Initial Recommendation on In-House Room Assignment Process

I. Background

The In-House Rush Task Force was created after the 2003 MacGregor rush in response to widespread dissatisfaction with some aspects of the current rush system. The task force met an hour a week for the past ten weeks to discuss concerns with the traditional rush process and various proposals to address these concerns. Although the entire rush process was examined, the focus was on the actual room assignment process.

Four major problems with the traditional rooming process were identified. Most importantly is the fact that many freshmen are assigned to an entry which they had ranked very low. In 2003, approximately twelve percent of freshmen were placed in either their seventh, eighth, or ninth choice of entries. Naturally, these freshmen and the entries which receive them are disappointed and often feel marginalized by the rush process. In some cases the freshman isolates them self and does not join the entry socially. Two other concerns, which apply to any method of room assignment, are the relative weights given to freshmen preferences versus entry input and the balance of power among the entries. It was also recognized that any rush process will provide incomplete and, sometimes, inaccurate information to the freshmen about the entries and to the entries about the freshmen.

II. Recommendation for Room Assignment Process

The task force recommends a computerized optimization approach to assigning rooms. In general, the optimization algorithm would attempt to assign each freshmen to an entry which they prefer and also to assign to each entry freshmen preferred by that entry. Most importantly, the optimization should, as compared to the traditional system, reduce the number of freshmen assigned to their least preferred entries.

The optimization algorithm would have two sets of input, one from the freshmen and one from the entries. Each freshmen would rank each entry one to nine (or eight for females), no ties allowed, with one the most preferred entry and nine the least preferred entry. Each entry would be able to put each freshman into one of three categories: ‘positive,’ ‘negative,’ or ‘neutral/don’t know.’ Any freshman not designated either ‘positive’ or ‘negative’ would be put by default into the ‘neutral’ category for that entry. Ideally, the inputs for the algorithm would be entered through the web, decreasing errors and time required. This would probably require MacGregor to borrow five to ten laptops to be used by the freshmen for the evening of rush. It should be noted that each entry would have a certain number of rooms available for males and a certain number for females (determined by the RAC to attempt to maintain an equal gender ratio in the eight coed entries). The algorithm would thus run separately for each gender group.

The optimization algorithm would take these inputs and match freshmen to entries to achieve an outcome which maximized the preferences of both groups. One key part of this matching process is the relative weight given to each set of input. The exact weighting should be determined in the process of testing and calibrating the algorithm so as to achieve results which are most desired. However, it is the freshmen who are most affected by the rush process. They will have just arrived at MIT and it is important that they are happy in the entries to which they are assigned. Unlike upperclassmen, a freshman does not have the resources to deal with the problems arising from being assigned to an entry they don’t want to live in. Thus, the optimization algorithm should place more weight on freshmen preferences and the upperclassmen input will provide confirmation that the final outcome is overall a good match between freshmen and entries.

A significant part of the traditional rush process has been ‘trading,’ in which entries are allowed to exchange freshmen after all freshmen have been assigned to an entry. If done after the proposed optimization had assigned rooms, any trading could not possibly create a better assignment and would most likely produce a worse outcome, at least in terms of what was defined to be optimal for the algorithm. However, since the inputs to the algorithm do not completely describe the preferences of either the freshmen or the entries, it is possible that a trade could make everyone involved happier. Therefore trading should be allowed, but only with consent of the freshmen being traded. This insures that the trade is actually a good one. Although the specifics would have to be decided, it would be possible to inform the affected freshmen of proposed trades by e-mail the evening of rush and also the next morning when they pick up their new room key from front desk. At that point either freshman could decide to reject the trade and just move into their original room, or both could accept the trade and switch rooms.

In addition to entering their entry preferences into the algorithm, the freshmen would also fill out a questionnaire concerning general preferences such as noise tolerance and production, gender preferences for their suite, and people they would like to live near. This would be something very similar to, although shorter than, the form the freshmen filled out this year. After the algorithm assigned freshmen to entries, each entry chair would receive the forms of the freshmen assigned to their entry and would be responsible for determining the actual room for each freshman in that entry.

Some freshmen are limited in the rooms which they are able to occupy. For example, the 222 and 223 rooms of the tower entries must be made available to residents who for medical reasons require the private bath, larger hallway space, and elevator access. Any person who has certain housing requirements must bring these to the attention of the MIT Housing Office, which in turn contacts the RAC at MacGregor. It would not be reasonable to write every one of these special cases into the algorithm. Therefore, any freshmen with rooming restrictions should be assigned a room by the RAC, in consultation with the freshman and applicable entry chair, before the rest of the freshmen are assigned rooms through by the algorithm.

III. Implementation

If HouseComm decides to pursue an optimization algorithm for the room assignment process, the algorithm would be written and tested over IAP and the early part of the spring semester. Also during this time a web-based input program for the algorithm should be written and other parts of the process (such as creating the questionnaire for the freshmen, documenting the algorithm, and writing the new bylaws) finished. By the end of March everything should be finalized and presented to HouseComm for final approval and to be voted into the bylaws.

It would be good to look for a student interested in programming the algorithm; possibly as a UROP or thesis project. Professor Dahleh has offered assistance if a student taking on this project needed help writing the algorithm correctly. Another option would be to hire a professional to write the program. It is important that HouseComm decide how much money it would be willing to allocate for the implementation of an algorithm for room assignment. A web-based program to collect the input for the algorithm could also be written by a student, not necessarily the same person writing the optimization program itself. At this point HouseComm needs to affirm, reject, or modify the direction outlined by this recommendation and raise any concerns it has with specific parts of the recommendation.