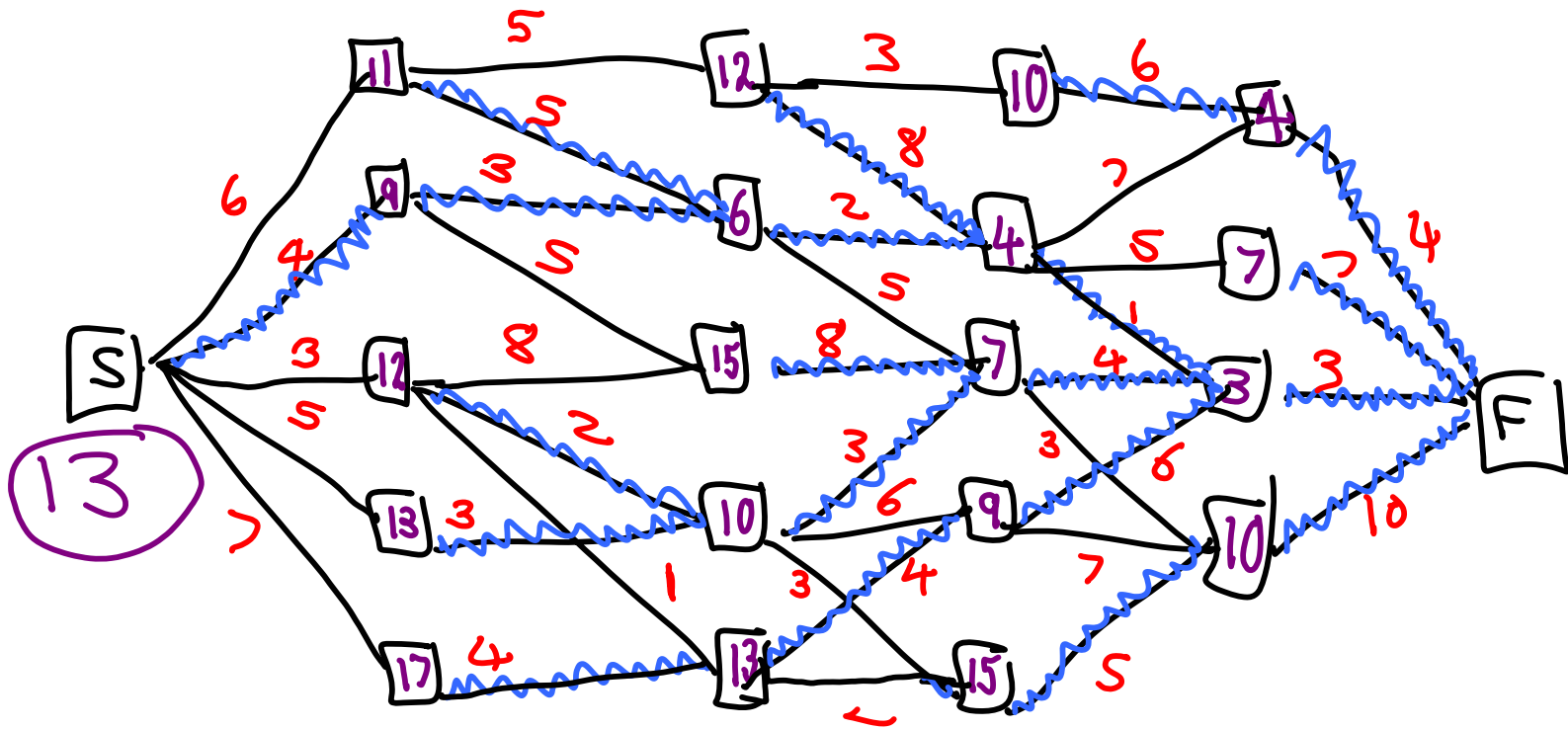


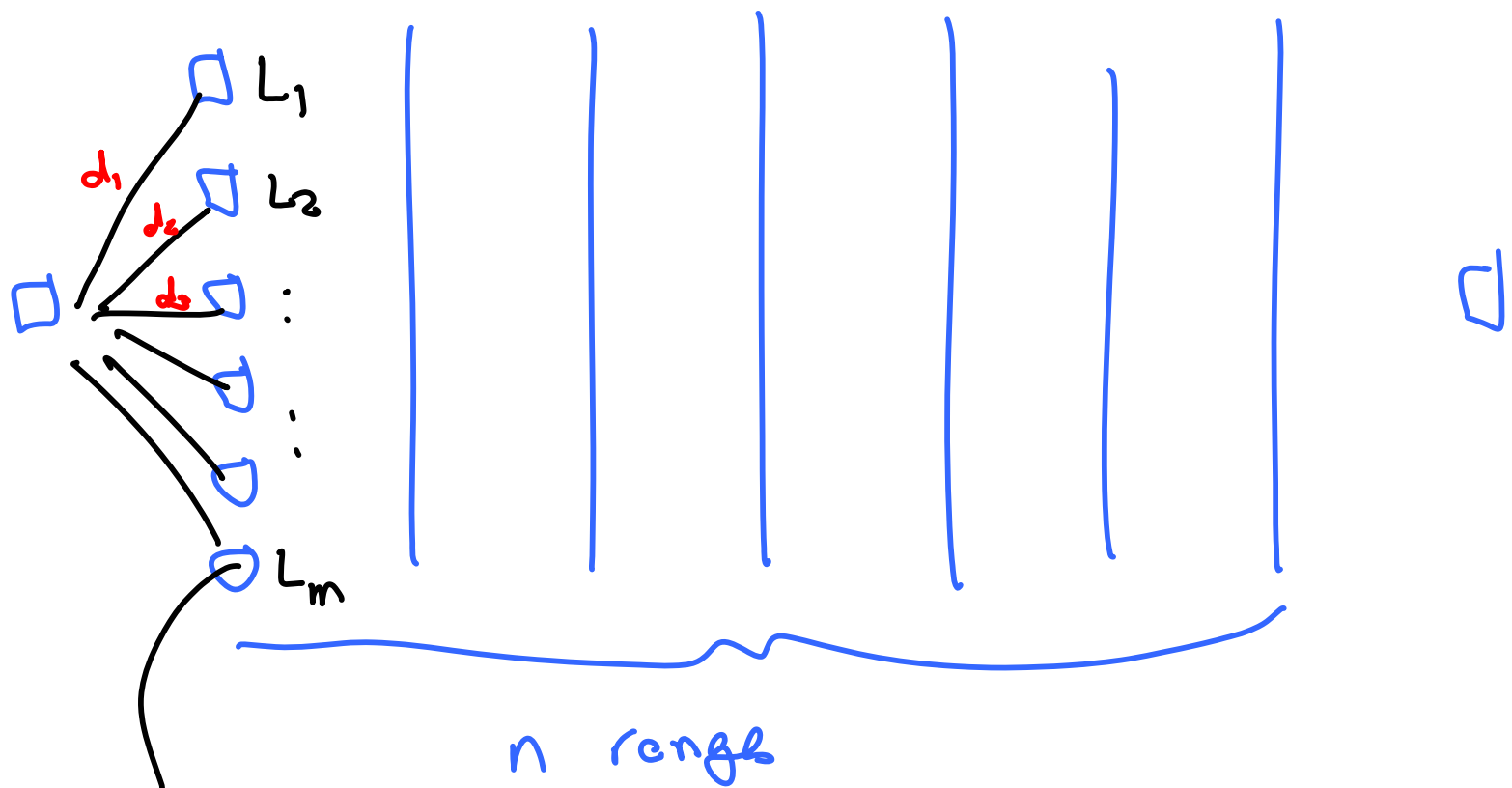
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□ ≡ pass through
mountain range

Dynamic Programming



problem: find shortest route $S \rightarrow F$

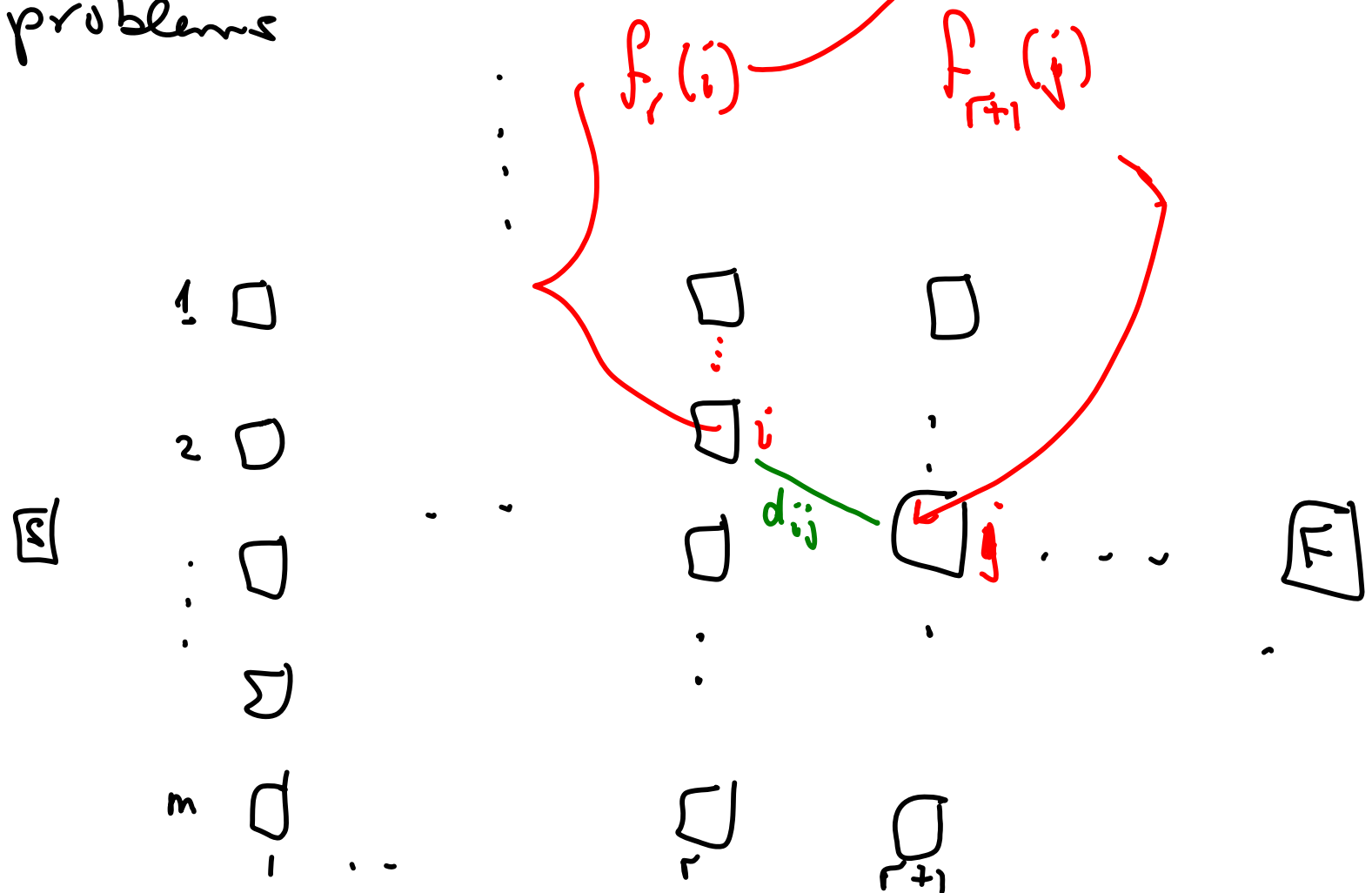


Suppose "oracle" gives solution to $n-1$ range problems.

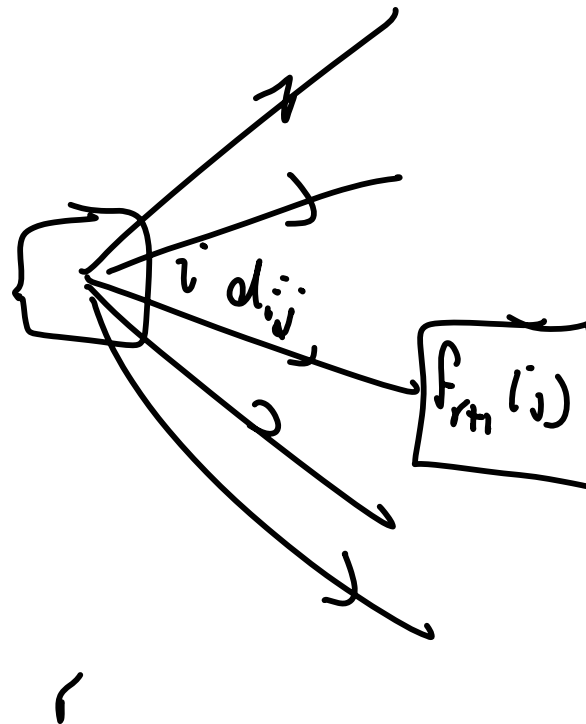
Shortest distance =
 $\min \{ L_1 + d_1, L_2 + d_2, \dots, L_n + d_n \}$

How to compute $L_1 \dots L_m$

Need an "oracle" to solve $n-2$ range problems



$$f_r(i) = \min_j \left[d_{ij}^{(r)} + f_{r+1}(j) \right]$$



Amount of "work" needed

$$O(m \times n \times m)$$

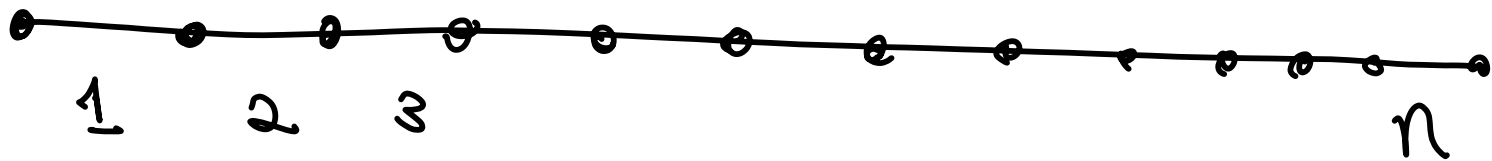
paths could be m^n

$$f_r(i) = \min_j \left(f_{r+1}(j) + d_{ij} \right)$$

$\uparrow$ # of i
 $\uparrow$ n range
 $\uparrow$ m

Production Problem

→ time



Small company: makes one product.

Data: (a) demand in period i is $d_i \in \{0, 1, 2, \dots\}$

(b) $c(X)$ = cost of making X units.

(c) Can only store up to H for any period ^{total car}

Problem: find sequence of production levels $x_1, \dots, x_n$ to minimize