

# Logic in Computer Science

## CTL: some corrections

We define  $M \models \psi$  to mean  $s \models \psi$  for all states  $s$  of  $M = (S, \rightarrow, L)$ .

For a model  $M$  we don't have that  $M \models \varphi \leftrightarrow \psi$  is equivalent to  $M \models \varphi \leftrightarrow M \models \psi$  (exercise: find a counter-example). What we have is that  $M \models \varphi \leftrightarrow \psi$  is equivalent to  $s \models \varphi \leftrightarrow s \models \psi$  for all states of  $M$ .

Similarly to have  $M \models \varphi \rightarrow \psi$  is the same as having  $s \models \varphi \rightarrow s \models \psi$  for all states of  $M$  which is *not* the same (exercise) as  $M \models \varphi \rightarrow M \models \psi$ .

Because of this, we don't have in general

$$\models (\varphi \rightarrow EX\varphi) \rightarrow (\varphi \rightarrow EG\varphi)$$

but what we have is that, *if*  $M \models \varphi \rightarrow EX\varphi$  *then*  $M \models \varphi \rightarrow EG\varphi$