Wednesday, February 19, 2020

Project Meeting with Matus

Everyone's here :)

- Matus offered us coffee. Nice.

TO BUSINESS:

- We've seen the new proposals
- We generally prefer the scheduling project
  - Hardware stuff would be hard to sell as an MRP
  - Software prototype would be cool
    - How would it be a research project?
      - Combining a research project and a functional prototype, you'll end up not completing both
    - Ideally, combining both would be cool
  - Goals:
    - Flexible made solution
      - Made for DKE
        - General solution would be awesome but too complex
      - Scheduling lectures for classes
      - Further —> MSP? Flexibility for sharing the buildings
      - Student's point of view is not often considered
        - Soft constraints
        - Having a class at 8:30 - 10:30 and another one from 16:30 until 18:00 is undesirable
        - TAs
        - People who work
        - Afternoons off

- How can you model it as an ILP
  - Are there different use cases?
    - How do different ILPs handle different use cases?
- RQ: Can we use free OSS solvers instead of expensive ones to solve the scheduling problem, can we improve these
  - Define constraints, can we find an exact solution?
    - Have two completely different ILPs?
      - Different use cases
    - Greedy?
      - Time slots for different rooms
        - Capacity for different rooms
      - Matching
      - Can't have all lectures for one course in one week
- Mental wellbeing - efficiency of scheduling
  - Optimize breaks in classes
- Online re-scheduling
  - If a professor is sick
  - Scheduling events
  - Next year - more students, can we use the same schedule?
  - Professors need to
- Our deliverables:
  - Algorithms, not necessarily software. Providing algorithms is the minimum deliverable.
    - Test the minimum,
    - Does it solve the problem exactly?
    - Does it solve the problem quickly?

- Talk to Denise (scheduler at DKE) - ask her what the priorities are when it comes to the constraints
  - Be friendly, we want to help her
  - Which problems is she struggling with?
  - Contact hours per course
  - Which rooms have computers, etc.
  - We need to generate our own constraints for the professors
    - Anonymize the old data regarding constraints for lecturers
- There are also fixed blocks which we want to consider
  - Staff meetings and such things
    - Less rooms, less professors
- Doing sports between lectures?
  - Ask bachelor students!
- Goal for the end of this block: Implement several algorithms
  - A set of courses - what is it made of? Lectures, labs; how should these be implemented?
  - How can we evaluate these?
- **Goal: Formalize the project plan and read the project plan**
  - **Read papers**
  - **Old DKE project - NO. Start from scratch**
- Do we want people to have white boards?
- We could turn it around: First optimize it for the students?
- Exam scheduling — might want to take that into account?
  - Without ILP?
    - Greedy approach
  - Use case: DKE get's part of the MECC building

    - Split up into groups?
    - Can we optimize it?
- How easy it is to put the data in the algorithm —> Not our main priority
  - BUT: It should be easy for us to test it
- How do we evaluate the performance of our algorithms
  - Quality of a schedule?
    - “We don’t want schedules on Fridays” -> give penalties for these hours.
    - “We don’t want 6 hour lectures”
    - Two days off for KE@Work, projects in the 2nd & 3rd year
      - Week off for first year students
- Guillermo QP: His old university said there were way too many constraints
  - But we’re only focussing on DKE. Phew!
    - Sharing rooms with MSP. —> Might be able to apply that later
- Find which algorithms would work for DKE!
  - Might not work for other systems
- Other research projects
  - Do they use ILP, do they use heuristics
  - PATAS
  - Which problems still have not been solved?
  - Why are there still conferences?
  - Where does our research fit in?
- Adaptability of the schedule
- Daniel: Paul, we should use Hillclimbing! (Paul agrees)
- Additional heuristic:
  - Assignment of rooms —> Matching problem!
    - Possibly do it later.

  - ILP is a useful skill to have, why not use it?
    - Branch and bound? Neural networks? Why the hell not.
      - Is the quality is 100, then bound, etc.
      - Genetic algorithms… if you're into that, go for it :P
      - At the end of the day, we just want it to work.
- Matus: You should have fun!
  - Have pizza evenings!
  - Google form to students and professors —> Evaluation function
    - Evaluate which students have which preferences
      - Some people want stuff spread out over a few days, others don't
    - Bachelor students have mandatory attendance
      - Labs - do they have attendance? Schedule these accordingly.
      - Attendance is a nightmare, let's possibly not consider
- Next meeting: 6th of March at 4 PM