

Problem 12**Showdown in Abilene**

Charlotte is the top costume designer at Marquis Films. Her latest project is to design the costumes for a new western entitled *Showdown in Abilene*. Each of the five main characters (including Roy) has a different occupation (one is a bartender), so Charlotte has chosen a hat of a different color (one is white) for each man, as well as a different item of apparel that will be his trademark in the movie. Each character rides a different type of horse, so Charlotte has also designed blankets to be worn by the animals. Match each character with his occupation, horse, hat color, and trademark.

1. The man who rides the palomino is neither the one who wears the enormous belt buckle nor the one in the black hat.
2. Avery, who rides the pinto, is a rancher; the rider of the quarter horse (who isn't the blacksmith) wears the spurs.
3. Dawson, who doesn't wear the neckerchief, rides neither the Arabian (which isn't ridden by the outlaw) nor the appaloosa.
4. Dusty wears the blue hat, but he doesn't ride the palomino.
5. The man in the tan hat wears neither the belt buckle nor the chaps.
6. The five characters are the one who wears the monocle, the rider of the palomino, the blacksmith, the rancher, and the one in the gray hat.
7. The appaloosa belongs to neither the man with the monocle nor the one with the belt buckle.
8. Neither Blake (who doesn't wear the chaps) nor Dawson is the outlaw.
9. The sheriff doesn't wear the black hat.

I'll begin by reading the question and externalizing known relationships into (and around) a table:

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto		
		quarter horse		spurs
Dusty		not palomino	blue	
Roy	bartender	palomino	white	belt buckle
Dawson	blacksmith	Arabian	black	neckerchief
Dusty	outlaw	appaloosa	tan	chaps
Blake	sheriff		gray	monocle

Actually, maybe it's better to rearrange things so that I have one full column, and make better note of the "negative" facts that are given.

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	not gray	not monocle not spurs
Blake	not outlaw			not chaps
Dawson	not outlaw	not Arabian not appaloosa		not neckerchief
Dusty		not palomino	blue	
Roy				

bartender	palomino	white	belt buckle
blacksmith	Arabian, monocle	black	neckerchief
outlaw	appaloosa	tan	chaps
sheriff	quarter horse, spurs	gray	monocle, Arabian
			quarter horse, spurs

Notice that clue 6 gives us lots of information because each of the traits there goes with a different person. So, we know that since Avery is the rancher, he cannot wear a gray hat or a monocle.

And, we know from clue 2 that quarter horse and spurs go together, and so Avery cannot wear the spurs, since he rides the pinto.

Whoever wears the monocle does not ride the palomino or the pinto, from clue 6, or the appaloosa, from clue 7. Therefore, whoever wears the monocle must also ride the Arabian.

But then, whoever wears the enormous belt buckle cannot ride the palomino, from clue 1, nor the appaloosa, from clue 7. Therefore, whoever wears the monocle must ride the pinto, and so that must be Avery.

At this point we know:

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	not gray	belt buckle
Blake	not outlaw			not chaps
Dawson	not outlaw	not Arabian not appaloosa		not neckerchief
Dusty		not palomino	blue	
Roy				

bartender	palomino	white	neckerchief
blacksmith	Arabian, monocle	black	chaps
outlaw	appaloosa	tan	monocle, Arabian
sheriff	quarter horse, spurs	gray	quarter horse, spurs

Now, clue 1 implies that Avery's hat isn't black (subtle, but it's there), and clue 5 implies Avery's hat isn't tan, and clue 6 implies Avery's hat isn't gray. So, Avery must wear the white hat.

But then, from clues 1 and 6, the rider of the palomino cannot wear the black or gray hat, so he must wear the tan hat.

And by clue 5, the wearer of the tan hat cannot wear the chaps, so by elimination he must wear the neckerchief.

And so by elimination, the wearer of the chaps must ride the appaloosa:

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	white	belt buckle
Blake	not outlaw			not chaps
Dawson	not outlaw	not Arabian not appaloosa		not neckerchief
Dusty		not palomino	blue	
Roy				

bartender	palomino, tan, neckerchief	black	neckerchief, tan, palomino
blacksmith	Arabian, monocle	tan, palomino, neckerchief	chaps, appaloosa
outlaw	appaloosa, chaps	gray	monocle, Arabian
sheriff	quarter horse, spurs		quarter horse, spurs

Now, whoever rides the quarter horse isn't the blacksmith and wears spurs, from clue 2. So, he doesn't wear the monocle, and he doesn't ride the palomino, and he's not the rancher, so by clue 6 whoever rides the quarter horse must be the one who wears the gray hat.

Therefore, from clue 6 again, whoever rides the appaloosa must be the blacksmith, since he cannot fit any of the other descriptions in clue 6:

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	white	belt buckle
Blake	not outlaw			not chaps
Dawson	not outlaw	not Arabian not appaloosa		not neckerchief
Dusty		not palomino	blue	
Roy				

bartender	palomino, tan, neckerchief	black	neckerchief, tan, palomino
blacksmith, appaloosa, chaps	Arabian, monocle	tan, palomino, neckerchief	chaps, appaloosa, blacksmith
outlaw	appaloosa, chaps, blacksmith	gray, quarter horse, spurs	monocle, Arabian
sheriff	quarter horse, spurs, gray		quarter horse, spurs, gray

Now, by clue 3, Dawson doesn't ride the Arabian or the appaloosa or the palomino (neckerchief!). So, Dawson must ride the quarter horse, and wear spurs and a gray hat.

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	white	belt buckle
Blake	not outlaw			not chaps
Dawson	not outlaw	quarter horse	gray	spurs
Dusty		not palomino	blue	
Roy				

bartender	palomino, tan, neckerchief	black	neckerchief, tan, palomino
blacksmith, appaloosa, chaps	Arabian, monocle	tan, palomino, neckerchief	chaps, appaloosa, blacksmith
outlaw	appaloosa, chaps, blacksmith		monocle, Arabian
sheriff			

Since the outlaw doesn't ride the Arabian (clue 3), or the quarter horse (clue 8), or the appaloosa (ridden by the blacksmith), the outlaw must ride the palomino.

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	white	belt buckle
Blake	not outlaw			not chaps
Dawson	not outlaw	quarter horse	gray	spurs
Dusty		not palomino	blue	
Roy				

	bartender	palomino, tan, neckerchief, outlaw	black	neckerchief, tan, palomino, outlaw
	blacksmith, appaloosa, chaps	Arabian, monocle	tan, palomino, neckerchief, outlaw	chaps, appaloosa, blacksmith
	outlaw, palomino, tan, neckerchief	appaloosa, chaps, blacksmith		monocle, Arabian
	sheriff			

But then, the outlaw cannot be Dusty (who doesn't ride the palomino), so Roy must be the outlaw (and wear a tan hat and neckerchief, and ride the palomino):

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	white	belt buckle
Blake	not outlaw			not chaps
Dawson	not outlaw	quarter horse	gray	spurs
Dusty		not palomino	blue	
Roy	outlaw	palomino	tan	neckerchief

	bartender	Arabian, monocle	black	chaps, appaloosa, blacksmith
	blacksmith, appaloosa, chaps	appaloosa, chaps, blacksmith		monocle, Arabian
	sheriff			

Then, Blake must wear the black hat (elimination), and since Blake doesn't wear chaps, he must wear the monocle and ride the Arabian.

But then, by elimination, Dusty must wear the chaps, ride the appaloosa and be the blacksmith:

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	white	belt buckle
Blake	not outlaw	Arabian	black	monocle
Dawson	not outlaw	quarter horse	gray	spurs
Dusty	blacksmith	appaloosa	blue	chaps
Roy	outlaw	palomino	tan	neckerchief

bartender

sheriff

And, finally we know the sheriff doesn't wear the black hat, by clue 9, so Dawson must be the sheriff and Blake must be the bartender:

Character	Occupation	Horse	Hat Color	Trademark
Avery	rancher	pinto	white	belt buckle
Blake	bartender	Arabian	black	monocle
Dawson	sheriff	quarter horse	gray	spurs
Dusty	blacksmith	appaloosa	blue	chaps
Roy	outlaw	palomino	tan	neckerchief

This example is intended to show a good presentation of the externalization and sequence of logical inferences that lead to the final solution.

This does not show the expected give and take between solver and listener(s), since it was worked out by one person. Your written presentation should show that as well.