$$
\begin{tikzcd}
A & B \\
x \arrow[r, squiggly] & y = f(x) \arrow[d, squiggly] \\
S_x & S_y \arrow[l, squiggly]
\end{tikzcd}
$$

```
solveA (x: instanceOf A)
{  y = f(x);
   Sy = solveB(y);
   Sx = g(Sy);
   return Sx;
}
```

$g \simeq f^{-1}$

---

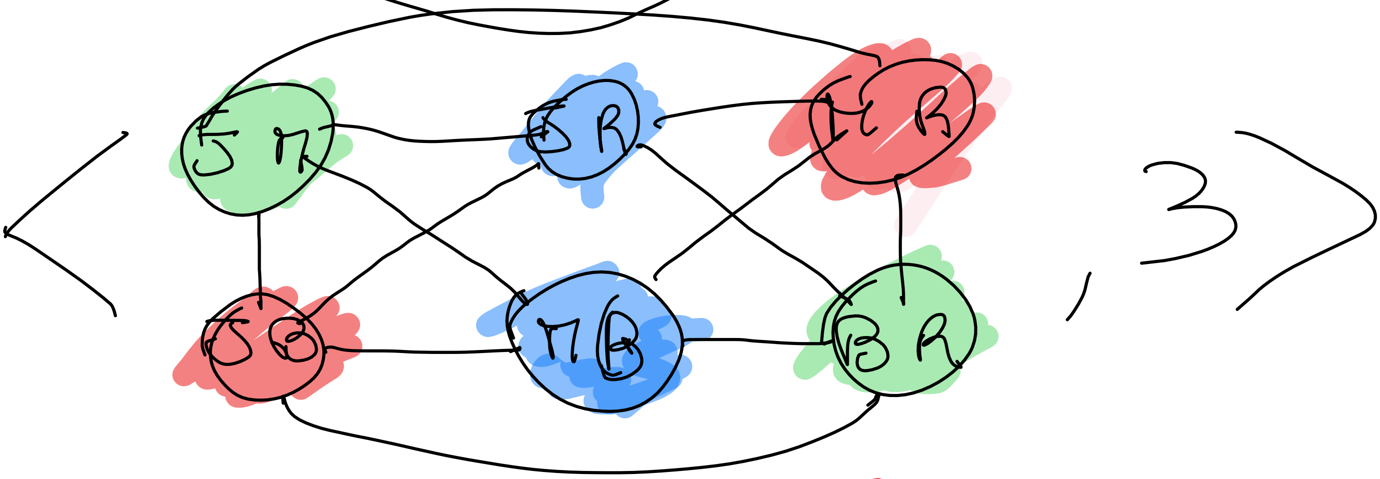
CALENDARIO

J, M, B, R

K-COL

$\langle G, K \rangle$

$f(\cdot)$




JM JR MR

BR MB JB

SIANO A, B 2 LINGUAGGI

LA FUNZIONE $f$ È UNA RIDUZIONE DA A A B SE

PER OGNI STRINGA $w$

$w \in A \iff f(w) \in B$

E INOLTRE $f$ È CALCOLABILE

---

TRASDUTTORE È UNA MACCHINA DI TURING, CON 3 NASTRI:

1: INPUT, READ-ONLY
2: WORK TAPE, READ/WRITE
3: OUTPUT, WRITE-ONLY

---

UN TRASDUTTORE M CALCOLA LA FUNZIONE $f$ SE PER OGNI STRINGA $w$, QUANDO M ESEGUE SU $w$, AL SUO ARRESTO LASCIA $f(w)$ SU OUTPUT

TEOREMA: Siano $A, B$ 2 linguaggi t.c. $A \leq B$

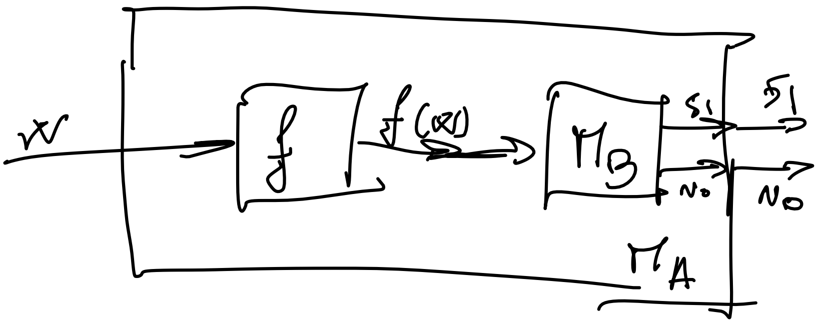
1) Se $A \notin R$, allora $B \notin R$
2) Se $A \notin RE$, allora $B \notin RE$

DIM:

1) $A \notin R \land B \in R$

$$X \to Y \equiv \underbrace{\neg X \lor Y}_{X \land \neg Y}$$

Se $B \in R$, $\exists M_B$ che decide $B$




$\Rightarrow$ CONTR

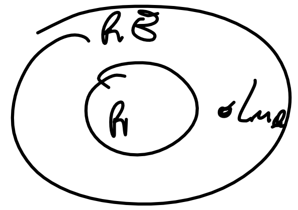
2) $A \notin RE \land B \in RE$

COROLLARIO $\quad X \to Y \equiv \neg X \lor Y \equiv \neg Y \to \neg X$

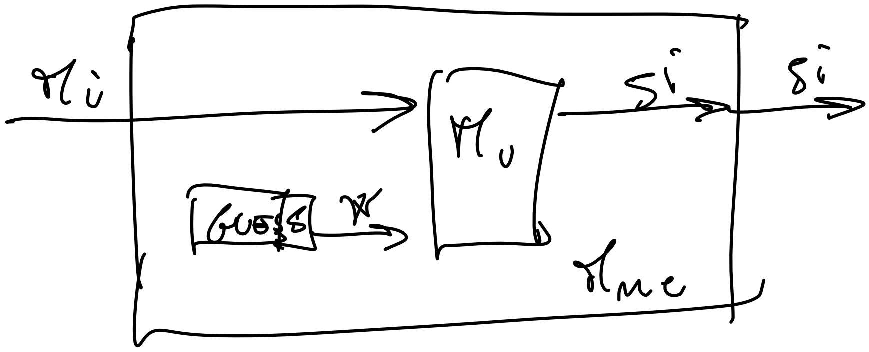
Siano $A, B$ 2 linguaggi t.c. $A \leq B$

1) Se $B \in R$, allora $A \in R$
2) Se $B \in RE$, allora $A \in RE$

$L_{ne} = \{ M_i \mid \mathcal{L}(M_i) \neq \emptyset \}$




- THEOREM: $L_{ne} \in RE$




$L_e = \{ M_i \mid \mathcal{L}(M_i) = \emptyset \}$

$L_e = \overline{L_{ne}}$

THEOREM: $L_{ne} \notin R$

DIM: $L_u \leq L_{ne}$

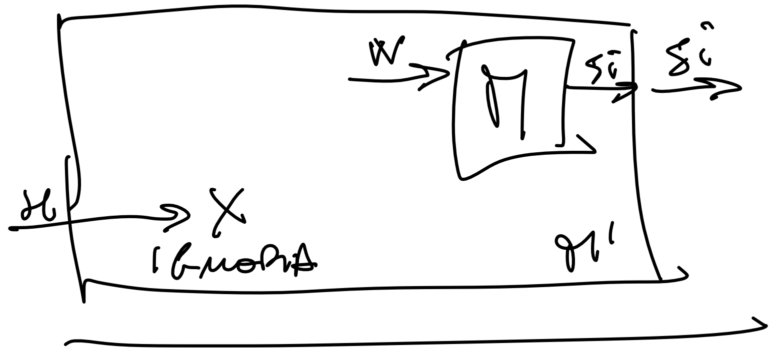
$L_u$ $\qquad\qquad\qquad$ $L_{ne}$

$(M, w) \xrightarrow{f} M'$

$(M, w) \in L_u \longrightarrow f((M, w)) = M' \in L_{ne}$

$(M, w) \notin L_u \longrightarrow f((M, w)) = M' \notin L_{ne}$

$\underbrace{(M, w)}$ $\xrightarrow{f}$




$\Rightarrow (M, w) \in L_u \Longrightarrow \mathcal{L}(M') = \Sigma^* \neq \emptyset$

$\Leftarrow (M, w) \notin L_u \Longrightarrow \mathcal{L}(M') = \emptyset$