in Cup 2.

If the rating for the tea in Cup 2 is 4, then the minimum possible rating for the tea in Cup 5 = 5.
The rating for the tea in Cup 3 = 10. This is not possible as the highest rating is not given to the tea in Cup 3.

Hence, the tea in Cup 2 has a rating of 2.

The tea in Cup 5 has a rating of 3 (odd number less than 5).
Therefore, the rank of the tea in Cup 5 = 5 and the tea in Cup 3's rating = 6.

There are only two even ratings that are given to the tea in Cup 3 and Cup 2.
Hence, between the ratings 3 and 6, only one rating, i.e., 5 is possible.
Tea in Cup 1's rating < Cup 3's rating.
Hence, the only possibility is that tea in Cup 1's rating = 5 and the tea in Cup 3's rating = 6.

From (1), Cup 6 contained the tea from Himachal, and it got the second highest rating. The rating must be an odd number greater than 6 and less than 10. Hence, 7 is the only possible number. It cannot be 9 because the tea from Ooty must be given a rating of 10 but there are only two even ratings.

Cup 4 has the tea from Ooty, whose rating should be an odd number greater than 7 and less than 10, i.e., 9.

The final table will be as follows:

Ranking	Place	Cup No	Rating
1	Ooty	Cup 4	9
2	Himachal	Cup 6	7
3		Cup 3	6
4		Cup 1	5
5		Cup 5	3
6		Cup 2	2

It is given that the rating of the tea from Munnar is less than that of the teas from Wayanad and Assam. Hence, it must be ranked either fifth or sixth.
If the tea from Munnar did not get the minimum rating, it will be ranked fifth whose rating is 3. Therefore, the teas from Assam and Wayanad will be ranked 3 and 4, respectively. Hence, the rating of the tea from Wayanad will be 5.

20. If cups containing teas from Wayanad and Ooty had consecutive numbers, which of the following statements may be true?

A. Cup 5 contains the tea from Assam.
B. Cup 1 contains the tea from Darjeeling.
C. The tea from Wayanad has got a rating of 6.
D. The tea from Darjeeling has got the minimum rating.

Answer: B

Solution:

The tea with the highest rating is ranked 1 and the tea with the lowest rating is ranked 6.
From (2) and (5),

Ranking	Place	Cup No	Rating
1	Ooty		
2			
3			
4			
5			
6		Cup 2	

From (4), only two cups have been given even-numbered ratings and from (5) one of them is Cup 2.

From 3, the rating of the tea in Cup 3 is an even number.
Therefore, the rating of the tea in Cup 5 must be an odd number.

From 6, Cup 3's rating is more than the ratings of the teas in Cup 5, Cup 2 and Cup 1.
Hence, the ranking of Cup 3 is either 2 or 3.
It cannot be 1 since the tea from Ooty is not in Cup 3 and it has the highest rating.

From 5, the rating for the tea in Cup 2 can either be 2 or 4. No other even number can be assigned to the tea in Cup 2.

If the tea in Cup 2's rating is 4, the minimum possible rating for the tea in Cup 5 = 5
The tea in Cup 3's rating = 10. This is not possible as the highest rating is not given to the tea in Cup 3.

Hence, the tea in Cup 2 has a rating of 2.

The tea in Cup 5 has a rating of 3 (odd number less than 5).
Therefore, the rank of the tea in Cup 5 = 5 and the rating for the tea in Cup 3= 6.

There are only two even ratings that are given to the tea in Cup 3 and Cup 2.
Hence, between the ratings 3 and 6, only one rating, i.e., 5 is possible.
Rating of the tea in Cup 1 < Rating of the tea in Cup 3
Hence, the only possibility is that the rating of the tea in Cup 1 = 5 and the rating of the tea in Cup 3 = 6

From (1), Cup 6 contained the tea from Himachal, and it got the second highest rating. The rating must be an odd number greater than 6 and less than 10. Hence, 7 is the only possible number. It cannot be 9 because the tea from Ooty must be given a rating of 10 but there are only two even ratings.

Cup 4 has the tea from Ooty, whose rating should be an odd number greater than 7 and less than 10, i.e., 9.

The final table will be as follows:

Ranking	Place	Cup No	Rating
1	Ooty	Cup 4	9
2	Himachal	Cup 6	7
3		Cup 3	6
4		Cup 1	5
5		Cup 5	3
6		Cup 2	2

If the cups containing teas from Wayanad and Ooty have consecutive numbers, then the cup containing the tea from Wayanad can either be Cup 5 or Cup 3.
But the tea from Wayanad cannot be in Cup 3 because the tea from Assam got a

higher rating than the tea from Wayanad. Hence, the tea from Wayanad should be in Cup 5, the tea from Munnar will be in Cup 2, and the tea from Darjeeling can either be in Cup 1 or Cup 3.

###TOPIC###Logical Reasoning||Logical Matching||Logical Matching###

21.

|||Common|||

Direction: Study the following information carefully and answer the questions that follow.

In an 8 × 8 chessboard, a queen placed anywhere can attack another piece if the piece is present in the same row, or in the same column or in a diagonal position in any of the 4 possible directions, provided there is no other piece in between the path from the queen to that piece.

The columns are labelled from a to h (left to right) and the rows are numbered from 1 to 8 (bottom to top). The position of a piece is given by the combination of column and row labels. For example, position c5 means that the piece is in the cth column and 5th row.

|||End|||
If the queen is at c5, and the other pieces are in the positions c2, g1, g3, g5, and a3, how many are under attack by the queen? There are no other pieces on the board.
A. 2
B. 3
C. 4
D. 5

Answer: C

Solution:

Queen is at c5.
The pieces which are under attack are a3, c2, g1, g5. So, a total of 4 pieces are under attack.

		Queen				(G5) Piece	
(A3) Piece						(G3) Piece	
		(C2) Piece					
A	B	C	D	E	F	(G1) Piece	H

22. If the other pieces are only at positions a1, a3, b4, d7, h7, and h8, then which of the following positions of the queen results in the maximum number of pieces being under attack?

A. f8
B. a7
C. c1
D. d3

Answer: D

Solution:

The pieces are at a1, a3, b4, d7, h7, and h8.

Option (1): If the queen is at f8, it will attack h8 and b4, a total of 2 pieces.

Option (2): If the queen is at a7, it will attack a3 and d7, a total of 2 pieces.

Option (3): If the queen is at c1, it will attack a1 and a3, a total of 2 pieces.

Option (4): If the queen is at d3, it will attack a3, d7 and h7, a total of 3 pieces.

So, the queen being at D3 means a maximum of 3 pieces will be under attack.

							Piece (H8)
			Piece (D7)				Piece (H7)
						(G5)Piece	
	Piece (B4)						
(A3) Piece						(G3)Piece	
Piece (A1)	B	C	D	E	F	G	H

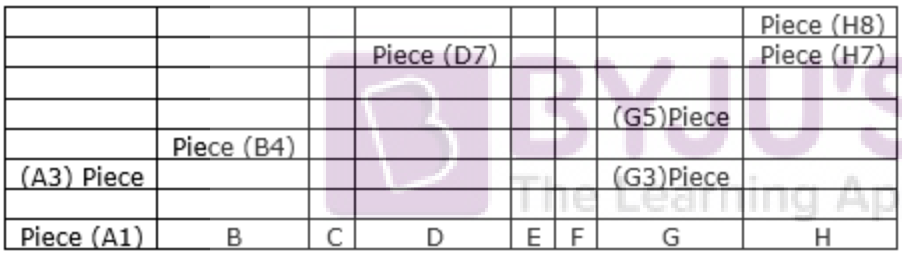
23. If the other pieces are only at positions a1, a3, b4, d7, h7, and h8, then from how many positions can the queennot attack any of the pieces?

A. 0
B. 3
C. 4
D. 6

Answer: C

Solution:

The queen cannot be placed in the columns: a, b, d, and h. From the remaining columns, it must be assessed.
If the queen is placed on C2, it will attack H7.
Queen can be placed on E2, F2, G2, G5. There are a total of 4 such squares for the Queen.



24. Suppose the queen is the only piece on the board and it is at position d5. In how many positions can another piece be placed on the board such that it is safe from the queen's attack?

A. 32
B. 35

C. 36
D. 37

Answer: C

Solution:

Given that the queen is at d5. The squares are either diagonal, or in the same row or in the same column.

Under Attack			Under Attack			Under Attack	
	Under Attack		Under Attack		Under Attack		
		Under Attack	Under Attack	Under Attack			
Under Attack	Under Attack	Under Attack	**QUEEN**	Under Attack	Under Attack	Under Attack	Under Attack
		Under Attack	Under Attack	Under Attack			
	Under Attack		Under Attack		Under Attack		
Under Attack			Under Attack			Under Attack	
			Under Attack				Under Attack

Hence, it can be concluded that a total of 36 such squares are safe from attack.

###TOPIC###Logical Reasoning||Tournaments||Tournaments###

25.

|||Common|||

Direction : Study the following information carefully and answer the question that follow.

Eight friends: Ajit, Byomkesh, Gargi, Jayanta, Kikira, Manik, Prodosh and Tapesh are going to Delhi from Kolkata by a flight operated by Cheap Air. In the flight, sitting is arranged in 30 rows, numbered 1 to 30, each consisting of 6 seats, marked by letters A to F from left to right, respectively. Seats A to C are on the left of the aisle (the passage running from the front of the aircraft to the back), and seats D to F are on the right of the aisle. Seats A and F are by the windows and referred to as window seats, C and D are by the aisle and are referred to as aisle seats while B and E are referred to as middle seats. Seats marked by consecutive letters are called consecutive seats (or seats next to each other). A seat number is a combination of the row number, followed by the letter indicating the position in the row; e.g., 1A is the left window seat in the first row, while 12E is the right middle seat in the 12th row.

Cheap Air charges Rs. 1000 extra for any seats in Rows 1, 12 and 13 as those have extra legroom. For Rows 2-10, it charges Rs. 300 extra for window seats and Rs. 500 extra for aisle seats. For Rows 11 and 14 to 20, it charges Rs. 200 extra for window seats and Rs. 400 extra for aisle seats. All other seats are available at no extra charge.

The following are known:

1) The eight friends were seated in six different rows.

2) They occupied 3 window seats, 4 aisle seats and 1 middle seat.

3) Seven of them had to pay extra amounts, totaling up to Rs. 4600, for their choices of seat. One of them did not pay any additional amount for his/her choice of seat.

4) Jayanta, Ajit and Byomkesh were sitting in seats marked by the same letter, in consecutive rows in increasing order of row numbers; but all of them paid different amounts for their choices of seat. One of these amounts may be zero.

5) Gargi was sitting next to Kikira, and Manik was sitting next to Jayanta.

6) Prodosh and Tapesh were sitting in seats marked by the same letter, in consecutive rows in increasing order of row numbers; but they paid different amounts for their choices of seat. One of these amounts may be zero.

|||End|||
In which row was Manik sitting?
A. 10
B. 11

C. 12
D. 13

Answer: A

Solution:

Let us take the initial letter of each friend.

For seats in row numbers 1 to 20, extra charges are applicable for all the seats except for the middle seats.

J, A, B must be in the aisle seats to get the sum of the charges they paid 4600. Given that, J, A, B paid different amounts. Therefore,

Row/No	A	B	C	D	E	F	Remarks
10			J	M			500 × 2 = 1000
11			A				400 × 1 = 400
12			B				1000 × 1 = 1000
13					G	K	1000 × 2 = 2000 (6 persons = 4400)
20						P	200 × 1 = 200 (7 persons = 4600)
21						T	No extra charge

G, K and K, G can be interchanged. They can be placed in rows 1 to 0.

The right window positions and the aisle seats can also be interchanged.

From the table, Manik sits in Row 10.

26. How much extra charge did Jayanta have to pay for his choice of seat?

A. Rs. 300
B. Rs. 400

C. Rs. 500
D. Rs. 1000

Answer: C

Solution:

Let us take the initial letter of each friend.

From row numbers 1 to 20, extra charges are applicable for all the seats except the middle seat.

J, A, B must be in the aisle seats to get the sum as 4600.
Given that, J, A, B paid different amounts. Therefore,

Row/No	A	B	C	D	E	F	Remarks
10			J	M			500 × 2 = 1000
11			A				400 × 1 = 400
12			B				1000 × 1 = 1000
13					G	K	1000 × 2 = 2000 (6 persons = 4400)
20						P	200 × 1 = 200 (7 persons = 4600)
21						T	No extra charge

G, K and K, G can be interchanged. They can be placed in row 1 to 0.

The right window positions and the aisle seats can also be interchanged.

Therefore, Jayanta paid Rs. 500 extra for his choice of seat.

27. How much extra did Gargi pay for her choice of seat?

A. 0
B. Rs. 300

C. Rs. 500
D. Rs. 1000

Answer: D

Solution:

Let us take the initial letter of each friend.

From row numbers 1 to 20, extra charges are applicable for all seats except the middle seat.

J, A, B must be in the aisle seats to get the sum as 4600.
Given that, J, A, B paid different amounts. Therefore,

Row/No	A	B	C	D	E	F	Remarks
10			J	M			500 × 2 = 1000
11			A				400 × 1 = 400
12			B				1000 × 1 = 1000
13					G	K	1000 × 2 = 2000 (6 persons = 4400)
20						P	200 × 1 = 200 (7 persons = 4600)
21						T	No extra charge

G, K and K, G can be interchanged. They can be placed in row 1 to 0.

The right window positions and the aisle seats can also be interchanged.

Hence, Gargi paid Rs. 1000 for her choice of seat.

28. Who among the following did not pay any extra amount for his/her choice of seat?

A. Kikira
B. Manik
C. Gargi
D. Tapesh

Question

Answer: D

Solution:

Let us take the initial letter of each friend.

From row numbers 1 to 20, extra charges are applicable for all seats except the middle seat.

J, A, B must be in the aisle seats to get the sum as 4600.
Given that, J, A, B paid different amounts. Therefore,

Row/No	A	B	C	D	E	F	Remarks
10			J	M			500 × 2 = 1000
11			A				400 × 1 = 400
12			B				1000 × 1 = 1000
13					G	K	1000 × 2 = 2000 (6 persons = 4400)
20						P	200 × 1 = 200 (7 persons = 4600)
21						T	No extra charge

G, K and K, G can be interchanged. They can be placed in row 1 to 0.

The right window positions and the aisle seats can also be interchanged.

Tapesh did not pay any extra amount for his/her choice of seat.

###TOPIC###Logical Reasoning||Seating Arrangement||Seating Arrangement###

29.

|||Common|||

Direction : Study the following information carefully and answer the question that follow.

A high security research lab requires the researchers to set a pass key sequence based on the scan of the five fingers of their left hands. When an employee first joins the lab, her fingers are scanned in an order of her choice, and then when she wants to re-enter the facility, she has to scan the five fingers in the same sequence.

The lab authorities are considering some relaxations of the scan order requirements, since it is observed that some employees often get locked-out because they forget the sequence.

|||End|||
The lab has decided to allow a variation in the sequence of scans of the five fingers so that at most two scans (out of five) are out of place. For example, if the original sequence is Thumb (T), index finger (I), middle finger (M), ring finger (R) and little finger (L) then TLMRI is also allowed, but TMRLI is not.

How many different sequences of scans are allowed for any given person's original scan?

Answer: 11

Solution:

If all the scans are in the correct order = 1 way

If exactly two are interchanged:

Any two of the five scans that can be interchanged in ${}^5C_2$ ways, viz. 10.

Therefore, 11 different sequences of scans are allowed for any given person's original scan.

30. The lab has decided to allow variations of the original sequence so that the input of the scanned sequence of five fingers is allowed to vary from the original sequence by one place for any of the fingers. Thus, for example, if TIMRL is the original sequence, then ITRML is also allowed, but LIMRT is not.
How many different sequences are allowed for any given person's original scan?

A. 7
B. 5
C. 8
D. 13

Answer: C

Solution:

Let the original scan be: TIMRL

So the allowed sequences are:
case a: Original Sequence i.e., TIMRL

case b: Interchanging TI we can get 3 sequences, i.e., ITMRL, ITRML, ITMLR.

case c: Interchanging MI we can get 2 sequences, i.e., TMIRL,TMILR.

case d: Interchanging MR we can get 2 sequences, i.e., TIRML, ITRML (this is a repeated sequence already present in case b) so only 1 extra sequence which is TIRML.

case e: Interchanging RL we can get 3 sequences, i.e., TIMLR, ITMLR, TMILR. But the 2nd and 3rd sequences are already present in case b and c. So, only 1 extra sequence is TIMLR.

Total number of allowed sequences = 1 + 3 + 2 + 1 + 1 = 8

31. The lab has now decided to require six scans in the pass key sequence, where exactly one finger is scanned twice, and the other fingers are scanned exactly once, which can be done in any order. For example, a possible sequence is TIMTRL. Suppose the lab allows a variation of the original sequence (of six inputs) where at most two scans (out of six) are out of place, as long as the finger originally scanned twice is scanned twice and other fingers are scanned once.

How many different sequences of scans are allowed for any given person's original scan?

Answer: 15

Solution:

Let us say original input: TIMTRL.

Case-a: None of them misplaced – 1 way.

Case-b : When exactly two are misplaced. T can be misplaced - 4 ways.

I can be misplaced - 4 ways.

M can be misplaced -3 ways.

T can be misplaced - 2 ways.

R can be misplaced - 1 way.

Total number of ways in Case-b = 4 + 4 + 3 + 2 + 1 = 14 ways.

Therefore, total number of ways = 14 + 1 = 15 ways

32. The lab has now decided to require six scans in the pass key sequence, where exactly one finger is scanned twice, and the other fingers are scanned exactly once, which can be done in any order. For example, a possible sequence is TIMTRL. Suppose the lab allows a variation of the original sequence(of six inputs) so that input in the form of scanned sequence of six fingers is allowed to vary from the original sequence by one place for any of the fingers, as long as the fingers originally scanned twice is scanned twice and other fingers are scanned once. How many different sequences of scans are allowed if the original scan sequence is LRLTIM?

A. 8
B. 11
C. 13
D. 14

Answer: C

Solution:

Given sequence: LRLTIM

The distinct possibilities are:

Case 1: . No shift = 1 way

(Total 1 ways)

Case 2. (a) LR = 1 way

(b) LR + LT = 1 way

(c) LR + LT + IM = 1 way

(d) LR + IM = 1 way

(e) LR + IT = 1 way

(Total 5 ways)

Case 3. (a) RL = 1 way

(b) RL + TI = 1 way

(c) RL + IM = 1 way

(Total 3 ways)

Case 4. (a) LT = 1 way

(b) LT + IM = 1 way

(Total 2 ways)

Case 5. TI = 1 way

(Total 1 way)

Case 6. IM = 1 way

(Total 1 way)

Total number of ways = 1 + 5 + 3 +2 +1 + 1 = 13 ways.

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