NUS National University of Singapore

School of Computing

The Tourist Problem:

(Review of TP Activity 1)

Video 5.3

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Experience the fun of problem solving

TP Activity #1:

Bus Scheduling – the Direct Way

(10 minutes)

Have you finished this Activity and have your answers ready?

IF NOT, STOP THE VIDEO HERE, GO FINISH IT FIRST.

TP Activity 1: (10 minutes)

Tourist Bus Scheduling: The Direct Way

Tourist Problem Version 1.0
Given: A list of tourist, each with his/her list of places to visit.
To do: Schedule bus rides for them so that
each tourist visits all the places in his/her list, and
C1: Each tourist visits *at most one place a day,*
C2: There is *at most one bus trip to each place, and*
C3: *minimize* the number of days to complete mission.

An Instance of Tourist Problem

Tourist	Places of Interest
Aaron	SZG, BG, JB
Betty	CG, JG, BG
Cathy	VC, SI, OR
David	JG, CG, OR
Evans	CG, JG, SZG

Note the conflicts:
On same day:
* Cannot schedule BG and JB
(Aaron wants to visit both)
* Can schedule SZG and OR
(nobody want to visit both)

To schedule P1, P2, P3 on same day:
must check no conflict between
P1—P2, P2—P3, P1—P3;

Q1: Using the above information, try to schedule the bus trips.
Make sure to check *all* the conflicts.
(You want to minimize the # days needed to complete all the bus trips.)

Day 1: _____

Day 2: _____

Review of TP Activity #1

- How many days did you use?
  - ____ days
- What is the key idea used in bus scheduling?
  - Check for non-conflicts

Review of TP Activity #1

- What was the main difficulty you faced?
  - Checking for non-conflicts is tedious,
  - Scheduling 3 trips on same day is even worse,
  - Lot of repetitive task. Error prone.
- What if we have large instance
  - say, 100 tourists, 30 places
- How can use fewer than 4 days?
  - See future videos

Quick Summary:

- Few iterations of
  - Problem formulation, giving solution, analyzing solution, getting better formulations,
- Initial versions:
  - trivial solutions, not practical
- TP-1.0: reasonable & interesting problem
- Activity 1 gives first-hand experience
  - reduced instance helps reduce work!

We found a way to schedule bus trips, but tedious and error-prone.

Need a better method!

End of Tourist Problem!

(Video 5.3)

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