

Problems

L. Michel
P. Shaw

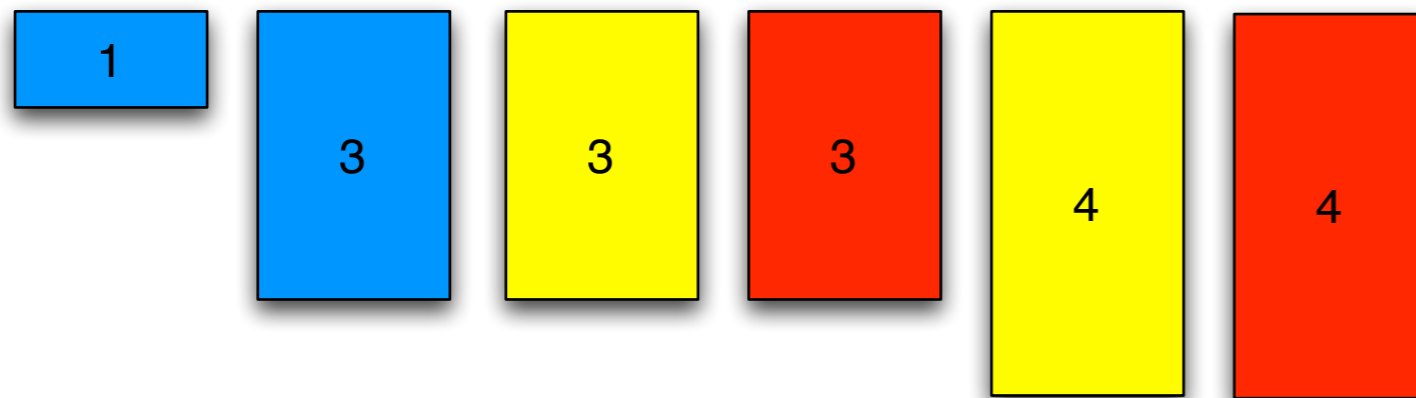
Steel Mill



Steel Mill

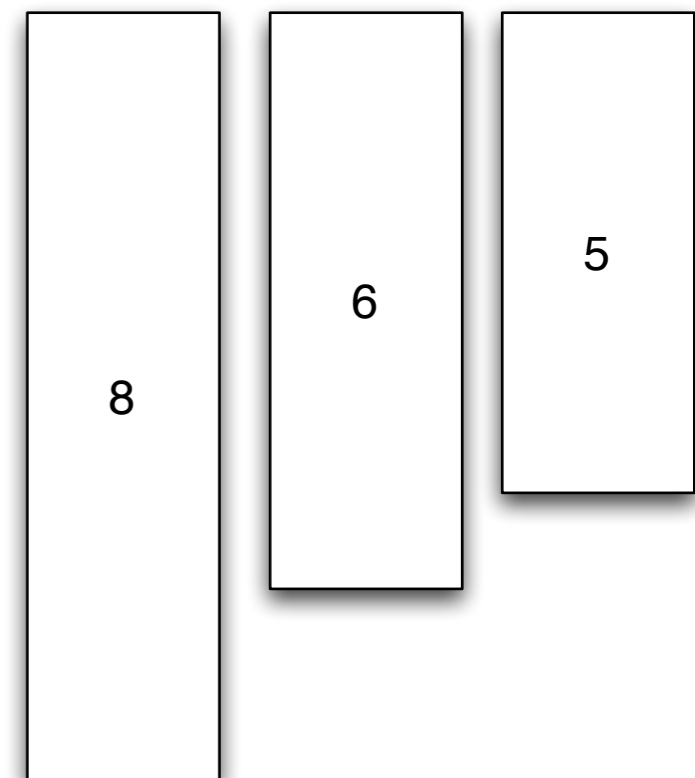
• Purpose

- Produces an assignment of “orders” to “slabs” that minimizes waste
- Orders have a color and size
- Slabs have a capacity
- Slabs can only carry two colors

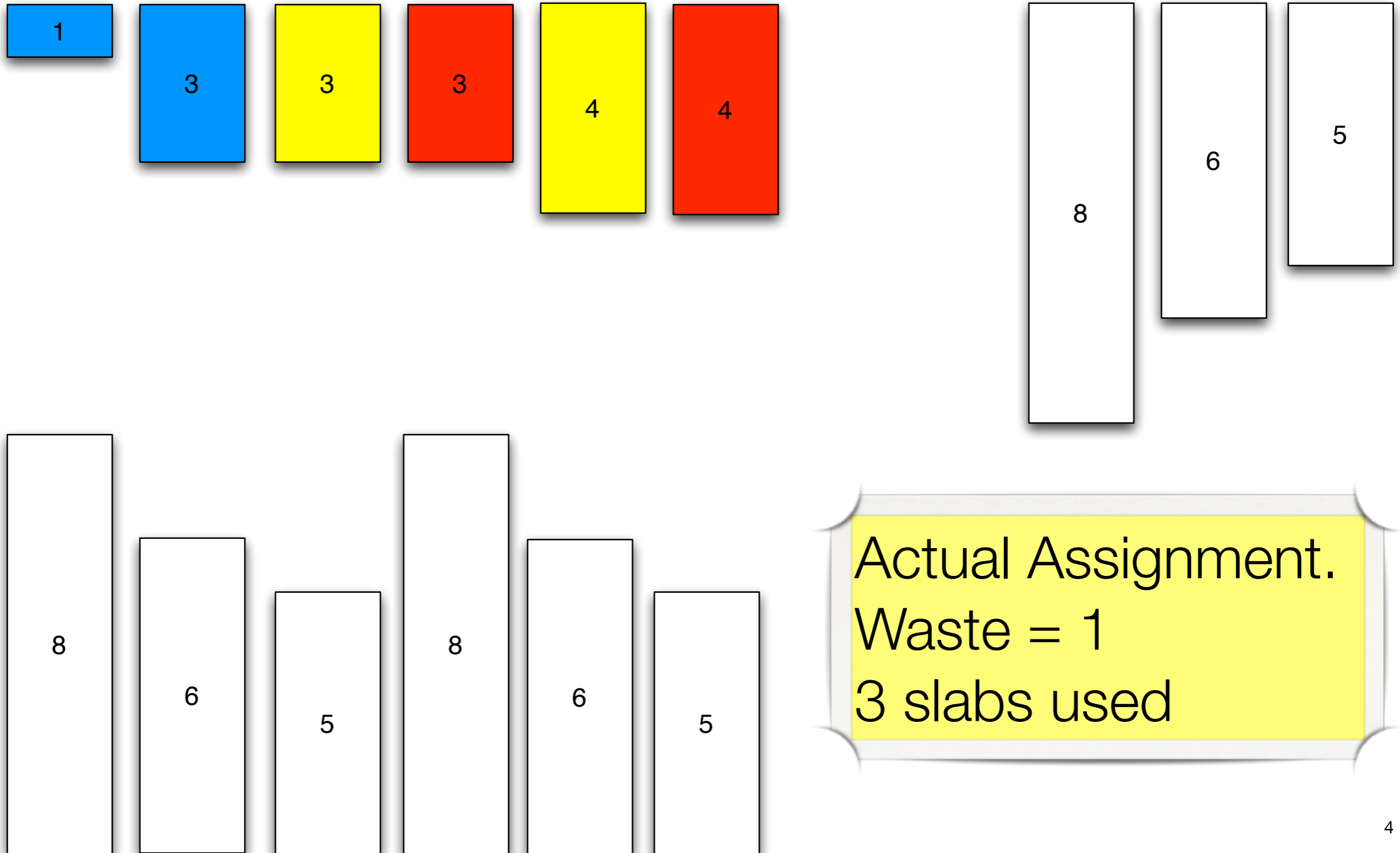


Orders (color,size)

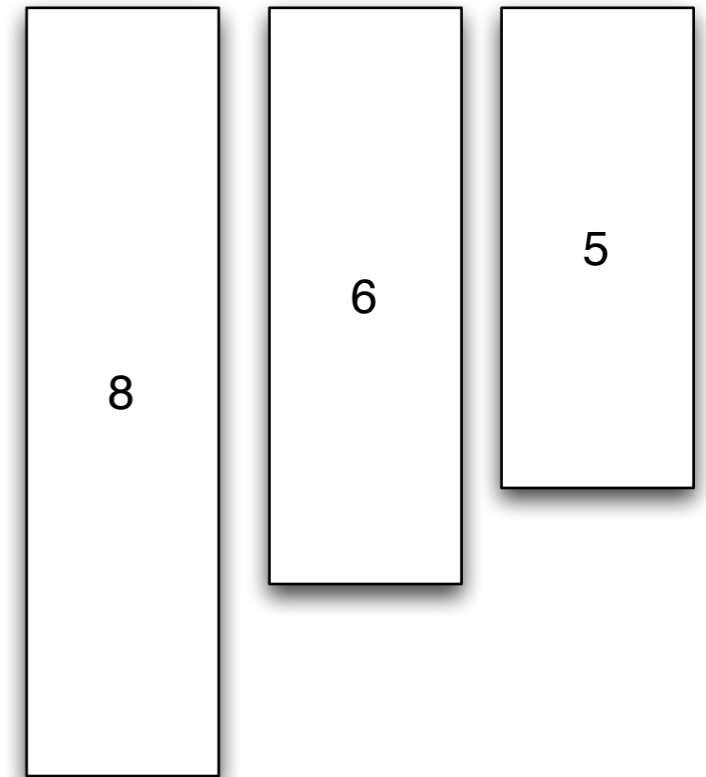
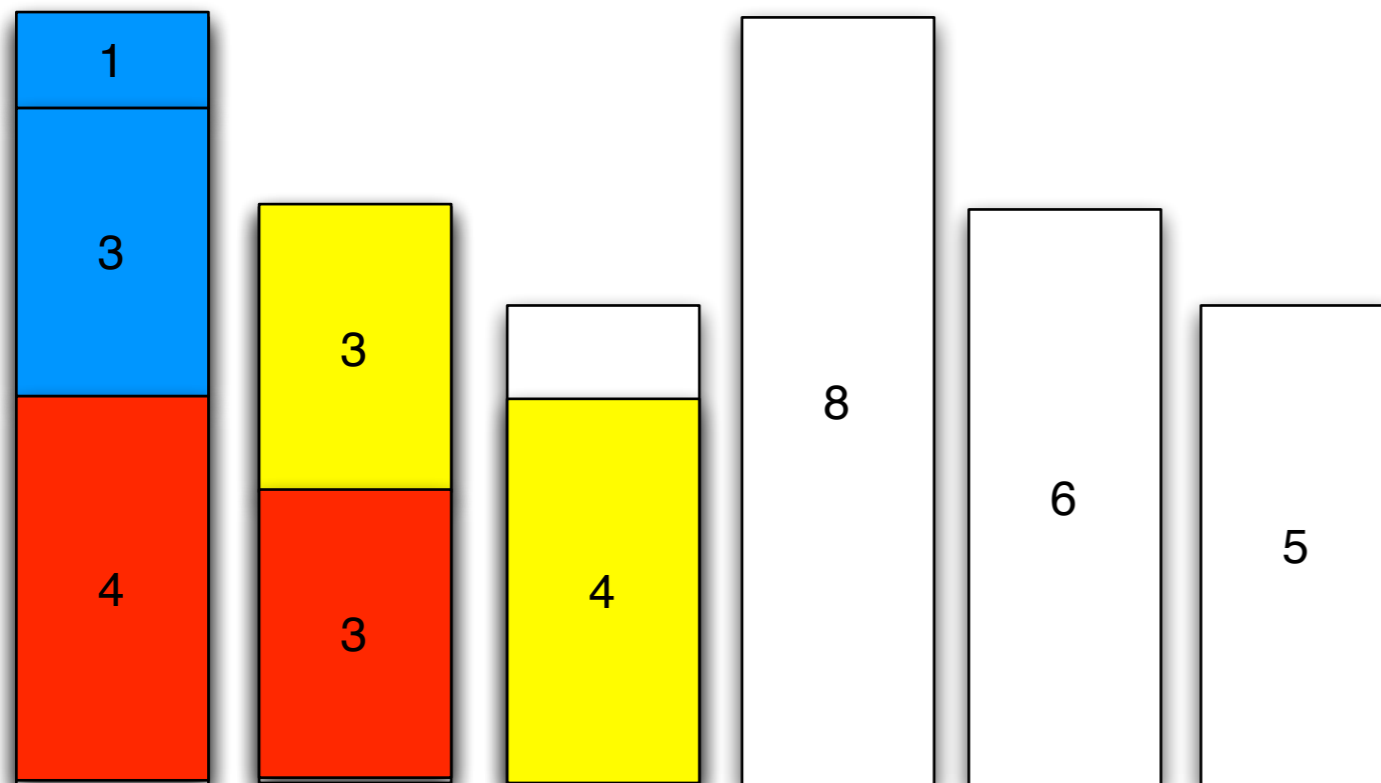
Slab Types



Steel Mill



Steel Mill



Actual Assignment.
Waste = 1
3 slabs used

Scene Allocation

The Problem

- **Planning a movie shoot**

The scene allocation problem consists of deciding when to shoot scenes for a movie. Each scene involves a number of actors and at most 5 scenes a day can be shot. All actors of a scene must, of course, be present on the day the scene is shot. The actors have fees representing the amount to be paid per day they spend in the studio. The goal of the application is to minimize the production costs.

The Problem

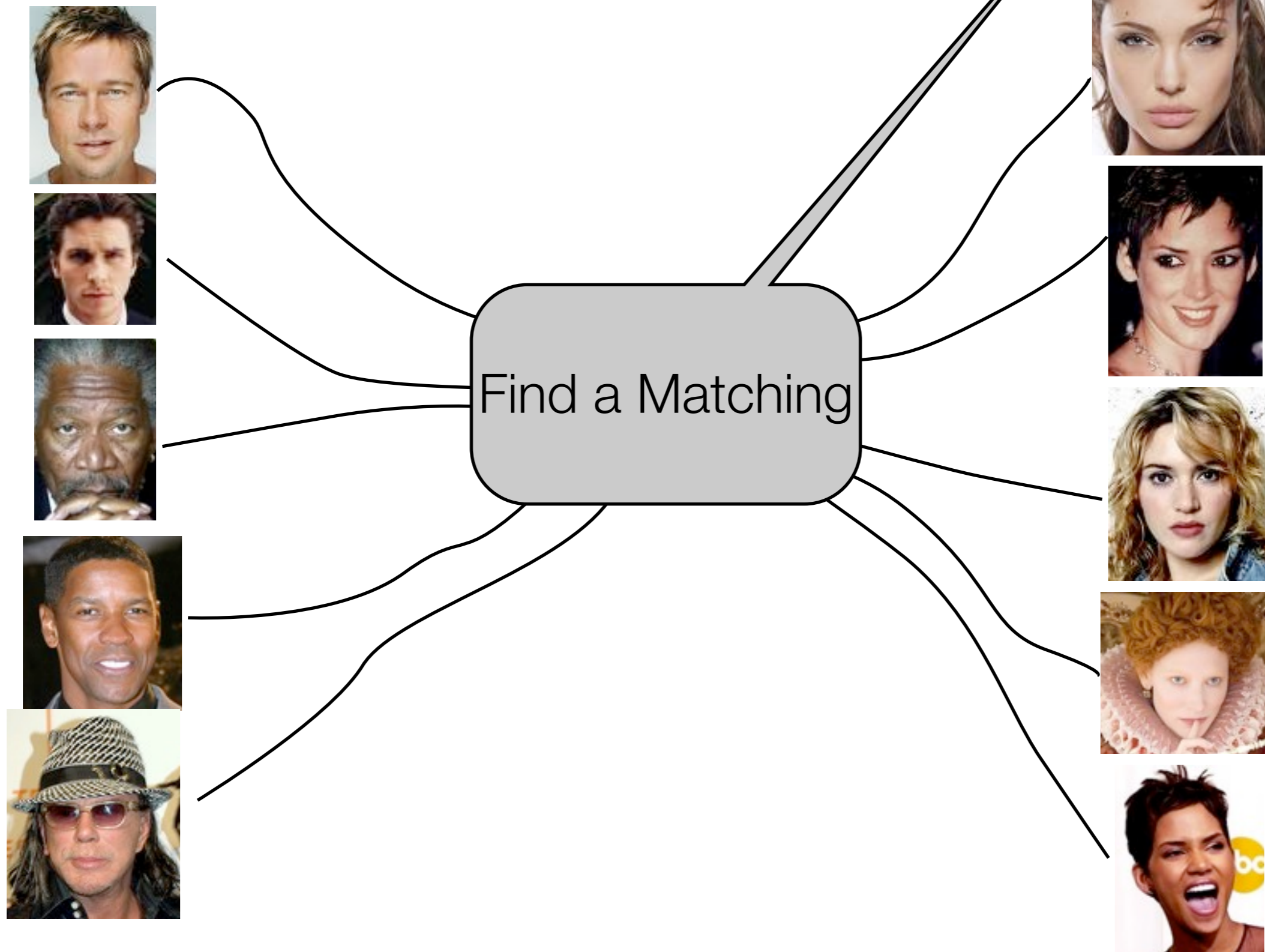
- **Planning a movie shoot**
- **Objective**
 - Minimize the production costs
 - subject to
 - All actors present on the set for their scenes
 - At most 5 scenes shot per day
 - cost driven by number of days on the set.

Stable Marriage

The Problem

- Find matchings between men and women that are “stable”
 - Stable means
 - nobody who wishes to change has an opportunity to...
 - In other words
 - All the partners in the pairing are “stuck” with their mate...
- the matching $m(X, Y)$ is stable if the following holds
 - When X prefers Y to his/her spouse,
 - Then Y prefers his/her spouse to X

Stable Marriage

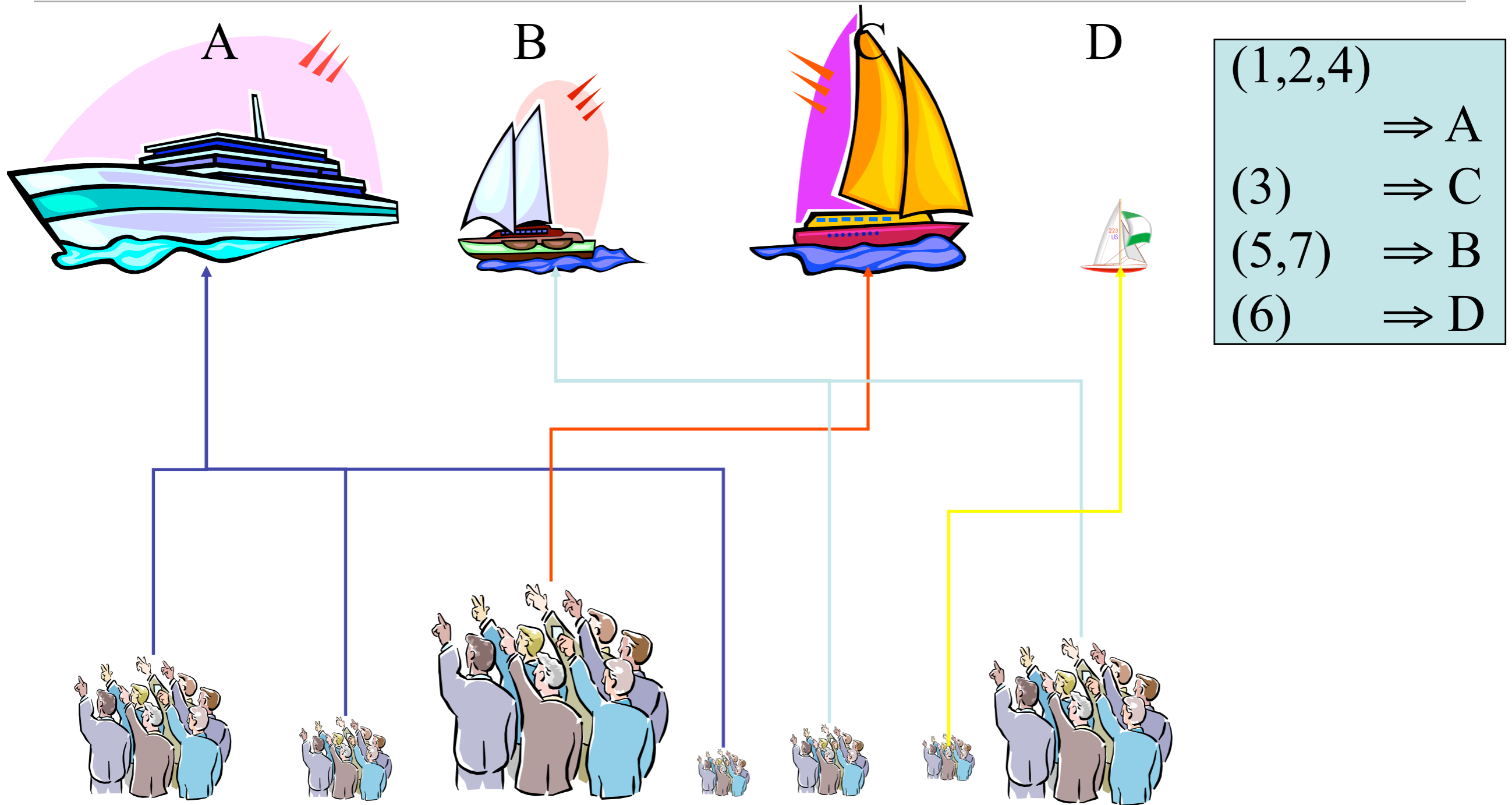


Progressive Party Problem

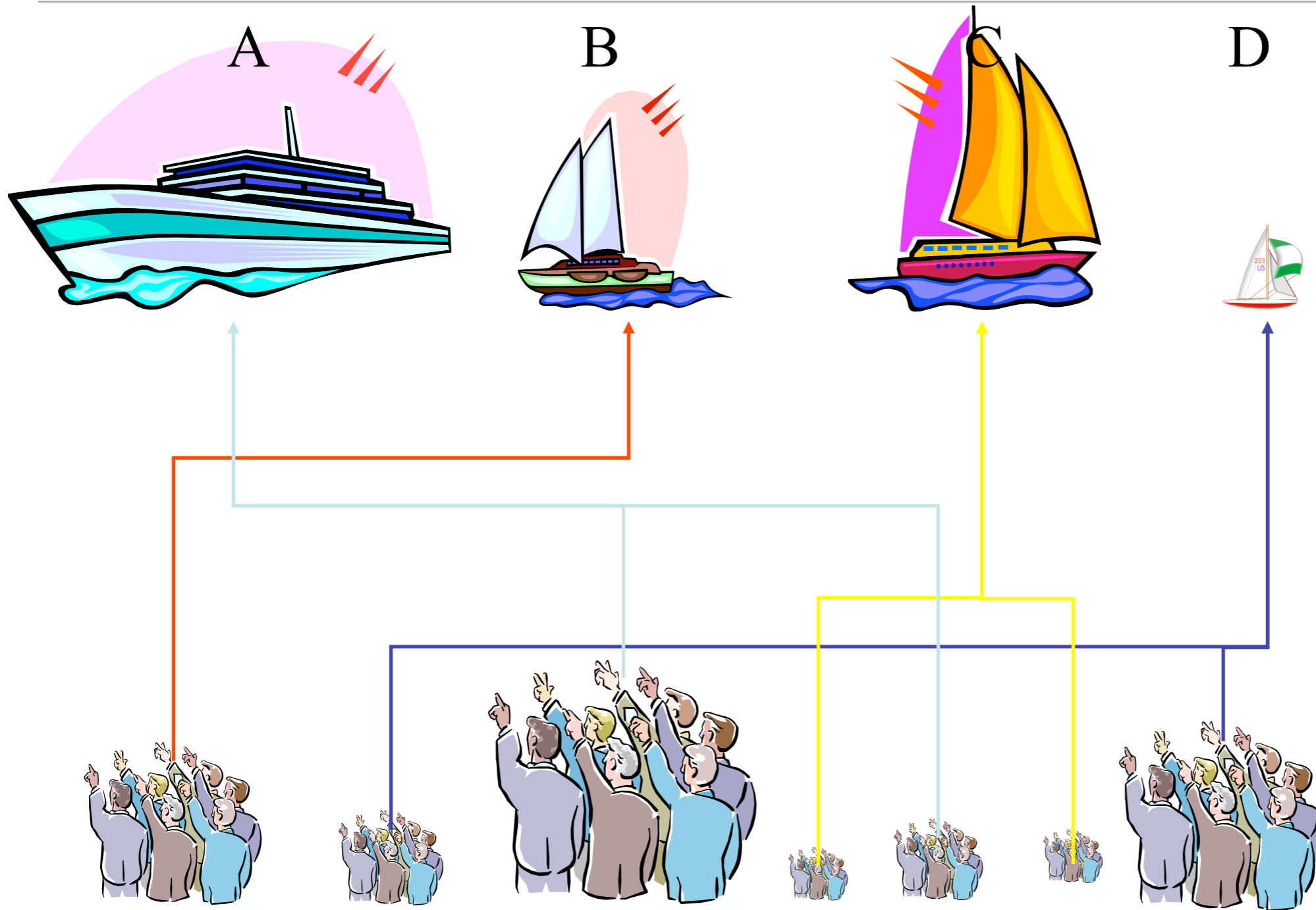
The Problem

- A Party at a yachting club
- Objective
 - For a target number of time periods and guest parties
 - Map groups of guests to host boat during
 - subject to
 - capacity constraints [don't sink the boats!]
 - mingling constraints [meet different people!]
 - diversity constraints [don't keep seeing the same boat!]

Illustration



Illustration



(1,2,4) \Rightarrow A
(3) \Rightarrow C
(5,7) \Rightarrow B
(6) \Rightarrow D

(1) \Rightarrow B
(3,5) \Rightarrow A
(4,6) \Rightarrow C
(2,7) \Rightarrow D

⋮