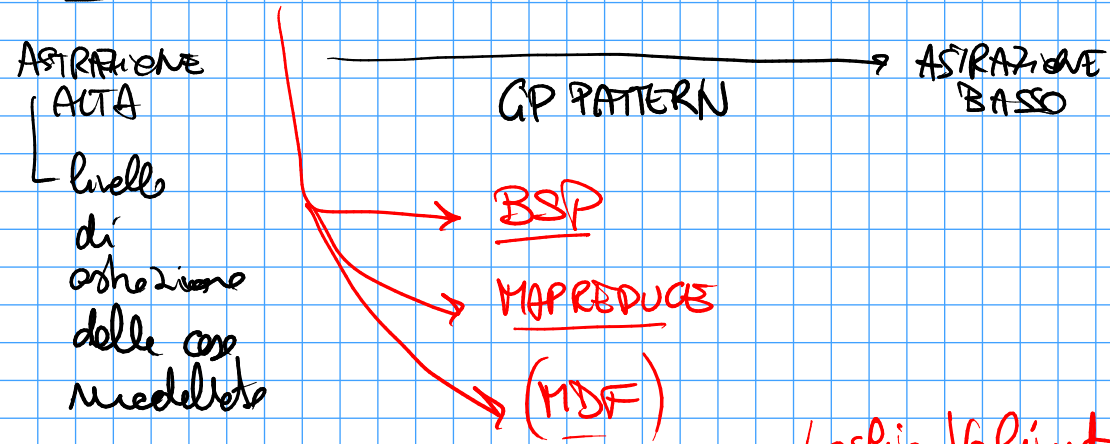


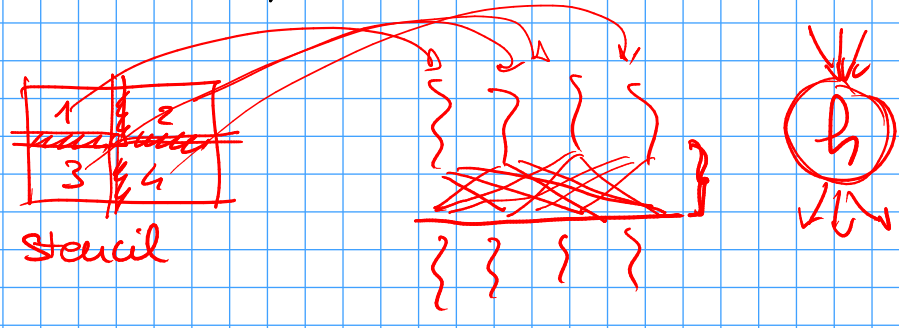
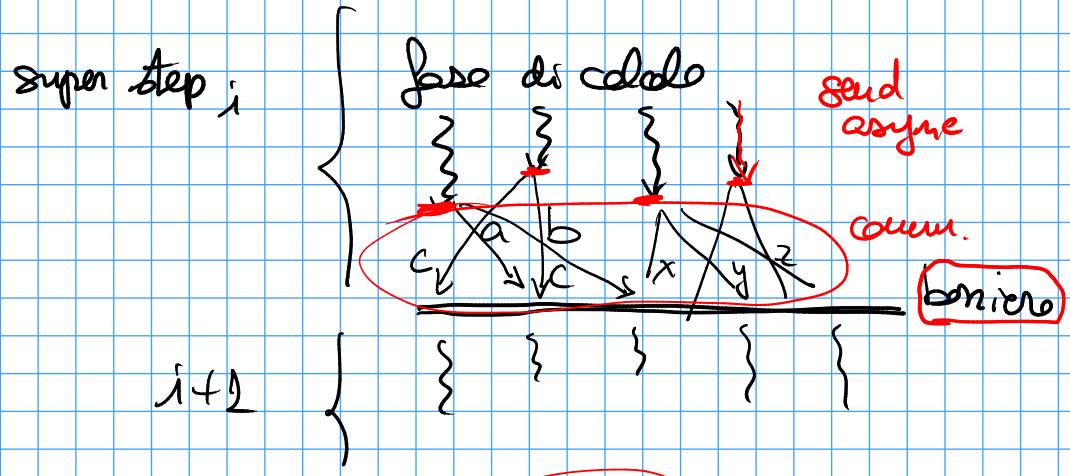
MODELLI COMPUTAZIONALI (1) DOMAIN SPECIFIC



Leslie Valiant

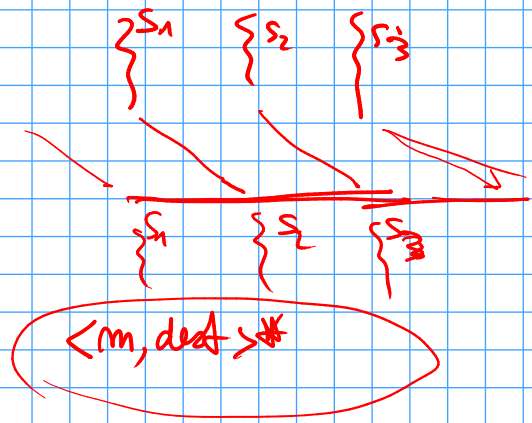
BSP bulk synchronous parallel

computazionale ≡ sequenza di super step

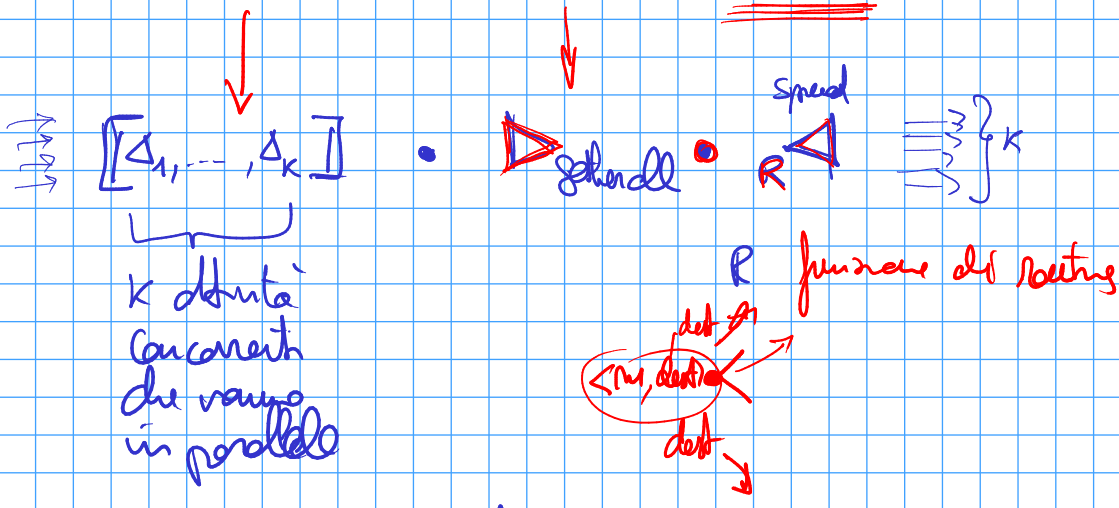


pipeline

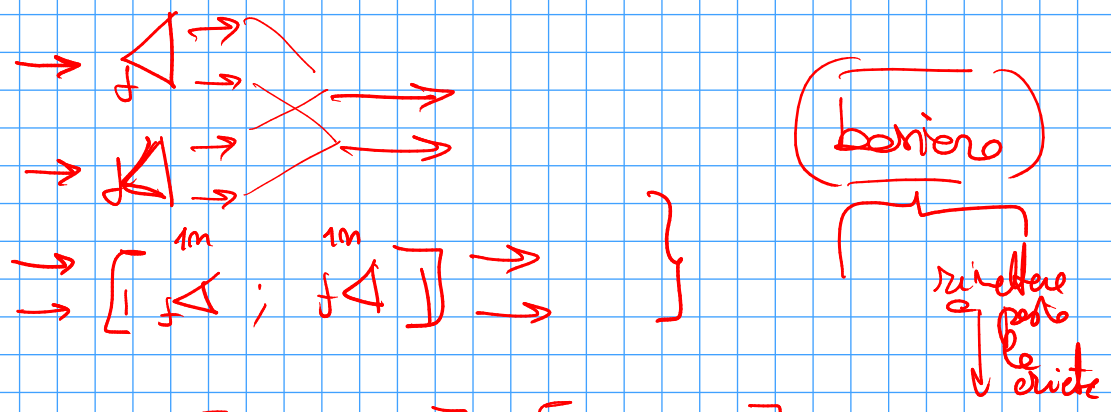
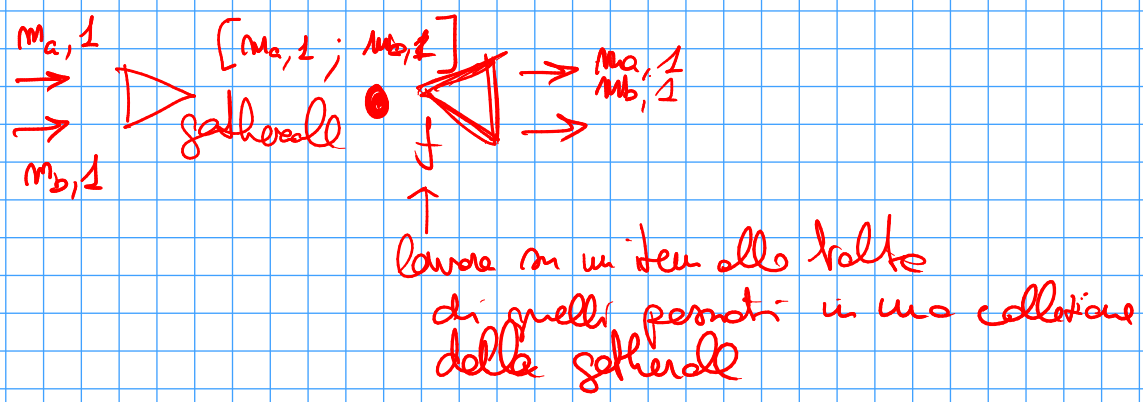
$S_1 \rightarrow S_2 \rightarrow S_3 \rightarrow$



$$SS_i = \Delta_{calcolo} \cdot \Delta_{comun} \cdot \underline{\underline{\Delta_{barriera}}}$$



$$out_put = \left\langle m, dest \right\rangle^* [k]$$



$$SS_i = \underline{\underline{[\Delta_1 \dots \Delta_k]}} \cdot \underline{\underline{[R_1 \dots R^k]}} \cdot \Delta_{ga} \cdot \Delta_{scatter}$$

\uparrow
 barriera

MAP-REDUCE (google)

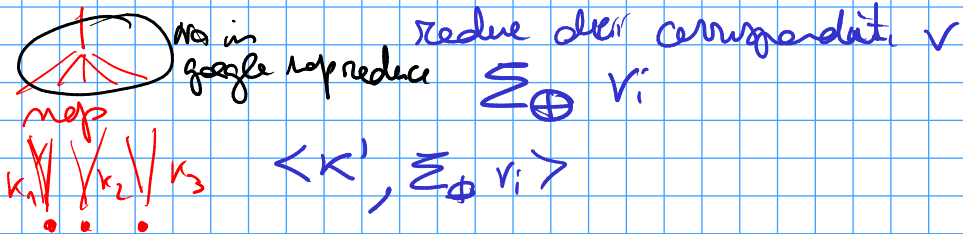
$\langle x_1 \dots x_m \rangle$ n mazzetta grande

map $f: x_i \rightarrow \langle \text{key}, \text{val} \rangle$

$\langle \langle k_1, v_1 \rangle \dots \langle k_m, v_m \rangle \rangle$

reduce $\forall \langle k, v \rangle \mid k = k'$

pipe (map, reduce)



$$MR(f, \oplus) = \Delta_{\text{map}} \cdot \Delta_{\text{reduce}}$$

$$\Delta_{\text{map}}(f) = \underbrace{\Delta_{\text{scatter}}}_{\substack{\text{in google} \\ \text{manc'è}}} \cdot \left[\left[(f) \right] \right]_m$$

$$\Delta_{\text{red}}(\oplus) = \underbrace{\Delta_{\text{gather}}}_{\substack{\text{in google} \\ \text{manc'è}}} \cdot \underbrace{\Delta_K}_{\substack{\text{key} \\ \text{key} \rightarrow \langle \text{key}, \text{val} \rangle^* \rightarrow \text{val}^*}}$$

$$\left[\Delta_K \right]_n$$

$$\cdot \left[\left[\Delta_{\text{scatter}} \right] \cdot \oplus \right]_n$$

$$MR(f, \oplus) = \Delta_{\text{scatter}} \cdot \left[\left[(f) \right] \right]_m \cdot \left[\Delta_K \right]_n \cdot \left[\left[\Delta_{\text{scatter}} \cdot \oplus \right] \right]_n$$

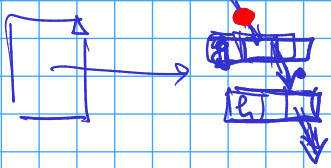
$$\Delta_{\text{scatter}} \cdot \left[\left[(f) \cdot \Delta_K \right] \right]_m \cdot \left[\left[\Delta_{\text{scatter}} \cdot \oplus \right] \right]_n$$

(MDF)

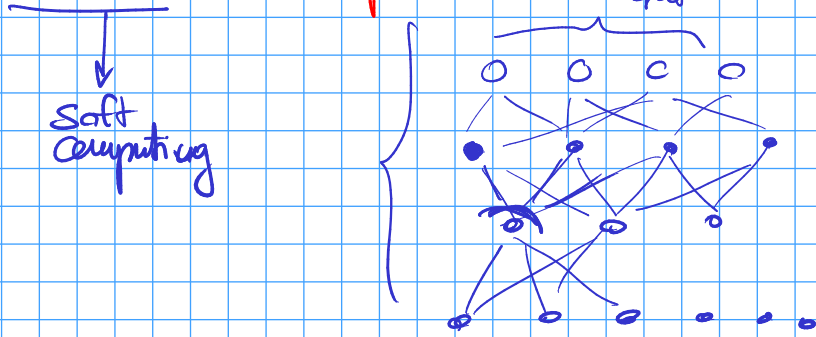
MDF integrals (b generative / e check / f esepne) =
 (g erative / i stansi / f estruai)
 (g erative / i stansi / f estruai)

$$((b)) \cdot ((e)) \triangle_{RR} \cdot [((f))]_{mw}$$

not exit
Jaken



Dominant specific patterns



evoluzione di una popolazione

