PROJECT 1: Prolog Programming

This project consists of writing Prolog codes to solve the problems below.

Instructions

1) Type your program in Notepad or Notepad++ and call it

   YourFirstName_YourLastName_ExerciseNumber

   Include query as a comment at the end of your

2) Test if it works and solves the problem correctly using the web page https://swish.swi-prolog.org/
3) Submit your Notepad or Notepad++ file via this link in Bb.

Exercise 1. Snail Race

At last year's SCAD snail race, 10 fine snail completed the tabletop course.

Predictably, as per every year, the results mysteriously went missing.

However, various spectators remembered the following snippets of information:

```
Simple Simon lost to Zebra Wings.

Zebra Wings beat Simple Simon, Frog Flippers and Apple Pie.

Fizzy Pop lost to Minty Mouth, Simple Simon and CD Player.

Frog Flippers beat Windy Hill, CD Player and Simple Simon.

Top Hat lost to CD Player, Kippers and Apple Pie.

CD Player beat Top Hat and Fizzy Pop.

Apple Pie lost to Zebra Wings and Simple Simon.

Kippers lost to Apple Pie and Frog Flippers.

Frog Flippers beat Fizzy Pop, Minty Mouth and CD Player.
```

CD Player lost to Frog Flippers, Kippers and Apple Pie.

Top Hat beat Fizzy Pop and Windy Hill.

Minty Mouth lost to Windy Hill and Simple Simon.

Windy Hill lost to Apple Pie and CD Player.

Answer

```
Zebra Wings
 Frog Flippers
  Simple Simon
   Apple Pie
    Kippers
     CD Player
      Top Hat
       Windy Hill
        Minty Mouth
         Fizzy Pop
```

Exercise 2. Training Stars.

A group of trainees UX designers are all sitting around the table, waiting to start their first day of training.

From the clues given below, can you work out where everyone sits?

Note: Seat 1 is next to Seat 2 and Seat 8, etc. Seat 5 is across from Seat 1, and Seat 7 is across from Seat 3, etc. Seat 2 is a higher seat number that Seat 1, etc.

1. William is next to Alisa and Nick.
2. William is across from Gabbie.
3. Amanda is next to Sarah.
4. Sarah is across from Eric.
5. Nick is next to Eric.
6. Sydney is at Seat 4 and sits next to Gabbie
7. Gabbie has a higher seat number than Sydney.
8. Alisa is not in Seat 2.

Answer

Seat 1 = William
Seat 2 = Nick
Seat 3 = Eric
Seat 4 = Sydney
Seat 5 = Gabbie
Seat 6 = Amanda
Seat 7 = Sarah
Seat 8 = Alisa

Explanation

Sydney is in Seat 4 and she is next to Gabbie (Clue 6), so Gabbie is in either Seat 3 or Seat 5. But Gabbie has a higher seat number than Sydney (Clue 7). Therefore Gabbie is in Seat 5.

William is across from Gabbie (Clue 2) and therefore is in Seat 1.

William is next to Alisa and Nick (Clue 1), so Alisa and Nick are in Seat 2 and Seat 8 (either way around). But Alisa is not in Seat 2 (Clue 8). Therefore Alisa is in Seat 8 and Nick is in Seat 2.

Nick is next to Eric (Clue 5) so can only be in Seat 3.

Sarah is across from Eric (Clue 4), and therefore is in Seat 7.

Amanda is next to Sarah (Clue 3) and can only be in Seat 6.

Exercise 3. Snail Racing # 2

After the recent SCAD snail racing contest, the four contestants were congratulating each other.

1. Only one snail wore the same number as the position it finished in.

2. Alfred's snail wasn't painted yellow nor blue, and the snail who wore 3, which was painted red, beat the snail who came in third.

3. Arthur's snail beat Anne's snail, whereas Alice's snail beat the snail who wore 1.

4. The snail painted green, Alice's, came second and the snail painted blue wore number 4.

5). Anne's snail wore number 1.

Can you work out who's snail finished where, its number and the color it was painted?

Answer

Rank	Owner	Wore No.	Color
1.	Alfred	3	red
2.	Alice	2	green
3.	Arthur	4	blue
4.	Anne	1	yellow

Exercise 4. Cake Theft

During a recent police investigation, Chief Inspector Stone was interviewing five local villains to try and identify who stole Mrs. Archer's cake from the mid-summers fayre. Below is a summary of their statements:

```
Arnold:  it wasn't Edward
         it was Brian

Brian:   it wasn't Charles
         it wasn't Edward

Charles: it was Edward
         it wasn't Arnold

Derek:   it was Charles
         it was Brian

Edward:  it was Derek
         it wasn't Arnold
```

It was well known that each suspect told exactly one lie. Can you determine who stole the cake?

Answer:

Charles committed the terrible crime.

Looking at Brian's statements, one of the statements was a lie and the other was the truth. Therefore it must have been either Charles or Edward.

Looking at Derek's statements, for the same reason, it was either Charles or Brian.

Therefore it must have been Charles who committed the crime. Double checking this against the other statements confirms this.

Exercise 5. SCAD Olympics

At the recent SCAD Festival, the 100 meters heats were closely monitored.

Each contestant had to run in two races so that the average place could be determined.

Only one runner finished in the same place in both races.

Alan was never last. Charles always beat Darren. Brian had at least one first place. Alan finished third in at least one of the races. Both Darren and Charles had a second place.

What were the two results?

Answer:
Race 1: Brian, Charles, Alan, Darren.
Race 2: Charles, Darren, Alan, Brian.

or

Race 2: Brian, Charles, Alan, Darren.
Race 1: Charles, Darren, Alan, Brian.

Your program should generate both answers!

Explanation

Since Charles always beat Darren and Darren had a second place, one race must have been Charles first and Darren second. Brian therefore won the other race with Charles second. Since only one runner finished in the same place in both races, this must have been Alan in third.
