

Solver: QM
Listener: PT
Listener: TX
Scribe: KI
Scribe: KP

In-Class Exercise 5 – Problem #2

Note: There were two scribes that worked on this write-up due to its length and the fact that two members of our group had not yet been scribe. The scribes took notes on separate days and collaborated on this write-up.

Problem Statement:

Recently, the Galactic Confederation sent out 15 starships on routine supply missions. Each starship traveled to a different planet, each of which is in one of four quadrants (Alpha, Beta, Gamma, or Delta). Although the trips can be long, the crews always relish a chance to get into the black! From the information provided, can you determine the starship that went to each planet and the quadrant in which each planet can be found?

Problem Solution:

After working for two class periods our group was unable to come up with a full solution to the problem. However we were able to match several ships with their respective planets, classes, and/or quadrant. We were able to match 4 ships with their correct planets: Brilliance went to Vishnu, Citizen went to Poseidon, Knight-Errant went to Shiva, and Jacob's Ladder went to Ogma. We were also able to match 5 ships with their respective quadrants: Knight-Errant and Proximity went to the Beta Quadrant and Jacob's Ladder, Optimism, and Rubicund went to the Gamma Quadrant. Finally we were able to match 8 ships with their respective classes: Brilliance, Citizen, and Knight-Errant are Cosmos class ships, Nightside and Proximity are Quasar class ships, and Honor Guard, Jacob's Ladder, and Watchword are Nebula class ships. Our main problem was for some planets and ships, such as Moonstone, Tangram, Fair Play, Chimera, and Narcissus, we were not given much information, making it harder to definitively eliminate these options from a large amount of planets and ships respectively. Also, the four different types of information we needed to match to each ship (class, quadrant, and planet) are not formally related to one another, making all assumptions have to work through the ships. If any of these descriptors were related to each other the clues would have contained more sufficient information than they did. Finally no clue gave us a definitive answer for any ship, with almost all clues dealing with where ships didn't go rather than the opposite. This led us to many frustrations as we could tell that there was a key piece of information missing, that if found would unlock most of the puzzle. To make it easier to see here is our chart of information filled up to the point we were able to reach.

	alpha	beta	gamma	delta	cosmos	quasar	nebula	Apollo	Bacchus	Electra	Hippolyta	Loki	Thor	Kali	Ogma	Shiva	Vishnu	Ganesha	Minerva	Narcissus	Poseidon	Chimera		
Brilliance					green	red											green							
Citizen			red		green	red																	green	
Dragonfly																								
Honor Guard					red	red	green																	
Knight-Errant	red	green	red	red	green	red											green							
Jacob's Ladder	red	red	green	red		red	green									green								
Fair Play																								
Optimism	red	red	green	red									red											
Nightside					red	green	red			red	red		red	red					red	red				
Proximity	red	green	red	red	red	green	red			red	red								red	red				
Rubicund	red	red	green	red									red											
Shepherd																				red				
Tangram																								
Watchword					red	red	green	red	red	red	red	red	red	red	red	red	red	red	red	red	red	red	red	red
Moonstone												red												red
Apollo																								
Bacchus					red	green	red																	
Electra							green																	
Hippolyta																								
Loki	red	green	red	red	red	green	red																	
Thor					red	red	green																	
Kali	red	red	green	red		green	red																	
Ogma																								
Shiva					green	red	red																	
Vishnu	red	red	green	red																				
Ganesha					green	red	red																	
Minerva					green	red	red																	
Narcissus																								
Poseidon																								
Chimera																								

Transcription of Discussion:

Q (Solver): First let's read the problem. I'm going to start by writing down all the starships. Let's see if they gave us any definite answers right off the bat.

P (Listener): It doesn't appear so. Oh wait, Optimism and Rubicund are in the Gamma Quadrant by clue 6. I think that's the only definite information.

Q: That is. We can start with clue 1 then. I hate this. We should make a note of class too.

P: I agree. Knight-Errant and Proximity went to the Beta Quadrant by clue 5.

Q: Whichever one went to Loki – because of 4 and 5 – is in the Quasar class.

P: I have the classes as the Cosmos, Nebula, and Quasars.

Q: Ok, so let's start putting these ships in class. Quasar for Nightside and Proximity. We should probably also make a list of which planets are in each quadrant. That would probably help narrow it down. The quadrants are Alpha, Beta, Gamma, and Delta [writes these down]. We know Loki's in Beta Quadrant.

T(Listener): Jacob's Ladder went to a planet in the Gamma Quadrant by number 5.

Q: Vishnu is in Gamma Quadrant—

P: And Kali.

Q: Right, and Kali. Watchword went to a planet in the same quadrant as Apollo... but we don't know which quadrant Apollo's in. Citizen did not go to Gamma quadrant by number 3.

KI: Why don't we try to figure out what quadrant Apollo's in since we can derive information from it in number 8?

Q: Well all we know about Apollo is that it's not in the Alpha Quadrant.

P: Well how do we know that for sure? From number 1? It doesn't necessarily exclude Apollo from the Alpha Quadrant. I think we're going to have to start compiling this by what *isn't* in each group [quadrant].

Q: Ok more putting stuff in classes. Alright whoever went to Loki was in the Quasar class...

KI: Well we know that the Citizen and the Brilliance are in the Cosmos class.

T: So for number one, is it saying those 6 starships went to those planets listed?

Q: No, it's saying that they definitely *didn't* go to those planets.

KI: So from number one we can eliminate six planets for six different starships, and similarly in number two we can eliminate 4 planets from 8 different starships, none of which are the same as in number one.

Q: Ok so let's just make a huge chart of what we know about the planets as opposed to the starships. So instead of matching planets to starships I'll match starships (and classes) to planets. So Loki and Kali are linked to the Quasar class and Ganesha, Minerva and Shiva are with the Cosmos class. Electra and Thor are with the Nebula class and Bacchus is with the Quasar class.

During this time P began drawing out a grid by which we would be able to mark Xs and Os to describe which information we knew.

Q: It would really help if we knew how many planets were in each quadrant... Well Loki is in the Beta quadrant, and Vishnu and Kali are in the Gamma Quadrant. If we can find the other two Nebula-class ships/planets, that would help. Vishnu's and Poseidon's ships are in the same class, so if we find four planets from one class we can immediately eliminate that class as an option for Vishnu and Poseidon.

KI: Jacob's Ladder did not go to Kali or Vishnu by number 5.

Q: All we know about Poseidon is that it's in the same quadrant as Chimera... What do we know about Thor? We know Thor is in the Nebula class and because of number one we can infer that it is not the Honor Guard or Jacob's Ladder. And the Rubicund didn't go to Thor because of number 8.

Q: Proximity didn't go to Loki. Watchword also didn't go to Thor...

At this point P finished the grid, so Q began to fill in all the information we had listed so far. I would list what he said here, but it would merely be a repeat of the information above.

Q: Citizen did not go to Gamma Quadrant. Citizen and Brilliance did not go to Ganesha, Minerva, and Shiva by number 3. Honor Guard, Jacob's Ladder, and Watchword did not go to Electra or Thor by number 4. Jacob's Ladder also did not go to Kali or Vishnu.

KI: Knight-Errant and Proximity didn't go to Loki by number 5.

Q: Knight-Errant didn't go to Poseidon either.

KI: Let's start looking to eliminate planets from starships.

KI: We know the Brilliance is a Cosmo class starship, and we know that Quasar class is going to Kali so the Brilliance cannot to Kali. In addition it cannot go to Electra or Thor. Citizen also cannot go to Kali because it is also a Cosmo class starship.

Q: That leaves only four starships for Kali.

KT: We also know Citizen cannot go to Vishnu because it is in the Gamma Quadrant and we know by number three that Citizen cannot go there.

Q: Do we know what Quadrant Kali is in?

KI: Gamma Quadrant

Q: Then we know Knight-Errant cannot go to Kali since it we know did not go to the Gamma Quadrant.

KT: Which ones do we have possibly going to Kali.

Q: Dragonfly, Honor Guard, and Moonstone.

KT: Honor Guard cannot go to Kali because it is Nebula class, while whatever went to Kali has to be Quasar class.

Q: So it has to be either Dragonfly or Moonstone, and that ship will be Quasar class.

Q: If Moonstone went to Kali, then Moonstone is Quasar, meaning Chimera and Hippolyta would have to be Quasar.

KI: Is Hippolyta or Chimera eliminated from the two known Quasar class ships?

Q: No, so we can't really infer any information from that assumption.

KT: Well then what other planets are we close on?

KI: We're kind of close on Vishnu.

Q: Vishnu can be Brilliance, Dragonfly, Honor Guard, and Moonstone.

KT: Do we know what Quadrant any of them went to?

Q: No we do not.

Q: Nightside and Proximity cannot go to Bacchus based on 4.

KI: Similar logic Honor Guard, Jacob's Ladder, and Watchword cannot go to Electra and Thor.

KI: Those three also cannot go to Bacchus because they are the wrong class to do that.

KI: Also the three Nebula and two Quasar class ships we know cannot go to Ganesha, Shiva, and Minerva since those are Cosmo planets.

Q: Which leaves Dragonfly, Knight-Errant, and Moonstone.

KI: Since neither Citizen and Brilliance cannot go to Hippolyta then Moonstone cannot be a Cosmo class ship because there would not be enough overlap between clues. This means that Moonstone cannot go to Shiva, Minerva, or Ganesha.

Q: That means either Knight-Errant or Dragonfly went to Shiva.

KT: Rubicund cannot go to Loki since it is a Gamma Quadrant ship and Loki is in the Beta Quadrant.

KI: Ganesha and Minerva are not listed in numbers one and two so they must be in either the alpha or delta quadrant. If Citizen went to Narcissus then Optimism would be Cosmos class, but Optimism goes to gamma quadrant so it cannot be Cosmo class and Citizen cannot go to Narcissus.

Q: Following that logic we know that the other planets not listed cannot be in Gamma or Beta, therefore any ship that went to Gamma or Beta cannot go to any of those planets. This eliminates Ganesha, Minerva, Chimera, Poseidon, and Narcissus from Jacob's Ladder, meaning it went to Ogma.

Q: We can do the same for Optimism, Proximity, Rubicund and Knight-Errant. Eliminating those five planets and Ogma leaves Shiva as the only planet for Knight-Errant.

KI: Which means that Knight-Errant is a Cosmo class ship, meaning Poseidon and Vishnu are also Cosmo class planets. Giving us all 5 Cosmos. Also Citizen and Brilliance have to go to Poseidon and Vishnu respectively. And since Citizen didn't go to Gamma and Vishnu is in Gamma, Brilliance went to Vishnu and Citizen went to Poseidon.

Q: Which means the last two Cosmos ships are the ones that went to Ganesha and Minerva.

KI: Dragonfly cannot go to Chimera, because Tangram, Dragonfly, and Moonstone cannot all be in the same class which would be the case.

KT: We can eliminate Apollo from Watchword.

Q: So Watchword can only go to Hippolyta, Chimera, or Narcissus.

This is where our discussion ended after two class periods of working on the problem. We were unable to derive a complete solution but have several starships and planets uniquely matched.