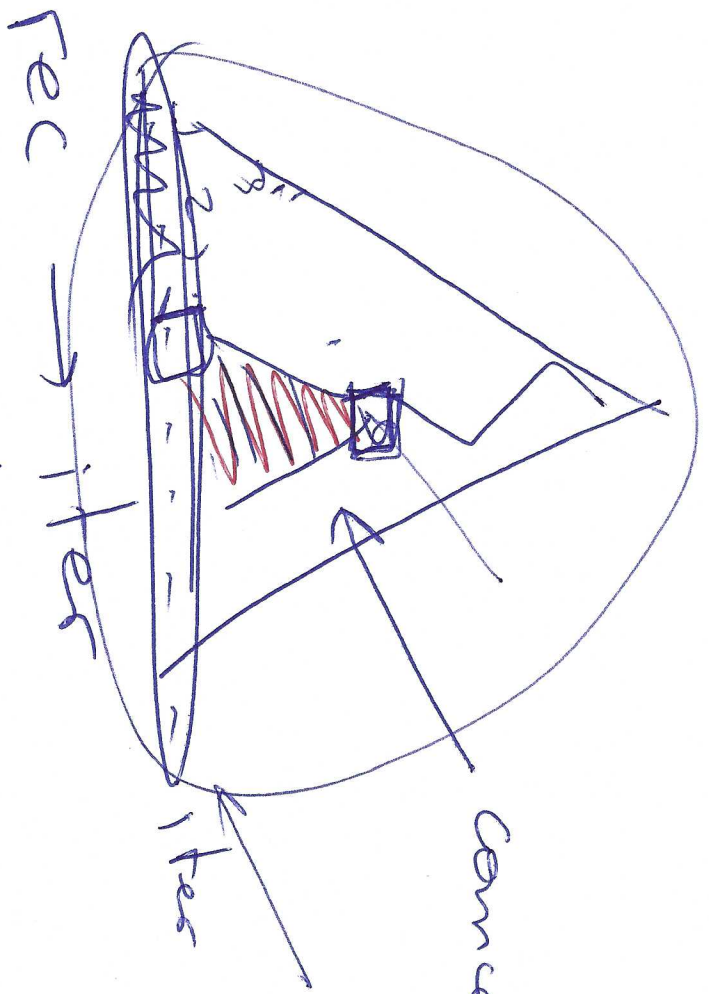


lockle
test exams



optimization

~~For~~ Lower Bound = sol. of relaxed problem

Or. P
 $f \rightarrow \min$
 x satisfies:
 $c_1)$
 $c_2)$
 $c_3)$

Rel. P.

$f \rightarrow \min$
 x satisfies
 $c_1)$
 ~~$c_2)$~~
 ~~$c_3)$~~

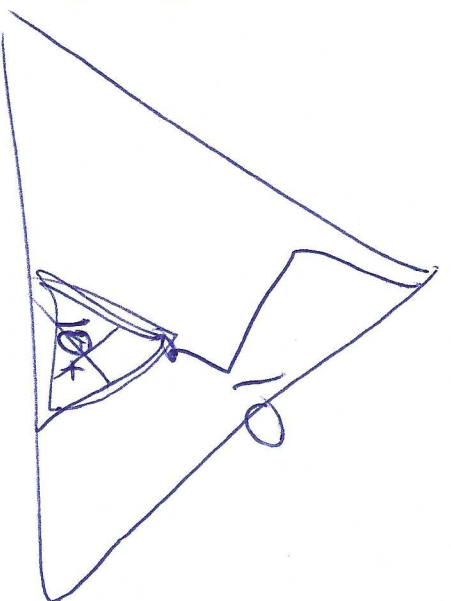
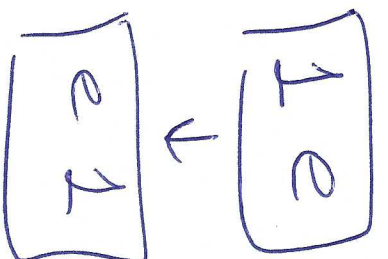
8-puzzle

7	1	6
8	3	5
8	2	5

min. moves

1 2 3
4 5 6
7 8

$$g \leq g+h \Rightarrow \text{correct}$$



$$g, f = 20$$

lower

year
hs

take files out,
put back to correct pos.

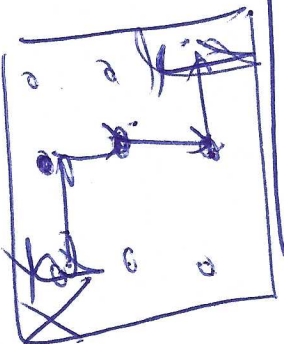
$$\# \text{ moves} = \# \text{ incorrectly placed files}$$

+1 per
inc.

h dominates hs

dominance

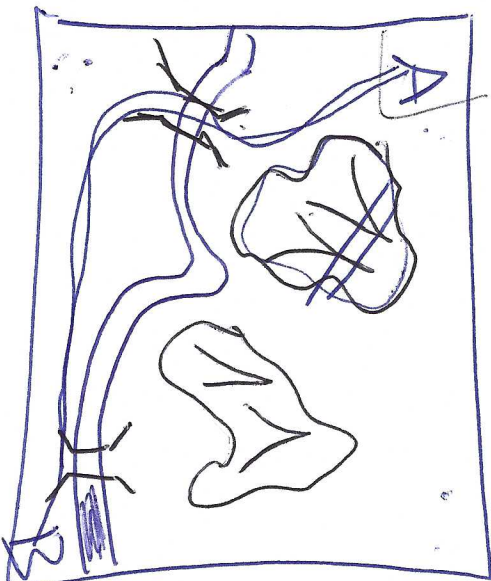
ht
year



$$\# \text{ move} = \sum \text{Manhattan dis of incor. placed files}$$

$$\frac{MD}{\text{for}} = | \Delta x | + | \Delta y | \cdot \left| CD = \max(|\Delta x|, |\Delta y|) \right|$$

path finding



find path

$len(p) \rightarrow min$

- 1) p does not contain "M" mound
- 2) p does not contain "R" river
- 3) $A \in p[0]$
- 4) $B = p.back()$

+

~~Q~~

*

Von Neumann

Moore

Soly

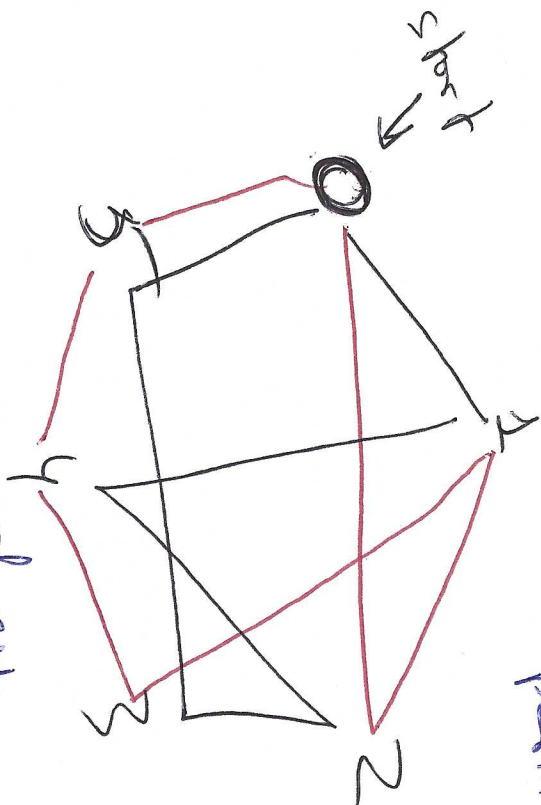
find path

$len(p) \rightarrow min$

- 1) ~~1~~
 - 2) ~~2~~
 - 3) ~~3~~
 - 4) ~~4~~
- straight line
- break

TSP

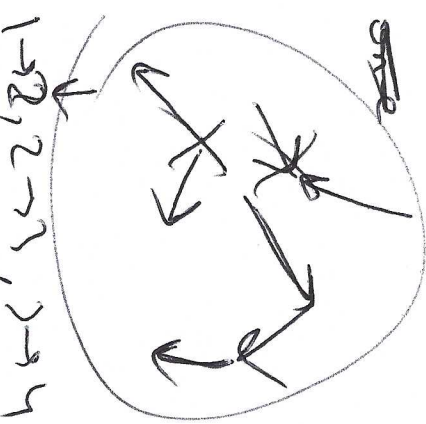
~~1~~ 2 3 4 5
~~2~~ 1 3 4 5
~~3~~ 2 1 4 5
~~4~~ 2 3 1 5
~~5~~ 2 3 4 1



find ~~sequence of~~ ~~edges~~ ~~edges~~

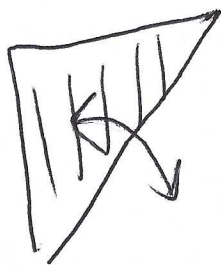
len(~~seq~~) \rightarrow min

- 1) each city is entered ~~once~~
- 2) each city is left
- 3) entered once
- 4) left once



opt. lower bound

	0	1	2	3	4	5
0		X	X	X	X	X
1	X		X	X	X	X
2	X	X		X	X	X
3	X	X	X		X	X
4	X	X	X	X		X
5	X	X	X	X	X	



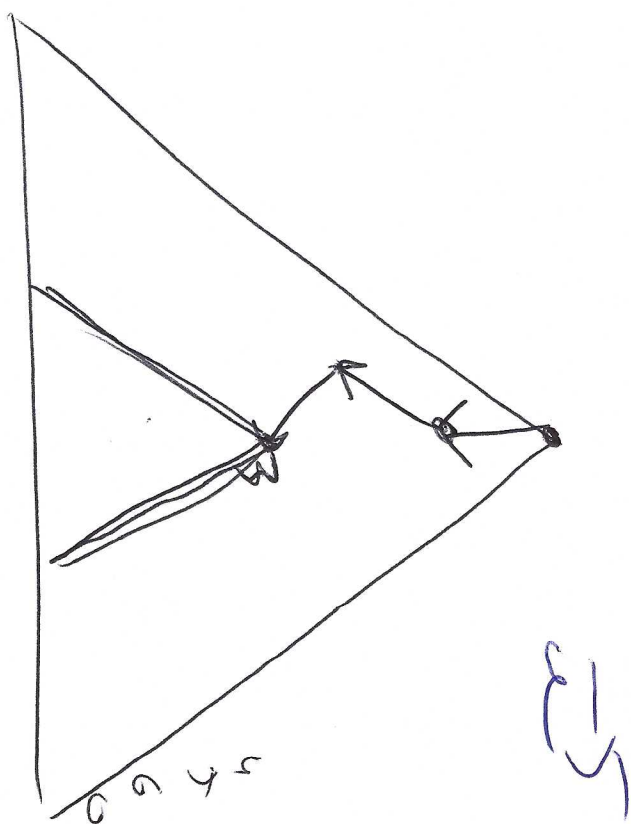
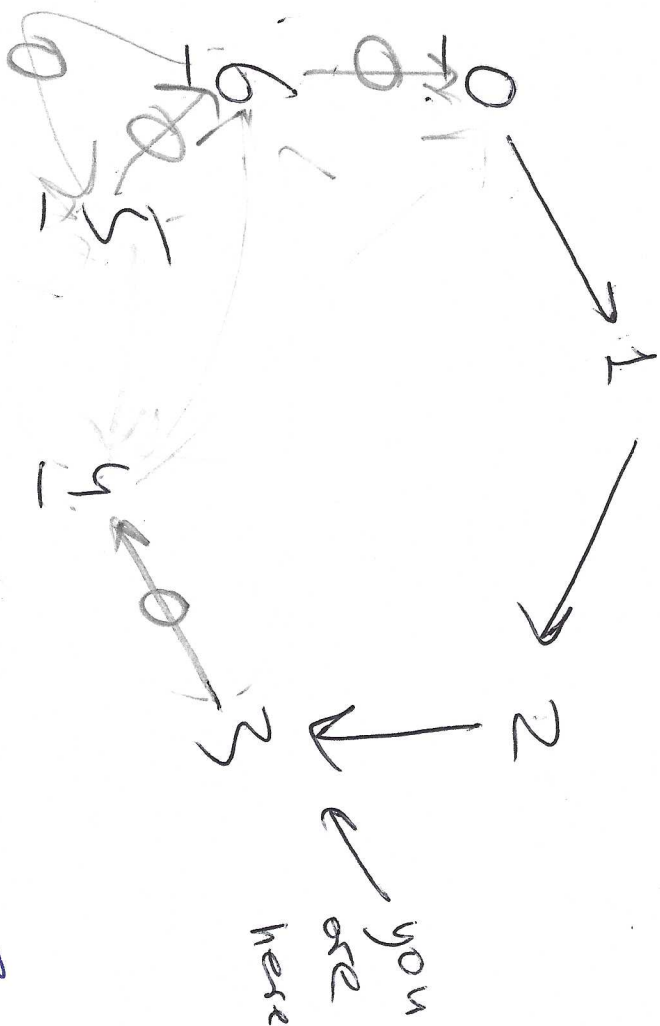
Rel

find seq. of edges

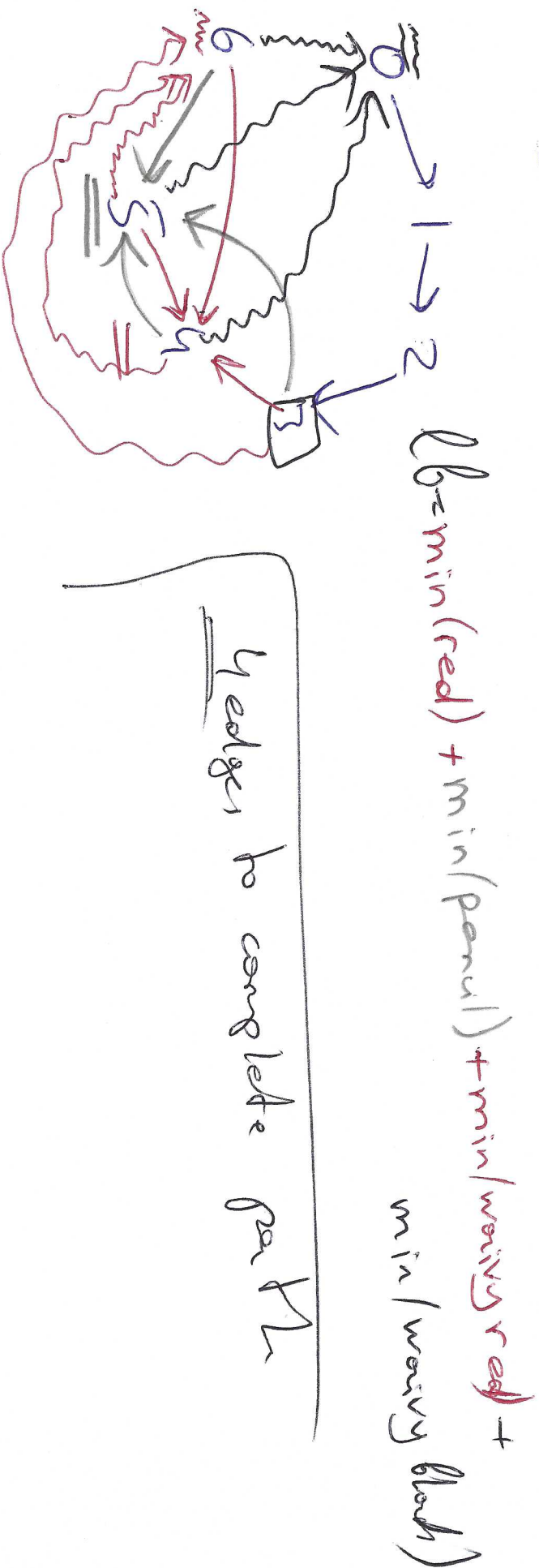
len(seq) \rightarrow min

~~1)~~
~~2)~~
~~3)~~
~~4)~~

all cities visited



$3 \rightarrow 4, 5 \rightarrow 6, 6 \rightarrow 0$ } lower bound
 $3 \rightarrow 4, 5 \rightarrow 6, 6 \rightarrow 0$

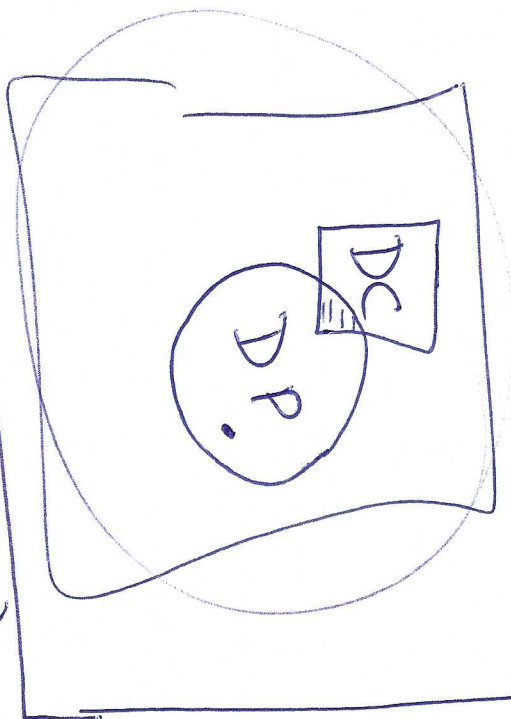


edges to complete path

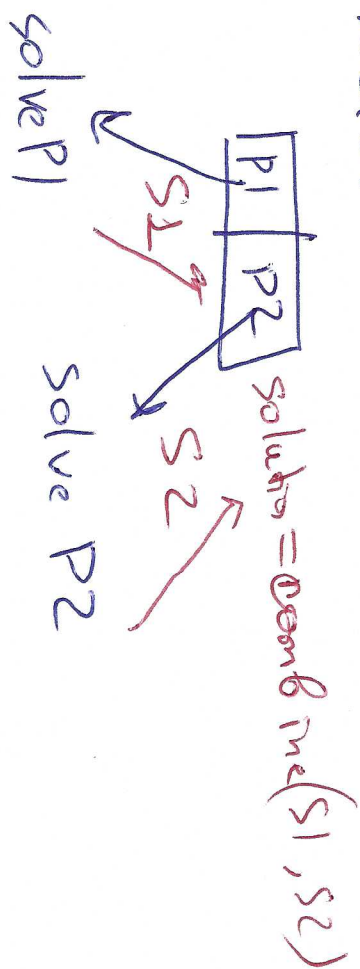
Divide & Conquer

-6-

Praka



Skeleton



DC (P) (base case) return looking [P],

$(P_1, \dots, P_n) = \underline{\text{split}}(P),$

for each $i = 1 \dots n$ {

$S_i = \text{DC}(P_i);$

}

$S = \text{combine}(S_1, \dots, S_n);$

return S;

Big num base
mult $4 \rightarrow 3$

$A, B = \text{split}$ X

m_1

\dots

m_y

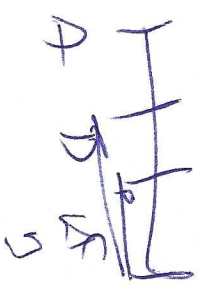
combine =
 $m_1 < n + \dots$

$$X = \overline{A B C} = A \cdot 2^{\frac{n}{2}} + B 2^{\frac{n}{2}} + C$$

$$Y = \overline{D E F} = \dots$$

9 multiplikation $\log_3 9$

$$\rightarrow \log_3 \frac{846}{5}$$



$$\log_2 3$$

$$\log_2 4 \rightarrow$$

$$\log_3 n$$

$$n^2 \rightarrow$$