

Mon, Mar 18, 2024

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## Scientific Computing

### Announcements:

→ Take-home midterm due on D2L,  
by the start of class, 11am, on  
Wednesday

Today: Backtracking code for WIS  
Object-Oriented Programming

Ex:  $R = \{r_1, \dots, r_{10}\}$

Brute force:  
check all subsets

$\text{solve}(\{r_1, \dots, r_{10}\})$

accept  $r_1$

reject  $r_1$

$R' =$  requests that  
don't conflict with  $r_1$   
return  $\text{solve}(R')$

return  
 $\text{solve}(\{r_2, \dots, r_{10}\})$

recursion

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$\{r_1, r_2, \dots, r_{200}\}$  Assume  $r_1$  and  $r_2$  conflict

Brute force will check all subsets that  
contain  $r_1$  and  $r_2$  -  $2^{198}$  obviously bad  
subsets

## Pseudocode

function solve(requests):

#goal: return the subset of [requests]  
with no conflicts and highest total value

if len(requests) = 0:  
return []

new\_request = requests[0]

compatible = requests that do not conflict  
with new\_request

accept\_solution = [new\_request] + solve(compatible)

reject\_solution = solve(requests[1:])

return whichever of accept\_solution  
and reject\_solution has the highest value

$L = [3, 7, 2, 5]$   
0 1 2 3

$L[1:] = [7, 2, 5]$