Weekly Challenge 05: Deduction

CS/MATH 113 Discrete Mathematics

Spring 2024

1. Desi Einstein

On his trip to Mississauga, Einstein felt transported to Pakistan and revised his riddle. He encountered a street with 5 houses of different colors. The inhabitant of each house hails from a different area of Karachi, has a different favorite drink, a different bad habit, and a different favorite food. Specifically, Einstein observed that

1. The person from Lyari lives in the Red house.
2. The person from Gulshan likes Biryani.
3. The person from Johar prefers Chai.
4. The Green house is exactly to the left of the Gray house.
5. The owner of the Green house enjoys drinking Thanda.
6. The person who relishes Huqqa loves Haleem.
7. The owner of the Yellow house smokes Cigarettes.
8. The resident of the center house likes Coffee.
9. The person from Saddar lives in the first house.
10. The Paan chewer lives next to the one who loves Nihari.
11. The person who likes Qorma lives next to the man who smokes Cigarettes.
12. The person who takes Ghutka drinks only Water.
13. The person from Clifton smokes Bidi.
14. The person form Saddar lives next to the Blue house.
15. The Paan chewer has a neighbour who drinks Milk.

Continue the reasoning in the solution box below in order to answer the question, "Who likes Karahi?"

Solution: We can model the 5 houses as follows.

	House 1	House 2	House 3	House 4	House 5
Color					
Area					
Drink					
Habit					
Food					

From 9, we know that the person from Saddar lives in House 1. So, we get the following.

	House 1	House 2	House 3	House 4	House 5
Color					
Area	Saddar				
Drink					
Habit					
Food					

Including 14, we know that House 2 is blue.

	House 1	House 2	House 3	House 4	House 5
Color		Blue			
Area	Saddar				
Drink					
Habit					
Food					

from 8, we know that resident of center house drinks coffee.

	House 1	House 2	House 3	House 4	House 5
Color		Blue			
Area	Saddar				
Drink			Coffee		
Habit					
Food					

From 4 and 5, we infer that the fourth house is green and fifth one is grey,
also the person in green house drinks thanda.

	House 1	House 2	House 3	House 4	House 5
Color		Blue		Green	Grey
Area	Saddar				
Drink			Coffee	Thanda	
Habit					
Food					

The colour for first and third house is not known yet, so using 1 it can be inferred that thrid house is red and the area is Liyari, thus first house is yellow. From 7, we know that the owner of yellow house smokes Cigarettes. From 11, we know that the person who likes Qorma lives next to the one who smokes Cigarettes.

	House 1	House 2	House 3	House 4	House 5
Color	Yellow	Blue	Red	Green	Grey
Area	Saddar		Liyari		
Drink			Coffee	Thanda	
Habit	Cigarettes				
Food		Qorma			

Lets consider the person in second house to be the paan chewer, thus from 15 the favourite drink for first house would be Milk. Furthermore, using 10 the person in House 1 loves Nihari.

	House 1	**House 2**	**House 3**	**House 4**	**House 5**
Color	Yellow	Blue	Red	Green	Grey
Area	Saddar		Liyari		
Drink	Milk		Coffee	Thanda	
Habit	Cigarettes	Paan			
Food	Nihari	Qorma			

According to 12, the only house gutka and water can fit into is the fifth house.

	House 1	**House 2**	**House 3**	**House 4**	**House 5**
Color	Yellow	Blue	Red	Green	Grey
Area	Saddar		Liyari		
Drink	Milk		Coffee	Thanda	Water
Habit	Cigarettes	Paan			Gutka
Food	Nihari	Qorma			

The only drink left now is chai which would be the favourite one for House 2. Hence, according to 3 the person in House 2 is from Johar.

	House 1	**House 2**	**House 3**	**House 4**	**House 5**
Color	Yellow	Blue	Red	Green	Grey
Area	Saddar	Johar	Liyari		
Drink	Milk	Chai	Coffee	Thanda	Water
Habit	Cigarettes	Paan			Gutka
Food	Nihari	Qorma			

As House 4 is the only one with unknown area aswell as unknown habit, therfore, from 13 it can be inferred the person in House 4 is from Clifton and smokes Bidi.

	House 1	**House 2**	**House 3**	**House 4**	**House 5**
Color	Yellow	Blue	Red	Green	Grey
Area	Saddar	Johar	Liyari	Clifton	
Drink	Milk	Chai	Coffee	Thanda	Water
Habit	Cigarettes	Paan		Bidi	Gutka
Food	Nihari	Qorma			

Using 6 we can infer that the Habit of the person in House 3 is Huqqa and the favorite food is Haleem as this is the only house left with unknown habit and food.

	House 1	**House 2**	**House 3**	**House 4**	**House 5**
Color	Yellow	Blue	Red	Green	Grey
Area	Saddar	Johar	Liyari	Clifton	
Drink	Milk	Chai	Coffee	Thanda	Water
Habit	Cigarettes	Paan	Huqqa	Bidi	Gutka
Food	Nihari	Qorma	Haleem		

From 2 the person in House 5 is from Gulshan and likes Biryani.

	House 1	**House 2**	**House 3**	**House 4**	**House 5**
Color	Yellow	Blue	Red	Green	Grey
Area	Saddar	Johar	Liyari	Clifton	Gulshan
Drink	Milk	Chai	Coffee	Thanda	Water
Habit	Cigarettes	Paan	Huqqa	Bidi	Gutka
Food	Nihari	Qorma	Haleem		Biryani

Since the favorite food for House 4 is missing, the person in this house likes 'Karahi'.