

# WorkLog

## From 2018 To 2019

Huu-Phuc Vo

24th May 2019

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# Chapter 1

## **2019** Meeting notes and Work Log

**1.1 [w21 : 100% SICK leave]**

## 1.2 [w20 : 100% VAB leave]



### 1.3 [w19 : 2019-0506 to 0507 (100% sick leave from 08-10 May)]

- Logic course:
  - Chapter 3
  - Chapter 4
- Repository: **waiting for feedback**
  - Added sudoku model pair.
  - Need to discuss about the proof of the model pair.
- Survey: **waiting for feedback**
  - Revised and sent the survey to Justin.
- Progress meeting with only Di Yuan
  - Justin did not participate the meeting for some reasons.

## 1.4 [w16-w18 : 2019-Apr-15]

- Logic course:
  - Chapter 3: continue to work on the exercises.
  - Chapter 4: continue to read manual of PVS.
- Repository: **waiting for feedback**
  - Added sudoku model pair.
  - Added description of the model.
  - Filter out the implied constraints.
  - Propose more basic models.
  - Need to discuss about the proof of the model pair.
  - Remind Justin to give comment and feedback on the repository.
- Survey: **waiting for feedback**
  - Revised and sent the survey to Justin.
  - Write the specific revision in the rebuttal style.
- PhD defense and Licentiate
  - Inform supervisors the plan to defense
- Meeting with Union.
- Meeting with Ombud.
- Come to the appointment with Previa.

## 1.5 [w15 : 100% SICK leave]

## 1.6 [w14 : 2019-Apr-01]

- Logic course:
  - Chapter 3
    - \* Read the text book.
    - \* Take notes difficulties.
    - \* Ask Justin the number of exercises
  - Chapter 4
    - \* Install PVS.
    - \* Read manual.
    - \* Find more examples.
- Repository: **waiting for feedback**
  - Added sudoku model pair.
  - Need to discuss about the proof of the model pair.
- Survey: **waiting for feedback**
  - Revised and sent the survey to Justin.

## 1.7 [w13 : 2019-Mar-25]

- Logic course: **waiting for feedback**
  - Chapter 1
    - \* sent solutions to Justin.
  - Chapter 2
    - \* Reading.
    - \* Not understand
    - \* Need help.
- Repository: **waiting for feedback**
  - Added sudoku model pair.
  - Need to discuss about the proof of the model pair.
- Survey: **waiting for feedback**
  - Revised and sent the survey to Di and Justin.

## 1.8 [w12 : 2019-Mar-18]

Weekly progress report **[sent to Justin and Di]**

- Reading course: Applied Logic for scientists: Move on to read chapter 2.
  - Not understand. Need help.
  - What exercises to do?
- Survey:
  - Revising survey from Di's comments.
  - Then continue to revise survey from Justin's comments.

## 1.9 [w11 : 2019-Mar-11]

### Weekly progress report [sent to Justin and Di]

- Reading course: Applied Logic for scientists
  - Read chapter 1.
    - \* Doing the exercises: get stuck & need help.
    - \* Sent revised solution.
    - \* Get stuck with the rest of exercises in chapter 1.
- Repository: Implied constraints
  - Added sudoku model pair.
  - Need to discuss about the proof of the model pair.

## 1.10 [w10 : 2019-Mar-04]

- Reading course
  - Read chapter 1
  - Do the exercises.
- Implied constraints
  - [DONE] Pick-up models from
    - \* [DONE] MiniZinc competition 2018
    - \* [DONE] CSPLib #2.
  - Consider these models are after-models.
    - \* Delete suspicious implied constraints.
  - Reverse to the before-models.
- [DONE] Proposed example of implied constraint models
  - [DONE] Car sequencing problem.
  - [DONE] Prob2: template design problem.

1.11 [w9 : 2019-Feb-25] **SICK LEAVE 100%**



## 1.12 [w8 : 2019-Feb-18]

- Meeting with Justin on Tuesday about another research plan.
  - Phuc is going to take the course about formalisation.
  - Phuc is going to continue to work on the reformulation by implied constraints.
- Meeting with Justin and Di Yuan on Friday to finalise the ISP.
  - Phuc disagrees with the goal: complete the course project 1DL451.

## 1.13 [w7 : 2019-Feb-11]

- Meeting with Justin on Friday about the research plan.
  - Justin rejects the proposal of research plan related to type 2: reformulate from non-string to string types.
- Meeting about Vacation and Withdrawal of parental days.
  - Joachim.
  - Di Yuan.
  - Ulrika.
  - Phuc.
- Weekly meeting on Wednesday.
- Come to the appointment with Previa.
- [DONE] Address Di's comments on the survey.
- Justin's comments
  - [DONE] Fixed "et al." style.
  - Working on the 3rd model.
  - Revise the report, models.
  - Submit the report by 17h00.

## 1.14 [w6 : 2019-Feb-04] **SICK LEAVE 100%**

- Sick leave the whole week.
- Survey: revise the survey and submit.
- 1DL451 course
  - Prepare for the report presentation
  - Working on the 3rd model.
  - Revise the report, models.
  - Submit the report by 17h00.

## 1.15 [w5 : 2019-Jan-28]

### 1.15.1 [Wednesday, 30 Jan 2019] Progress meeting

- Meeting notes:
  - Make a table to group the references. The table has two columns, the first is the group of references, the second is the description in brief.
  - Find example for the reformulation section, which can cover as much categories as possible.
  - Each categories can be illustrated by applying the technique for one or two constraints in the example.
- 1DL451 course
  - Completed and sent the draft report of model 1 and 2 to Pierre and Justin.
  - Working on the 3rd model.
    - \* Modelling.
    - \* Writing report.
  - Prepare for the presentation this afternoon.
- Revised the draft survey.
  - Sent to Justin and Di.
- Read the paper "Formally ..."

### 1.15.2 [Thursday(w4) – Wednesday(w5)]

- [DOING] Working on 1DL451 course project: Spacecraft Assembly Project
  - [DONE] Viewpoint 1.
  - [DONE] Viewpoint 2.
  - [DOING] Channelling.
  - [DONE] Draft report.
- [TODO] **Fix** the survey.
  - Advice for not using the identical sentence from other source.
  - [DONE] *Introduction* and *Preliminaries* sections are much longer than *Reformulation* section.
    - \* [DONE] Briefly describe related work
    - \* [DONE] Split the references
  - [TODO] Discuss with Justin more about the heading for *Categories* and *Three types of reformulations* sections.
  - Missing
    - \* [DONE] Examples: learn from Pierre's M4CO slides, using MiniZinc like language.
      - Added more examples to the CSP and Modelling section.

- Write as Tutorials.
  - \* [DONE] Reformulation long list of references.
  - \* Summary section: not necessary at the moment since this is a part of the lic. thesis in the future.
- Think more about the level of details CSPs, should be shorten or not, and where to refer.
- Advice from repeating or recalling the same thing:
  - \* *SHOUDN'T*: in the same relatively short context.
  - \* *SHOULD*: in a long context or show relationship between many contexts.
- To the *to-be-changed paragraphs*, mark them using **To be rewritten**.
- [DONE] Use *mathMode*.
- [DONE] Remove title and author from the TOC.
- [DONE] Read paper
  - Discuss the paper with Justin.
  - Formally Verified Decomposition of Non-binary Constraints into Equivalent Binary Constraints.

## 1.16 [w4 : 2019-Jan-21 to 2019-Jan-23]

### 1.16.1 [Thursday-Friday]

- [DOING] Do the project
  - Model of viewpoint 1.
  - Model of viewpoint 2.
  - Model 3: channelling.
- Project report.
- Project presentation.

### 1.16.2 [Wednesday, 23 Jan 2019] Meeting with Di and Justin

- Comments on the survey.
  - Advice for not using the identical sentence from other source.
  - *Introduction* and *Preliminaries* sections are much longer than *Reformulation* section.
  - Discuss with Justin more about the heading for *Categories* and *Three types of reformulations* sections.
  - Missing
    - \* Examples: learn from Pierre's M4CO slides, using MiniZinc like language.
    - \* Reformulation long list of references.
    - \* Tutorials.
    - \* Summary section.
  - Think more about the level of details CSPs, should be shorten or not, and where to refer.
  - Advice from repeating or recalling the same thing:
    - \* *SHOUDN'T*: in the same relatively short context.
    - \* *SHOULD*: in a long context or show relationship between many contexts.
  - Use *mathMode*.
  - To the *to-be-changed paragraphs*, mark them using `To be rewritten`.

### 1.16.3 [Monday to Tuesday] Reading and Writing

- [TODO] Read paper
  - Formally Verified Decomposition of Non-binary Constraints into Equivalent Binary Constraints.
- [DOING] Working on 1DL451 course project: Spacecraft Assembly Project
  - [DOING] Viewpoint 1.
  - [DOING] Viewpoint 2.
  - [DOING] Channelling.
  - [DOING] Draft report.

- [DOING] Slide for presentation.
  - [DONE] Book the meeting room and send out invitations.
- [DONE] Finalise the first version of the survey.
- [DONE] Sent to Justin and Di.
- [DONE] Skim through
  - Book
    - \* Book 2004 Chapter 3: Building Integer Programming Models
    - \* Skim through the Handbook of CP
      - [DONE] Chapter 23
      - Chapter 25
      - Chapter 26

## 1.17 [w3 : 2019-Jan-14]

### [Monday to Friday] Reading and Writing

- [TODO] Writing
  - [DONE] Introduction
  - [DONE] Preliminaries
  - [DONE] Summarise abstract to corresponding sections.
- Learn L<sup>A</sup>T<sub>E</sub>X gradually at the same time.
- [TODO] Skim through
  - Book
    - \* Book 2004 Chapter 3: Building Integer Programming Models
    - \* Skim through the Handbook of CP
      - [DONE] Chapter 23
      - Chapter 25
      - Chapter 26



## 1.18 [w2 : 2019-Jan-07]

### 1.18.1 Friday, 11 January 2019

- [TODO] Writing
  - [TODO] Copy all abstract to corresponding sections.
  - [TODO] Introduction
  - 3 types of reformulation
- [DONE] Writing
  - [DONE] Abstract
  - [DONE] Revise survey outline.
  - [DONE] Put all citations to corresponding sections.
- [DONE] Report
  - [DONE] Send progress report to Di and Justin.
  - [DONE] Send abstract, and revised outline to Justin.
  - [DONE] Ask Justin for comments and advice on abstract, outlines, refs for pre-computation heading
- [TODO] Skim through
  - Book
    - \* Book 2004 Chapter 3: Building Integer Programming Models
    - \* Skim through the Handbook of CP
      - [DONE] Chapter 23
      - Chapter 25
      - Chapter 26

### 1.18.2 Thursday, 10 January 2019

- [TODO] Writing
  - [TODO] Revise survey outline.
  - [TODO] Put all citations to corresponding sections.
  - [TODO] Copy all abstract to corresponding sections.
- [DOING] Writing
  - Abstract
  - Introduction
- [TODO] Skim through
  - Book
    - \* Book 2004 Chapter 3: Building Integer Programming Models
    - \* Skim through the Handbook of CP

- [DONE] Chapter 23
- Chapter 25
- Chapter 26
- [DONE] Find relevant literature: 67 papers.
  - [DONE] Update the list of literature.
  - [DONE] Append citation for those new found paper.
  - [DONE] Skim through and Summarise

### 1.18.3 Wednesday, 09 January 2019

- [DONE] Reading papers
  - [DONE] MiniZinc with Strings.
  - [DONE] A generic method for identifying and exploiting Dominance relations
  - [DONE] Slide 2004 Modeling Problems in Constraint Programming
- [DONE] To selected papers ( 55 papers).
  - [DONE] Summarise all selected papers.
  - [DONE] Categorise those papers.
    - \* Type 1: Model to Model'
      - Manual
      - Semi-Auto
      - Auto
    - \* Type 2: Model(Non-Standard Types) to Model'(Standard Types)
    - \* Type 3: Model to SATMIPOthers
  - [DONE] Put all the relevant abstracts to the categories.
  - [DONE] Take notes for all 32 papers that have been read.

### 1.18.4 Tuesday, 08 January 2019

- [DONE] Meeting with Justin
  - Question about the categoriy of licentiate: monograph or comprehensive summary.
  - Revise survey outline & Survey structure
    - \* Add the third category: Model to SAT/MIP/Others.
  - Handbook chapter 11.
  - Discuss the following papers
    - \* MiniZinc with Strings
    - \* Dominance relations
- [DOING] Writing
  - Abstract
  - Introduction

- [\[DOING\]](#) Reading papers
  - [\[DOING\]](#) MiniZinc with Strings.
  - [\[DOING\]](#) A generic method for identifying and exploiting Dominance relations
  - Others
    - \* [\[DOING\]](#) Skim through the Handbook of CP
      - [\[DONE\]](#) Chapter 23
      - [\[DOING\]](#) Chapter 25
      - [\[DOING\]](#) Chapter 26
    - \* [\[DOING\]](#) Book 2004 Chapter 3: Building Integer Programming Models
    - \* [\[DONE\]](#) Slide 2004 Modeling Problems in Constraint Programming

### 1.18.5 Monday, 07 January 2019

- [\[DONE\]](#) Case studies
  - [\[DONE\]](#) From "A Generic Method for Identifying and Exploiting Dominance Relations" (chu2012generic) with 10 instances of each size, time out is 900 seconds.
    - \* Nurse Scheduling
    - \* RCPSP: resource constrained project scheduling problem
    - \* Talent scheduling problem
    - \* Steel mill problem.
    - \* PC Board Problem.
      - [\[DONE\]](#) Add problems' descriptions.
      - [\[DONE\]](#) Add those case studies to the repository.
  - [\[DONE\]](#) Write description for those case studies & Push them to github.
    - \* [\[DONE\]](#) (1) Knapsack.
    - \* [\[DONE\]](#) (1) Photo Placement.
    - \* [\[DONE\]](#) (1) Blackhole solitaire.
    - \* [\[DONE\]](#) (2) The SET game.
- [\[DONE\]](#) Find more relevant papers from the following conferences
  - IJCAI
    - \* 2015 Polynomial-Time Reformulations of LTL Temporally Extended Goals into Final-State Goals. Reformulation (3)
    - \* 2017 Automatic Synthesis of Smart Table Constraints by Abstraction of Table Constraints. automatic
    - \* 2003 Propagation Redundancy for Permutation Channels channel
  - AAAI
    - \* 1990 Approximation Reformulations reformulation
    - \* 2016 Surprise-Triggered Reformulation of Design Goals reformulation
    - \* 2016 News Verification by Exploiting Conflicting Social Viewpoints in Microblogs. viewpoint
    - \* 2018 Automatic Model Selection in Subspace Clustering via Triplet Relationships automatic model

- \* 2010 Automated Channel Abstraction for Advertising Auctions channel
- CP
  - \* 2018 Automatic Generation and Selection of Streamlined Constraint Models via Monte Carlo Search on a Model Lattice automatic model
  - \* 2018 Towards Semi-Automatic Learning-Based Model Transformation automatic model
  - \* 2015 Automatically Generating Streamlined Constraint Models with Essence and Conjure automatic model
  - \* 2015 Automatically Improving SAT Encoding of Constraint Problems Through Common Subexpression Elimination in Savile Row common
  - \* 2003 Constraint Patterns pattern
- CPAIOR
  - \* 2011 Identifying Patterns in Sequences of Variables pattern
  - \* 2013 Improved Discrete Reformulations for the Quadratic Assignment Problem reformulation

## 1.19 [w1 : 2019-Jan-02]

### 1.19.1 Wednesday to Friday, 02 to 04 January 2019: 25% Parental leave (02 Jan - 29 Mar)

- Reading papers
  - MiniZinc with Strings.
  - A generic method for identifying and exploiting Dominance relations
- Find more relevant papers from the following conferences
  - IJCAI
    - \* 2015 Polynomial-Time Reformulations of LTL Temporally Extended Goals into Final-State Goals. Reformulation (3)
    - \* 2017 Automatic Synthesis of Smart Table Constraints by Abstraction of Table Constraints. automatic
    - \* 2003 Propagation Redundancy for Permutation Channels channel
  - AAAI
    - \* 1990 Approximation Reformulations reformulation
    - \* 2016 Surprise-Triggered Reformulation of Design Goals reformulation
    - \* 2016 News Verification by Exploiting Conflicting Social Viewpoints in Microblogs. viewpoint
    - \* 2018 Automatic Model Selection in Subspace Clustering via Triplet Relationships automatic model
    - \* 2010 Automated Channel Abstraction for Advertising Auctions channel
  - CP
    - \* 2018 Automatic Generation and Selection of Streamlined Constraint Models via Monte Carlo Search on a Model Lattice automatic model
    - \* 2018 Towards Semi-Automatic Learning-Based Model Transformation automatic model
    - \* 2015 Automatically Generating Streamlined Constraint Models with Essence and Conjure automatic model
    - \* 2015 Automatically Improving SAT Encoding of Constraint Problems Through Common Subexpression Elimination in Savile Row common
    - \* 2003 Constraint Patterns pattern
  - CPAIOR
    - \* 2011 Identifying Patterns in Sequences of Variables pattern
    - \* 2013 Improved Discrete Reformulations for the Quadratic Assignment Problem reformulation
  - Others
    - \* Book 2004 Chapter 3: Building Integer Programming Models
    - \* [\[DONE\]](#) Slide 2004 Modeling Problems in Constraint Programming
    - \* Handbook of CP
      - Chapter 23
      - Chapter 25

· Chapter 26

- [DONE] Write description for those case studies & Push them to github.
  - [DONE] (1) Knapsack.
  - [DONE] (1) Photo Placement.
  - [DONE] (1) Blackhole solitaire.
  - [DONE] (2) The SET game.
- [DONE] Put all the relevant abstracts (32) to the categories.
- [DONE] Take notes for all 32 papers that have been read.

### 1.19.2 Friday, 14 December 2018: 50% VAB

- Find more relevant papers
  - In the following conferences
    - \* IJCAI
    - \* AAAI
    - \* CP
    - \* CPAIOR
- [DONE] Put all the relevant abstracts (32) to the categories.
- [DONE] Take notes for all 32 papers that have been read.

### 1.19.3 Thursday, 13 December 2018: 50% VAB

- [DONE] Progress meeting with Di and Justin
  - Pierre is no longer a third supervisor.
  - Justin will give comments and feedback for the survey outline.
  - From Di: Pierre is the grader, Di is the examiner to report the result.
- [DOING] Find more relevant papers
  - [DOING] In the following conferences
    - \* IJCAI
    - \* AAAI
    - \* CP
    - \* CPAIOR
  - [DONE] Others
    - \* [DONE] Christopher Mears
      - CP2016, Learning from learning solvers
      - CP2013, Globalizing Constraint Models
    - \* [DONE] Geoffrey Chu and Peter J. Stuckey. A generic method for identifying and exploiting dominance relations. In Michela Milano, editor, Principles and Practice of Constraint Programming, volume 7514 of Lecture Notes in Computer Science, pages 6–22. Springer Berlin Heidelberg, 2012.
    - \* [DONE] MiniZinc with String.

### 1.19.4 Wednesday, 12 December 2018: 50% VAB

- [TODO] To selected papers.
  - [DONE] Put them into categories.
  - [DONE] Place the abstracts to those categories
    - \* Automatic reformulations
    - \* Semi-automatic reformulations
    - \* Manual reformulations
    - \* Viewpoints

- \* Non-binary to binary
- \* Different perspectives
- [TODO] Write introduction of
  - Constraint programming.
  - CSPs.
  - MiniZinc.
- [DONE] Write description for those case studies & Push them to github.
  - [DONE] (1) Knapsack.
  - [DONE] (1) Photo Placement.
  - [DONE] (1) Blackhole solitaire.
  - [DONE] (2) The SET game.

### 1.19.5 Tuesday, 11 December 2018

- [DONE] Technical meeting with Justin
  - Comments on the outline of survey.
  - Two worlds in the reformulations research:
    - \*  $\text{Model} \longrightarrow \text{Model}'$
    - \*  $\text{Model}(\text{non-CP-standard types}) \longrightarrow \text{Model}(\text{CP-standard types})$
- To selected papers.
  - [DONE] Put them into categories.
  - [DOING] Summarise all selected survey papers.
    - \* Automatic reformulations
    - \* Semi-automatic reformulations
    - \* Manual reformulations
    - \* Viewpoints
    - \* Non-binary to binary
    - \* Different perspectives
- [TODO] Write introduction of
  - Constraint programming.
  - CSPs.
  - MiniZinc.
- [DONE] Prepare survey outline
  - [DONE] Send proposed outline to Justin and ask for comments



### 1.19.6 Monday, 10 December 2018

- [DONE] Read and summarise the paper:
  - [DONE] (1) Towards Automatic Dominance Breaking for Constraint Optimisation Problems, 2014. <https://www.ijcai.org/Proceedings/15/Papers/057.pdf>.
  - [DONE] (2) A Reformulation Strategy for Multi-Dimensional CSPs: The Case Study of the SET Game, 2011. <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1177&context=cseconfwork>
  - [DONE] Push the case studies from those papers to github.
    - \* [DONE] (1) Knapsack.
    - \* [DONE] (1) Photo Placement.
    - \* [DONE] (1) Blackhole solitaire.
    - \* [DONE] (2) The SET game.

## Chapter 2

### **2018** Meeting notes and Work Log

## **2.1 [w51 : 2018 December 17 : SICK LEAVE]**

## 2.2 [w50 : 2018 December 10]

### 2.2.1 Friday, 14 December 2018: 50% VAB

- Find more relevant papers
  - In the following conferences
    - \* IJCAI
    - \* AAAI
    - \* CP
    - \* CPAIOR
- [DONE] Put all the relevant abstracts (32) to the categories.
- [DONE] Take notes for all 32 papers that have been read.

### 2.2.2 Thursday, 13 December 2018: 50% VAB

- [DONE] Progress meeting with Di and Justin
  - Pierre is no longer a third supervisor.
  - Justin will give comments and feedback for the survey outline.
  - From Di: Pierre is the grader, Di is the examiner to report the result.
- [DOING] Find more relevant papers
  - [DOING] In the following conferences
    - \* IJCAI
    - \* AAAI
    - \* CP
    - \* CPAIOR
  - [DONE] Others
    - \* [DONE] Christopher Mears
      - CP2016, Learning from learning solvers
      - CP2013, Globalizing Constraint Models
    - \* [DONE] Geoffrey Chu and Peter J. Stuckey. A generic method for identifying and exploiting dominance relations. In Michela Milano, editor, Principles and Practice of Constraint Programming, volume 7514 of Lecture Notes in Computer Science, pages 6–22. Springer Berlin Heidelberg, 2012.
    - \* [DONE] MiniZinc with String.

### 2.2.3 Wednesday, 12 December 2018: 50% VAB

- [TODO] To selected papers.
  - [DONE] Put them into categories.
  - [DONE] Place the abstracts to those categories
    - \* Automatic reformulations
    - \* Semi-automatic reformulations

- \* Manual reformulations
- \* Viewpoints
- \* Non-binary to binary
- \* Different perspectives
- [TODO] Write introduction of
  - Constraint programming.
  - CSPs.
  - MiniZinc.
- [DONE] Write description for those case studies & Push them to github.
  - [DONE] (1) Knapsack.
  - [DONE] (1) Photo Placement.
  - [DONE] (1) Blackhole solitaire.
  - [DONE] (2) The SET game.

#### 2.2.4 Tuesday, 11 December 2018

- [DONE] Technical meeting with Justin
  - Comments on the outline of survey.
  - Two worlds in the reformulations research:
    - \* Model  $\longrightarrow$  Model'
    - \* Model(non-CP-standard types)  $\longrightarrow$  Model(CP-standard types)
- To selected papers.
  - [DONE] Put them into categories.
  - [DOING] Summarise all selected survey papers.
    - \* Automatic reformulations
    - \* Semi-automatic reformulations
    - \* Manual reformulations
    - \* Viewpoints
    - \* Non-binary to binary
    - \* Different perspectives
- [TODO] Write introduction of
  - Constraint programming.
  - CSPs.
  - MiniZinc.
- [DONE] Prepare survey outline
  - [DONE] Send proposed outline to Justin and ask for comments

### 2.2.5 Monday, 10 December 2018

- [DONE] Read and summarise the paper:
  - [DONE] (1) Towards Automatic Dominance Breaking for Constraint Optimisation Problems, 2014. <https://www.ijcai.org/Proceedings/15/Papers/057.pdf>.
  - [DONE] (2) A Reformulation Strategy for Multi-Dimensional CSPs: The Case Study of the SET Game, 2011. <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1177&context=cseconfwork>
  - [DONE] Push the case studies from those papers to github.
    - \* [DONE] (1) Knapsack.
    - \* [DONE] (1) Photo Placement.
    - \* [DONE] (1) Blackhole solitaire.
    - \* [DONE] (2) The SET game.

## 2.3 [w49 : 2018 December 03]

### 2.3.1 Thursday, 06 December 2018

- 50% VAB on 06 + 07 December.
- Book a technical meeting with Justin on Tuesday, December 11, 2018.

### 2.3.2 Wednesday, 05 December 2018: Kickoff meeting

- Participants: Di Yuan, Justin Pearson, Pierre Flener, and Phúc.
  - Repository will contain the examples of original models, the reformulated models, and the reformation techniques.
  - Survey would contain different approaches and the chronological order.
  - Roles of supervisors
    - \* Di: in charge of the progress and ISP.
    - \* Justin and Pierre: give advice for scientific goals.
    - \* Weekly meeting
      - All of them will participate.
      - Scientific meeting: Di won't join.
- Progress summary
  - Phuc read
    - \* chapter 11.8 of Handbook of Constraint programming.
    - \* titles, abstract and some introduction of 21 papers.
  - Keywords to filter the relevant papers
    - \* Keywords - No. of papers
    - \* reformulation - 15
    - \* viewpoint(s) - 4
    - \* automatic - 9
    - \* automated - 2
    - \* channelling - 1
    - \* common patterns - 1
  - Phuc proposed the following aspects for the survey, which are categorised based on chronological order, viewpoint, approaches, and automation
    - \* Based on viewpoint
      - Keep the same viewpoint
      - Change viewpoint
    - \* Chronological order: 2018, 2017, ..., 2002
    - \* Approaches
      - Non-binary to binary translations
      - Permutation problems
      - Boolean models
      - Different perspectives

- \* Automation
  - Semi-automatically reformulations
  - Automatically reformuations
- Phuc created the link to
  - \* Repo <https://github.com/PhucVH888/MiniZinc-examples.git>.
  - \* Survey <https://github.com/PhucVH888/Reformulation-survey.git>. The comments for the survey will be done incrementally.
- Others
  - Participate 10 docs/csd seminars => get 3 credits.
    - \* Di will answer in the next week meeting.
  - Framework for PhD.
    - \* Those goals will be considered when the ISP has a longer timespan.
  - Thunderbolt cable
    - \* Phuc sent the link to Justin.
- Di's reply
  - In the meeting it has been advised that structuring the survey using chronological order is most probably not optimal.
  - Seminars/credits: This question will be brought up to CSD. So far, to my knowledge no credits have been issued for the CSD division, but it is good to have an explicit policy for the entire division. I will return to you regarding this when there is more information.
  - Framework for PhD (the matrix): In the meeting it has been said that this is a help document, and ISP is the formal document governing you PhD study. The former could be useful in forming the latter. At the moment, as the main supervisor I advise to focus on the ISP.



## 2.4 [w48 : 2018 November 26] Survey

### 2.4.1 Friday, 30 November 2018: Read abstract

- Number of selected papers: 32
  - [DONE] Download those papers
- [DONE] Print out 1 page of all papers.
- Read title and abstracts.
  - [DONE] Read titles.
  - Read abstracts.
- Take notes to all 32 papers.
  - [DONE] Take notes for 1-5 papers.
- [DONE] Create References
  - [DONE] Check the .bib tex for all
  - [DONE] Format as the asta.bib

**From:** Huu-Phuc Vo huu-phuc.vo@it.uu.se  
**Subject:** Re: Literature review  
**Date:** 28 November 2018 at 16:04  
**To:** Justin Pearson justin.pearson@it.uu.se  
**Cc:** Huu-Phuc Vo huu-phuc.vo@it.uu.se, Di Yuan di.yuan@it.uu.se, Pierre Flener pierre.flener@it.uu.se



Hi,

The list of all previous papers of all year is nice.

Related to (iv), may I have a bigger picture and what are the next series follow-ups?

Here is the updated list of literature (32 papers/abstracts in total).

1	2018	Özgür Akgün and Ian Miguel	Modelling Langford's Problem: A Viewpoint for Search	Paper
2	2017	David Mitchell	A Logical View of Constraint Modelling and Reformulation	Invited
3	2016	V. Armant and K. N. Brown	Reformulation of Drivers' Fixed Path Constraints in Ridesharing Problems	Paper
4	2015	Tias Guns, Anton Dries, Guido Tack, Siegfried Nijssen and Luc De Raedt	Automatic solver chaining in MiningZinc	Paper
5	2015	Chris Mears	Towards Automatic Dominance Detection in Constraint Optimisation Problems	Invited
6	2014	Christopher Mears and Maria Garcia de La Banda	Towards Automatic Dominance Breaking	Paper
7	2014	Barry Hurley, Insight Centre for Data Analytics, University College Cork	Modelling, reformulation, and solving with Numberjack	Invited
8	2014	Mateu Villaret, University of Girona	Solving intensional WCSPs by reformulation into SMT	Invited
9	2011	Alan Frisch	A Decade of Research on Constraint Modelling and Reformulation: The Quest for Abstraction and Automation	Invited
10	2011	Amanda Swearingin, Berthe Y. Choueiry and Eugene C. Freuder	A Reformulation Strategy for Multi-Dimensional CSPs: A Case Study for the SET Game	Paper
11	2011	Panelists: Stefan Heinz, Michela Milano, Peter Stuckey, Willem-Jan van Hoeve Moderation: Helmut Simonis	Directions of CP Modelling and Reformulation in the Context of Extended Solver Representations	Panel
12	2010	Ozgur Akgun, Alan Frisch, Brahim Hnich, Chris Jefferson and Ian Miguel	Conjure Revisited: Towards Automated Constraint Modelling	Papers
13	2010	Christopher Jefferson, Wendy Moncur and Karen E. Petrie	Combination: Automated Generation of Puzzles with Constraints	Paper
14	2009	Barbara M. Smith	Comparing Dual Viewpoints in Permutation Problems	Paper
15	2008	Alastair Andrew and John Levine	Automatically Detecting Neighbourhood Constraint Interactions using Comet (LSCS'08)	Paper
16	2006	Bessiere, Quinqueton, Raymond	Mining Historical Data to Build Constraint Viewpoints	Paper
17	2006	Martinez-Hernandez, Frisch	The Automatic Generation of Redundant Representations and Channelling Constraints	Paper
18	2005	Bernadette Martinez Hernandez and Alan M. Frisch	The systematic generation of channelling constraints	Paper
19	2004	M. Trick	Formulations and Reformulations in Integer Programming	Invited
20	2004	N. Yorke-Smith, C. Gervet	Tight and Tractable Reformulations for Uncertain CSPs	Paper
21	2004	A.M. Frisch, C. Jefferson, B. Martinez-Hernandez, I. Miguel.	The Rules of Modelling: Towards Automatic Generation of Constraint ProgRams	Paper
22	2004	M. Jarvisalo, I. Niemela.	A Compact Reformulation of Propositional Satisfiability as Binary Constraint Satisfaction	Paper
23	2003	Marco Cadoli and Toni Mancini	Automated Reformulation of Specifications by Safe Delay Constraints	Papers
24	2003	Brahim Hnich and Toby Walsh	Why Channel? Multiple Viewpoints for Branching Heuristics	Papers
25	2003	Adam Bakewell, Alan M. Frisch and Ian Miguel	Towards Automatic Modeling of Constraint Satisfaction Problems: A System Based on Compositional Refinement	Poster
26	2003	J. Christopher Beck, Patrick Prosser and Evgeny Selensky	An Empirical Study of Mutual Routing-Scheduling Reformulation".	Poster
27	2003	Remi Coletta, Christian Bessiere, Barry O'Sullivan, Eugene C. Freuder, Sarah O'Connell and Joel Quinqueton	Semi-Automatic Modeling by Constraint Acquisition	Poster
28	2003	Evgeny Selensky	A Reformulation of the Bridge Building Problem as Vehicle Routing	Poster
29	2002	Helmut Simonis	Reformulation: A Practical View	Paper
30	2002	Pierre Flener, Alan M. Frisch, Brahim Hnich, Zeynep Kiziltan, Ian Miguel and Toby Walsh	Matrix Modelling: Exploiting Common Patterns in Constraint Programming	Paper
31	2002	Alan M. Frisch, Brahim Hnich, Ian Miguel, Barbara M. Smith and Toby Walsh	Towards Model Reformulation at Multiple Levels of Abstraction	Paper
32	2002	Lyndon Drake, Ian Gent and Toby Walsh	Automatically Converting SAT Encodings of CSPs	Paper

Thank you.

Best regards,  
Phuc

## 2.4.2 Monday-Thursday, 26-29 November 2018: meeting with Di Yuan and Pierre

- [DONE] Monday: meeting with Pierre
  - M4CO project report: clarify Pierre's comments
- [DONE] Tuesday: meeting with Di Yuan
  - General discussion about the roles of supervisors.
  - Justin and Pierre are responsible for the scientific advice.
  - Di Yuan is responsible for the study plan, and progress.
- [DONE] Go through all papers in CP workshop from 2002 to 2018.
- [DONE] Make a list of selected papers that are related to reformulation.
- [DONE] Phuc informs Di, Justin, and Pierre about his vacation plan.
  - 2017 (31 vacation days)
    - \* July: -20 vacation days (  $+31 - 20 = +11$  days left)
  - 2018 ( $31 + 11 = +42$  vacation days)
    - \* July: -20 vacation days in July. (  $+42 - 20 = +22$  days left)
    - \* Nov 19-23: -4.5 days. (  $+22 - 4.5 = +17.5$  days left)
    - \* Dec 17-21: -4.5 days. (  $+17.5 - 4.5 = +13$  days left)
    - \* Dec 24-Jan 11: -10 days (  $+13 - 10 = +3$  days left)
  - [DONE] Di sent the plan to Lars-Henrik and Lina Von Sydow for verification.
    - \* [TODO] Waiting for the responses from Lina and Lars-Henrik.

## 2.5 [w33-w47]

### 2.5.1 Week 33 to week 47

- [DONE] Request of changing supervisors: sent to Lina
- [TODO] Request of prologation: sent to Lina
  - [DONE] Sent request to Lina
  - [TODO] Waiting for the result.
- [DONE] Complaint about
  - Lars-Henrik, Justin Pearson, and Pierre Flener.
  - [DONE] Sent to
    - \* [DONE] Vice-chancellor.
    - \* [DONE] Equal Opportunities Group.
    - \* [DONE] Lina Von Sydow.
- [DONE] Discuss with Union and Ombud

## 2.6 [w31-w32]

### 2.6.1 Wednesday, 8-August: meeting with Justin and Pierre

- Coursera courses
  - Project report
    - \* one week before 25 of September
  - Project presentation
    - \* two week before 25 of September
    - \* together with the draft of the report
- General Meeting
  - Faculty: Karin Berggren Bremdal <http://katalog.uu.se/empinfo/?id=N3-703>.
  - Head of department: Lina von Sydow.
  - Head of division: Lars-Henrik.
  - Supervisors: Justin and Pierre.
  - Union: ...
  - Student Ombud: ...
- Upcoming courses ??
  - CP (5 hp)
    - \* Lectures + assignments
    - \* Requirement: C++ gecode
  - M4CO:
    - \* Lectures + project (2hp)
    - \* Assignments (0-3hp): non overlapped (3hp)

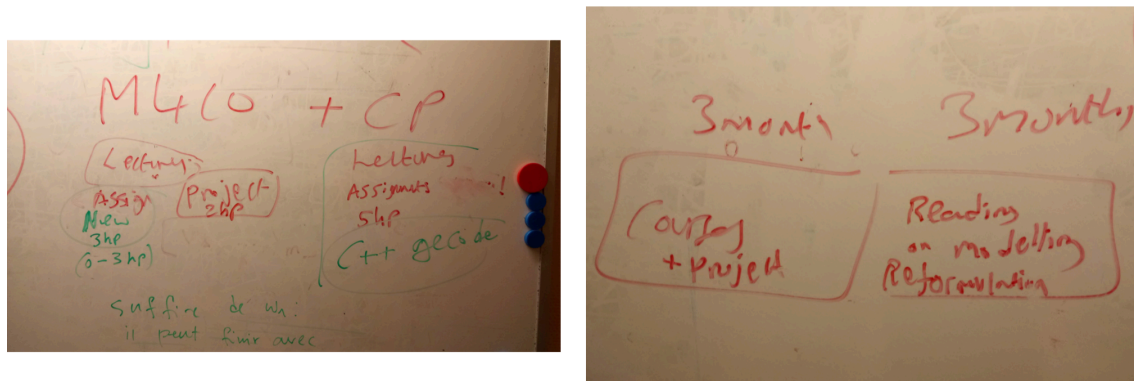


Figure 2.2: Upcoming courses: M4CO and CP

## 2.6.2 General

- Reading book "Handbook of constraint programming"
  - How many credits will I get?
- Course project: Hash Code - Streaming Videos
- Registered "Stress management for PhD students" course
- Assignment 7: suitor schedule
  - [DONE] Stage A.
  - [DONE] Stage B.
  - [Debugging] Stage C.
- [DONE] Workshop 8.
- Assignment 8
  - Stage A.
  - Stage B.
  - Stage C.
  - Stage D
  - Stage E.
  - Stage F.
- [DONE] Watch the video lectures for assignment 7 again.

## 2.7 [w27-w28-w29-w30] Summer Vacation in 20 days

## 2.8 [w25 : 2018-June-18] (on leave 50%) Advanced modelling course

### 2.8.1 Thursday, 21-June

- Weekly meeting: progress report
  - Advanced modelling course
    - \* [TODO] Week 3: assignment.
    - \* [TODO] Week 5: lectures and assignment.
  - Get credit for participation in UPMARC summer school 2018.
  - Course project: including report model presentation.
    - \* Report should be done before the presentation.
    - \* The presentation could be internally held or sometimes in September interleaving with Pierre's course.
  - In early of August, vacation days will be reported in order to calculate the time for the revision of tentative ISP.
  - Revision of ISP
    - \* Tentative ISP will be discuss before the special meeting.
  - Taken courses in period 1 2 of 2019.
    - \* Period 1: MZN including assignments (3 crds) project (2 crds).
    - \* Period 2: Gecode including assignments (5 crds).
- Advanced modelling course
  - Week 5: lectures.
  - Week 3: Suitor assignment.

### 2.8.2 Wednesday, 20-June

- Participate UPMARC summer school

### 2.8.3 Tuesday, 19-June

- Participate UPMARC summer school

### 2.8.4 Monday, June-18

- Participate UPMARC summer school
- Assignment 7: suitor schedule



## 2.9 [w24 : 2018-June-11] (**on leave 50%**) Advanced modelling course

### 2.9.1 [**Week 25**] Monday 18-June to Wednesday 20-June: **UPMARC Summer School**

- Participate UPMARC summer school

### 2.9.2 [Friday, June-15]

- [DONE] Assignment 6 : Weighing the Elephant : Improve the model
- Assignment 7: suitor schedule

### 2.9.3 [Thursday, June-14]

- Technical meeting with Justin 11:00.
  - Assignment 6 : Weighing the Elephant: Improve the model
- Meeting with senior group 13:00.

### 2.9.4 [Wednesday, June-13] (\*)

- Assignment 6 : Weighing the Elephant: Improve the model
- Week 4: Advanced modelling course
  - [DONE] 2.4.1. Square packing
  - [DONE] 2.4.2. Rectilinear packing without rotation
  - [DONE] 2.4.3. Rectilinear packing with rotation

### 2.9.5 [Tuesday, June-12] (\*)

- Week 3: Advanced modelling course
  - [DONE] 2.3.4. Sequence dependent scheduling 1
  - [DONE] 2.3.5. Sequence dependent scheduling 2
  - [DONE] 2.3.6. Module 3 summary
  - [DONE] Workshop 7: visiting Zhuge Liang

### 2.9.6 [Monday, June-11] (\*)

- Week 3: Advanced modelling course
  - [DONE] 2.3.1. Basic scheduling
  - [DONE] 2.3.2. Disjunctive scheduling
  - [DONE] 2.3.3. Cumulative scheduling
- Meeting with Michael
  - Special meeting will be held in late of August 2018.

## 2.10 [w24 : 2018-June-11] Meeting with Michael Thune

Meeting with Michael at his office from 13:00 to 14:30.

- Michael proposes to have a meeting at faculty office around end of August. The participants would come from
  - Faculty.
  - Main supervisor: Justin
  - Secondary supervisor: Pierre (also as Head of PhD program)
  - Union: Robert.
  - Feel good: Psychologist.
  - Me.
  - Head of department: Lina Von.
  - Head of division: Lars-Henrik.
- The meeting will resolve the following things
  - Admit PhD goal of Phuc.
    - \* Dependent issues such as course credits, publications, ... would be solved natively themselves.
  - Address the PhD goal in the study plan.
  - Prolong the PhD study.
  - Resolve funding issue.
- Regarding to request of changing supervisor: Michael recommend to wait until the special meeting happens. Then the request could be brought up again.

## **2.11 [w22 & w23 : 2018-May-28] (on leave 50%) Advanced modelling course**

### **2.11.1 [Week 23] Thursday, June-07**

- Quick weekly progress meeting with Justin
  - Advanced modelling course: Keep debugging assignemnt 6 using Gecode Gist.
  - Phuc will take at most 10 vacation days in July.
  - Justin will ask Pierre for the project's description that he can do during July.
  - Phuc and Justin will have a technical meeting next week at 10.00 am.
- Read about Gecode Gist.

### **2.11.2 [Week 23] Monday, June-04 & Tuesday, June-05**

Moving leave 50% on Monday and 50% on Tuesday.

### **2.11.3 [Thursday, May-30 & Friday, June-01]**

- Advanced modelling course: Keep debugging assignemnt 6.

### **2.11.4 [Wednesday, May-30]**

- Advanced modelling course
  - Assignment 6. Improving model
  - Lectures on week 3.

### **2.11.5 [Tuesday, May-29] (\*)**

- Participate NordConsNet.

### **2.11.6 [Monday, May-28] (\*)**

- Advanced modelling course
  - Assignment 6: modeling the correspondence of decision variables guards and stones
    - \* Fix the position of the guards

## **2.12 [w21 : 2018-May-21] (on leave 50%) Advanced modelling course**

### **2.12.1 [Wednesday, May-23]**

- Advanced modelling course
  - Assignment 6: modeling the correspondence of decision variables guards and stones
    - \* Maximize the hard task, otherwise easy task
    - \* Watch the video lecture again
- Weekly meeting with Justin & Pierre
  - Focus on technical discussion.
  - Meeting every two weeks due to 50% on sick leave.
  - Start thinking about the project when finishing the week 3.
  - Take Pierre's course in period 1 or 2.

### **2.12.2 [Tuesday, May-22] (\*)**

- Advanced modelling course
  - Assignment 6: modeling the correspondence of decision variables guards and stones
    - \* Watch the video lecture again
    - \* Track the status of the guards

### **2.12.3 [Monday, May-21] (\*)**

- Advanced modelling course
  - Assignment 6: modeling the correspondence of decision variables guards and stones
    - \* Fix the position of the guards

## **2.13 [w20 : 2018-May-14] (on leave 50%) Advanced modelling course**

### **2.13.1 [Friday, May-18]**

- Advanced modelling course
  - Assignment 6: modeling the correspondence of decision variables guards and stones
    - \* Fix the position of the guards

### **2.13.2 [Thursday, May-17]**

- Advanced modelling course
  - Assignment 6: modeling the correspondence of decision variables guards and stones
    - \* Improve the objective

### **2.13.3 [Wednesday, May-16]**

- Advanced modelling course
  - Review workshop 6.
  - Assignment 6: modeling the correspondence of decision variables guards and stones

### **2.13.4 [Tuesday, May-15]**

- Advanced modelling course
  - 2.3.2. Disjunctive scheduling
  - Workshop 6: weighing an elephant

### **2.13.5 [Monday, May-14]**

- Advanced modelling course
  - 2.3.1. Basic scheduling
  - Workshop 6: weighing an elephant

## 2.14 [w19 : 2018-May-07] (**on leave 50%**) Advanced modelling course

### 2.14.1 [Friday, May-11]

- Advanced modelling course
  - 2.2.5. Module 2 Summary
  - [\[DONE\]](#) Assignment: debugging the buggy models using different techniques Escape to Jing Province

### 2.14.2 [Thursday, May-10] **Red-day**

### 2.14.3 [Wed, May-09]

- Advanced modelling course
  - 2.2.4. Contexts
  - Assignment: debugging the buggy models using different techniques
    - \* Need 1 more point to pass the assignment.

### 2.14.4 [Tue, May-08]

- Advanced modelling course
  - 2.2.3. Using predicates
  - Assignment: debugging the buggy models using different techniques

### 2.14.5 [Mon, May-07]

- Advanced modelling course
  - 2.2.1. Predicates
  - 2.2.2. The let-in Construct
  - Assignment: debugging the buggy models using different techniques

## 2.15 [w18 : 2018-May-02] (**on leave 50%**) Advanced modelling course

### 2.15.1 Fri, May-04

- Advanced modelling course
  - References
    - \* Ref 9: Transforming data
    - \* Ref 10: User defined functions
    - \* Ref 11: Command line interface
  - Assignment: debugging the buggy models using different techniques

### 2.15.2 Thu, May-03

- [\[DONE\]](#) Basic modelling course: Assignment 4 (PASSED)
  - Debugging
  - Improved the models
  - Passed the course
- Advanced modelling course
  - References
    - \* Ref 9: Transforming data
    - \* Ref 10: User defined functions
    - \* Ref 11: Command line interface
  - Assignment: debugging the buggy models using different techniques
- Meeting with Justin

### 2.15.3 Wed, May-02

- Basic modelling course: Assignment 4 (passed 3 tests)
  - Debugging
- Advanced modelling course
  - References
    - \* Ref 6: Option types
    - \* Ref 7: Predicates
    - \* Ref 8: Flattening
  - Assignment: debugging the buggy models using different techniques
- Others
  - **Long meeting with Lars-Henrik & SACO union**
  - Quick meeting with Justin about the progress of Basic modelling course

### 2.15.4 [Week 18] Mon & Tue, May-01: red day

## 2.16 [w17 : 2018-April-23] (on leave 50%) Advanced modelling course

### 2.16.1 Fri, April-27

- Basic modelling course: Assignment 4 (passed 3 tests)
  - Debugging
  - Excerpt email sending to Justin
- Advanced modelling course
  - Assignment: debugging the buggy models using different techniques
- Others
  - Related to the study plan
    - \* Justin informs Phuc that he and Lars-Henrik decided not to follow the point in the study plan saying that the ISP will be revised every 3 months.
    - \* ask for meeting with Lars-Henrik
  - Related to disagreement
    - \* Phuc asks Justin who should he contact with to resolve the disagreements which was summarised in the previous meeting notes on 25-April ??.
  - Related to PhD goals and courses

### 2.16.2 Thu, April-26: ISP, basic modelling course

- Basic modelling course: Assignment 4 (passed 3 tests)
  - Debugging
- Advanced modelling course
  - Assignment: debugging the buggy models using different techniques
- Others
  - Phuc calls for revision of the study plan after 3 months which is consented by the head of department

### 2.16.3 Wed, April-25: Discrimination problem

- Basic modelling course: Assignment 4 (passed 3 tests)
  - [DONE] Revise the model base on the comments from Justin
  - [DONE] No improvement after tightening the constraint using
    - \* *alldifferent\_except\_0(horse/rider)*
    - \* if and only if <->
- Advanced modelling course
  - [DONE] Workshop 5: debugging the buggy models using different techniques



- \* Comment out constraints
- \* Using *trace()* function
- \* Add more check on the unbounded array index
- \* Tighten the *alldifferent\_except\_0()* constraint
- Assignment: debugging the buggy models using different techniques
- Meeting about discrimination problem
  - Whether or not Phuc is a PhD student in the department? Justin: Phuc’s position is the same as other PhD students.
  - Does Phuc have the rights as other PhD students? Justin: Phuc has all the rights as other PhD student.
  - Can Phuc take more credits for his PhD? Justin: Phuc can not.
    - \* Why can’t Phuc take more credits? Justin: the current credits are sufficient for the Licentiate.
    - \* Phuc plans for the PhD goals after the Licentiate, can he accumulate enough credits for PhD goal? Justin: No, as Phuc’s supervisor, Justin doesn’t agree for Phuc to take more credits.
    - \* Disagreement
      - Phuc informs Justin that he plans to gradually take enough credits for his PhD within the rest of his PhD full time study.
      - Justin doesn’t allow Phuc to take more credits.
  - Why other PhD student in the group can participate the summer school? Justin:
    - \* No funding for participating summer school.
    - \* Phuc doesn’t have the right to participate summer school.
  - Why there is a discrimination in taking courses for PhD, doing PhD, funding for books, summer schools, ...?
    - \* Justin explains due to the funding resource from the department. He doesn’t have any money to spend on me for those matters.
    - \* Justin explains that Phuc doesn’t have the right to take courses since he’s his supervisor.
    - \* Disagreement
      - On one hand, Justin confirms that Phuc has all the rights as other PhD students.
      - On the other hand, Justin explains that he doesn’t have the right to take the courses, as well as doing his PhD.
  - Phuc explains that in the very first meeting between Joachim, Michael, and him, Michael committed that Phuc just changed the goals to the Licentiate, other things remains the same including taking courses, buying textbook for doing research.
    - \* Justin gives no comment on this.
  - Justin advices Phuc to focus on finishing the 2 online courses and then move on in doing research.

#### 2.16.4 Tue, April-24: Advanced modelling course

- Basic modelling course: Assignment 4
  - Improve the model a bit (+1 more point), but still need to be better to fully pass the test.
  - Send the latest code to Justin and call for help.
- Advanced modelling course
  - [\[DONE\]](#) 2.1.7. Module 1 Summary
  - [\[DONE\]](#) Additional reference material
  - Workshop 5
- Others
  - Justin calls for a meeting on 24 of April. However, Phuc couldn't participate since he is discussing with the union. Phuc proposes to have a meeting next week.
  - Justin proposes to have a meeting on 25 of April. Phuc agrees to have a meeting to clarify the matters related to

#### 2.16.5 Mon, April-23: Advanced modelling course

- Others
  - Discuss with union
  - Email to Justin, Pierre, Joachim, and Michael about matters centered around Licentiate goal
- Basic modelling course: Assignment 4
  - Continue to debug: add/remove constraints but doesn't help
- Advanced modelling course
  - 2.1.7. Module 1 Summary
  - Additional reference material
- Reading papers
  - [\[DONE\]](#) Bessier - Reasoning about Constraint Models: abstract

#### 2.16.6 [\[Week 16\]](#) Fri, April-19: Advanced modelling course

- [\[Week 16 - Week 20\]](#) Advanced modelling course : [\[DONE\]](#) Reference Material
  - Reference 1: Basic features
  - Reference 2: booleans expressions
  - Reference 3: Set, Arrays and comprehensions
  - Reference 4: Enumerated Types
  - Reference 5: Strings and output
  - Reference 6: Option types

### 2.16.7 [Week 16] Thu, April-19: Advanced modelling course

- [Week 16 - Week 20] Advanced modelling course : 1<sup>st</sup> week: debugging and improving models
  - [DONE] 2.1.3. Relational models
  - [DONE] 2.1.4. Too many solutions
  - [DONE] 2.1.5. Missing solutions
  - [DONE] 2.1.6. Basic model improvement
    - \* *alldifferent\_except\_0()*
    - \* *glocal\_cardinality()*
  - [DONE] 2.1.7. Module 1 summary
- Meeting notes
  - Justin will discuss with Joachim about revising time for the study plan.
  - Phuc will send the latest model to Justin tomorrow (April-20).
  - Reading the papers and discussing with Justin will interchange with taking 'Advanced modelling course'.
  - Related to the summer school this year, Justin advises Phuc not to take it since Phuc should spend more time on the courses and backgrounds. The summer school participation will be revised next year.
  - Related to the funding matter, Justin explains that there are not any extra funding for Phuc to participate the summer schools, or conference travelling.
  - Phuc sent the thesis outline to Justin <https://github.com/PhucVH888/Thesis>
  - Phuc informs Justin that he will take more credits for his PhD in the future.

### 2.16.8 [Week 16] Wed, April-18: Basic modelling course

- [Week 16 - Week 20] Advanced modelling course : 1<sup>st</sup> week: debugging and improving models
- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling> [Assignment 4]
  - Use 'beauty0' and 'ability0' to deal with index 0, but just 3/7 tests passed.
  - Add more constraints between 'rank' and 'beauty' but the result is 'unsatisfiable'.

### 2.16.9 [Week 16] Tue, April-17: Warm up

- Others
  - [DONE] Reinstall MacOS on the new iMac.
  - [DONE] Email to Union about the future meeting.
  - [DONE] Apply sick leave on Primula web.
- Quick meeting notes
  - Phuc informs Justin about his 50% sick leave from 2018-04-17 to 2018-05-28.
  - Phuc will continue to work on the assignment 4 in the basic modelling course.

## 2.17 [w16 : 2018-April-17] (on leave 50%) Warm up

### 2.17.1 Fri, April-19: Advanced modelling course

- [Week 16 - Week 20] Advanced modelling course : [DONE] Reference Material
  - Reference 1: Basic features
  - Reference 2: booleans expressions
  - Reference 3: Set, Arrays and comprehensions
  - Reference 4: Enumerated Types
  - Reference 5: Strings and output
  - Reference 6: Option types

### 2.17.2 Thu, April-19: Advanced modelling course

- [Week 16 - Week 20] Advanced modelling course : 1<sup>st</sup> week: debugging and improving models
  - [DONE] 2.1.3. Relational models
  - [DONE] 2.1.4. Too many solutions
  - [DONE] 2.1.5. Missing solutions
  - [DONE] 2.1.6. Basic model improvement
    - \* *alldifferent\_except\_0()*
    - \* *glocal\_cardinality()*
  - [DONE] 2.1.7. Module 1 summary
- Meeting notes
  - Justin will discuss with Joachim about revising time for the study plan.
  - Phuc will send the latest model to Justin tomorrow (April-20).
  - Reading the papers and discussing with Justin will interchange with taking 'Advanced modelling course'.
  - Related to the summer school this year, Justin advises Phuc not to take it since Phuc should spend more time on the courses and backgrounds. The summer school participation will be revised next year.
  - Related to the funding matter, Justin explains that there are not any extra funding for Phuc to participate the summer schools, or conference travelling.
  - Phuc sent the thesis outline to Justin <https://github.com/PhucVH888/Thesis>
  - Phuc informs Justin that he will take more credits for his PhD in the future.

### 2.17.3 Wed, April-18: Basic modelling course

- [Week 16 - Week 20] Advanced modelling course : 1<sup>st</sup> week: debugging and improving models
- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling> [Assignment 4]
  - Use 'beauty0' and 'ability0' to deal with index 0, but just 3/7 tests passed.
  - Add more constraints between 'rank' and 'beauty' but the result is 'unsatisfiable'.

## 2.17.4 Tue, April-17: Warm up

- Others
  - [DONE] Reinstall MacOS on the new iMac.
  - [DONE] Email to Union about the future meeting.
  - [DONE] Apply sick leave on Primula web.
- Quick meeting notes
  - Phuc informs Justin about his 50% sick leave from 2018-04-17 to 2018-05-28.
  - Phuc will continue to work on the assignment 4 in the basic modelling course.

**2.18** [w16-w21 : 2018-May-28] On leave 50%

**2.19** [w11-w15 : 2018-April-16] On leave 100%

## 2.20 [w10 : 2018-Mar-05] List of top conferences

### 2.20.1 Fri, Mar-09: Basic modelling course

- Handbook of CP
- [Week 7 - 10] Basic modelling course
  - [Assignment 4] Debugging, got 6/26 (require 19/26 to pass).
- [Week 11 - Week 14] Advanced modelling course : 1<sup>st</sup> week: debugging and improving models
  - [TODO] 2.1.3. Relational models
  - [TODO] 2.1.4. Too many solutions
  - [TODO] 2.1.5. Missing solutions
  - [TODO] 2.1.6. Basic model improvement
  - [TODO] 2.1.7. Module 1 summary
- [Deadline: 1<sup>st</sup> May] Summer school Manchester
  - [TODO] Ask Justin for participating the SAT/SMT/AR summer school at University of Manchester, from 03-06 July 2018.
    - \* <http://ssa-school-2018.cs.manchester.ac.uk>
    - \* <http://ssa-school-2018.cs.manchester.ac.uk/index.php/application/>

### 2.20.2 Thur, Mar-08: Basic modelling course & Advanced modelling course

- [DONE] *MiniZinc* tutorial
- [Week 7 - 10] Basic modelling course
  - [Problem] Couldn't model the constraints from the given descriptions - need help.
- [Week 11 - 14] Advanced modelling course - Start early - W1: Debugging and improving models
  - [DONE] 2.1.1. Model debugging
  - [DONE] 2.1.2. Tracing models
- Others
  - ...
- Weekly meeting with Justin
  - Justin helps Phuc to model the constraints in assignment 4, explain the use of *inverse()*, ...
  - Course project: in week 13
    - \* Phuc will email Gustav [gustav.bjordan@it.uu.se](mailto:gustav.bjordan@it.uu.se) to discuss more about the project.

- \* Phuc will start thinking about the project, prepare and discuss the project with Justin.
- Phuc asks Justin for more discussions about
  - \* summarise the challenge 1.
  - \* wrap-up in the 1-2 page(s).
  - \* submit to the poster track in the future.
- ∞ Justin and Phuc will discuss more in the next study plan's revision.

### 2.20.3 Wed, Mar-07: On leave

- *MiniZinc* tutorial
  - Chapter 6. Effective modelling Practices in *MiniZinc*
    - \* [DONE] Section 6.1. Variable bounds.
    - \* [DONE] Section 6.2. Unconstrained variables.
    - \* [DONE] Section 6.3. Effective Generators: using *trace* to to understand what is happening during model creation.
    - \* [DONE] Section 6.4. Redundant Constraints.
    - \* [DONE] Section 6.5. Modelling Choices: better model is likely to have
      - smaller number of variables
      - smaller domain sizes of variables
      - more succinct, or direct, definition of the constraints of the model
      - uses global constraints as much as possible
    - \* [DONE] Section 6.6. Multiple Modelling and Channels
  - Chapter 7. Boolean Satisfiability Modelling in *MiniZinc*
    - \* [DONE] Section 7.1. Modelling Integers
    - \* [DONE] Section 7.2. Modelling disequality
    - \* [DONE] Section 7.3. Modelling Cardinality
- Basic modelling course
  - [TODO] Week 4 - Multiple Modelling: Assignment 4
  - [Problem] Couldn't model the constraints from the given descriptions - need help.
  - [DONE] Watch all the lectures again to find out how.
- Others
  - Sick leave.
  - [DONE] Email Justin
    - \* for longer meeting related to the channeling technique & multi-viewpoints.
    - \* to discuss more about the roadmap of challenge #1.



## 2.20.4 Tue, Mar-06: On leave

- Handbook of CP:
  - [DONE] Section 10.4.1. The Lex-Leader Method
- *MiniZinc* tutorial
  - Section 5.3. Annotations.
- Basic modelling course
  - [TODO] Week 4 - Multiple Modelling: Assignment 4
  - [Problem] Couldn't model the constraints from the given descriptions - need help.
  - Watch all the lectures again to find out how.
- Others
  - Sick leave.
  - Ask Justin for longer meeting related to the channeling technique & multi-viewpoints.
  - Discuss more about the roadmap of challenge #1.

## 2.20.5 Mon, Mar-05: Top conferences

- [DONE] Top conferences: by decreasing prestige
  1. <http://www.a4cp.org/events/cp-conference-series>
  2. <http://www.andrew.cmu.edu/user/vanhoeve/cpaior/>
  3. <http://www.ijcai.org/>
  4. <https://www.ijcai-18.org>
  5. <https://www.aaai.org>
  - See more resources: <http://www.it.uu.se/research/group/optimisation/resources/constraint>
- *MiniZinc* tutorial
  - [DONE] Chapter 5. Search
    - \* 5.1. Finite domain search.
    - \* 5.2. Search annotations: `int_search()`, `bool_search()`, `set_search()`.
- Basic modelling course
  - [Problem] Couldn't model the constraints from the given descriptions - need help.
  - [DONE] Read & watch the lectures again, try many different ways to model the constraints.
- Others

## 2.21 [w9 : 2018-Feb-26] Continue the basic modeling course

### 2.21.1 Fri, Mar-02: Basic Modelling Course

- Handbook of CP:
  - [TODO] Section 10.4. Adding constraints before search
    - \* [TODO] The Lex-Leader method.
- *MiniZinc* tutorial
  - [TODO] Chapter 5. Search
- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - [TODO] Week 4 - Multiple Modeling
    - \* [TODO] Assignment 4
- Others
  - [DONE] Change the parental leave plan due to the coming appointment with doctor.
  - [DONE] Ask Justin for the list of conferences and workshops in the field.
  - [DONE] To participate the SAT/SMT/AR summer school at University of Manchester, from 03-06 July 2018. Link: <http://ssa-school-2018.cs.manchester.ac.uk?>

### 2.21.2 Thu, Mar-01: Basic Modelling Course

- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Modeling with Functions. "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
    - \* [DONE] Improve the assignment 3 - PASSED.
    - \* [DONE] Watch the workshop 3 again, which is about using **regular** expression together with automaton.
  - Week 4 - Multiple Modeling
    - \* [DONE] 1.4.2. Permutation
    - \* [DONE] 1.4.3. More Permutation Problem
    - \* [DONE] 1.4.4. More Multiple Models
    - \* [DONE] 1.4.5. Module 4 summary
    - \* [DONE] Working on workshop 4 - Composition
    - \* [DONE] Working on workshop 4 - SOLUTION

### 2.21.3 Wed, Feb-28: **On leave** & Progress Report

- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Modeling with Functions. "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>

- \* [TODO] Improve the model.
- Handbook of CP:
  - [TODO] Section 10.4. Adding constraints before search
- *MiniZinc* tutorial
  - [TODO] Chapter 5. Search
- Others
  - Traffic jam.
    - \* Take 3 hours from Stockholm to Uppsala.
    - \* Take 3 hours more from Uppsala to Stockholm.
  - Sick leave.
- Meeting with Justin: Progress report
  - Justin adds 3 more papers in the Google Drive
    - \* to be read later
  - Basic modelling online course, Phuc will refine the constraint of
    - \* ...in a row...
    - \* **at\_most(...)**
  - Justin informs Phuc about Pierre's course on propagation in September 2018
  - Summer school
    - \* Phuc will look up the summer school agenda & let Justin know when its agenda is ready online.
  - Phuc will participate the NordConsNet 2018 @ Goteborg
  - Phuc informs Justin about
    - \* discussion with SACO regarding to PhD contract.
    - \* his appointment with Psychologist on March.
    - \* looking for the summer school on Constraint programming.
    - \* Michael's approval for taking parental leave.

#### 2.21.4 Tue, Feb-27: **On leave**

- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Modeling with Functions. "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
    - \* [TODO] Improve the model.
    - \* [DONE] 1.4.1. Multiple modeling
- Handbook of CP:
  - [DONE] Section 10.1. Symmetries and group theory.
    - \* 10.1.1. Group theory in constraint programming.

- \* 10.1.2. Computational group theory
- [DONE] Section 10.2. Definitions.
  - \* Def.10.20. Solution symmetry.
  - \* Def.10.21. Problem symmetry.
- [DONE] Section 10.3. Reformulation.
  - \* Modelling and reformulation are equally important for symmetry breaking.
- *MiniZinc* tutorial
  - [DONE] Chapter 4. Predicates
- Others
  - Sick leave.

### 2.21.5 Mon, Feb-26: Reading book - Basic modeling course

- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Modeling with Functions. "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
    - \* [DONE] Watch the lectures again
- Handbook of CP:
  - [TODO] Chapter 10: intro.
- *MiniZinc* tutorial
  - [DONE] Chapter 3.
- PhD contract: discuss with several parties for advice and answers.
  - [DONE] Discuss with Ombudsmen.
- Discuss with SACO union.
  - [DONE] Resolve the PhD contract issue

## 2.22 [w8 : 2018-Feb-19] Continue the basic modeling course

### 2.22.1 Fri, Feb-23: Back to work

- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Modeling with Functions. "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
    - \* [TODO] Watch the lectures again
    - \* [TODO] Improve the model.
- Handbook of CP:
  - [DONE] Chapter 2: constraint satisfaction: An emerging paradigm.
  - [TODO] Chapter 10.
- *MiniZinc* tutorial
  - [TODO] Chapter 3.
- PhD contract: discuss with several parties for advice and answers.
  - [TODO] Discuss with Ombudsmen.
- Ask for the employment certificate
  - [DONE] Email to Anna-Lena => no response.
  - [DONE] Email to Ulrika => response without the employment certificate.
    - \* [DONE] Ask Ulrika again this afternoon => no response.
    - \* [TODO] Ask Ulrika again early next Monday.

### 2.22.2 Thu, Feb-22: On leave

- Sick leave.
- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Week 3 - Modeling with Functions
    - \* Watch the lectures again, hopefully to figure out how to improve the model.
- PhD contract: discuss with several parties for advice and answers.
  - [DONE] Ask Ulrika about
    - \* The duration of the next PhD contract?
    - \* How come the PhD contract preventing to apply for parental leave on Primula web in 2018?

### 2.22.3 Wed, Feb-21: On leave

- Sick leave
- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Week 3 - Modeling with Functions
    - \* [DONE] Improved a bit (13/20 : need 1 point more to pass).

### 2.22.4 Tue, Feb-20: On leave

- Sick leave
- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Week 3 - Modeling with Functions
    - \* [DONE] Submitted - Assignment 3.
      - Failed many test cases. Revised and submit again (3/20 : need 14 points to pass).
    - \* [DONE] There are 5 problem instances in **data** folder. With the first four tests, the solver has found the solution quickly, but the last test, it takes more than 2 minutes.
- [DONE] Related to the paper 'Forward the future in Encore' submitting to COORDINATION 2018.
  - [DONE] Ask K. for previous version.
  - [DONE] Ask K. for the last version.
- PhD contract: discuss with several parties for advice and answers.
  - [DONE] Discuss with SACO union.
- Report sick leave (Tues, 20 Feb 2018)
  - [DONE] To primula web.
  - [DONE] To Justin.

### 2.22.5 Mon, Feb-19: Reading book

- "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - Week 3 - Modeling with Functions
    - \* [DONE] Working on workshop 3
- Handbook of CP:
  - [DONE] Chapter 2: constraint satisfaction: An emerging paradigm.

- *MiniZinc* tutorial
  - [\[DONE\]](#) Chapter 1.
  - [\[DONE\]](#) Chapter 2.

## 2.23 [w7 : 2018-Feb-12] Continue the basic modeling course

### 2.23.1 Fri, Feb-09: Reading book

Continue reading handbook of constraint programming

### 2.23.2 Thu, Feb-15: Weekly progress meeting

- Phuc is on week 3 of the first coursera course.
- Progress is going well. Not time yet to start thinking about a project for Pierre's modelling course. Agreed when he is 50% through the advanced coursera course.
- Informed Phuc of Lars-Henrik's new contract period.
- Informed Phuc that he will be moving office, but I'm not sure when.
- Decisions there is no need to get a certificate for the two coursera courses. Phuc just needs to show us his online progress.
- [DONE] Phuc will put his working at home days on his google calendar.
- Action points (not discussed in the meeting)
- [DONE] invite pierre.flener@gmail.com to Phuc's calendar
- [TODO] Pierre will invite Phuc to his work calendar.

### 2.23.3 Wed, Feb-14: Reading books

- Read chapter 1
- Read chapter 2.
- Resolving the parental leave application.

### 2.23.4 Tue, Feb-13: Modeling with Functions

- **1.3.1. Modeling Functions:** many combinatorial problems have the form: assign to each object in one set DOM (domain) a value from another set COD (codomain). We can interpret this as: defining a function  $\text{DOM} \rightarrow \text{COD}$ , or partitioning the set DOM (in sets labelled by COD).
  - This function could be: *injective* - assignment problem, *bijective* ( $\text{DOM} = \text{COD}$ ) - matching problem.
- **1.3.2. Another assignment problem example**
- **1.3.3. Modeling partitions** Partitioning problems
  - Finding a function  $f : \text{DOM} \rightarrow \text{COD}$
  - Can be considered a partitioning problem
- **1.3.4. Global cardinality constraint:** A clustering problem. Given a set of  $n\text{Spots}$  points, divide them into at most  $k$  clusters so that



- No two points in the same cluster are more than *maxSep* away from each other.
- Maximize the minimal distance between any two points in different clusters.
- Summary
  - \* Pure partitioning with
    - bounded set of clusters  $k$
    - know number of clusters  $k$
    - unknown number of clusters
  - \* Cluster numbers are irrelevant
    - induces a value symmetry
  - \* Removing value symmetry with `value_precede_chain()` in MiniZinc

## 2.23.5 Mon, Feb-12: Basic modeling - Workshop 2 & Assignment 2

Workshop 2 : Surrender Negotiations problem

- Select a set of negotiators to make up the party.
- The party must be made up of between minimum and maximum negotiators.
- Negotiators will work in teams of two, each pair has a joint negotiation strength.
- Total strength of the party is the sum of strength of all pair in the party, and it needs to reach some threshold value to be successful.
- The aim is maximise the honour of the negotiation party, given by minimum honour of negotiators.
- Data format:
  - $p$  : the problem number.
  - $l$  : minimum size of the negotiation party.
  - $u$  : maximum size of the negotiation party.
  - $m$  : minimum total negotiation strength required for success.
  - NEGOTIATOR : an enumerated type defining the negotiators
    - \* including *dummy* negotiator, which has a value lower than other negotiator.
  - *honor* : the honor of each negotiator ( $honor[dummy] = 0$ ).
  - *joint* : a two dimensional array of integer values defining the negotiation strength of each pair of negotiators.
    - \* Negotiation strength of all pairs with the *dummy* are guaranteed to be 0.
    - \* Array is guaranteed to be *symmetric*.

Assignment 2 : *Raid Planning* is similar to the *Workshop 2* problem. The objective is to maximize the strength of the raiding party which is given by the sum of the strengths the warriors in the party.

- Data format:
  - $p$  : the problem number.
  - $l$  : minimum size of the raiding party.

- $u$  : maximum size of the raiding party.
- $m$  : maximum number of pairs from clans who hate each other.
- *WARRIOR* : an enumerated type defining the warriors
  - \* including *dummy* warrior, which has a strength value lower than any other warrior.
- *strength* : the strength of each warrior.
  - \*  $strength[dummy] = 0$ .
- *CLAN* : an enumerated type defining the clans
- *clan* : the clan of each warrior
  - \* the clan of *dummy* warrior has no hatreds with any other clan
- *hates* : a two dimensional array of 0..1 values defining which clans hate which other clans.
  - \* the *hates* is guaranteed to be symmetric.

## 2.24 [w6 : 2018-Feb-05] Finalise ISP, parental leave, and teaching

### 2.24.1 Specific tasks in week 6 and **TODO** list

- **[TODO]** Take the "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - **[TODO]** week 2 - Modelling with Sets.
    - \* **[DONE]** Lectures on datatypes in MiniZinc.
  - **[DONE]** week 1 - MiniZinc introduction & Assignment 1.
    - \* **[DONE]** Reference 1 to 7.
  - **[TODO]** Workshop 2
- **[TODO]** Learn about MiniZinc tutorial
  - **[DONE]** Summarise basic functions & features. Link: <http://bit.ly/2F40oqe>
  - **[TODO]** Do exercises & examples.
- **[TODO]** Read the example of transformation: <http://soda.swedishict.se/6114/>
- **[DONE]** New study plan
  - **[DONE]** Formalise the process (do the paperwork).
    - \* **[DONE]** Send an email to Justin to ask for formalising the process.
  - **[DONE]** Create a new study plan, and fill in basic info, courses taken, ...

### 2.24.2 Fri, Feb-09: Meeting with SACO & Coming to Forsakringkassan's office

Occupied by a meeting with Robert at SACO union regarding to the PhD contract with the department. Coming to Elias's thesis defence is planned, but for the priority of discussing with Forsakringkassan about the paternity application is higher. Queuing in the line at the front door of Forsakringkassan for hours before getting a chance to talk to someone there.

### 2.24.3 Thu, Feb-08: basic modeling - week 2 : Set

- *SetSelect* problem (without cardinality constraints) is known as the weighted set packing problem a well studied NP complete problem from combinatorics.
- Set packing is the dual of set covering, one of the most studied combinatorics problems.
- Modeling by Set with special properties such as *card*.
- **[TODO]** Workshop 2 is to model subset selection and to experiment with different set variable representations. Using built-in *Set* and *Array*.

### 2.24.4 Wed, Feb-07: basic modeling - week 2 : *MiniZinc*'s intro

- Summarise exercises and assignments in week 1, and write in thesis <https://github.com/PhucVH888/Thesis>.

### 2.24.5 Tue, Feb-06: Meeting with Justin

The meeting with Justin is simply to finalise the study plan and research plan.

- Finalise the study plan
  - Change funding source to 100% FoFu CSD (department funding).
  - Clearly state that the work on Dave's project has been discontinued.
  - Record to take parental leave as soon as possible.
- Schedule working process
  - First, take basic modelling course on coursera (4 weeks) [2].
  - Second, take advance modelling course on coursera (4 weeks) [1].
  - In parallel, participate Pierre's lectures [5].
  - After finishing first task, think about project in Pierre's course under supervision of Justin. Discuss with Justin or ask him for the concrete project.
- Have weekly 30-minute meeting every Thursday, at 13:30 at Justin's office.
  - What have been done.
  - What are going to do.
  - Book a longer meeting for questions and technical issues.

### 2.24.6 Mon, Feb-05: Meeting with Justin and Joachim

The meeting with Justin and Joachim was about the new ISP, 25% parental leave, PhD contract, and teaching.

- Before the meeting with Justin and Joachim, read the following documents about rules/regulations
  - Doctoral studies [8, 6, 7].
  - PhD rights [12].
  - Supervisors regulations [9].
  - Discrimination [3] & Equal opportunities rules [4]. All rules are here [11].
  - Parental leave rules.
  - Report primula web problem when apply for 25% parental leave.
- Fill in the form and send to Michael to apply for taking 25% parental leave from March.
- Finalise the study plan [10], which includes the changes as the following:
  - Expected to be completed date, which is 2020-April-30.
  - Don't do teaching this academic year semester 2 of academic year.
  - Change supervisors, the department appointed
    - \* Justin Pearson to be main supervisor.
    - \* Pierre Flener to be secondary supervisor.

- Revise the study plan every 3 month under the supervision of the head of department, Michael Thune.
- Elaborate the concrete tasks for the next 03 months
  - \* First, take basic modelling course on coursera (4 weeks) [2].
  - \* Second, take advance modelling course on coursera (4 weeks) [1].
  - \* In parallel, participate Pierre’s lectures [5].
  - \* After finishing first task, think about project in Pierre’s course under supervision of Justin. Discuss with Justin or ask him for the concrete project.
- Record Phuc’s wish to do teaching in the future.
- Record on leave some working days after signing the new ISP.
- Record possibly to participate the Lab meeting every Thursday or Friday.

## 2.25 [w5 : 2018-Jan-29] Courses taken in 2<sup>nd</sup> course week

### 2.25.1 Meeting with Justin about constructing the ISP

- Do 80% research and express the wish to do 20% teaching.
- Take the Pedagogy training course in the final PhD year.
- Take 25% parental leave from February.
- On leave 5 working days after signing the new ISP.
- Report weekly progress to Justin.
- Possibly participate the Lab meeting every Thursday or Friday.
- Construct new ISP with concrete goals every 3 months.

### 2.25.2 **TODO** list

# Specific tasks in week #5.

- **[TODO]** Take the "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - **[DONE]** week 1 - MiniZinc introduction & Assignment 1.
  - **[TODO]** week 2 - Modelling with Sets.
    - \* **[DONE]** Reference 1 to 7.
    - \* **[DONE]** Lectures on datatypes in MiniZinc.
- **[TODO]** Read the example of transformation: <http://soda.swedishict.se/6114/>
- **[TODO]** New study plan
  - **[TODO]** Formalise the process (do the paperwork).
    - \* **[DONE]** Send an email to Justin to ask for formalising the process.
  - **[DONE]** Create a new study plan, and fill in basic info, courses taken, ...
- **[TODO]** Learn about MiniZinc tutorial
  - **[DONE]** Summarise basic functions & features. Link: <http://bit.ly/2F40oqe>
  - **[TODO]** Do exercises & examples.

## 2.26 [w4 : 2018-Jan-22] Courses taken in 1<sup>st</sup> course week

- Meeting's 2.27 status: Please refer to section 2.27 for the current status as well as updated version.
- Individual study plan (ISP)
  - Participate the Association for Constraint Programming (ACP) Summer Schools. Date and venue are unknown, but ACP summer school was held in September 18-22, 2017 in France last year. Link: <http://www.a4cp.org/events/summer-schools>
  - [Or] Participate the SAT/SMT/AR summer school at University of Manchester, from 03-06 July 2018. Link: <http://ssa-school-2018.cs.manchester.ac.uk>
- [DONE] Read & summarise paper "MiniZinc: Towards a standard CP modelling language".
  - The paper was summarised as a mindmap <http://bit.ly/2B1AZGk>
- [TODO] New study plan
  - [TODO] Formalise the process (do the paperwork).
  - [DONE] Create a new study plan, and fill in basic info, courses taken, ...
- [DONE] Justin asks Phuc to prepare a two pages plan and send to him on Monday.
  - The plan is about all the ideas related to the challenge #1 such as implied constraints, model transformations, useful correct refactoring, ...
  - The plan should be stretched over 3 years in general
    - \* The 3-months plan should be prepared relying on the 3 years plan.
    - \* The proper research comes first, then the licentiate after.
  - [DONE] Write 2-pages ideas & send to Justin on Monday, Jan 22, 2018.
- [TODO] Learn about MiniZinc tutorial
  - [DONE] Summarise basic functions & features. Link: <http://bit.ly/2F40oqe>
  - Do exercises & examples.
- [TODO] Take the basic level CP course, given by Pierre.
  - Read & summarise Pierre' slides about Modelling for combinatorial optimisation (M4CO).
  - Link to M4CO: <http://user.it.uu.se/~pierref/courses/M4CO/slides/>
- [TODO] Take the "Basic modelling for discrete optimisation" online course: <https://www.coursera.org/learn/basic-modeling>
  - [TODO] Participate the first week lectures and assignment.
- [TODO] Read the example of transformation: <http://soda.swedishict.se/6114/>

## 2.27 [w3 : 2018-Jan-18] 1<sup>st</sup> meeting with Justin

- [TODO] New study plan
  - Formalize the process.
  - [DONE] Create a new study plan, and fill in basic info, courses taken, ...
- [DONE] Justin asks Phuc to prepare a two pages plan and send to him on Monday.
  - The plan is about all the ideas related to the challenge #1 such as implied constraints, model transformations, useful correct refactoring, ...
  - The plan should be stretched over 3 years in general
    - \* The 3-months plan should be prepared relying on the 3 years plan.
    - \* The proper research comes first, then the licentiate after.
  - [DONE] Write 2-pages ideas & send to Justin on Monday, Jan 22, 2018.
- [TODO] Learn about MiniZinc tutorial
  - [DONE] Summarise basic functions & features.
  - Do exercises & examples.
- [TODO] Take the basic level CP course, given by Pierre.
  - Read Pierre slides about Modelling for combinatorial optimisation (M4CO).
  - Link to M4CO: <http://user.it.uu.se/~pierref/courses/M4CO/slides/>
- [TODO] Take the CP online course: <https://www.coursera.org/learn/basic-modeling>
- [TODO] Read the example of transformation: <http://soda.swedishict.se/6114/>



## 2.28 [w2 : 2018-Jan-08] Meeting with Joachim and Michael

- “Phuc has not yet started on the document” => Phuc did prepare the document and send it to Joachim first time on 14 Nov, and second time on 18 Dec 17 at 16:30. Joachim has investigated the formalities for having an external advisor. No potential advisor other than Justin has been contacted.
- The main priority is now to get Phuc accepted by Justin and find a place in Justin’s project. Before this is resolved other potential advisors need not be contacted.
- Phuc asked Joachim whether or not Joachim forwarded all Phuc’s documents to Justin. Joachim will re-check and forward them to Justin.
- Phuc asked about the responsibility of the first and second supervisors in helping to construct a new ISP. Phuc proposed Joachim and Justin help him to construct a 2 months ISP firstly with the specific outcomes. The 6 months or 1 year ISP will be planned afterwards.
- Phuc should immediately read up on mini-zinc, there is a tutorial on the homepage.
- Phuc should work on the document expressing his skills and experiences in some detail, especially those that could be relevant for Justin’s project. This includes but is not limited to programming languages, lambda calculus, program transformations, type systems etc. Joachim will help Phuc in this. If discussions with Justin fail, this document can be a basis when contacting other potential advisors. Since Joachim thinks that Phuc’s CV, transcripts, project report, ... are useless but the document expressing his skills and experiences.
- In a subsequent meeting with Lars-Henrik it is determined that Phuc has not applied for and currently does not intend to apply for parental leave.

## **2.29 [w1 : 2018-Jan-01] Individual study plan and project**

- Justin sends a project proposal and asks for Phuc's feedbacks.
- Email conversations between Phuc and Justin.
- Justin suggests a project as a possibility and Phuc indicates interest.
- Due to overlapping travel they cannot meet until mid January.