

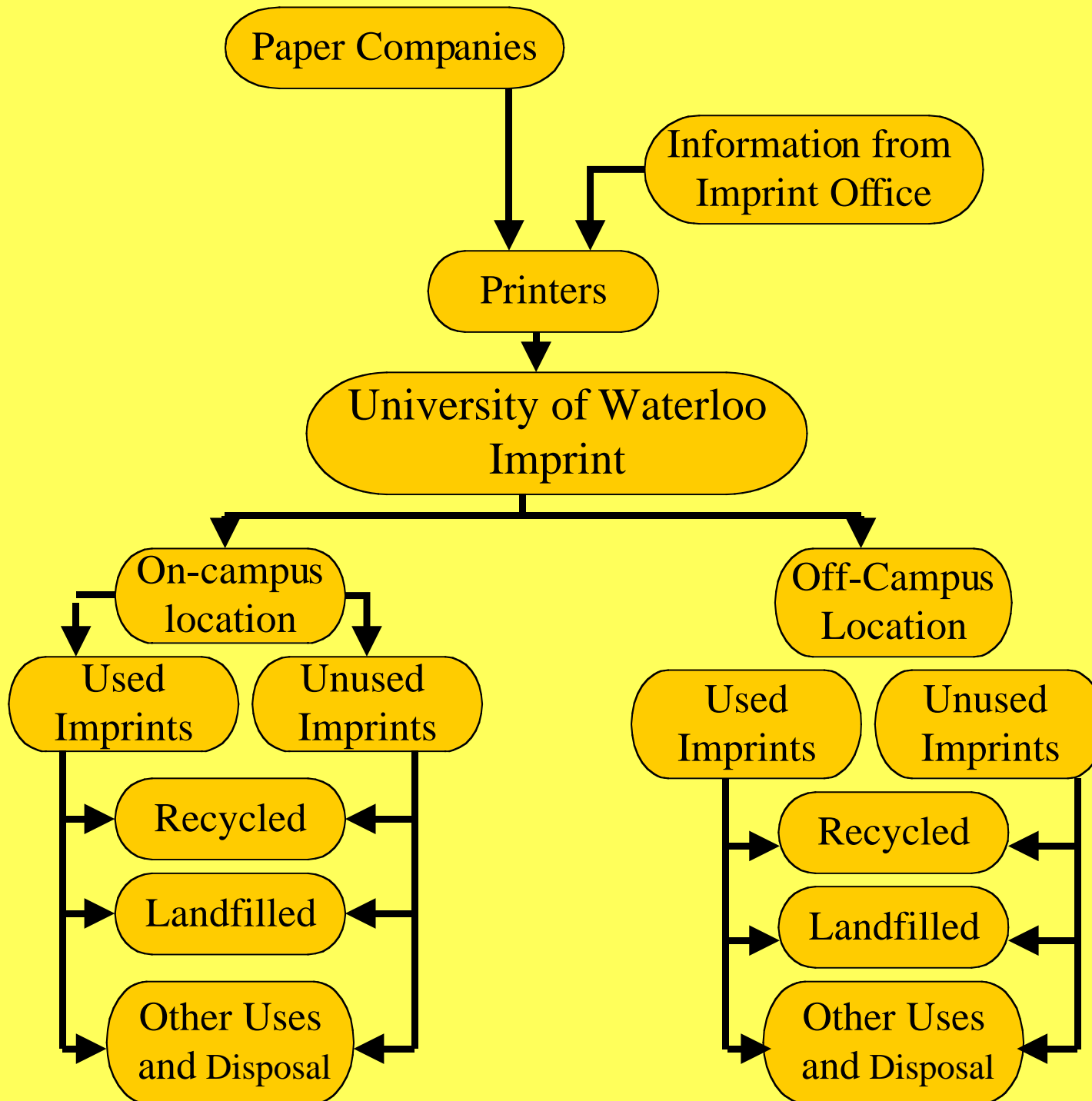
Introduction to a systems approach

**A technique for framing and
understanding problem situations**

Describing a situation from a system's perspective

Constructing a **system description
provides us with new insights**

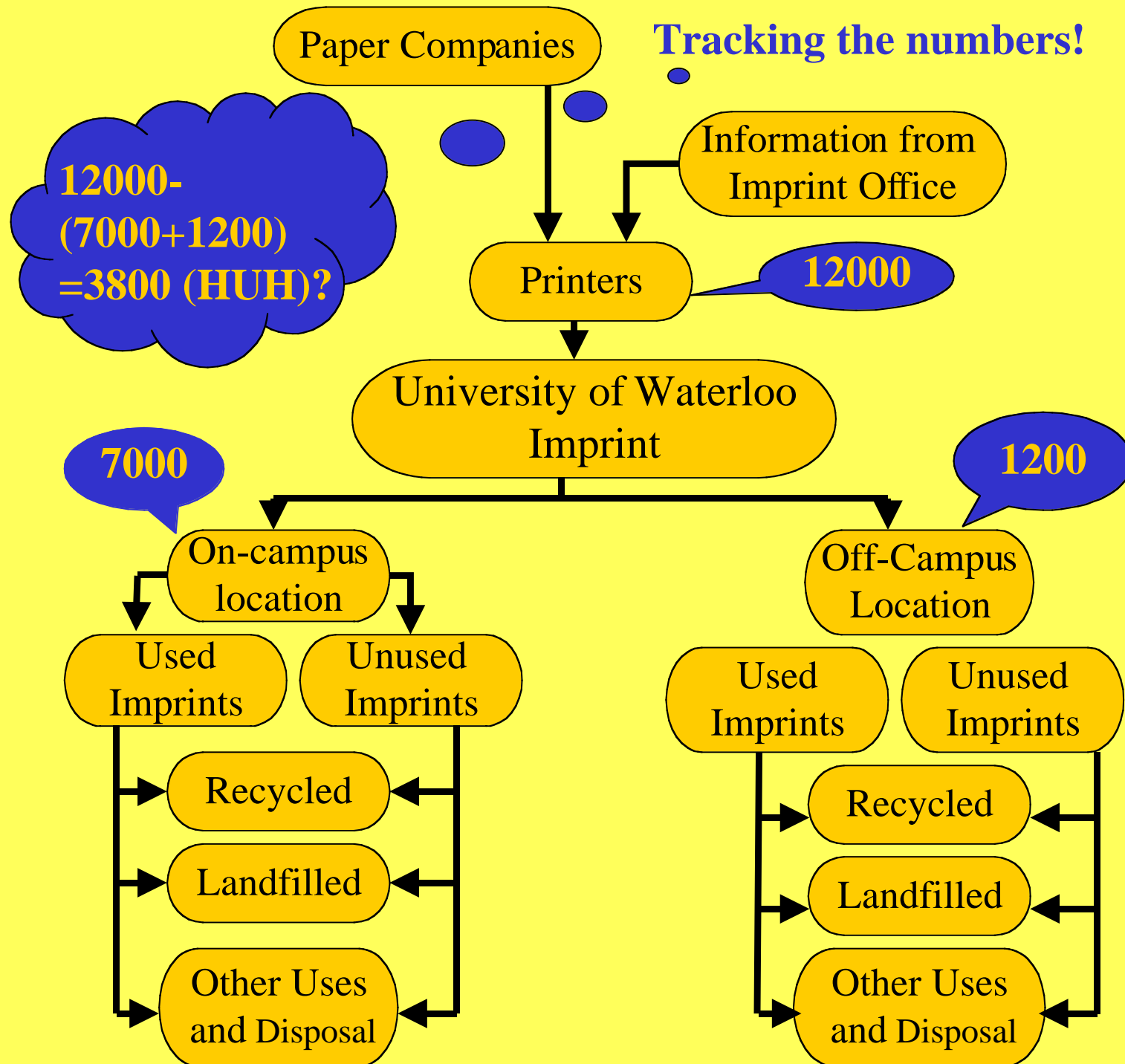
Flows in Systems (The IMPRINT)



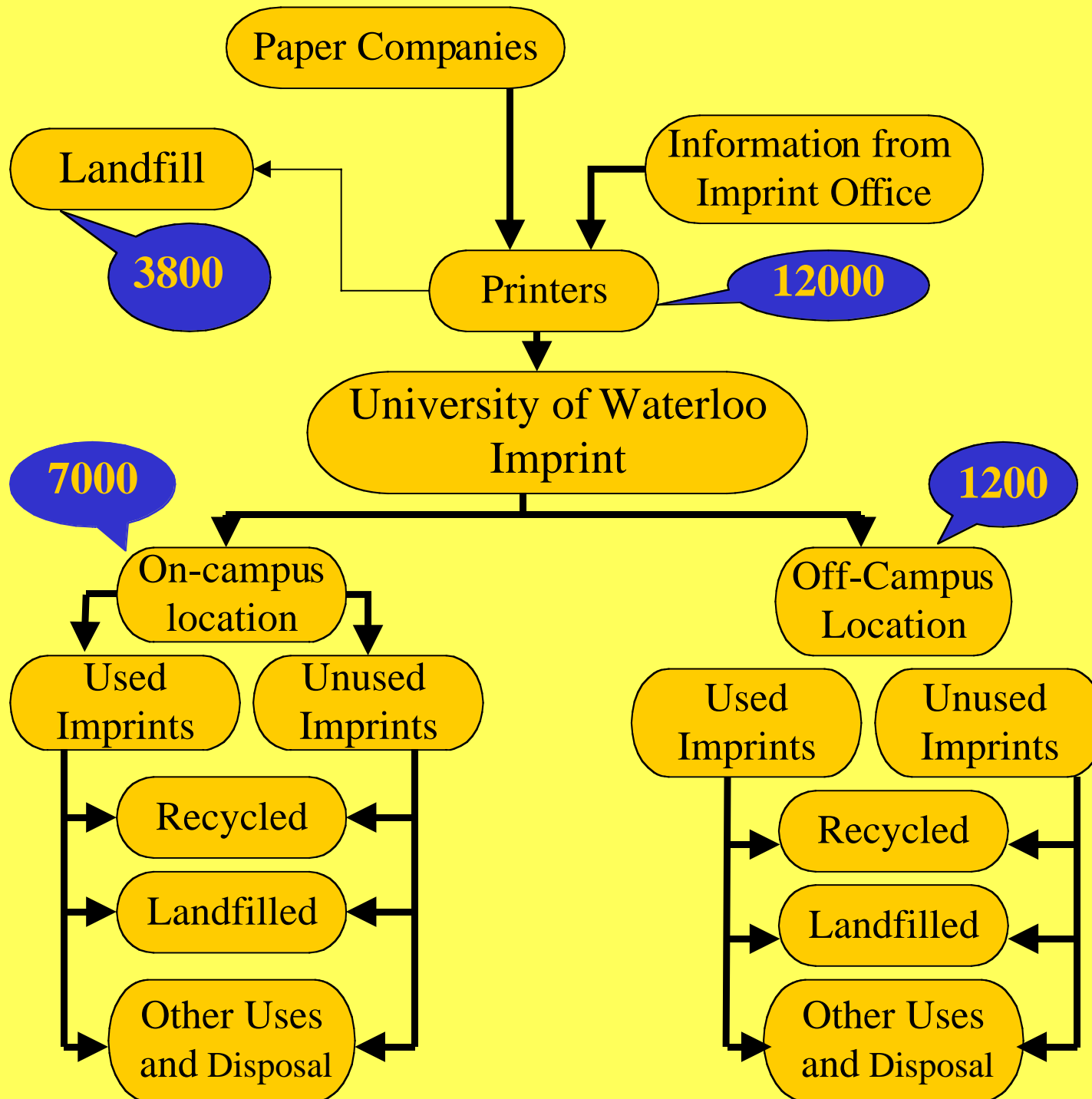
Creating the diagram

- **Who has the information to create the diagram?**
 - In truth, the students who made this diagram had to go to more than one person, follow the physical papers all around, and pretty much track the delivery trucks as they made there rounds
- **NO Single person is aware of the whole system.**
- **Drawing the system diagram is a time consuming detective job!**

Flows in Systems (The IMPRINT)



Flows in Systems (The IMPRINT)



Results

- **Making the system description identified that almost a third of the papers never reached campus.**
- **A similar analysis was done of the university paper (the Gazette) and as a result 30% less papers are now printed each year.**

Waste reduction in the student residence cafeteria

**The "all you can eat"
versus
the "debit card" system**

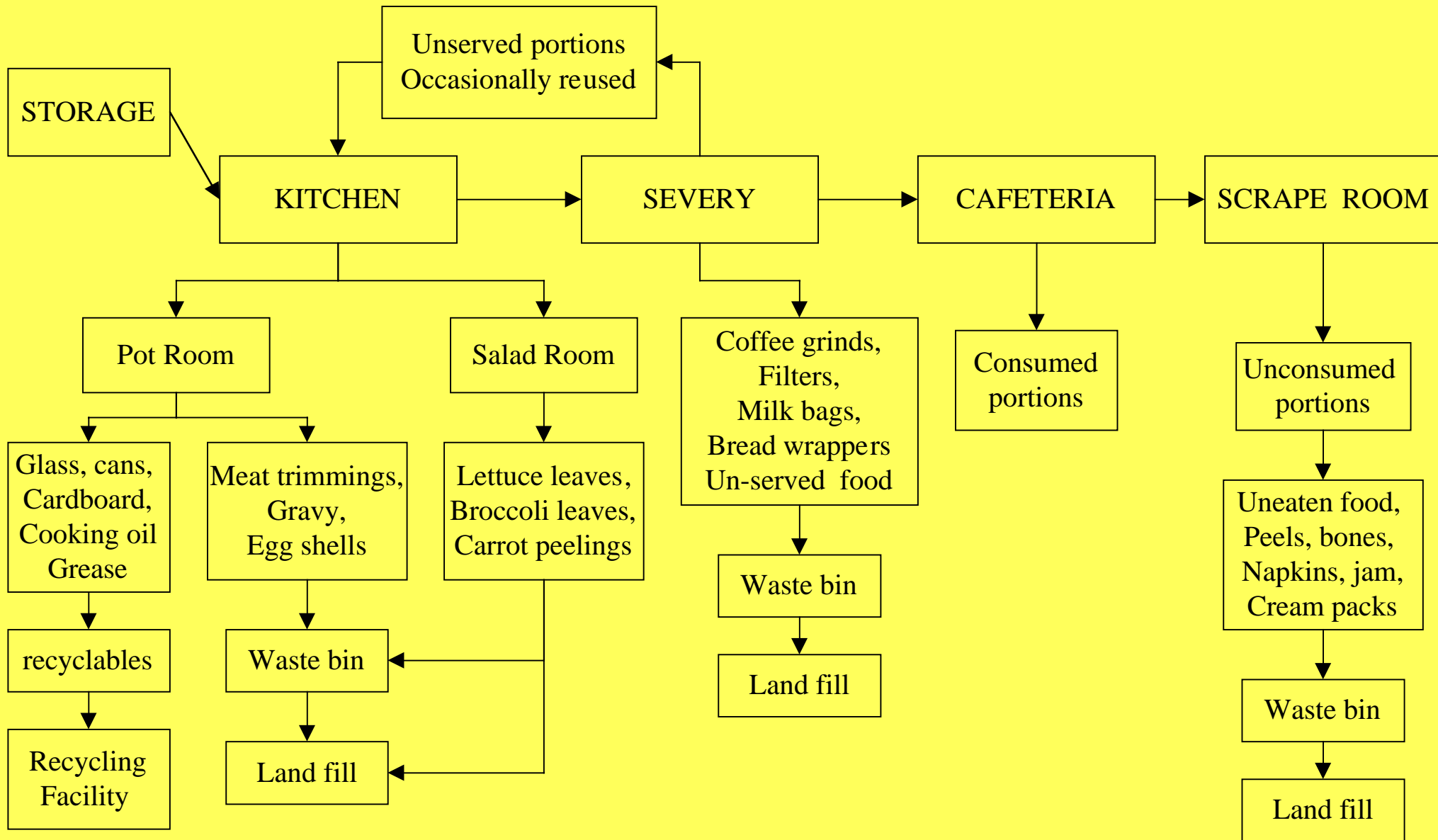
Waste reduction in the student residence cafeteria

- **A waste audit of the cafeteria revealed that a large volume of food was being thrown out without every being touched (unopened milk containers, orange juice, untouched bananas and oranges etc....)**
- **People were taking food on speculation so that they would not have to go through the lineups again.**
- **After research, consultation, and discussion it was decided to change to a debit card system, in which students paid for each item taken.**

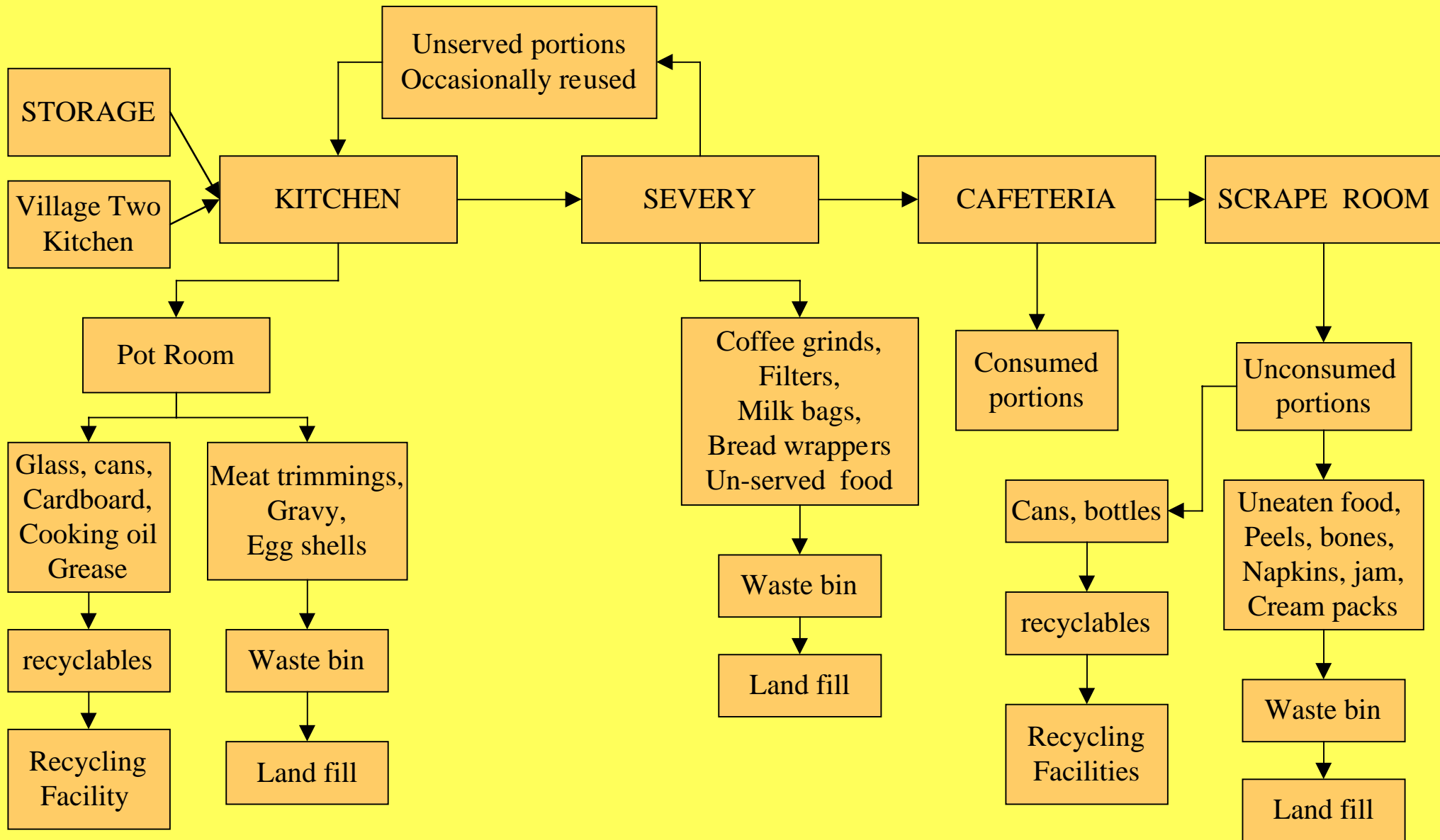
Waste reduction in the student residence cafeteria

- **Research question:**
 - Did the new system reduce the waste generated?
- **Measure:**
 - ~~– Waste generated off the plates.~~
 - Describe the food production and consumption system and measure the total waste generated at every step in the process
- **Start with a system description obtained by following the food through the process.**

All you can eat



Debit card



Waste reduction results

Source	Difference (%)
Kitchen servery	-7
Pot Room	+15
Scrape room	-71
Overall	-47

(weight per person served)

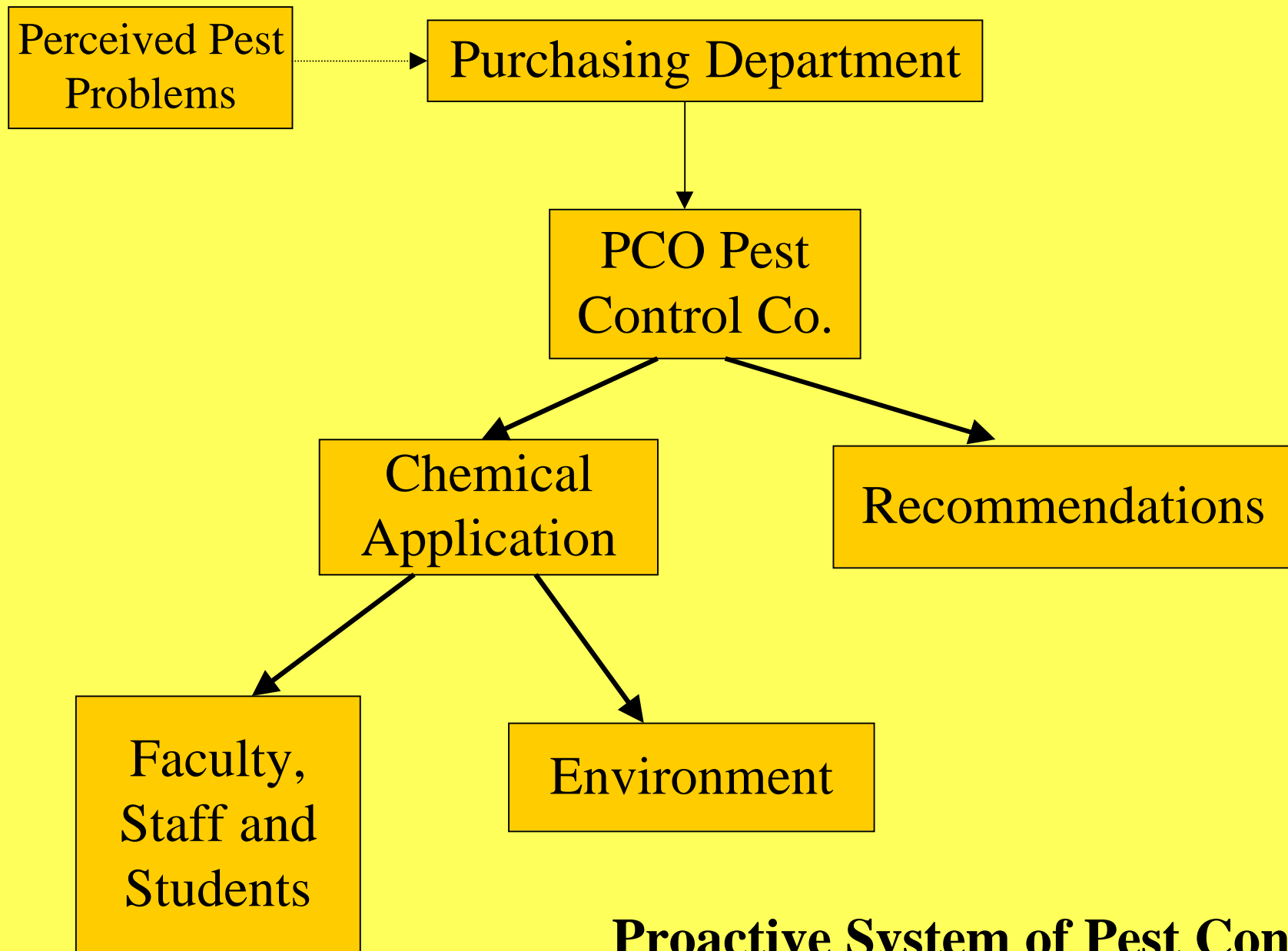
Waste reduction in the student residence cafeteria

- **Looking at the whole system gives a different result from just looking at one element of the system.**
- **Failure to think through the system can result in a false sense of success.**
- **Changing one part of the system for the better usually will negatively effect another part of the system.
(Suboptimization)**

Indoor pesticide use on campus

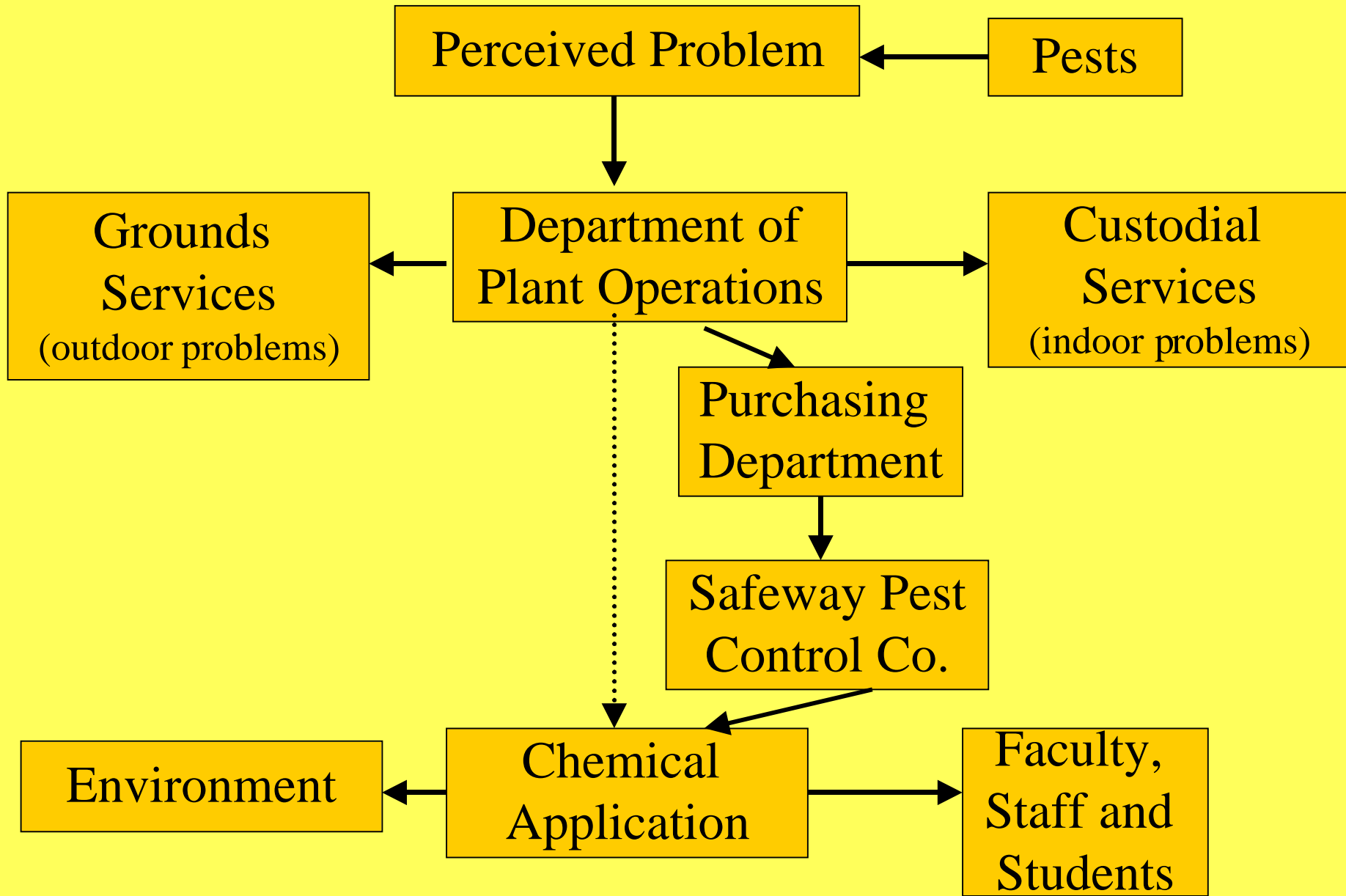
Twin systems!

PEST CONTROL



Proactive System of Pest Control

PEST CONTROL



Reactive System of Pest Control

Indoor pesticide use on campus

- **In large institutions there is a tendency for no one to keep track of the overall system. So much duplication and waste can occur.**
- **If you are having lots of trouble sorting out a system description, maybe there is more than one system!**

Lug a mug

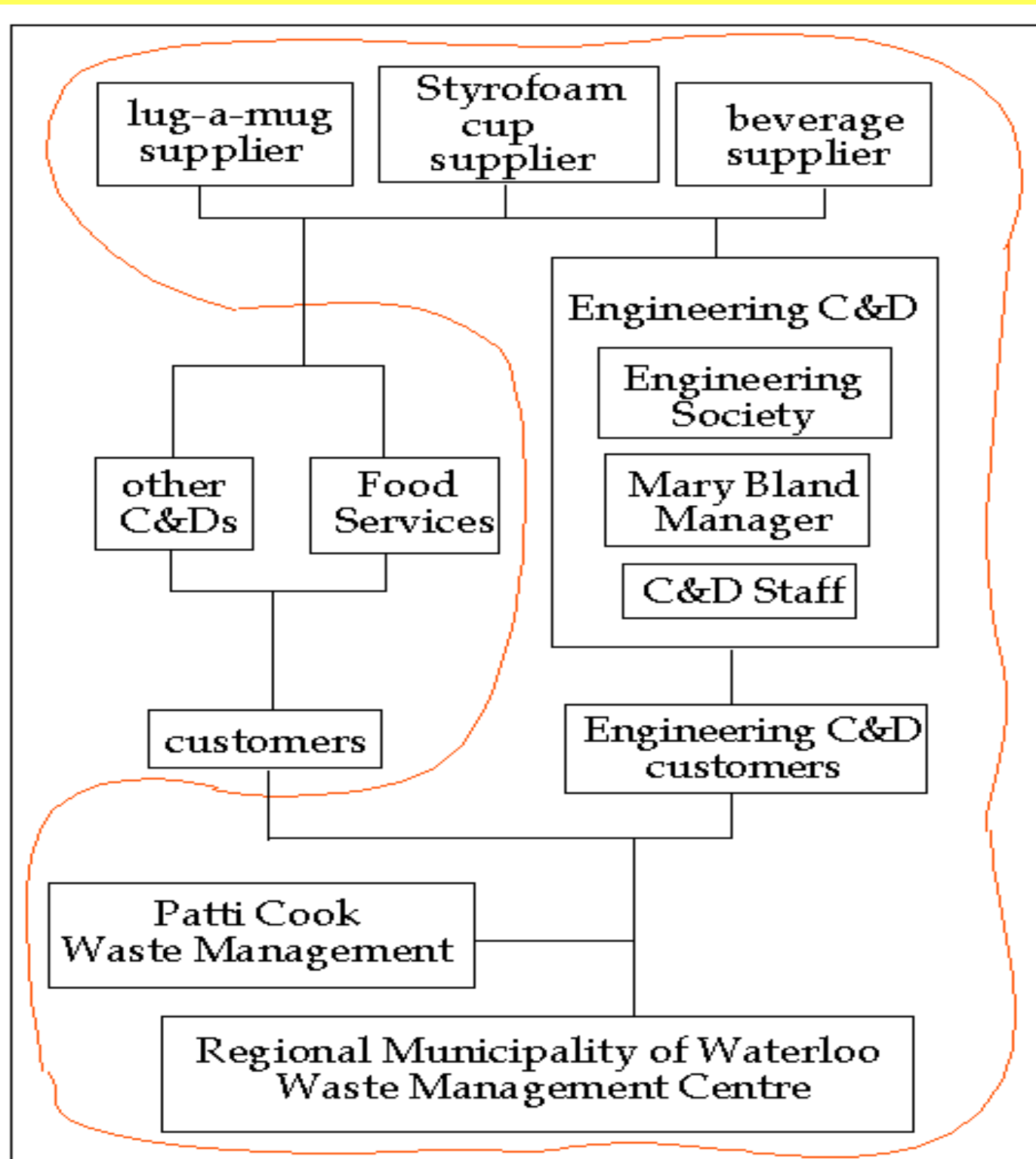
The Engineering C & D

Lug a mug

- **From 1989 to 1997, styrofoam cup usage on campus was reduced from 1,000,000 per year to 200,000**
- **Research question:**
 - Can the use of non reusable beverage containers be reduced?

Lug a mug

- **Having identified a solution it was then necessary to consider the people who would be involved in making the change.**
- **This requires an "actor" system description**



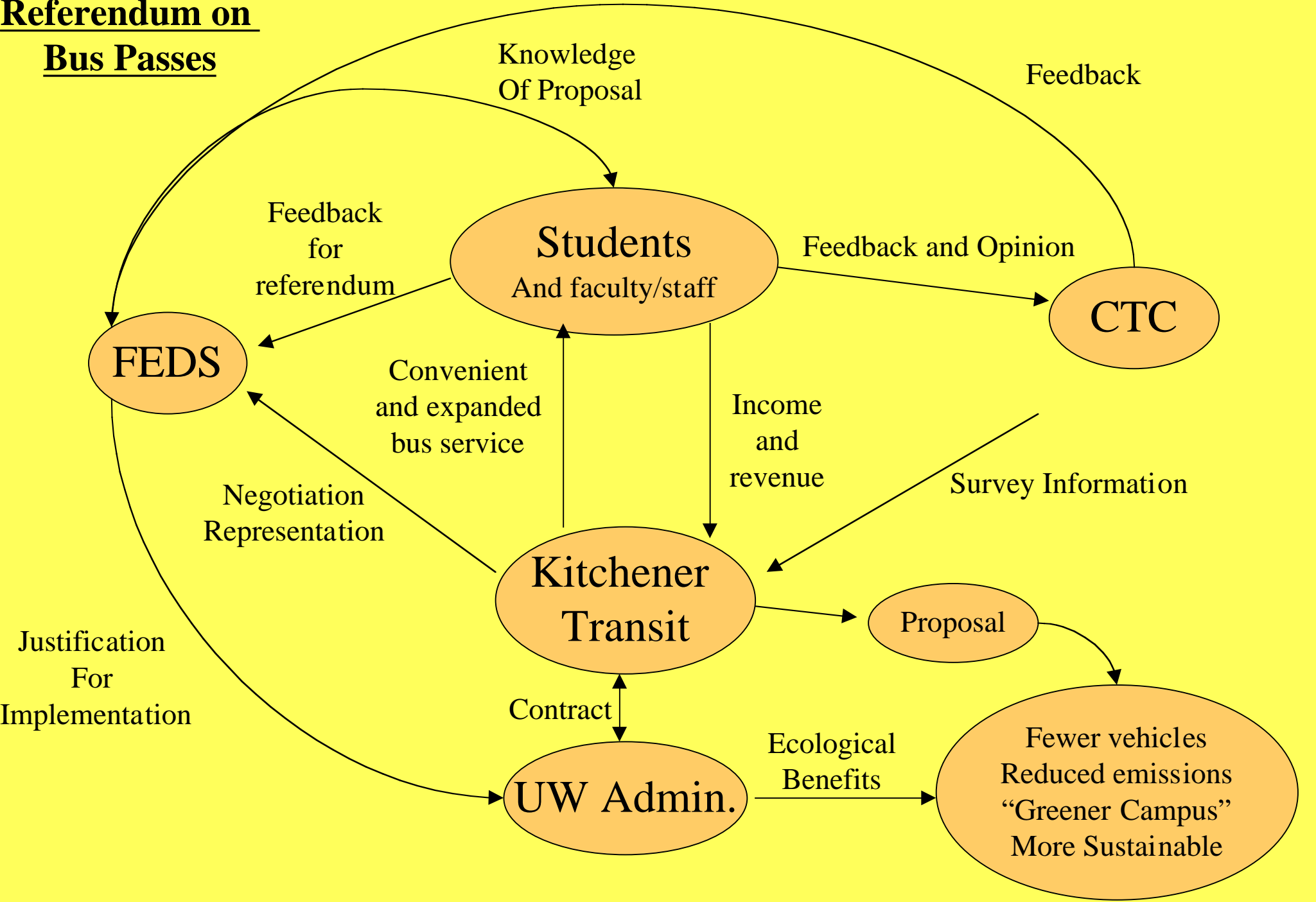
Actor systems

Bus passes for all students

Bus passes for all

- **A group of students were interested in having all students issued a bus pass that would be paid for through a small increase in student fees.**
- **They started by examining who all the players in the decision were and how they are related. This was described by an actor system diagram. This diagram informed the students about how they might effectively influence the situation.**

Referendum on
Bus Passes



Systems descriptions

- **In any situation, a description of the physical flow system provides insights into how the system can be made more sustainable**
- **Equally important is a description of the people involved and how they influence how the system works.**
- **Only through an understanding of the physical and the social system can we hope to move towards sustainability.**