

Automated Item Generation

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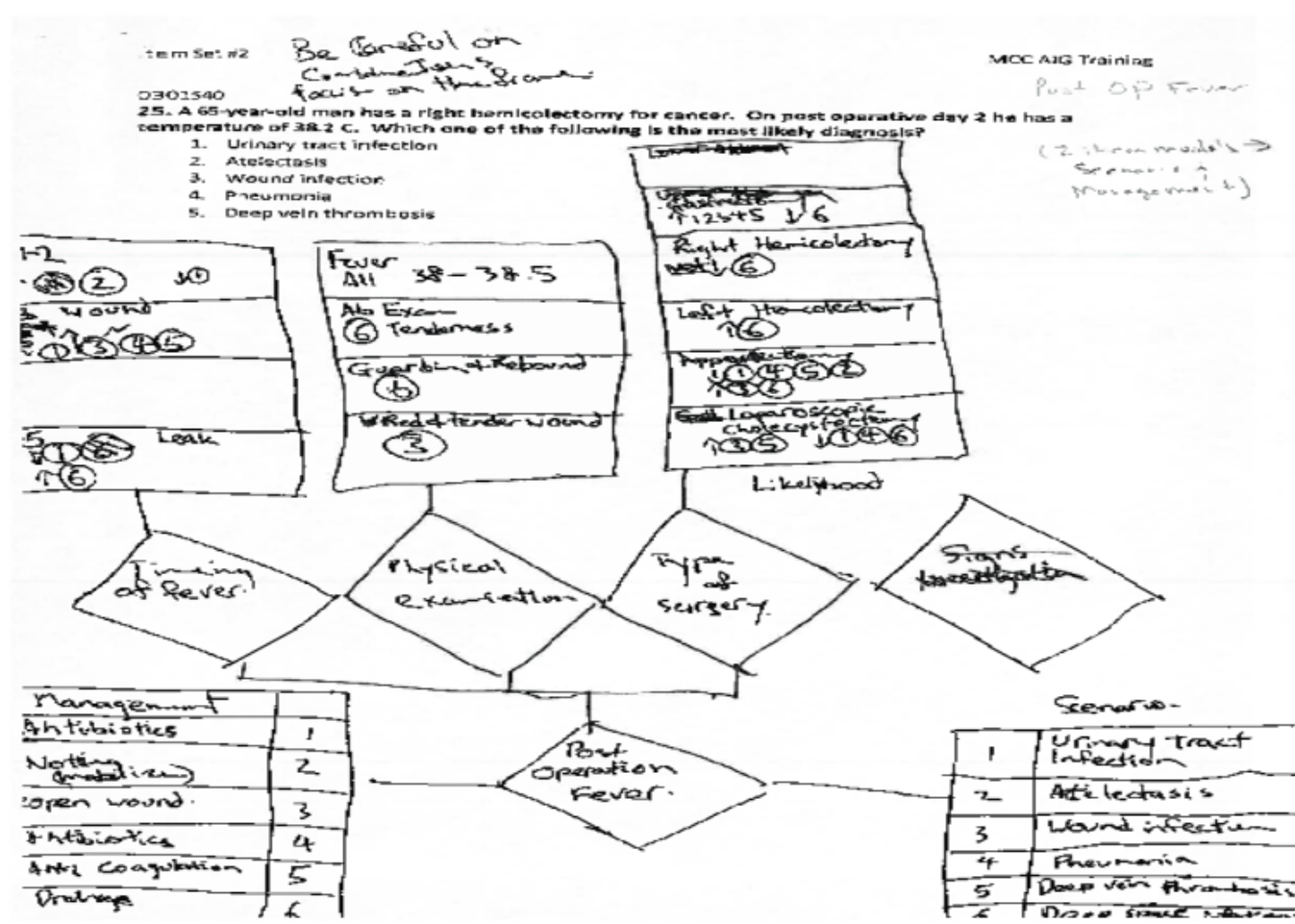
What is Automated Item Generation (AIG)?

- **Automated item generation (AIG) is the process of using item models to generate test items with the aid of computer technology**
- AIG uses a 3-stage process for generating items where the cognitive mechanism required to solve the items is identified and manipulated to create new items

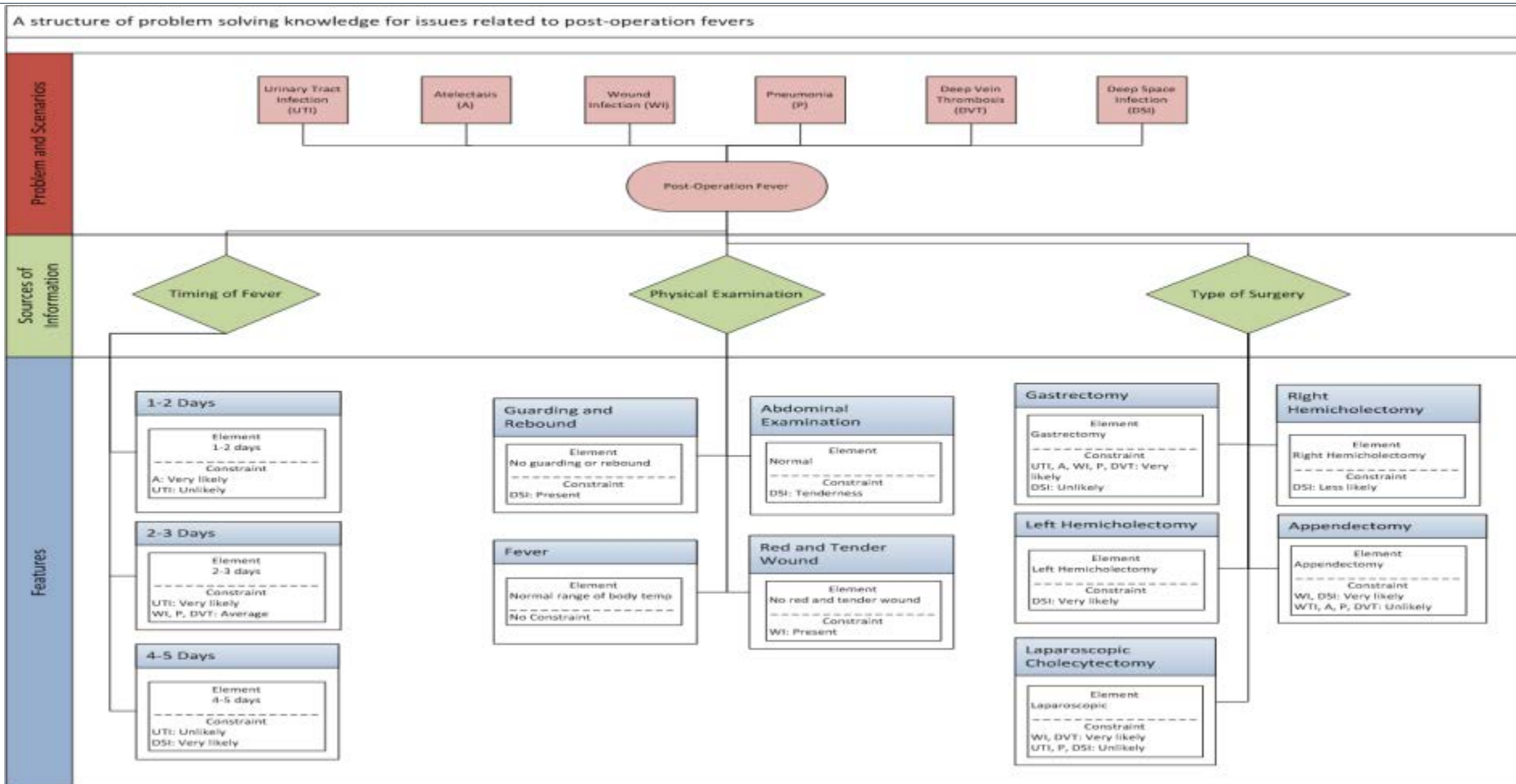
The Item Writing World As We Currently Know It..



The Item Writing World As We May Come to Know It....



The Item Writing World As We May Come to Know It...



AIG Methodology

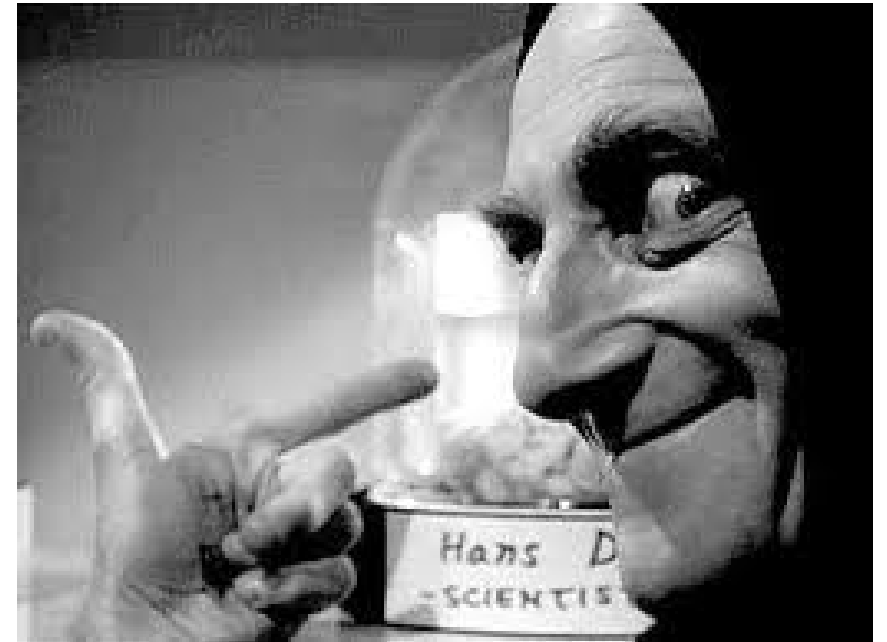
- The model includes three key outcomes:
 1. Identify **THE PROBLEM** (i.e., Post-Operative Fever)
 2. Specify **sources of information** required to diagnose the problem (i.e., Type of Surgery, Physical Examination, etc.)
 3. Describe **KEY features** within each information source (e.g., Guarding and Rebound, Fever, Calf Tenderness, etc.) needed to create different instances of the problem

AIG Methodology

- Item models are created using the cognitive model content, where an item model is like a template, a rendering, or a mold of the assessment task (i.e., it's a target where we want to place the content for the item)
- A 54-year-old woman has a <**Type of Surgery**>. On post-operative day <**Timing of Fever**>. The patient has a temperature of 38.5c. Physical examination reveal <**Physical Examination**>. Which one of the following is the best next step?
 - **Type of Surgery:** Gastrectomy, Right Hemicolectomy, Left Hemicolectomy, Appendectomy, Laparoscopic Cholecystectomy
 - **Timing of Fever:** 1 to 6 days
 - **Physical Examination:** Red and Tender Wound, Guarding and Rebound, Abdominal Tenderness, Calf Tenderness

AIG Methodology

- After the item model is specified, we combine this information systematically to produce new items
- To accomplish this complex combinatoric task, we created software for item generation called IGOR (Item GeneratOR)
- IGOR was programmed using Sun Microsystems JAVA



What Have We Learned?

- The MCC has been working on AIG with the University of Alberta (Mark Gierl and Holli Lai) for the past 5+ years
- Tens of thousands of items have been generated across 50+ cognitive maps
- Predictive identification accuracy ranged from 32% to 52% across four experts, with an average accuracy rate of 42%
 - **Experts cannot systematically differentiate AIG from traditional items**
- Piloted AIG items cover shallow areas of our pool very well
 - On average, AIG items are more difficult and discriminating (based on classical and IRT statistics)
 - Directly attributable to the AIG process

Next Steps for the MCC

- Undertake 2 additional AIG content development workshops in May and September, 2015
 - ~ 20 new cognitive maps
- Pretest 80-100 AIG items in the spring, 2015 MCCQE Part I exam cycle
 - Selected from 2014 cognitive maps and generated items
- Create several apps that will further automate the AIG process and allow us to fully transition AIG to the MCC
- Complete a cost-benefit analysis of AIG vs. traditionally written items