



Sorting Algorithms

Session Objectives

ALL students will be able to describe one method of comparing and sorting values

MOST students will be able to describe at least two sorting algorithms using appropriate technical language

SOME students will be able to compare the efficiency of different sorting algorithms and evaluate their complexity

A competition!

Stand in order by:

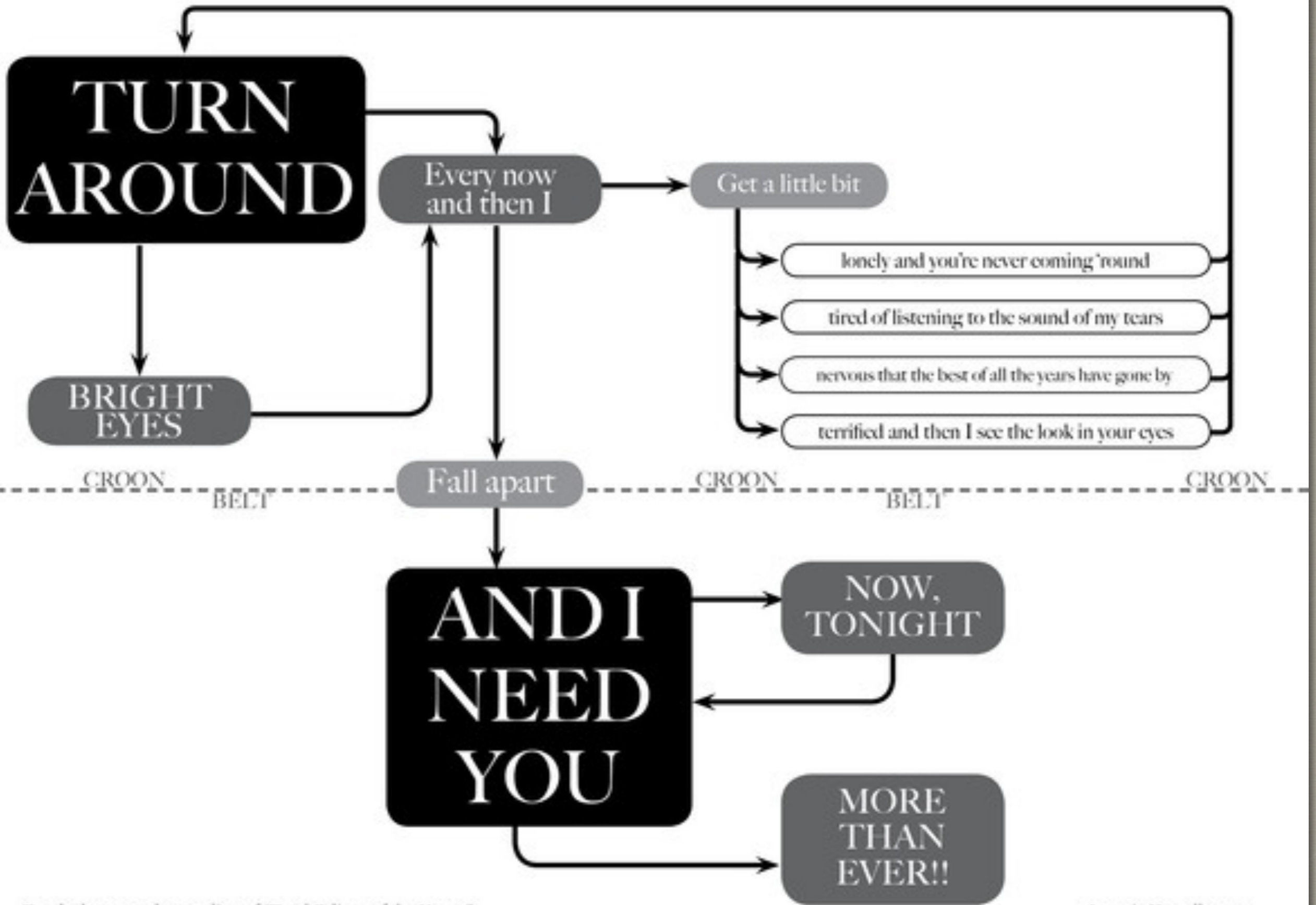
Height

First name (ascending)

What is an algorithm?

In mathematics and computer science, an algorithm is a step-by-step procedure for calculations. Algorithms are used for calculation, data processing, and automated reasoning. (Wikipedia)

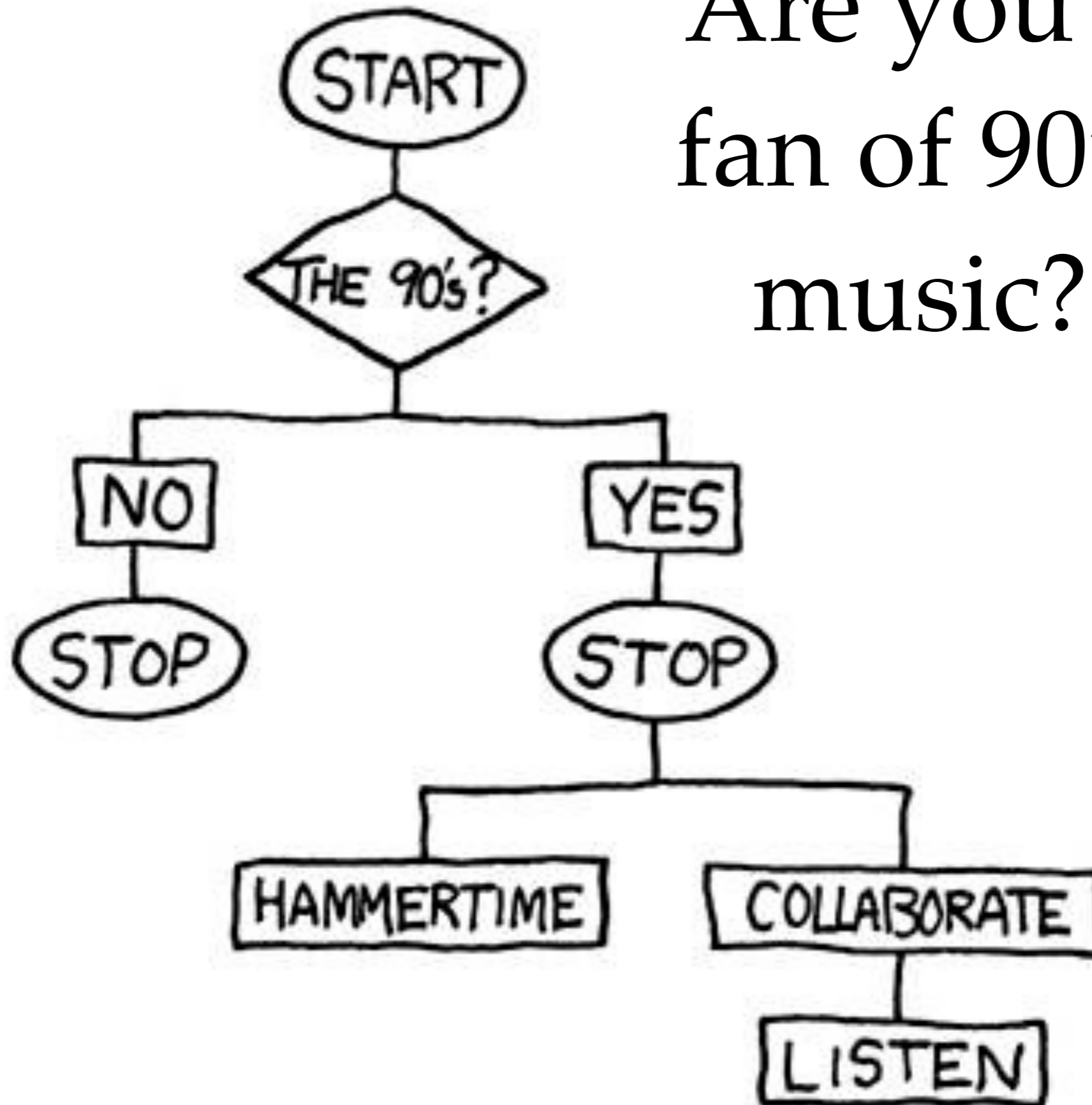
e.g. “Come in, sit down, log on”



For the better understanding of "Total Eclipse of the Heart."

Jeannie Harrell 2009

Are you a fan of 90's music?



Simple Algorithm - Selection Sort

Important: Remember to count how many checks you do

We know that the cards should go from Ace to King

Check each card to see if it's an Ace - if it is then move it

Now check each card to see if it's a 2 - if it is then move it

Now check each card to see if it's a 3...

Simple Algorithm - Bubble Sort

Important: Remember to count how many checks you do

Compare CARD 01 and CARD 02.

If the first one is bigger then swap them.

Compare CARD 02 and CARD 03.

If the first one is bigger then swap them.

Make 1 full pass.

Put the last card to one side.

Repeat...

Complex Algorithm - Merge Sort

Important: Remember to count how many checks you do

Split the cards into 2 equal piles.

Repeat until you have piles of 1 or 2 cards each.

Sort each pair.

Merge Group 1 and Group 2.

Sort Group 3 and Group 4.

Repeat

Merge "Groups 1&2" with "Groups 3&4"

Comparing Algorithms

Which was easier to understand?

Which took the fewest comparisons?

Which is the easiest to program?

What limitations are there?

Which would work best for large numbers?

Sorting Algorithms

Go to pi.mwclarkson.co.uk and look for the Summer School resources

Load the **Sorting Activities** web page

Follow the instructions to sort the boxes into order

Further Resources

- ❖ Animated sorting algorithms - <http://www.sorting-algorithms.com/>
- ❖ AlgoRythmics - Sorting algorithms to Hungarian folk dancing - <http://www.youtube.com/user/AlgoRythmics/videos>