

6/17/25 Greedy Algorithms

Problem 1

Finishing max # tasks

Input: n tasks each take t_i time
 M , # minutes to complete as many tasks
as possible

Output: ~~#~~ max # tasks that can be completed
in M or fewer minutes.

SOL:

Sort input array

$sum = 0, res = 0$

```
for (int i = 0; i < n; i++) {  
    if ( $t[i] + sum > m$ )  
        break;
```

$res++;$

$sum += t[i];$

}

→ res is ans

Problem 2

Room Scheduling (Single)

Each event start time s_i ; end time e_i

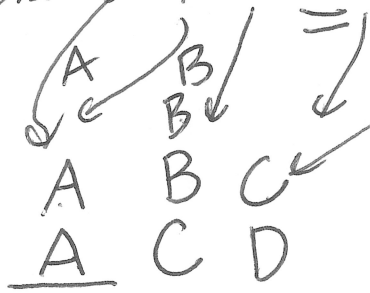
Event	Start	End			
1	15	40	0/12 → #2 X		
2	10	60	→ #4 X	10	50 ✓
3	20	25	→ #1 ●	49	51
4	30	80	→ #5 X	50	100 ✓
5	35	45	→ #3 ●		
6	40	80	→ #6 X		

1) Sort by end time

2) Go through each event + schedule if room is open

Containers

Shipments: ACB DABBCA



or A B D
or A A D
or A B A

more freedom then

✓

✓

Fibonacci Question

$$F_n = \frac{1}{\sqrt{5}} \left(\left(\frac{1+\sqrt{5}}{2} \right)^n - \left(\frac{1-\sqrt{5}}{2} \right)^n \right)$$

1 pair new rabbits Month 1

1 pair mature rabbits Month 2

1 pair mature

1 pair new

Month 3

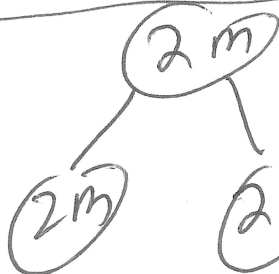
2

the golden ratio

1 pair mature 1 pair new 1 pair mature

Month 4

3



1 New

3m, 2N

Month 5

F_n

=

F_{n-1}

+

F_{n-2}

rabbits month n

all prev rabbits

mature pairs last month

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ...

for all a greedy doesn't work

change 10~~8~~¢

7¢, 5¢, 1¢

}
}

$$7 + 1 + 1 + 1 = 10$$

$$5 + 5 = 10$$

Fishmongers

Buy 5 \$10/kg

Buy 2 \$8/kg

Buy 20 \$7/kg

Buy 4 \$5/kg

Sort
decrease
cost

weight

10, (20), (30), 5, (18)

6, (100), (40), 2, 8

9, 12

Sort
decreasing