Hennessy Milner Logic (HML)

- Specification by means of properties to be satisfied

  Imple $\models$ Property

- Modal (local: either immediate or consecutive properties)

  $\langle a \rangle F$: possible a and then F

  $[a] F$: whenever we execute a later F

- Global temporal properties still missing

- Semantics capture the intended meaning:

  $\langle a \rangle F \quad \exists\, p \xrightarrow{a} p' \quad p' \models F$

  $[a] F \quad \forall\, p \xrightarrow{a} p' \quad p' \models F$

  Key fact: $p \overset{a}{\not\to} \iff p \models [a] ff$

- Negation can be represented by duality

  $p \not\models F \iff p \models F^c$ (therefore $F^c \sim \neg F$)

  Immediate consequence: formulas have no moral

  We can specify impossible requirements: $F \wedge F^c$.

- Semantics of CCS by means of formulas:

  Just playing with $p \models F$ the other way around

  $p \sim q \iff (\forall F \ (p \models F \iff q \models F))$

  Technical requirement: only works for image-finite procs.

- An apparent contradiction: finite formulas fully characterize the behaviour of arbitrary processes

  Because an infinite set of finite formulas "perfectly approximate any "infinite property"

- Next we will add recursive formulas that will capture those "infinite properties" in a finite way.