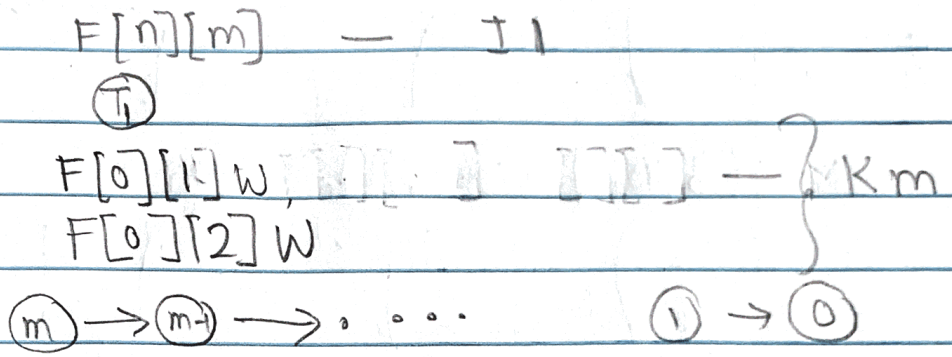
Extracting Parallelism (2D cases)

1. Coin Collection

Q. Complexity: $O(n \cdot m)$

Dependency:

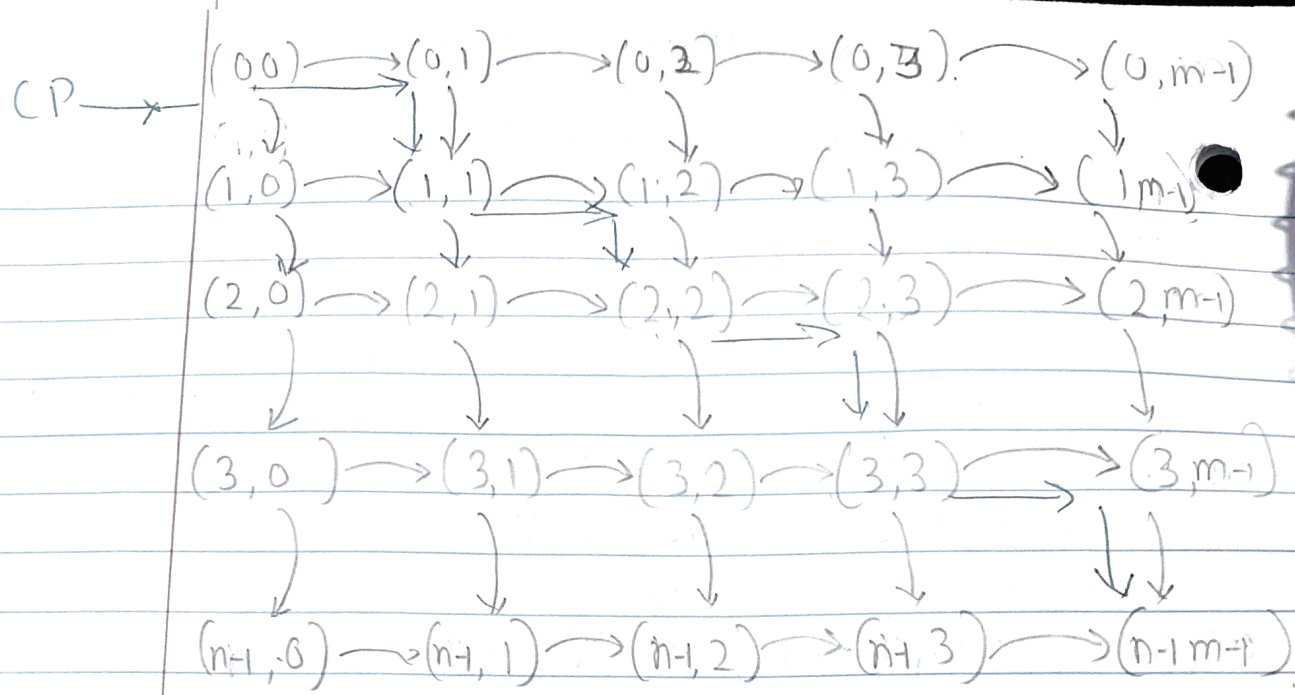


F[1][0] W — F[1][2] W, F[1][3] W, ⋮, F[1][m] W

F[2][0] W — F[2][2] W, F[2][3] W, ⋮, F[2][m] W

⋮

F[n][0] W — F[n][2] W, F[n][3] W, ⋮, F[n][m] W



Work $(n+1)\cdot(m+1)$ $\Theta(n \times m)$

Width 1

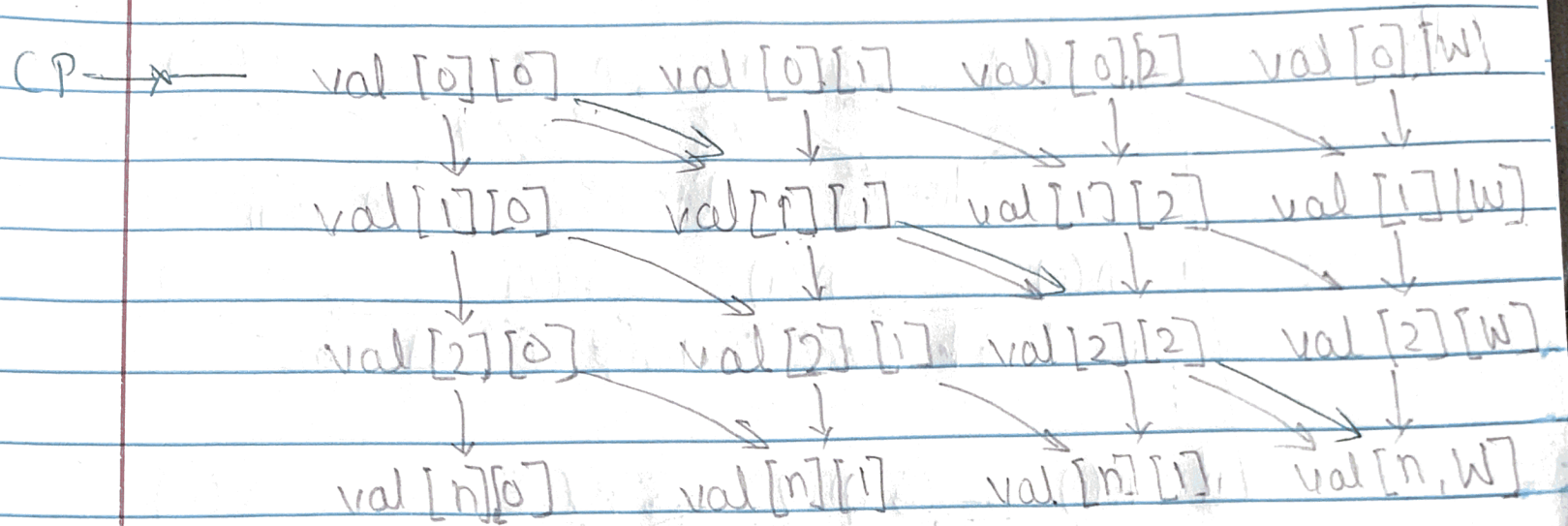
Critical Path: $1 + (n-1) + (m-1)$ $\Theta(n+m)$

Knapsack

Q. Complexity

Soln → $\Theta(n \cdot W)$

Q Dependencies



Width → W $\Theta(W)$

Work $(W+1)(n+1)$ $\Theta(W \cdot n)$

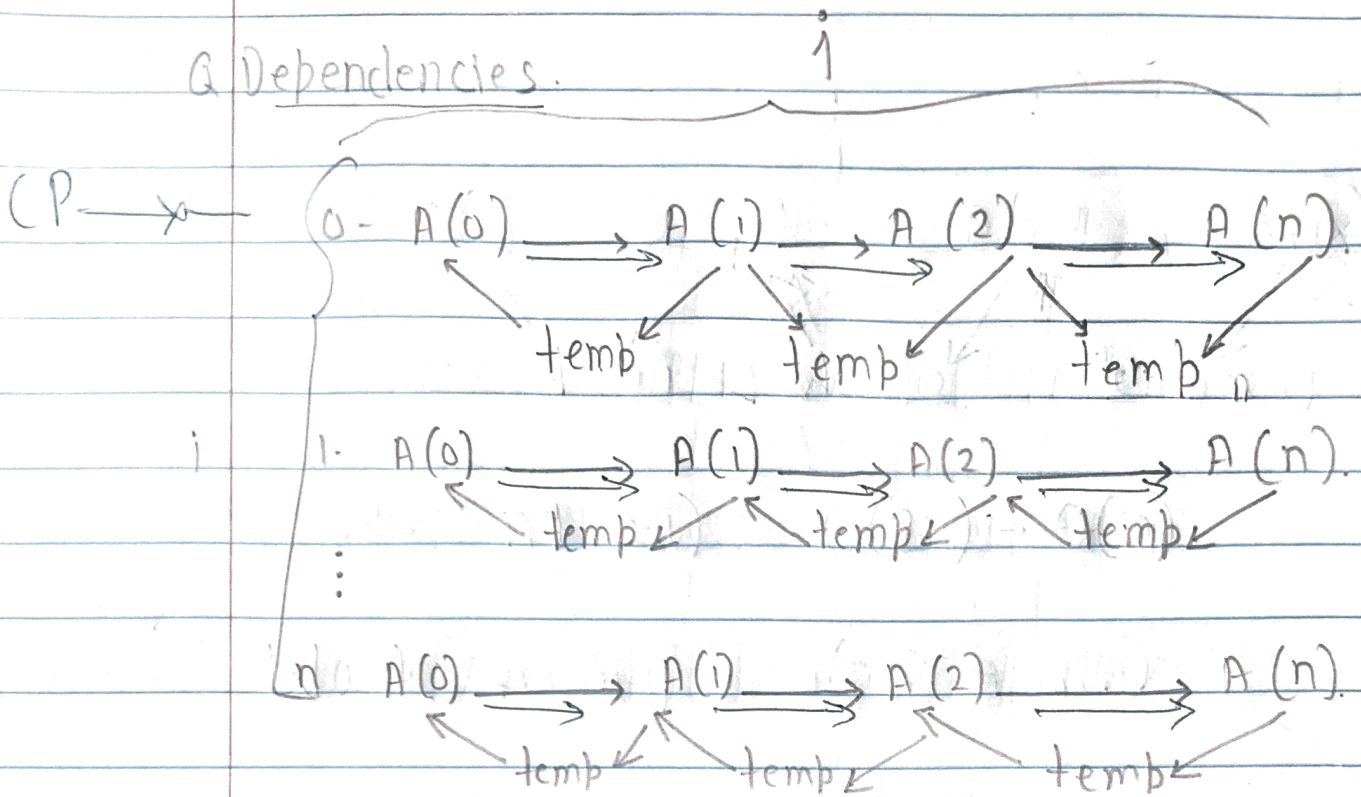
Critical Path: $n > W$: n $\Theta(n)$
$W > n$: W $\Theta(W)$ } length

Bubble Sort

Q. Complexity

Soln: $O(n^2)$

Q Dependencies.



Width $n/2$ $\Theta(n/2)$ (Swaping alternately)

Work. n

Critical Path. n^2 $\Theta(n^2)$