Intertwined Data

Lecture 11
14 October 2019
Rumor mills
Ginny controls the rumor mill

You’d think people had better things to gossip about. Three Dementor attacks in a week, and all Romilda Vane does is ask me if it’s true you’ve got a Hippogriff tattooed across your chest.

What did you tell her?

I told her it’s a Hungarian Horntail. Much more macho.

Thanks. And what did you tell her Ron’s got?

A Pygmy Puff, but I didn’t say where.
Tracking rumors

Suppose we want to track gossip in a rumor mill.
Tracking rumors

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Pansy
Tracking rumors

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Tracking rumors

Suppose we want to track gossip in a rumor mill.

Pansy

Draco

Cho

Romilda

Vincent

Ginny
Tracking rumors

Suppose we want to track gossip in a rumor mill.

Simplifying assumption: Each person tells at most two others
Tracking rumors

Suppose we want to track gossip in a rumor mill.

Simplifying assumption:
Each person tells at most two others

Pansy → Cho
Cho → Romilda
Romilda → Ginny
Ginny → Vincent
Vincent → Draco
Draco → Cho
Representing rumor mills

Is a rumor mill simply a list of people?
Representing rumor mills

Is a rumor mill simply a list of people?
No, because there are relationships among the people.
Representing rumor mills

;;; A Person is
;;; (make-person Image Person Person Person)

How about this?
Representing rumor mills

;;; A Person is
;;; (make-person Image Person Person)

How about this? No, because some people don’t gossip to anyone else.
Representing rumor mills

;;; A RumorMill is either
;;; - '(')
;;; - (make-gossip Image RumorMill RumorMill)

How about this?
Example rumor mills

;; A RumorMill is either
;; - '()
;; - (make-gossip Image RumorMill RumorMill)

empty
Example rumor mills

;; A RumorMill is either
;; - '()
;; - (make-gossip Image RumorMill RumorMill)

(make-gossip '() '())
Example rumor mills

`; A RumorMill is either
`; - '()
`; - (make-gossip Image RumorMill RumorMill)

(make-gossip
  '()
  (make-gossip
    '() '()))
(make-gossip)

(make-gossip '() '())

(make-gossip '() '())

(make-gossip '() '())

(make-gossip '() '())
Example using constants:

(define GINNY-MILL
  (make-gossip '() '()))

(define ROMILDA-MILL
  (make-gossip '() GINNY-MILL))

(define VINCENT-MILL
  (make-gossip '() '()))

(define DRACO-MILL
  (make-gossip ROMILDA-MILL VINCENT-MILL))

(define CHO-MILL
  (make-gossip '() '()))

(define PANSY-MILL
  (make-gossip CHO-MILL DRACO-MILL))
Programming with rumors

;; A RumorMill is either
;; - '()
;; - (make-gossip Image RumorMill RumorMill)
Programming with rumors

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Programming with rumors

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#;
;; RumorMill -> ...
(define (fun-for-rumor-mill rm)
  (cond [(empty? rm) ...]
       [(gossip? rm)
        ([... (gossip-who rm)
            (fun-for-rumor-mill (gossip-next1 rm))
            (fun-for-rumor-mill (gossip-next2 rm)))]))
Programming with rumors

;; A RumorMill is either
;; - '()
;; - (make-gossip Image RumorMill RumorMill)

;; RumorMill -> ...
(define (fun-for-rumor-mill rm)
  (cond [(empty? rm) ...]
        [(gossip? rm)
          (... (gossip-who rm)
               (... (gossip-next1 rm))
               (fun-for-rumor-mill (gossip-next1 rm)))
          (fun-for-rumor-mill (gossip-next2 rm)))])
Rumor program examples

Design the function `informed?` that takes a person image and a rumor mill and determines whether the person is part of the rumor mill.
Rumor program examples

Design the function `rumor-delay` that takes a rumor mill and determines the maximum number of days required for a rumor to reach everyone, assuming that each person waits a day before passing on a rumor.
Rumor program examples

Design the function `add-gossip` that takes a rumor mill and two person images – one new and one old – and adds the new person to the rumor mill, receiving rumors from the old person; the old person must not already have two next persons.
Rumor program examples

Design the function `rumor-chain` that takes a person image and a rumor mill and returns a list of person images representing everyone who must pass on the rumor for it to reach the given person; return `#false` if the given person is never informed.
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