Communications and Transport Systems
Department of Science and Technology
Linköping University

Fall 2017

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TNFL01 - flygtrafik och flygtransporter

Homework Set 2, 2016

Solutions are due September 28, 2016. **Please put your name on all pages!**

Question 1 (Planning of aircraft routes):

Timetable. A small Swedish airline focusing on domestic traffic has the following timetable:

Flightnr	Dep time	Arr time	Dep AP	Arr AP	E[Pax]	R
1	450	900	A	L	16	500
2	1000	1230	A	G	18	300
3	1020	1410	A	L	25	500
4	1810	2200	A	L	49	500
5	510	840	L	G	12	400
6	1030	1225	L	U	21	350
7	1510	1810	L	G	55	400
8	2020	2350	L	A	24	400
9	615	800	U	A	21	200
10	1545	1740	U	A	23	200
11	1745	1930	U	L	19	250
12	2000	2310	U	G	17	500
13	430	710	G	A	12	400
14	920	1250	G	U	24	500
15	1330	1640	G	U	53	500
16	1920	2250	G	U	11	500

Figure 1: Timetable

Dep AP = Departure airport
E[Pax] = Expected (forecasted) number of passenger
R = Expected mean revenue per passenger

The timetable is cyclic, with a cycle time of one day. This means that each flight in the table should be flown once each day (including weekends).

Fleet. The aircraft fleet consists of two types of aircraft, two Jetstream 31 (J31) and four Fokker 50 (F50). The F50 has a capacity for 50 passengers and requires 50 minutes from landing until it can start again (i.e. turn-around time). The J31 can take 18 passengers and needs 30 minutes of turn-around time. The airline approximates the operating cost as 1000 per hour in flight for the J31 and 1500 for the F50 aircraft.

Maintenance. The same rules for maintenance applies to both aircraft types. After a maximum of 30 hours in flight, a maintenance check has to be performed. This takes five hours. The maintenance base for the J31 is located at airport A, while the base for the F50 fleet is located at airport L.

Assignment. Your assignment is to create a feasible aircraft schedule for the next summer season (5 months, May-Sept). The objective is to maximize profit.

Write a simple report describing how you solved the problem, presenting your solution, and discussing advantages and disadvantages with the schedule.

The assignment should be done in groups of 2-3 students.

The report should be sent by email by email to christiane.schmidt@liu.se no later than **September 28**.

It should be noted that the report will be sent to URKUND (`http://www.urkund.com`), a plagiarism checker to ensure original content.

The work will be presented with a short oral talk on **October 6**. Each group will get access to another groups report for reviewing and acting as opponents during the seminar.
Evaluation criteria

- Presentation of solution method
- Presentation of solution
- Discussion on simplifications, advantages and disadvantages with the solution
- Result: feasibility, profit. That is, your solution **must** be feasible!