Current and Planned Educational Initiatives in AI at the IT University of Copenhagen

Designing Study Programs for Modern Industrial Informatics

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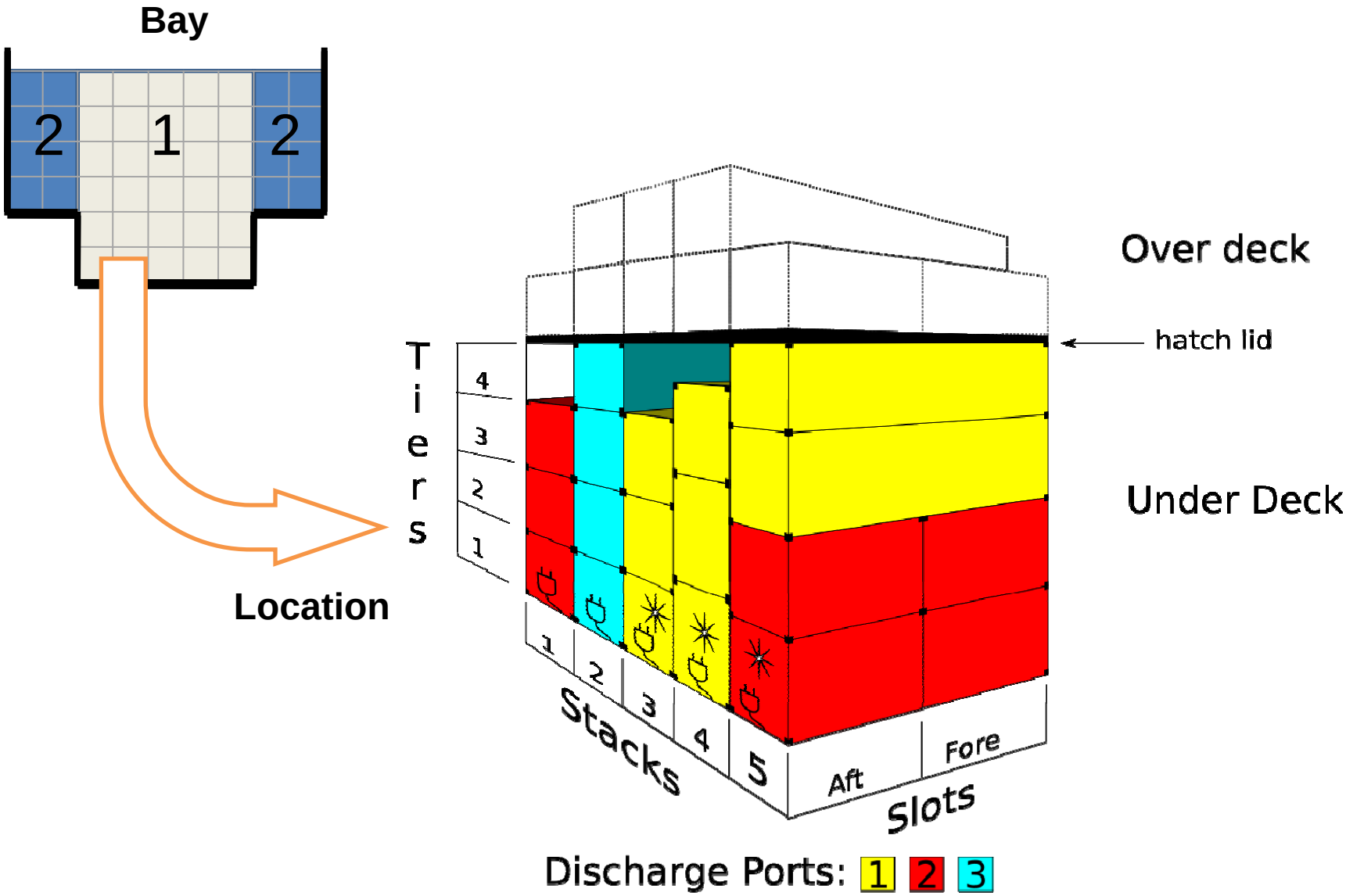
Outline

- **My research**
- **Current: ”Modern AI” Specialization**
  - Efficient AI Programming (R.M.Jensen)
  - Advanced AI in Games (G.Yannakakis)
- **Future: Data Mining Course**

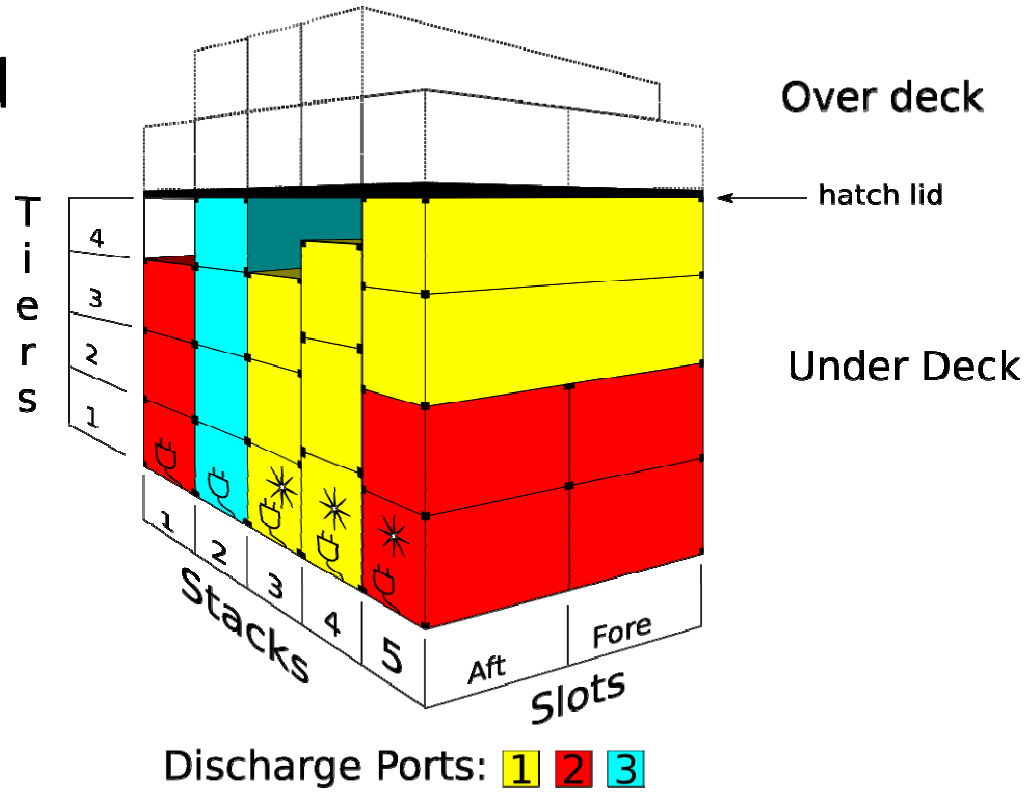
My Research

The Under-deck Stowage Problem

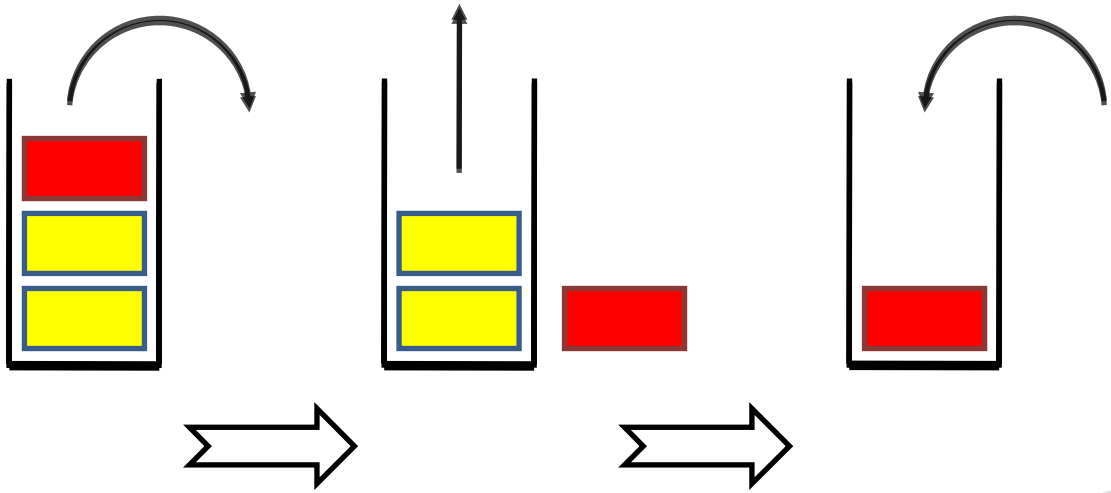


Constraints

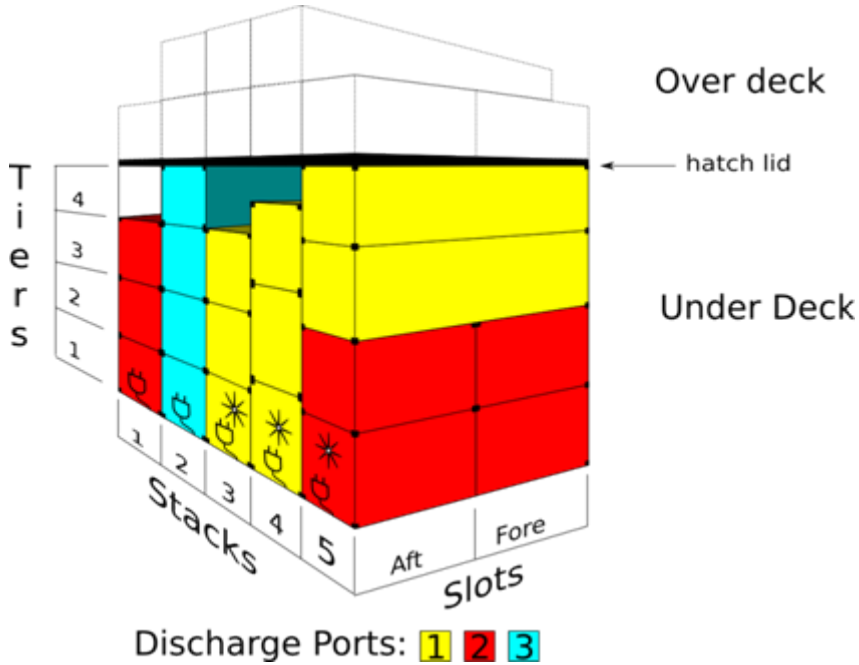
- Max. Stack weight and height
- Reefer container in reefer slot
- Must form stacks
- No 20 on top of 40
- Cells capacity
- Pre-loaded containers
- All loaded



Objectives



- Min. overstowage
- Max. pure stacks
- Max. free stacks
- Max. free reefer slots

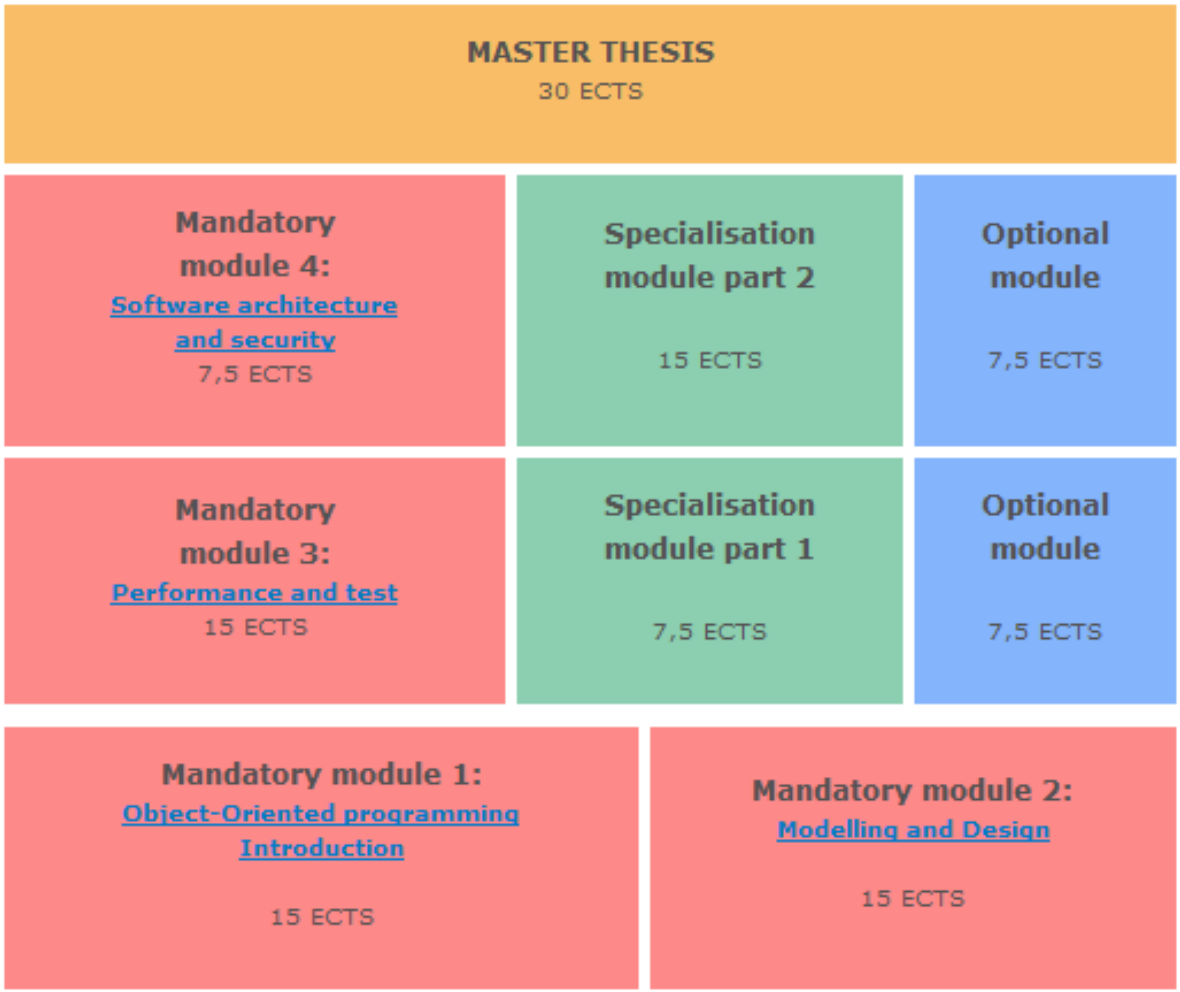


Results

Instance	TEUs	IP(ms)	CP(ms)	Optimal Obj.	LS(ms)	LS Gap%	LS Obj.
1	68	21889	8340	240	**1730**	9	265
2	38	4972	1700	165	**750**	**0**	165
3	78	40046	14550	310	**1780**	2	315
4	62	56	**20**	120	760	**0**	120
5	74	148	**30**	150	2160	**0**	150
6	172	-	**2000**	360	7180	4	375
7	80	1752	30510	215	**1170**	10	235
8	140	**220**	340	595	19540	**0**	595
9	70	**164**	1320	330	4420	**0**	330
10	70	116	**30**	230	800	**0**	230
11	70	162	**10**	120	920	**0**	120
12	68	148	**20**	120	950	**0**	120
13	106	-	5320	240	**1870**	**0**	240
14	16	**10**	**10**	60	1080	**0**	60
15	14	**10**	70	60	1450	**0**	60
16	84	**10**	40	390	1640	**0**	390
17	56	100	**20**	90	2400	**0**	90
18	46	1172	**960**	120	3320	12	135

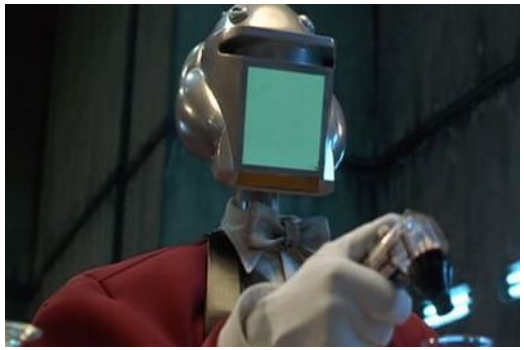
Current: Modern AI Specialization

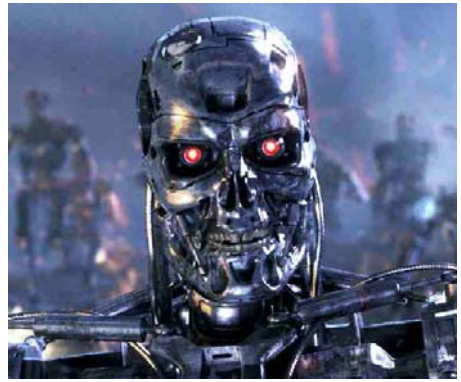
The Software Development and Technology Study Program (SDT)

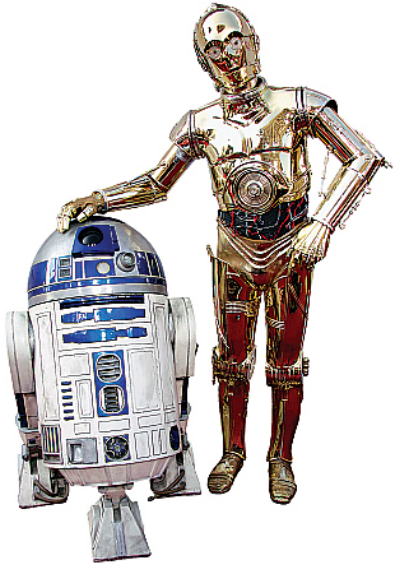


Organization of SDT Specializations

	Autumn	Spring	Autumn
Databases	Database Systems (7,5 ECTS)	Database Tuning (15 ECTS)	
Models and Programs	Advanced OOP (7,5 ECTS)	Advanced Models and Programs (15 ECTS)	
Mobile and Distributed Systems		Mobile and Distributed Systems (7,5 ECTS)	Advanced Mobile and Distributed Systems (15 ECTS)
Scalable Computing		AI Programming (7,5 ECTS)	Advanced Algorithms (15 ECTS)
Modern Artificial Intelligence		AI Programming (7,5 ECTS)	Advanced AI in Games (15 ECTS)



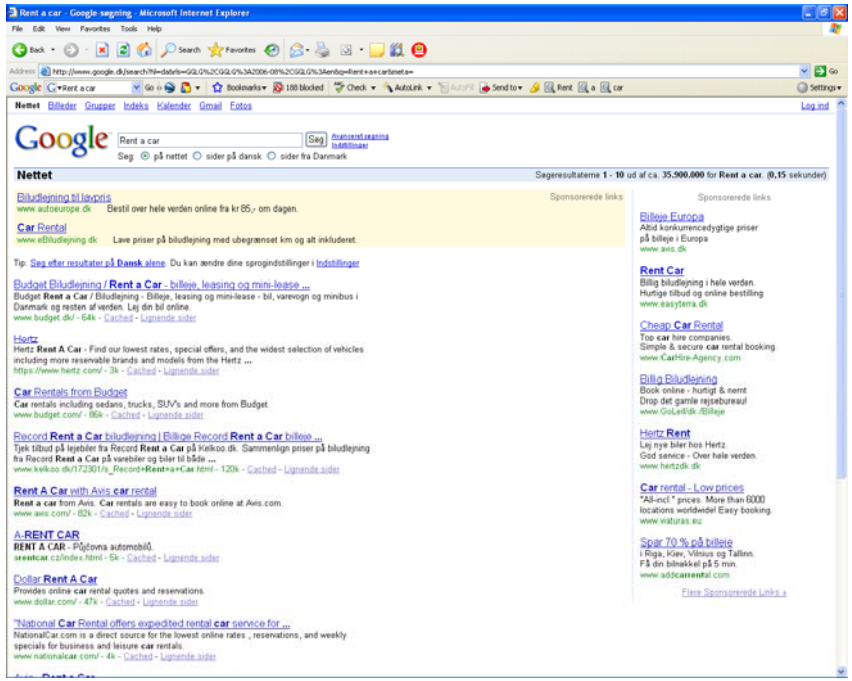




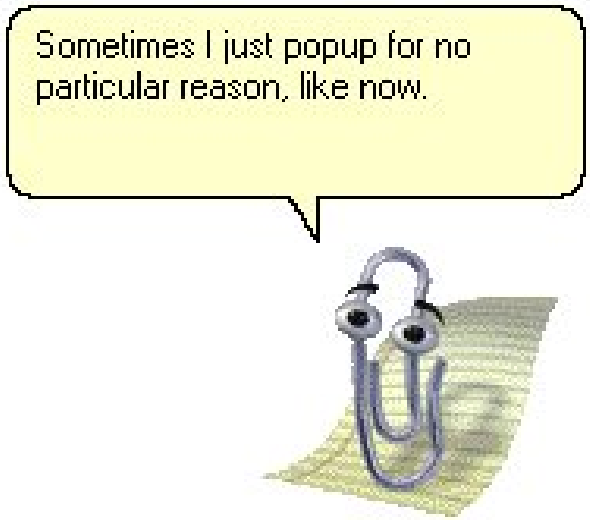
“Intelligent” Products

Win or luse, it was a great game

Win or lose, it were a great game



Affective Products

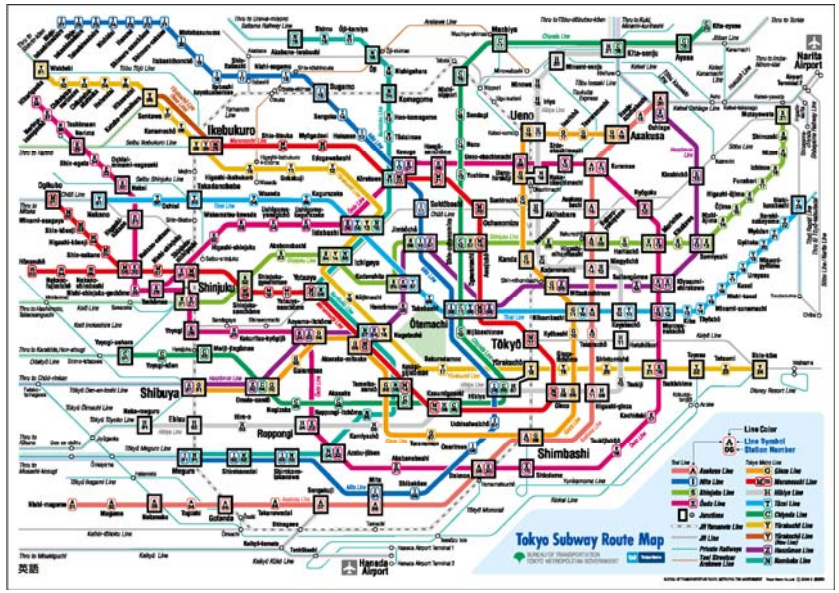


Games


Table 14818 (6 max) - Hold'em - $10/$20. Good Luck
mcd1135
$1700
lisalisa27
$847
ctheriver69
$100
$24
Hornet007
$485
RIPBEAST
$552

Datamining / Business Informatics

Optimization / Business Informatics



Efficient AI Programming

- Uninformed search
- Informed search
- Local search
- Adversarial search*
- Propositional logic
- Binary decision diagrams I/II*
- Constraint programming I/II*
- Planning
- Decision tree learning

Advanced AI in Games

- Expert Knowledge Systems
  - FSMs, Fuzzy Logic
- Unsupervised Learning
- Supervised Learning
  - Artificial Neural Networks
- Reinforcement Learning
  - Genetic Algorithms, Temporal difference learning
- Hybrids
  - Neuroevolution, Neurofuzzy, Learning Classifier Systems
- Advanced: AI and Affective Computing

Future: Data Mining Course/Program

Our Ideas

- Design a **data mining course** as a **business intelligence course** with technical focus
- Focus on data models
- Consider collaboration with **SAS Institute**
- Consider throwing it as an **industrial training course**

Conclusions

- **AI technologies** like data mining, heuristic optimization, and affective/intelligent computation is **are central to many modern products**
- **Classical AI courses fail to connect theory with business practice**
- We need to **re-structure AI courses to be aligned with application** (but maybe not rename them)