Communications and Transport Systems
Department of Science and Technology
Linköping University

Fall 2018

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TNK051: Planning of Air Traffic

Homework Set 3, 2018

Solutions are due October 15, 2018, 13:00. **Please put your name on all pages!**

Question 1 (Longest Path in a DAG):
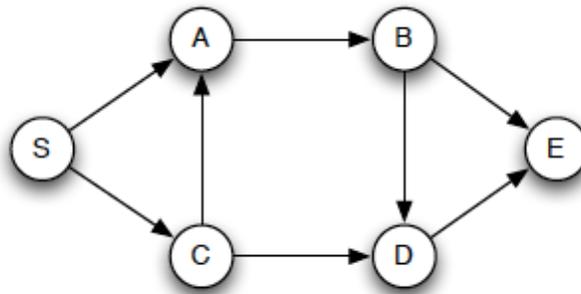Use the algorithm from the lecture to compute the longest path in the DAG from Figure 1.

Figure 1: DAG

Question 2 (Aircraft Routing):
We revisit the airline from homework set 1. The timetable is still given by Figure 2.
Now, the airline only has a single Jetstream with 30 minutes turn-around time. Moreover, we only consider a single day of operation. The airline wishes to maximize the number of flights it can cover with the single aircraft. Use the appropriate method from the lecture to solve this problem. Which flights should the aircraft serve? How many are these?

Question 3 (Safety Management Systems):
Nordic Flights is a new small Swedish airline that will offer domestic flights. Before they are allowed to start they have to establish a safety management system. Explain what such a safety management system encompasses and

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 2: Timetable

present the airline a draft of a safety management system that they could implement directly. Do not forget that they do not know anything about Safety Management Systems, hence, make sure you give them a step by step guide.

Question 4 (Differential Pricing):
You and your partner Mister Easy bought a small airline, FlyXY, which is serving a single route between two European capitals. Mister Easy suggests to simply sell all tickets for the same price P. You know that this is not a good idea, and want to give a detailed argument why you should indeed use differential pricing. To make your argument to Mister Easy you may assume that you have a simple price-demand curve, and have exact knowledge about how many people have what willingness-to-pay (WTP).

Explain what differential pricing is. Argue for a start why it will be beneficial for FlyXY to sell tickets at two different prices, P_1, P_2, with $P_1 < P < P_2$, and why your customers will be satisfied with that as well.

Question 1, 3, and 4should be submitted individually, question 2 should be handled in groups and a short report should be submitted for both.
The report should be both sent by email to christiane.schmidt@liu.se and uploaded to lisam no later than the due date.