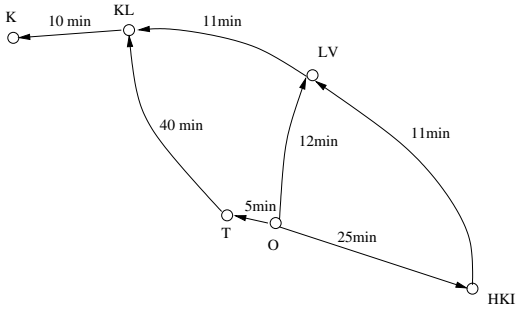
T-79.230 **Kevät 2004**
Agenttipohjaisen tietojenkäsittelyn perusteet
Laskuharjoitus 4
Tehtävät

1.



A rational engineer wants to travel from Otaniemi to Kirkkonummi using public transportations. There are three possible routes:

I) First take a bus to downtown Helsinki (ticket 15 mk) and then from there to Kirkkonummi by train (24 mk).

II) Take a bus to Leppävaara (10 mk) and from there to Kirkkonummi by train (16 mk)

III) Take a bus to Tapiola, change to another bus and g oto Kauklahti (10 mk) and board a train from there (10 mk).

The durations of the travel routes are shown in the above figure.

a) Let the engineer have a cost function $U(t, m) = m + at$, where m is the cost, t is the duration of trip, and a his hourly rate. What route should the engineer take so that $U(t, m)$ is minimized, when $a = 40$mk/h. What should the hourly rate be so that route III would be better than the route II? Is one of the routes clearly better or worse than the others.

b) Let cost function $U(t_1, t_2, m) = a_1 t_1 + a_2 t_2 + m$, where t_1 is the time spent in a bus, t_2 the time spent in a train, $a_1 = 1.5a$ and $a_2 = 0.5a$. What is now the best route?

c) Let $U(t)$ be as in a-part, but the busses may be late according to the following probability distribution:

Line	0 min	1 min	5 min	10 min	15 min
O-Hki	75%	20%	5%	-	-
O-T	80%	15%	5%	-	-
T-KL	20%	20%	20%	20%	20%
O-LV	30%	20%	-	20%	30%

What choise is now the best?