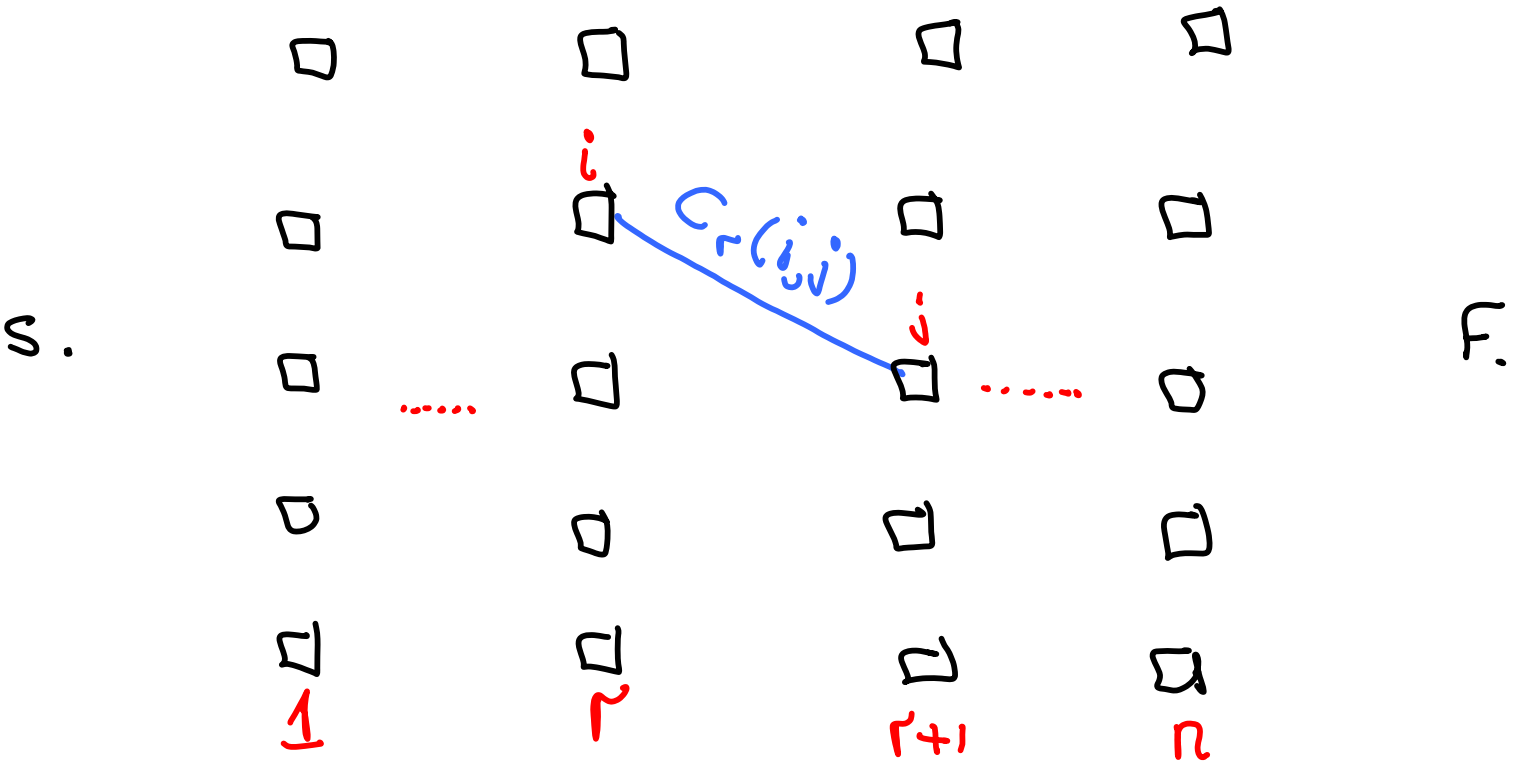
8/29/11

n mountain ranges
m passes in each

Shortest Path



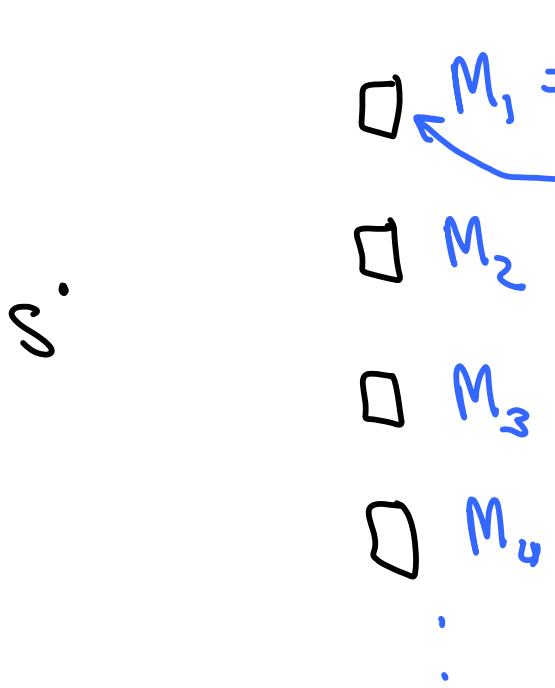
Cost of a path = sum of costs of the edges

Find minimum cost path.

Naive approach: compute length of every path and take cheapest

$$\#\text{paths} = m^n.$$

Suppose one knows



M_1 = minimum cost of path from 1 to F.

M_2

M_3

M_4

S

M_S = cost of path $S \to f$

$= \min\{c(S,1) + M_1,$
$c(S,2) + M_2,$
$\vdots$
$\}$

More terminology:

Choosing path $\equiv$
Making sequence of "decisions".

Also, after making one decion,
one is left with a smaller
(similar) problem

$f_r(i)$ = minimum length of a path from  to F.

$$f_r(i) = \min_j \left[c_r(i,j) + f_{r+1}(j) \right]$$

$f_n(i) = c_n(i,F)$.

I want $f_0(S)$

Work involved is $O(m^2 n)$