The Chinese University of Hong Kong

Weeks 3 and 4

The Chinese University of Hong Kong

Let's look at Survey 3

In-class Survey

- What is the maximum profit for the following assignment problem?

	t1	t2	t3	t4	t5
w1	7	3	3	4	2
w2	5	2	5	1	4
w3	4	3	4	2	5
w4	3	1	6	3	5

- A: 16
- B: 17
- C: 18
- D: 20
- E: 21

In-class Survey

- What does the following constraint express?

```
constraint ((x = NIGHT /\ x = EVE)
                -> y = EVE) \/
            y = OFF;
```

  - A: if x is NIGHT or EVE, then y is EVE or OFF
  - B: if x is EVE then y is EVE. X is not OFF
  - C: no constraint (i.e. constraint is true)
  - D: y is NIGHT
  - E: x is not EVE

In-class Survey

- What does the following constraint express?

```
constraint x = NIGHT \/
             (x = EVE -> (y = EVE /\ y = OFF));
```

  - A: if x is NIGHT or EVE, then y is EVE or OFF
  - B: if x is EVE then y is EVE. X is not OFF
  - C: x is OFF
  - D: y is not NIGHT
  - E: x is not EVE

Rescue Search

- Given 6 searchers A, B, C, D, E, F each of which must search in a direction n, s, e, w.
  - Each direction must have at least 1 searcher
  - if A searches n or s, then B cannot search n or s
  - C and D must search in opposite directions
  - if either E or F goes w, then no one else can search that direction
  - the pairs (A,E), (B,F), (C,E) can't search the same direction

Find a Solution

- By hand!?
- Write a MiniZinc model

Retail Roster

- In a retail roster each person can take at most two shifts a day.
  - The shifts are: opening, morning, lunch, afternoon, and closing, or NONE
  - A person who is closing cannot be on afternoon
  - A person who is on morning can't be on opening

Retail Roster (cont'd)

- Each person gives preferences for each day and shift, and if a person gives 0 as preference for a shift, the person can't be on that shift on that day
- 8 or more in pm: lunch, afternoon or closing
- 8 or more in am: lunch, morning or opening
- at least 1 opening, 2 morning, 2 lunch, 3, afternoon, and 1 closing
- Data set `rr.dzn` given on course homepage
- Maximize preferences of shifts given

Manual (Hand) Solution?

MiniZinc Solution

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Let's look at Survey 4

In-class Survey

- Given the profit array below

	t1	t2	t3	t4
w1	7	8	9	7
w2	3	2	1	1
w3	4	3	4	5
w4	5	7	6	7

Which viewpoint is the best?

- A: task vars
- B: worker vars
- C: task and worker vars, searching on task
- D: task and worker vars, searching on worker
- E: task and worker vars, searching on both

In-class Survey

- Given the profit array below

	t1	t2	t3	t4	t5
w1	5	1	9	7	1
w2	3	2	8	6	2
w3	4	3	7	5	3
w4	5	2	6	7	1

Which viewpoint is the best?

- A: task vars
- B: worker vars
- C: task and worker vars, searching on task
- D: task and worker vars, searching on worker
- E: task and worker vars, searching on both

Experimental Design

- We have n=r*c experiments to arrange in r rows and c columns
- Each experiment is assigned to one of m groups
- No more than 2 experiments from the same group can be in the same row or the same column
- Experiments in the same group cannot be adjacent (horizontally or vertically)

Experimental Design (Data)

```
r = 5;
c = 4;
m = 5;
group = [1,1,1,2,2,2,3,3,3,3,3,3,4,4,4,4,4,5,5,5];
```

Manual (Hand) Solution?

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Build a MiniZinc model to answer!