DM204 (3.+4. Kv., 10 ECTS)
Skedulering, Skemalægning og Ruteplanlægning
Scheduling, Timetabling and Routing

Marco Chiarandini, adjunkt

marco@imada.sdu.dk
http://www.imada.sdu.dk/~marco/DM204

IMADA
University of Southern Denmark

UNIVERSITY OF SOUTHERN DENMARK

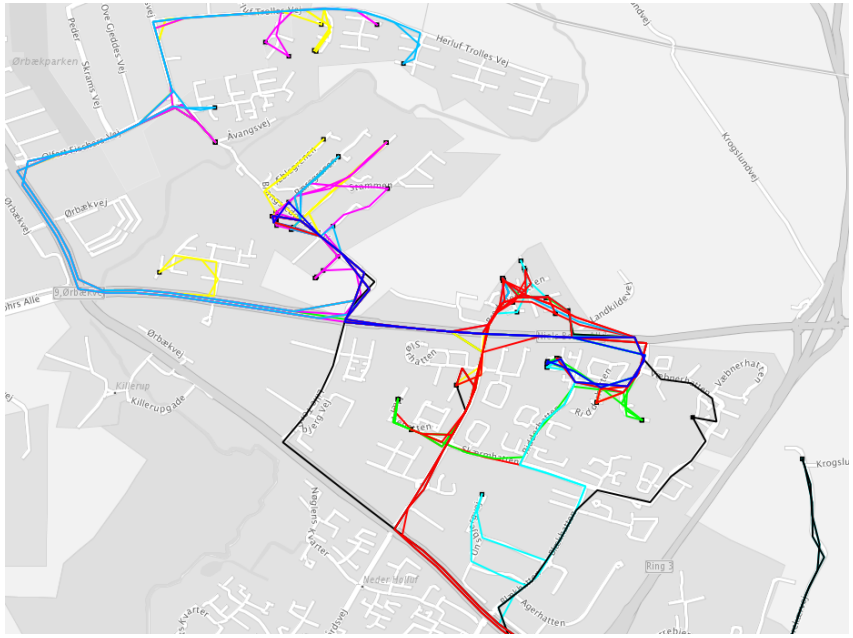
Datalogi (bachelor)

- Opslagstavlen
- Læseplaner
- Personligt skema
- Bachelorprojektet
- Uddannelsens opbygning
- Kompetenceprofiler
- Eksamen
- Det Naturvidenskabelige Studienævn
- Ansøgningsskemaer
- Vejledning
- Regelsamling
- Praktisk information

Skema for M1 i Efterår 2008

	MAN	TIR	ONS	TOR	FRE	LØR	SØN
8-9	MM501 (E) (M1) (36-41) U26						
9-10	MM501 (E) (M1) (36-41) U26						
10-11	MM501 (F) (36-41) U55			MM501 (F) (35-40) U55			
11-12	MM501 (F) (36-41) U55			MM501 (F) (35-40) U55			
12-13			MM501 (E) (M1) (36-41) U147				
13-14			MM501 (E) (M1) (36-41) U147				
14-15		MM501 (F) (35) U45					
15-16		MM501 (F) (35) U45					

	Mandag	Tirsdag	Onsdag	Torsdag	Fredag
8-9	DM63 (Sem)	MM/MMP36 (Sem)	DM40 (Sem)	MM10 (Sem)	DM518
9-10	DM63 (Sem)	MM/MMP36 (Sem)	DM40 (Sem)	MM10 (Sem)	DM518
10-11	MM67 (Sem)	DM518 (Sem)	MM22 (Sem)	DM63 (Sem)	MM67 (Sem)
11-12	MM67 (Sem)	DM518 (Sem)	MM22 (Sem)	DM63 (Sem)	MM67 (Sem)
12-13	DM/DMP42 (Sem)	DM40 (Sem)	DM/DMP42 (Sem)	DM/DMP49 (Sem)	MM22 (Sem)
13-14	DM/DMP42 (Sem)	DM40 (Sem)	DM/DMP42 (Sem)	DM/DMP49 (Sem)	MM22 (Sem)
14-15	DM/DMP49 (Sem)	Dat.Koll. (Sem)	MM10 (Sem)	MM/MMP36 (Sem)	Op.Alg.Koll. (Sem)
15-16	DM/DMP49 (Sem)	Dat.Koll. (Sem)	MM10 (Sem)	MM/MMP36 (Sem)	Op.Alg.Koll. (Sem)
16-17				Mat.Koll. (Sem)	
17-18				Mat.Koll. (Sem)	



Sources

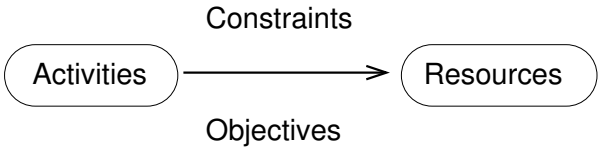
- Anders Rasmussen. *Skemalgning for naturvidenskab ved SDU*. Master Thesis, 2007
- Steffen Elberg Godskesen. *Automated Planning of Work for Home Nurses*. Master Thesis, 2006.

Further examples:

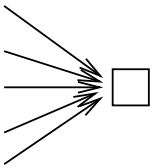
- Jakob Skov, *Scheduling of an Anodizing Plant at Bang & Olufsen*. Master Thesis, 2007.
- Rune Larsen. *Optimizing pallet routes at Jusk*. Master Thesis, 2007
- Thomas Sejr Jensen. *Planninng train maintanances at DSB*. Master Thesis, 2007

Contents: Modeling

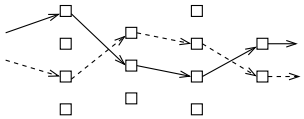
Scheduling



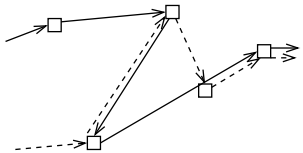
Single and Parallel Machine



Flow Shop and Flexible Flow Shop



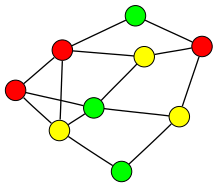
Job Shop, Open Shop



Contents: Modeling

Timetabling

- Interval Scheduling, Reservations



- Educational and Employee Timetabling

Periods

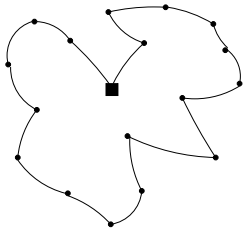
Rooms	P_1	P_2		P_i		P_j		P_{45}
R_1	—	L_4	⋯	L_{10}	⋯	L_{14}	⋯	—
R_2	L_1	L_5	⋯	L_{11}	⋯	L_{15}	⋯	—
R_3	L_2	L_6	⋯	L_{12}	⋯	—	⋯	—
⋮	⋮		⋮		⋮		⋮	
R_r	L_3	L_7	⋯	L_{13}		L_{16}	⋯	—

- Transportation Timetabling

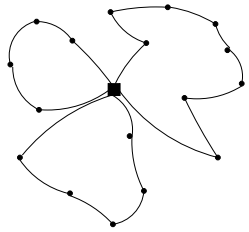
Contents: Modeling

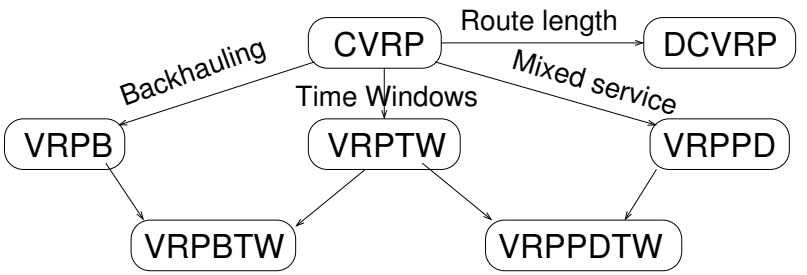
Vehicle Routing

TSP



VRP





Contents: Solution Techniques

- Mathematical Programming
- Networks
- Branch and Bound
- Constraint Programming
- Dedicated algorithms
- Dispatching Rules and Construction Heuristics
- Metaheuristics: SA, Tabu Search, GA

Contents: Solution Techniques

DM204 – Scheduling, Timetabling and Routing

- Mathematical Programming
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Course prerequisites

- DM507 (algorithms and data structures)
- MM505 (linear algebra)
- DM515 (Introduction to Linear and Integer Programming)
- The content of DM811 and DM812 should be known

Students' Activity

DM204 – Scheduling, Timetabling and Routing

During the Course (30 lectures, 4 hours per week)

- Work out *exercises* in class
- Learning new modelling languages (ZIMPL, Gecode)
- Read and present an article (still to be decided)

Final Assessment (10 ECTS)

- Group project (40% of the final grade)
  approved choice of a case study
  deliverables: program + report
  meant to assess to ability to apply
- Oral exam of 30 minutes with external examiner (60% of final grade)
  meant to assess the base knowledge

Course Material

DM204 – Scheduling, Timetabling and Routing

Books:

- M.L. Pinedo, Planning and Scheduling in Manufacturing and Services; Springer Series in Operations Research and Financial Engineering, 2005, (388 DKK)
- M.L. Pinedo, Scheduling: Theory, Algorithms, and Systems; 2nd ed., Prentice Hall, 2002.
- P. Toth, D. Vigo, eds. The Vehicle Routing Problem, SIAM Monographs on Discrete Mathematics and Applications, Philadelphia, 2002.

Further literature:

- Articles
- Lecture notes

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