

# Lecture 17

CSE 331

Oct 7, 2016

# Homework 5

## Homework 5

Due by **11:00am, Friday, October 13, 2017.**

Make sure you follow all the [homework policies](#).

All submissions should be done via [Autolab](#).

## Sample Problem

### The Problem

Extend the topological ordering algorithm we saw in class so that, given an input directed graph  $G$ , it outputs one of two things: (a) a topological ordering, thus establishing that  $G$  is a DAG, or (b) a cycle in  $G$ , thus establishing that  $G$  is not a DAG.

The running time of your algorithm should be  $O(m + n)$  for a directed graph with  $n$  nodes and  $m$  edges.

[Click here for the Solution](#)

# Solutions to HW 4

End of the lecture

# Quiz 1 on Monday

note ☆ stop following 3 views

## Quiz 1 on Monday, Oct 9

The first quiz will be from 1-1:10pm in class on **Monday, October 9**. We will have a 5 mins break after the quiz and the lecture will start at 1:15pm.

We will hand out the quiz paper at 12:55pm but you will **NOT** be allowed to open the quiz to see the actual questions till 1pm. However, you can use those 5 minutes to go over the instructions and get yourself in the zone.

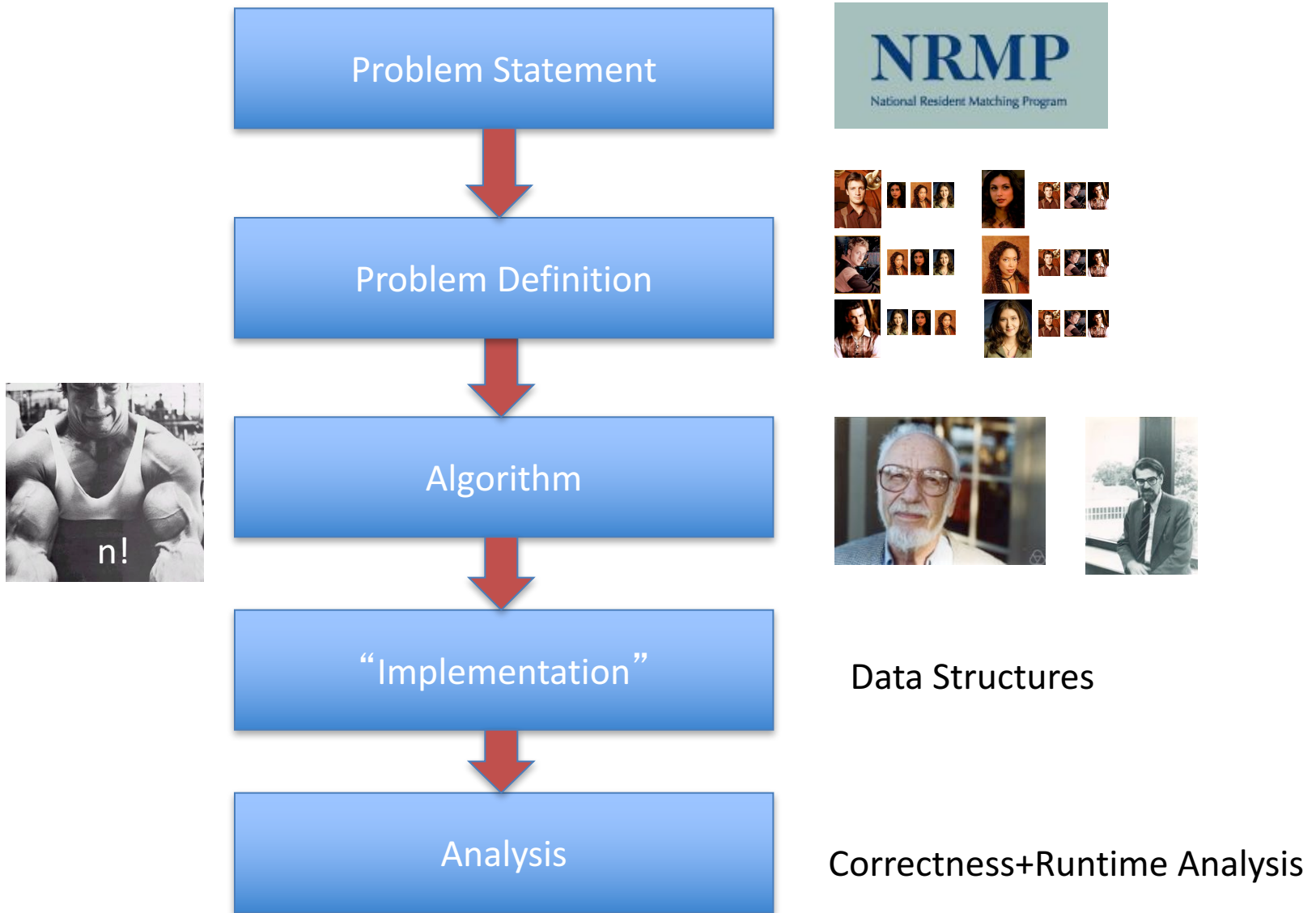
There will be two T/F with justification questions (like those in the sample mid term 1: [@373](#))

#pin

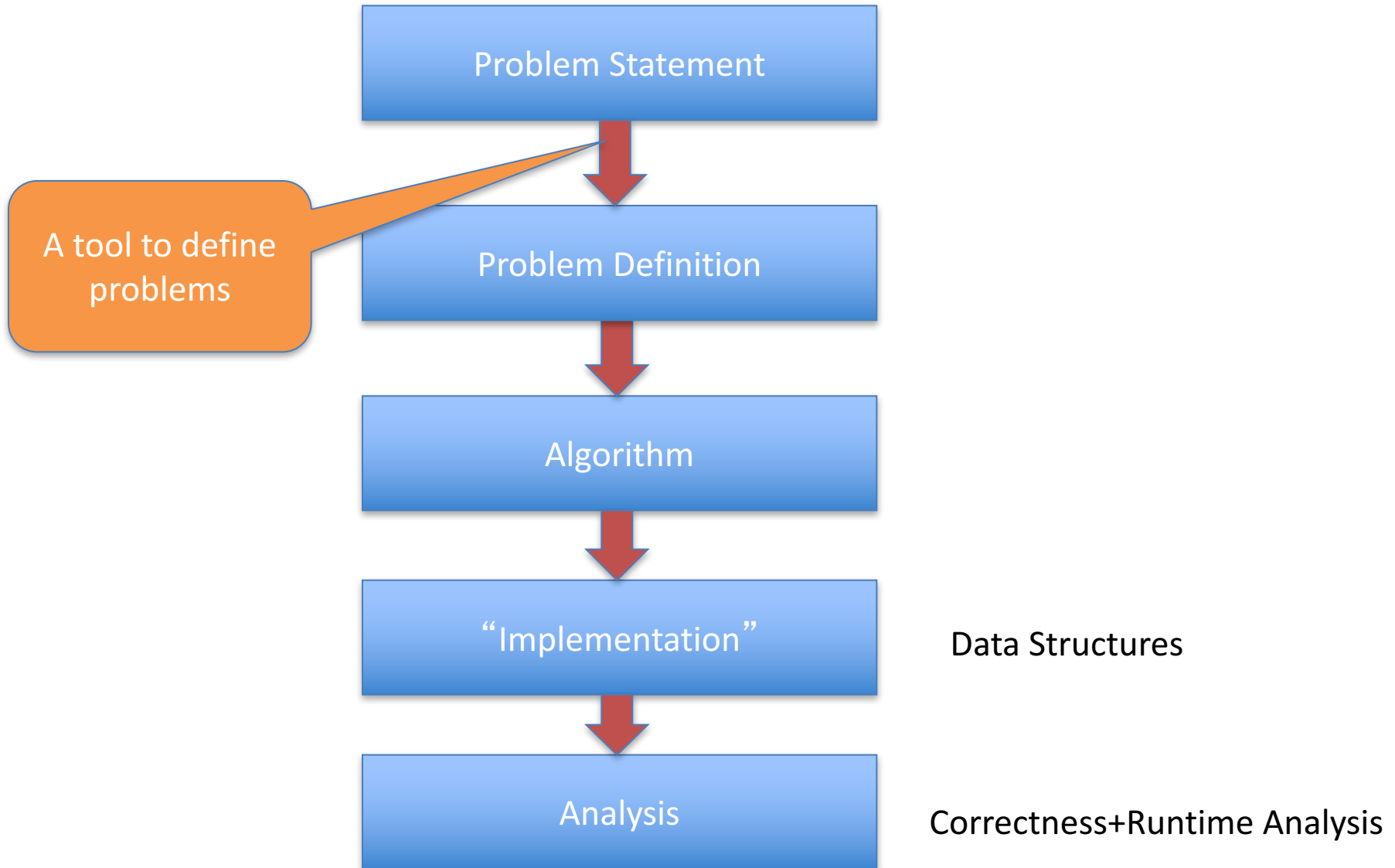
[quiz](#)

[edit](#) good note | 0 Updated 10 minutes ago by Atri Fluxus

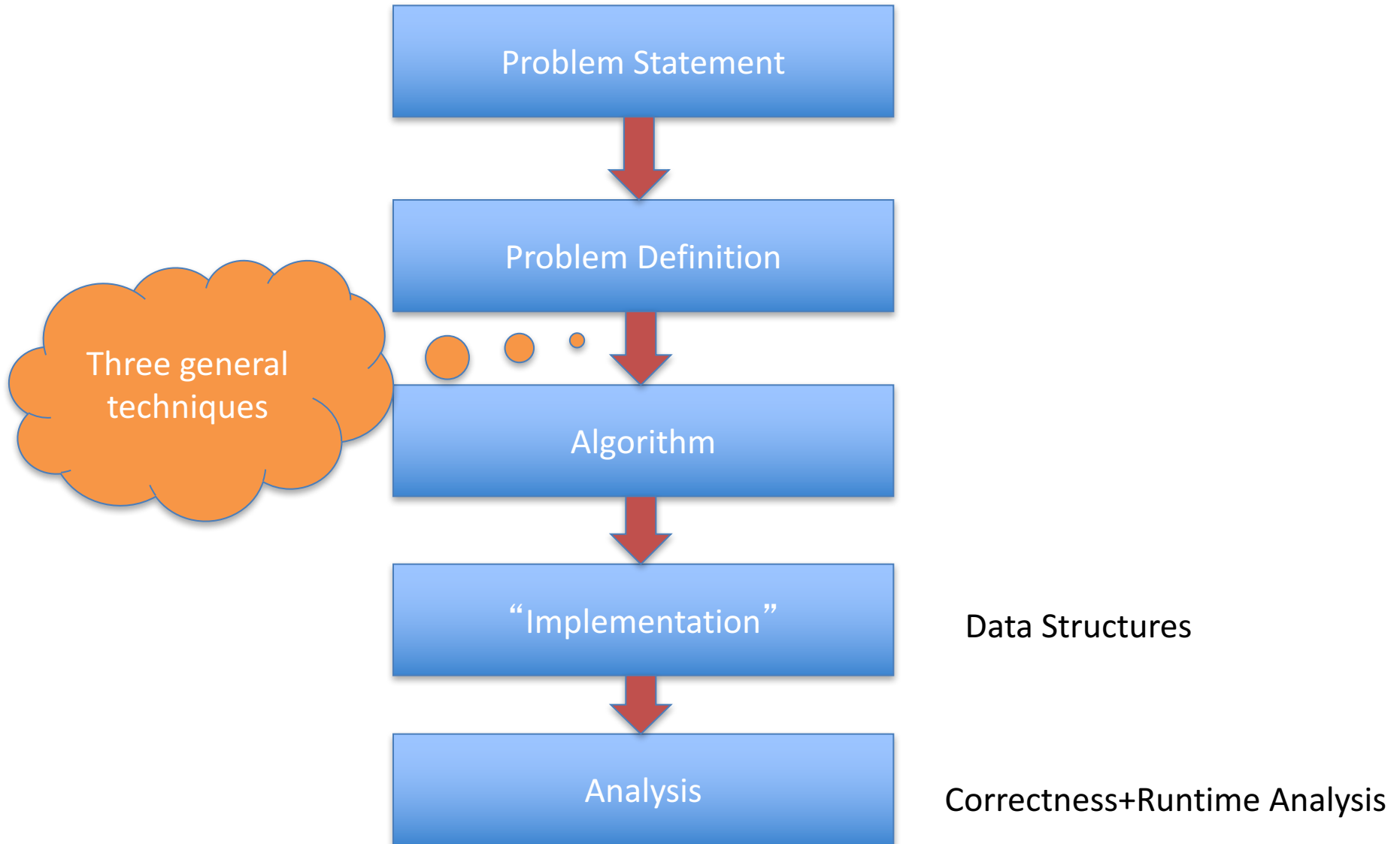
# Main Steps in Algorithm Design



# Where do graphs fit in?



# Rest of the course



# Greedy algorithms

Build the final solution piece by piece

Being short sighted on each piece

Never undo a decision

Know when you see it





# End of Semester blues

Can only do one thing at any day: what is the maximum number of tasks that you can do?



Write up a term paper

Party!

Exam study

homework

331 HW

Project

Monday

Tuesday

Wednesday

Thursday

Friday

# Greedily solve your blues!

Arrange tasks in some order and iteratively pick non-overlapping tasks



Write up a term paper

Party!

Exam study

331 HW

Project

Monday

Tuesday

Wednesday

Thursday

Friday

# Ordering is crucial

Order by starting time



Write up a term paper

Party!

Exam study

331 HW

Algo = 1

Project

Monday

Tuesday

Wednesday

Thursday

Friday

# Another attempt

Order by duration



Ordering by least conflicts doesn't work



Algo = 1



# The final algorithm

Order tasks by their END time



Write up a term paper

Party!

Exam study

331 HW

Project

Monday

Tuesday

Wednesday

Thursday

Friday



# Questions?



# Today's agenda

Prove the correctness of the algorithm

# Formal Algorithm

$R$ : set of requests

Set  $S$  to be the empty set

While  $R$  is not empty

    Choose  $i$  in  $R$  with the earliest finish time

    Add  $i$  to  $S$

    Remove all requests that conflict with  $i$  from  $R$

Return  $S^* = S$