Are You MISTified? Scheduling and Process Improvement for Muslim Inter-Scholastic Tournament

Mechanical & Industrial Engineering
UNIVERSITY OF TORONTO

mist TORONTO

1. What is MIST and what are their issues?

The Muslim Inter-Scholastic Tournament (MIST) is a three-day annual event that consists of competitions and workshops targeted for high-school students. In 2012, there were over 750 participants and 100 volunteers registered.

Figure 1: The MIST committee is currently facing issues with creating and executing their schedule

2. How does MIST currently schedule?

The As-is business process diagram created on the basis of information collected through client interviews

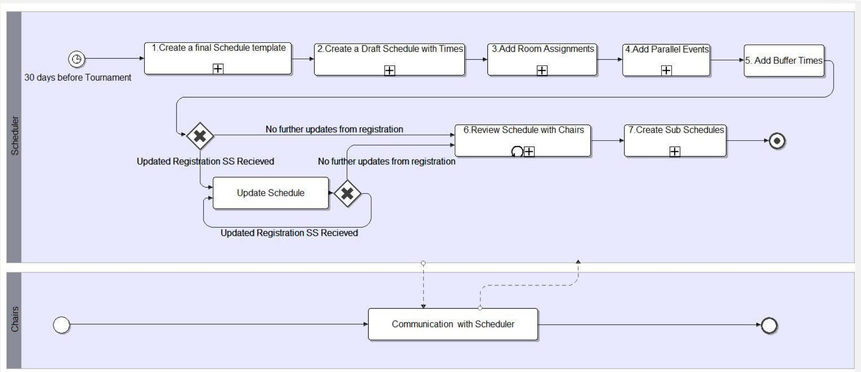

Figure 2: Business Process Diagram displaying the current scheduling process overview

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3. Our approach

The objective, constraints and results identified using the As-Is process.

Objective:	Constraints:	End result to be achieved:

• Minimization of:
  • Human error i.e. double booking & conflicts
  • Delays on the day of tournament
	• Time
	• Budget
	• Room availability
		• Reduction in time taken to schedule
		• Accommodation of changes to schedule

Prototype

The prototype created used the algorithms and the logic behind the As-Is business process.

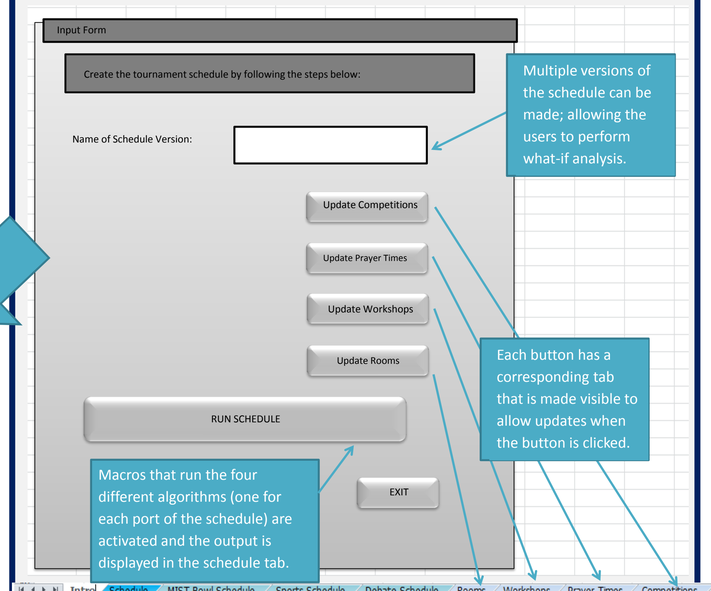
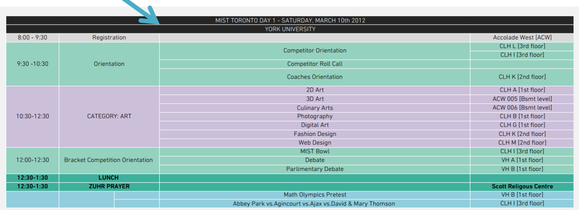


Figure 3: Paper prototype of the software-based scheduling system



MIST TORONTO DAY 1 - SATURDAY, MARCH 10th 2012
YORK UNIVERSITY

8:00 - 9:30	Registration		Accolade West [ACW]
9:30 -10:30	Orientation	Competitor Orientation	CLH L [3rd floor]
			CLH I [3rd floor]
		Competitor Roll Call	
		Coaches Orientation	CLH K [2nd floor]
10:30-12:30	CATEGORY: ART	2D Art	CLH A [1st floor]
		3D Art	ACW 005 [Bsmt level]
		Culinary Arts	ACW 006 [Bsmt level]
		Photography	CLH B [1st floor]
		Digital Art	CLH G [1st floor]
		Fashion Design	CLH K [2nd floor]
		Web Design	CLH M [2nd floor]
12:00-12:30	Bracket Competition Orientation	MIST Bowl	CLH I [3rd floor]
		Debate	VH A [1st floor]
		Parimentary Debate	VH B [1st floor]
12:30-1:30	**LUNCH**		
12:30-1:30	**ZUHR PRAYER**		**Scott Religious Centre**
		Math Olympics Pretest	VH B [1st floor]
		Abbey Park vs Agincourt vs Ajax vs David & Mary Thomson	CLH I [3rd floor]

Figure 7: Final schedule obtained from the scheduling software

4. Scheduling Algorithms

The tournament schedule is composed of four different aspects. Algorithms for each are described below:

1. Quiz Bowl Preliminary Rounds

This portion of the schedule assigns four teams to each game using a variation of the Hungarian Algorithm. Minimizing the number of times a team plays the same opponent.

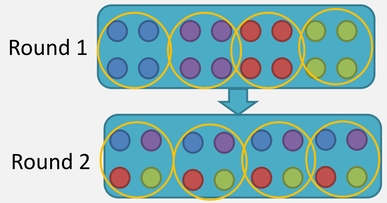


Figure 4: Grouping participants for each round

2. Debates Preliminary Rounds

This portion of the schedule assigns two teams to each debate using a variation of the assignment algorithm.

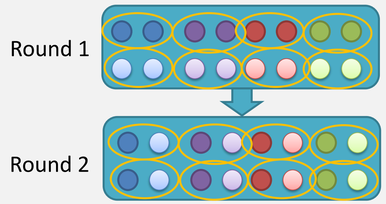


Figure 5: Grouping participants for each round

3. Elimination Rounds

This portion of the schedule takes the winners from each round and assigns them to games in the next round.

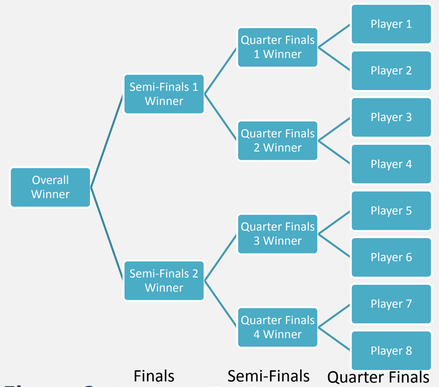


Figure 6: Groupings for the elimination rounds

4. Rooms & Time Slots

Rooms & time slots are assigned to all aspects of the schedule using graph theory to assign rooms and a variation of the bin-packing algorithm to assign time slots.

5. Measures of Success

The final product will be tested against the following attributes to measure success:

- Time savings in terms of scheduling
- Sustainability of system for three to five years
- Reliability of system i.e. making it error-free
- Integration with existing system