**Problem Solving**

**Chapter 4: Matrix Logic**

**Problem Set A**

**1) CLASS SCHEDULES**

The master schedule for River High School appears below. The X’s indicate the period(s) in which a class is offered. All students must take the classes marked with \*’s. The other classes are electives.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th |
| \*English | X |  | X |  |  | X |  |
| \*Math |  | X |  | X | X |  |  |
| \*Science |  |  | X | X |  |  |  |
| \*PE | X | X |  |  | X |  |  |
| History |  | X |  |  |  |  | X |
| Drama |  |  | X |  |  |  |  |
| Typing |  |  |  |  |  | X | X |
| Band | X |  |  |  |  |  |  |
| \*Lunch |  |  |  | X | X |  |  |

a. Make up a schedule for Jill. She wants to take Band and History as her electives. She needs Lunch 5th period because the science club meets then.

b. Make up a schedule for Tom. Tom wants to take Drama and Typing. He would like lunch 4th period, but he doesn’t care that much.

c. Make up a schedule for Leanne. Leanne wants to take Band and Drama.

d. Make up a schedule for Mea. Mea wants to take History and Typing.

e. Part 1: Jose wants to take Drama and History. Figure out his schedule.

Part 2: Jose had his schedule all figured out, but when he went to sign up for first period PE, he found out that the class was closed. The other two periods of PE were still open, however. What should he do?

Part 3: After making a new schedule that he wasn’t too happy with, Jose found out that the school was opening a new 6th period Science class. Now what should he do?

**2) THE FISHING TRIP**

Several friends take a fishing trip every year. Each year they have a contest to see who catches the heaviest fish. The loser has to pay for all of the junk food they eat on the trip. (Second and third places are also expected to chip in token amounts.) Determine their standings in this year’s contest by the following clues. By the way, in the tradition of fishing trips, everything quoted here is a falsehood.

Marta: Larry was first.

Sally: Marta beat Woody.

Woody: I beat Sally.

Larry: Woody was second.

**3) CABINET MEMBERS**

The President was discussing some politics with the Vice President and three of her cabinet members: the secretaries of state, education, and treasury. Determine which woman (one is named Norma) holds which job.

Paula said, Ms. President, I don’t think the secretary of state knows what she is talking about. I think our foreign policy has really deteriorated lately.”

(The secretary of state shook her head. So did the Vice President.)

The secretary of the treasury said, “I agree with Paula. We haven’t even talked to Japan lately.”

The Vice President jumped in. “Will you two leave Inez alone? She is doing a fine job.”

Georgianne, who had been silent so far, finally said, “Okay, let’s get on to something else.”

The Secretary of Education said, “I’m sorry too, Inez. I guess we just got carried away.”

Inez replied, “That’s OK. I know we’ve all been under a lot of stress lately.”

Determine the name and position of each person in this conversation.

**4) VOLLEYBALL TEAM**

Three friends—Elaine, Kelly, and Shannon—all start for their college volleyball team. Each plays a different position: setter, middle blocker, and outside hitter. Of the three, one is a freshman, one a sophomore, and the other a junior. From the clues below, determine each woman’s position and year in school.

1. Elaine is not the setter.
2. Kelly has been in school longer than the middle blocker.
3. The middle blocker has been in school longer than the outside hitter.
4. Either Kelly is the setter or Elaine is the middle blocker.

**5) MUSIC PREFERENCES**

Two men (Jack and Mike) and two women (Adele and Edna) each like a different type of music (one likes jazz). Their last names are Mullin, Hardaway, Richmond, and Hughes. From the clues below, find each person’s full name and favorite type of music.

1. Hardaway hates country-western music.
2. The classical music lover said she’d teach Higgins to play the piano.
3. Adele and Richmond knew the country-western fan in high school.
4. Jack and the man who likes rock music work in the same office building.
5. Richmond and Huggins are on the same bowling team. There are no men on their team.

**6) SUSPECTS**

The police department arrested four suspects—two men and two women—on suspicion of petty theft. The sergeant on duty who processed the suspects was having a bit of a bad day. He produced this list of suspects and descriptions.

Robin Wilde: scar on left cheek

Cary Steele: purple hair

Pat Fleece: tall and blonde

Connie Theeves: birth mark on left wrist

When the list of suspects and descriptions landed on the arresting detective’s desk, he was furious. He immediately went to the sergeant and said, “Paul, you may be having a bad day, but this list is full of mistakes. The first and last names are all mismatched. And none of the descriptions go with either the first or last name they were listed with. Do you think you can fix this?”

The sergeant replied, “Sorry, Dick. I am having a bad day. But I think I need a little bit more information.”

The detective answered, “OK, Paul. Here’s some more info. Connie has purple hair to match her purple high tops. The men are Steele and Fleece. A woman has the scar. Do you think youcan straighten this mess out now?”

The sergeant now determined the first and last names of each suspect, as well as the descriptions. You work it out too.

**7) ANNIVERSARIES**

Three couples are good friends. At a dinner party one night, they discovered that their anniversaries were in different months—May, June, and July. They also discovered that they had been married a different number of years—11, 12, and 13. From the clues below, match up each husband (one is Pete) with each wife (one is Lorna), the month of their anniversary, and the number of years each has been married.

1. Jorge and his wife have three kids. Their anniversary is not in July. They have not been married as long as Tori and her husband.

2. Nylia and her husband have four kids. Their anniversary is in June. They have been married longer than Ahmed and his wife.