**Problem Statement**

University of Michigan Medical School (UMMS) offers 105 accredited residencies and fellowships. Administrators face many challenges in building annual rotation schedules for trainees, including the:

- Complex rules & preferences
- Conflicting goals
- Program interdependencies

Schedule construction is resource-intensive yet often fails to satisfy the individual and collective needs of stakeholders.

**Research Objective**

Develop a decision support tool to enable efficient construction of high-quality rotation schedules.

**Solution Approach**

1. **Formulate**
   - Two models, each customized to specific needs of the program(s)

2. **Encode**
   - Written in C++ using CPLEX 12.4, implemented in Visual Studio 2012

3. **Load**
   - Inputs provided in a collection of .txt, .csv, and .xls files

4. **Solve**
   - Executable run to solve to optimality under input conditions

5. **Review**
   - Schedule and metric reports generated and presented to administrators for approval

**Impact/Results**

The Surgical Block Scheduling decision support tool aided the construction of schedules for:

- 118 residents
- 10 programs
- 62 services

Solve time per iteration: <5 min

The Pediatrics Block Scheduling decision support tool aided the construction of schedules for:

- 99 residents
- 2 programs
- 14 services

Solve time per iteration: <3 min

Ongoing and future work include:

- Formulating a generalized model to address the needs of these and other training programs collectively
- Developing a graphical user interface to enable quick and easy modifications to rules and preferences

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