DSUM PRESENTATION

International Timetabling Competition 2019

DATA SCIENCE FOR UNIVERSITY MANAGEMENT

Grand Solutions project funded by Innovation Fund Denmark and MaCom A/S

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SOLUTION APPROACH

Mixed Integer Programming (MIP) Model

Comprehensive graph-based MIP

- Uses clique covers, star covers, odd cycles, complete bipartite covers, etc.
- Approx. 45 variable sets
- Approx. 85 constraint sets

Matheuristics

- Fix-and-optimize
- Two/Three-Stage Constructive Algorithm

Instance	Constraints	Variables
agh-fis-spr17	1,806,658	2,159,378
agh-ggis-spr17	1,330,393	1,472,214
bet-fal17	2,974,988	2,426,521
iku-fal17	296,727	3,449,418
mary-spr17	423,901	402,043
muni-fi-spr16	1,970,020	1,636,839
muni-fsps-spr17	330,911	275,897
muni-pdf-spr16c	3,527,034	4,338,790
pu-llr-spr17	1,671,963	1,344,501
tg-fal17	52,556	82,223
agh-ggos-spr17	2,458,347	2,304,596
agh-h-spr17	1,623,559	1,674,303
lums-spr18	121,663	442,590
muni-fi-spr17	2,783,030	2,299,293
muni-fsps-spr17c	3,530,470	2,077,599
muni-pdf-spr16	4,264,196	3,423,148
nbi-spr18	549,940	592,387
pu-d5-spr17	4,300,705	4,002,079
pu-proj-fal19		
yach-fal17	1,226,721	659,118
agh-fal17	10,071,748	9,788,065
bet-spr18	4,070,348	3,022,369
iku-spr18	276,717	3,074,521
lums-fal17	106,246	437,140
mary-fal18	1,355,615	1,272,392
muni-fi-fal17	3,391,653	2,893,880
muni-fspsx-fal17	5,708,241	3,253,105
muni-pdfx-fal17	7,135,695	8,322,330
pu-d9-fal19	18,878,893	11,297,549
tg-spr18	72,087	91,937

SOLUTION APPROACH

Parallelized Matheuristic
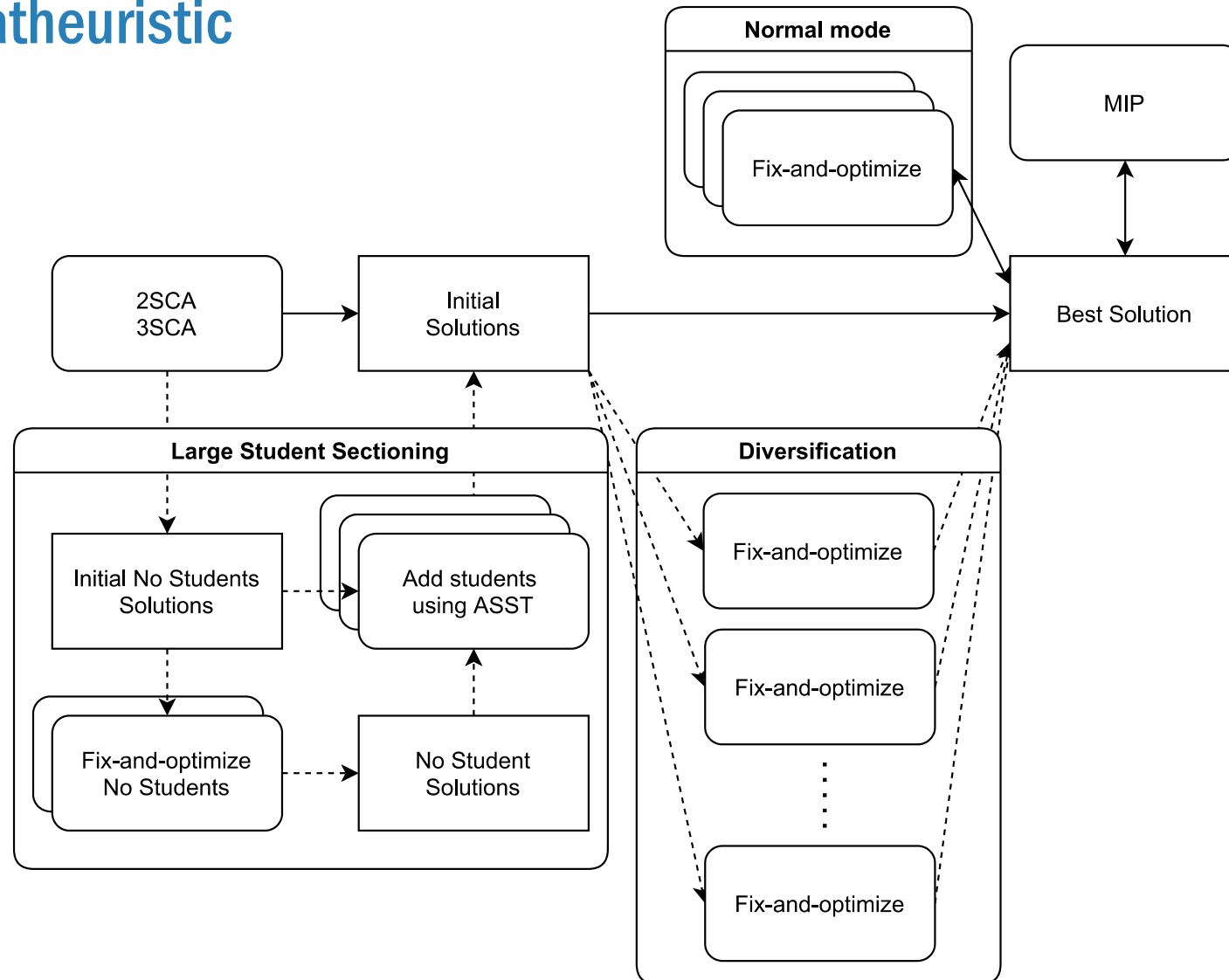
COMPLEMENTARY INFORMATION

Implemented in C#

- Run on Linux cluster through Mono 5.20

MIP Solver

- Gurobi 8.1.1 (Updated to Gurobi 9.0 post-competition)

Runs/time

- One run for 10 days on Late instances

Updated solution and bound values

- https://dsumsoftware.com/itc2019/