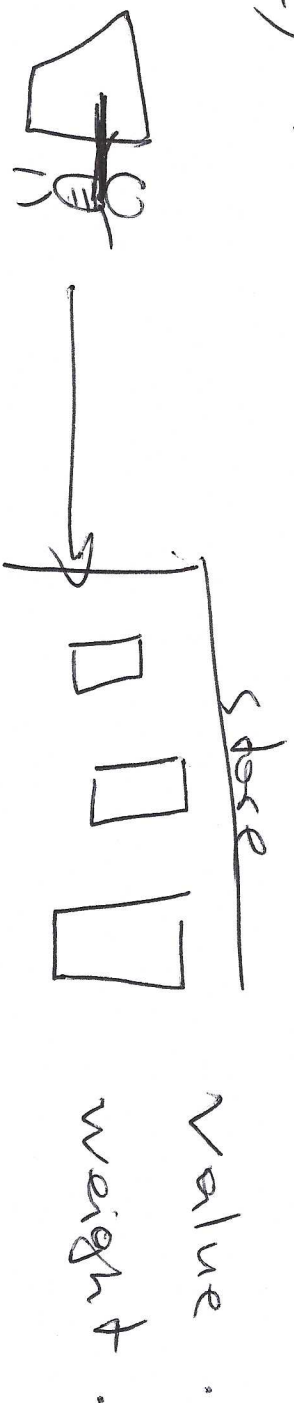


- 1) Lexicographical order (Perm) easier -
- 2) harder ~~harder~~ 0-1 Knapsack (odd 597)



$$a[n] = \{ (v_i, w_i) \}_{i=1..n}$$

~~subsequence~~ subset $\{i_j\}_{j=1..k}$

$$\sum_{i=1}^k w_{i_j} \leq W$$

$$\sum_{i=1}^k v_{i_j} \rightarrow \text{max.}$$

W - your capacity

$$bsf = -\infty$$

for each P in subset $\{$

if P is better than bsf
 $\{ bsf = P \}$

$$o(n) \quad w_1 + w_2 + \dots + w_n = \text{weight}$$

min-change

prev. iteration

curr.

$i_1 \dots i_k$

$i_1 \dots i_k \underline{i_{k+1}}$

Value $\boxed{+/-}$ $V_{i_{k+1}}$

weight $+ = W_{i_{k+1}}$

Value ~~weight~~ - 2 -

225

for $int \& oldweight = weight$,
weight = $oldweight + W[i_{k+1}]$

weight ...

Gray code

$\begin{matrix} 5 & 4 & 3 & 2 & 1 & 0 \\ 1 & 1 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 & 1 \end{matrix}$

$\Rightarrow K=3$, added, ~~or removed~~, $bool$

operator

\wedge 0010000
GCC compiler \rightarrow command

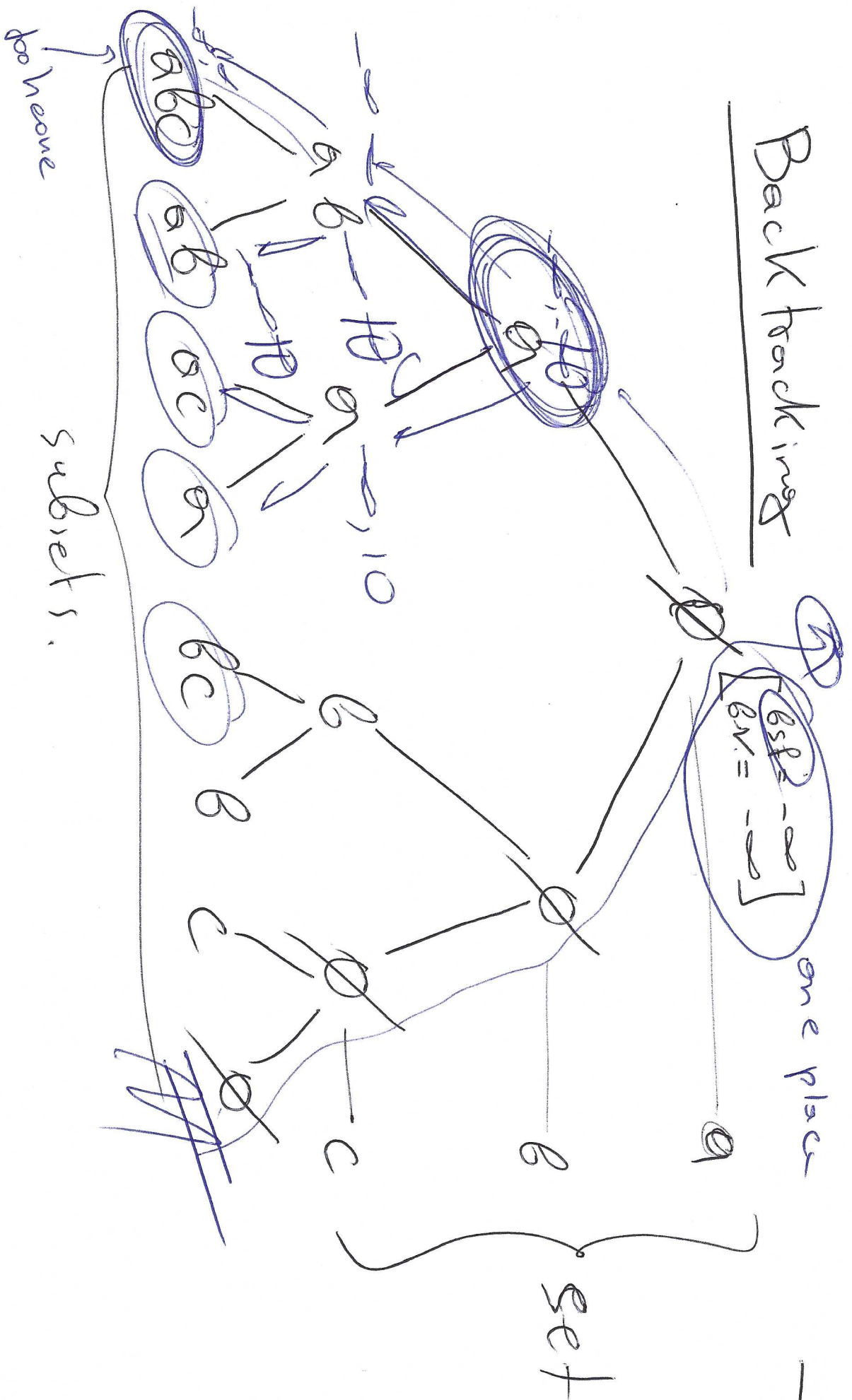
Min-change perm.

1 2 3) 2 15 WAP
 1 3 2) 3 25 WAPs
 2 1 3) 2
 2 3 1) 3
 3 1 2) 3
 3 2 1) 2

Johnson-TH \rightarrow slides

1 2 3
 1 3 2
 2 1 3
 2 3 1
 3 2 1

Back tracking



1 3 7 10

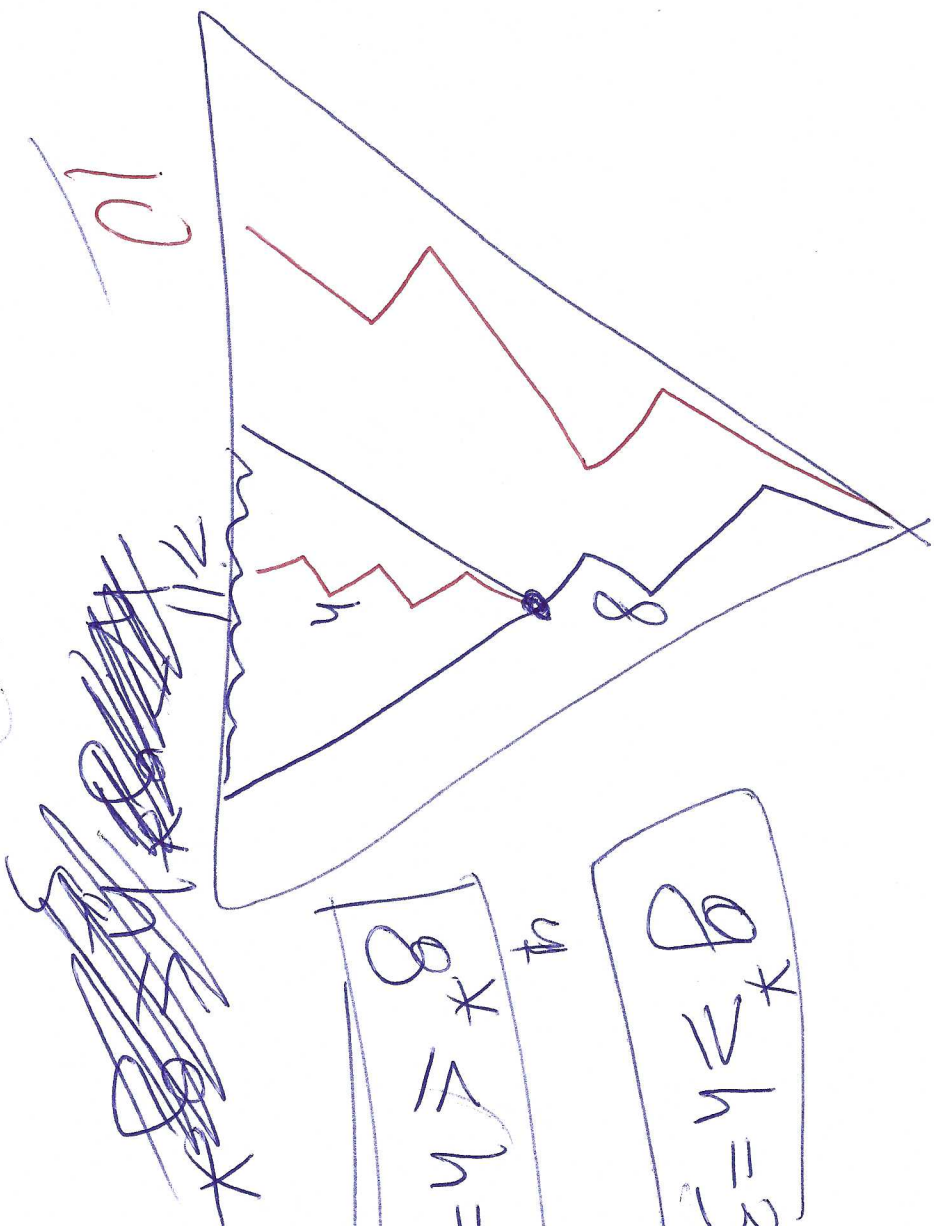
X = 12 no

X = 14 yes

X = 10 yes

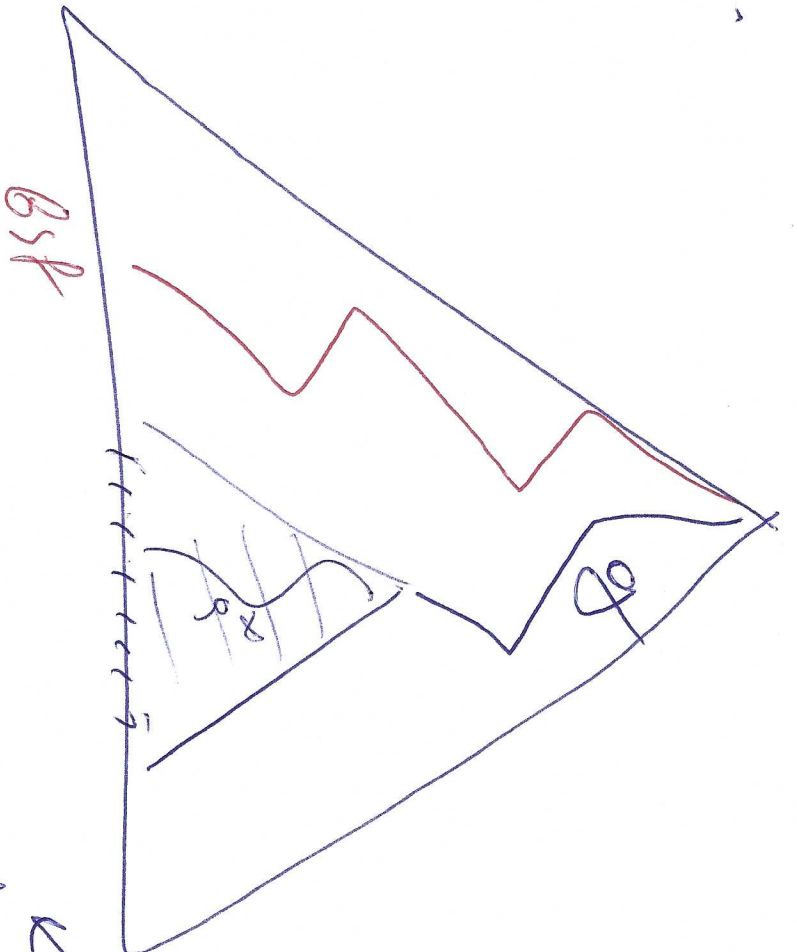
$g^* \geq h=3$ | cancel
cancel

$g^* \leq h=5$ | Good.
cannot
use to



10
9
8 + 5

min.



bsf

Lower Bound,

$$[h \leq g^*]$$

$$\boxed{bsf \leq g + h}$$

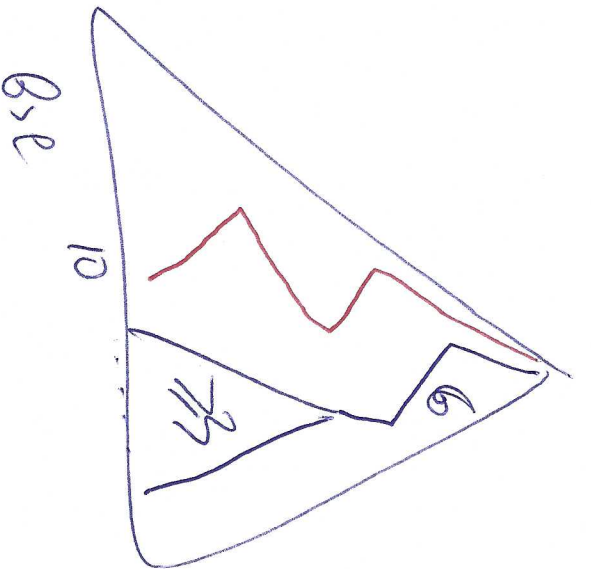
$\leq g + g^* = \text{actual sol. at the base}$

cancel

b, f

g

-8-



$$10 \leq 8 + 3 \text{ cancel}$$

$$10 \leq 6 + 3 \text{ do not cancel}$$

explode

minimize

$$b, f \leq g + \text{lower-bound} \Rightarrow \text{cancel}$$

branch and bound optimization.

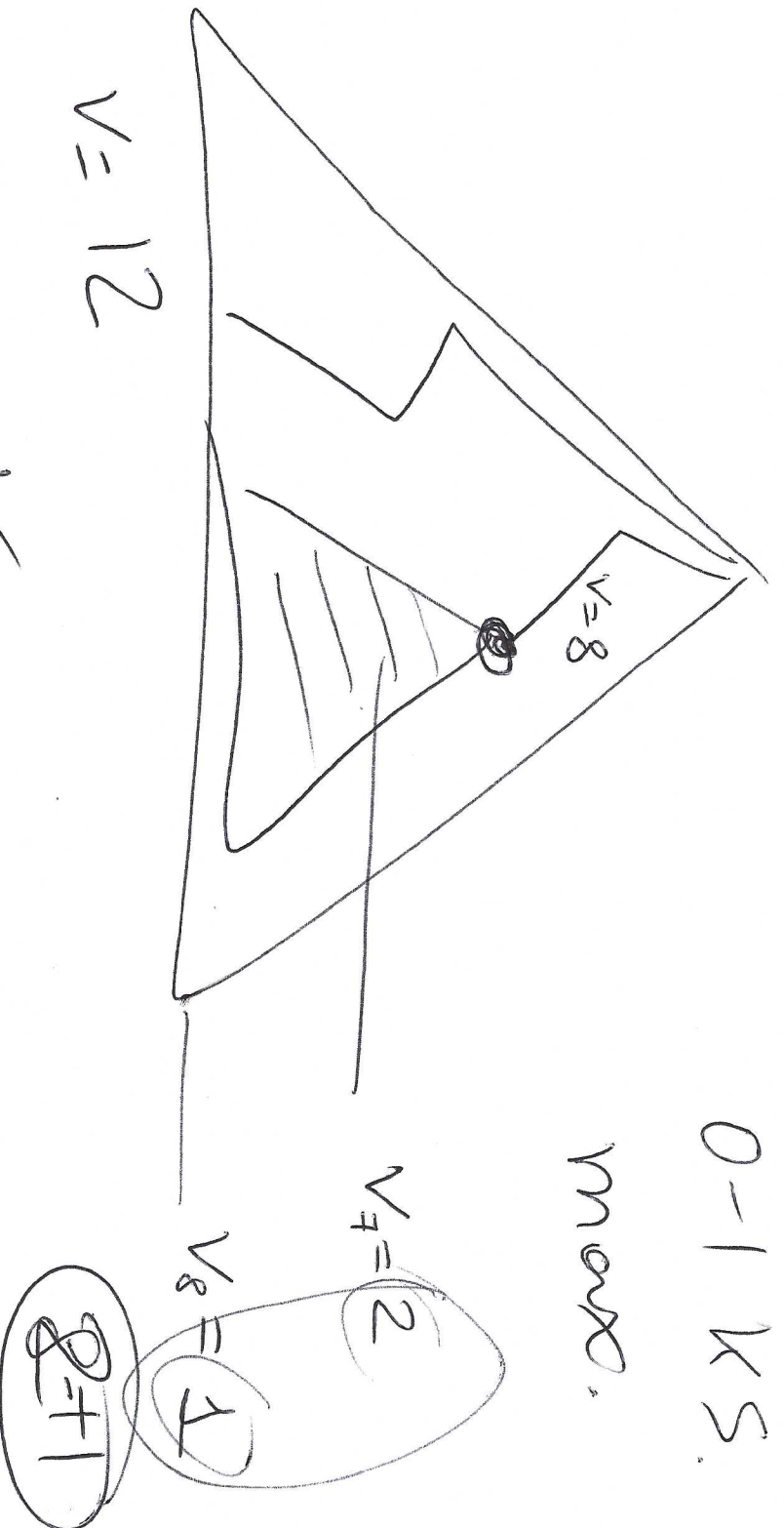
max

$$b, f \geq \underline{\underline{8}} + \text{upper-bound} \Rightarrow \text{cancel}$$

0-1 KS.

-9-

max.



$$v = 12$$

✓

$$12 \geq 8 + 3 \Rightarrow \text{corner}$$

6.8

8

h.p. 6.