T-79.231 Parallel and Distributed Digital Systems
Homework 4, October 14, 2002 **Teemu Tynjälä**

Visualizing LTL formulae

LTL formulae are widely used in the specification of properties for parallel and distributed systems. Often, same formulae occur in practice in any given problem, and these "common" formulae have recently been tabulated.

For the four formulae in the sequel, give two non-trivial infinite executions - one that satisfies the formula and another that does not satisfy the formula. From your results infer what the given formula actually represents (possibilities are absence, precedence and response).

1. $\Box(\Phi \Longrightarrow \Diamond\Psi)$
2. $\Box(\neg\Phi \mathcal{W} \Psi)$
3. $\Box((\Phi \wedge \neg\Psi \wedge \Diamond\Psi) \Longrightarrow (\neg\Phi' \mathcal{U} \Psi))$
4. $\Box(\Psi \Longrightarrow \Box\neg\Phi)$

In the above formula, the operator $\mathcal{W}$ represents the "weak until" operation. The semantics of weak until are

$$\Phi \mathcal{W} \Psi = \Box\Phi \vee (\Phi \mathcal{U} \Psi)$$

Return the answer to the mailbox located between rooms B 336 and B 337 in the Computer Science Building by 4 PM on November 25, 2002. You may also return the answer either in postscript of pdf format to Jukka.Honkola@hut.fi