ITT 2025 Heidelberg University
with INOVA+ and SAP
30 June – 04 July 2025

Please **arrive by 08:30 on Monday** to ensure smooth registration at **SAP AppHaus** (address below).

Program

	Monday 30 June 2025 SAP AppHaus	**Tuesday 01 July 2025 Mathematikon**	**Wednesday 02 July 2025 Mathematikon**	**Thursday 03 July 2025 Mathematikon**	**Friday 04 July 2025 Mathematikon**
09:00	Short ITT Introduction SAP Introduction Presentation of SAP challenges I	Short ITT Introduction INOVA+ Introduction Presentation of INOVA+ challenges I	Group work	Group work	Group Presentations
10:30	Coffee Break	Coffee Break	Coffee Break	Coffee Break	Coffee Break
11:00	Presentation of SAP challenges II Impulse talk on quantum-enhanced models by Vishal Ngairangbam	Presentation of INOVA+ challenges II Impulse talk on combinatorial optimization by Bogdan Savchynskyy	Group work & Short Team Presentations (starting about 12:00)	Group work	Group Presentations & Concluding Remarks
12:30	Lunch Break	Lunch Break	Lunch Break	Lunch Break	Lunch to-go
14:00	Round Table	Round Table & Topic Consolidation	Group work	Group work	
15:30	Coffee Break	Coffee Break	Coffee Break	Coffee Break	
16:00	Topic Consolidation	Forming groups & Get-together	Group work	Group work & Pizza	

Challenge Abstracts

SAP challenge 1

One of the central challenges in unsupervised machine learning is to learn probability distribution based on samples of data points. The challenge is to develop quantum-enhanced models for anomaly detection using public multi-variate time-series dataset. Possible directions are to utilize efficient encoding to model multi-variate time series data, suitable quantum model, efficient optimization, scalability, and complexity analysis of the model.

SAP challenge 2

This challenge invites students to explore novel ideas for creating synthetic customer data that closely resemble real datasets while maintaining privacy protection. The emphasis is on developing a conceptual framework for artificial mixed-integer and linear programming models that align with a given baseline model in terms of structure, complexity, and computational behavior. By engaging in this theoretical exploration, participants can contribute to secure data sharing and analysis without exposing sensitive information. Additionally, the framework should incorporate mechanisms that make it highly resistant to tracing back to the original data, ensuring strong privacy safeguards.

Inova+ challenge 1

Job scheduling and workplan: Basically, a method (I could propose something multiagent), to extract from a text document a workplan with task activities, the structured workplan with required knowledge, then from a pool of CVs (data privacy aware) select the persons that can execute the work and propose their allocation to the workplan. The complexity increases with multiple projects in an extended timeline. Where these people will be allocated.

Inova+ challenge 2

Interior architecture planning: from a 2D floorplan with selected furniture we want to reshuffle the first set plan to a new 2D layout of a new room, keeping the furniture but just positioning it differently across the new layout. This needs to follow rules like, don't block windows or doors, and keep the floor pathway clear. A solution needs also to align with CAD standards, since this will need to be updated across software packages. Suggestions include discrete optimization and BIM standards linked to the different objects.

Venues

Monday: SAP AppHaus, Bergheimer Str. 147, Heidelberg

Google Maps link - Public transit stops "Heidelberg Hauptbahnhof" or "Betriebshof"
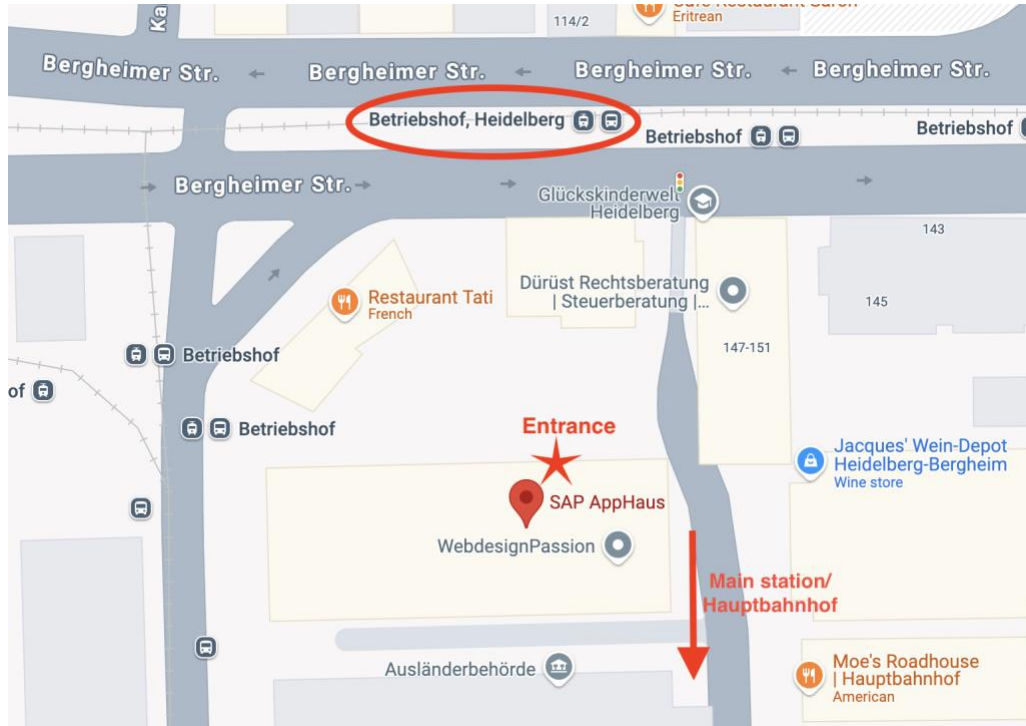
Tuesday- Friday: MATHEMATIKON, 5th Floor, Im Neuenheimer Feld 205, Heidelberg

Google Maps link - Public transit stop: "Bunsengymnasium"