MATH 100 : Project on 'Stable Matchings'

Description: Each year, the graduates of medical schools submit preference lists of hospitals where they wish to be residents. Each hospital also has a preference list of the applicants for residency. Each hospital needs to be **matched** with an applicant in a way thats "stable". Say, if hospital A is matched to a resident x and hospital B is matched to a resident y, but x prefers hospital B to A and hospital B prefers x to y, then B and x would break up their current matchings and pair up with each other instead. This would be an "unstable" matching.

How can we match hospitals to residents so that there are no "unhappy" pairs like B and x above?

The project requirements are:

1. Read and understand the history and mathematical description of this problem from a textbook and related literature.
2. Read and understand the related algorithm (which is used in real-life) of this problem from a textbook and related literature.
3. Write a detailed report explaining the above two items with examples.
4. [Optional depending on item 3 above] Implement the algorithm using your favorite computer language.
5. Give a presentation to your classmates on your project.

Advisor: Prof. Hemanshu Kaul, (kaul@iit.edu).