

## UNIT 1

### INTRODUCTION

#### 1. A first problem: Stable Matching

##### 1.1 The problem:

- Designing a college admission process or job recruiting process that is self-enforcing.
- All juniors in college majoring in computer science begin applying to companies for summer internships.
- Application process is the interplay between two different types of parties.
  1. Companies (the employers)
  2. Students (the applicants)
- Each applicant has a preference ordering on companies and each company forms a preference ordering on its applicants.
- Based on these preferences, companies extend offers to some of their applicants, applicants choose which of their offers to accept.
- Gale and Shapely considered the sorts of things that could start going wrong with the process.
  1. "Raj" accepted job at company "CluNet".
  2. "WebExodus" offers job to "Raj".
  3. "Raj" now prefers "WebExodus" and rejects "CluNet".
  4. "Kiran" gets an offer from "CluNet".
  5. "Kiran" already had accepted offer from "BabelSoft".
  6. "Kiran" accepts offer from "CluNet" and rejects "BabelSoft".
  7. "Deepa" who has accepted the offer from "BabelSoft" calls up "WebExodus" to join them (i.e. she preferred WebExodus over BabelSoft.
  8. "WebExodus" rejects "Raj" and accept "Deepa" (i.e. WebExodus preferred Deepa over Raj).
- Situation like this creates chaos and both applicants and employers end up unhappy with the process as well as outcome as the process is not self-enforcing and people are not allowed to act in their self-interest.