

Computation Tree Logic

Luis Tertulino & Ronaldo Silveira

October 19, 2015

In previous chapters...

Temporal Logic

Motivation and Intuition

Motivation

Intuition

How to communicate

Syntax of CTL

Semantics of CTL

In previous chapters...

Temporal Logic

Motivation and Intuition

Motivation

Intuition

How to communicate

Syntax of CTL

Semantics of CTL

Previously on Temporal Logic Week...

Temporal Logic

In previous chapters...

Temporal Logic

Motivation and Intuition

Motivation

Intuition

How to communicate

Syntax of CTL

Semantics of CTL

Motivation

Needing of uncertainty;

Motivation

Needing of uncertainty;

Different paths of the future;

In previous chapters...

Temporal Logic

Motivation and Intuition

Motivation

Intuition

How to communicate

Syntax of CTL

Semantics of CTL

Intuition

In Computation Tree Logic (CTL) the model of time is a tree-like structure. This way, we cannot use Linear Temporal Logic (LTL) to express the existence of a certain path of time in which some event occurs.

In previous chapters...

Temporal Logic

Motivation and Intuition

Motivation

Intuition

How to communicate

Syntax of CTL

Semantics of CTL

Syntax

Definition

The syntax of CTL consists on the syntax of temporal logic plus some path operators. The class of formulas can be defined in Backus-Naur form. If ϕ is a formula:

Syntax

Definition

The syntax of CTL consists on the syntax of temporal logic plus some path operators. The class of formulas can be defined in Backus-Naur form. If ϕ is a formula:

$$\begin{aligned} \phi ::= \perp \mid \top \mid p \mid \neg\phi \mid \phi \wedge \phi \mid \phi \vee \phi \mid \phi \rightarrow \phi \mid \phi \leftrightarrow \phi \mid \mathbf{AX}\phi \mid \mathbf{EX}\phi \mid \mathbf{AF}\phi \mid \\ \mathbf{EF}\phi \mid \mathbf{AG}\phi \mid \mathbf{EG}\phi \mid \mathbf{A}[\phi \mathcal{U} \phi] \mid \mathbf{E}[\phi \mathcal{U} \phi] \end{aligned}$$

Syntax

Definition

The syntax of CTL consists on the syntax of temporal logic plus some path operators. The class of formulas can be defined in Backus-Naur form. If ϕ is a formula:

$$\begin{aligned}\phi ::= & \perp \mid \top \mid p \mid \neg\phi \mid \phi \wedge \phi \mid \phi \vee \phi \mid \phi \rightarrow \phi \mid \phi \leftrightarrow \phi \mid \mathbf{AX}\phi \mid \mathbf{EX}\phi \mid \mathbf{AF}\phi \mid \\ & \mathbf{EF}\phi \mid \mathbf{AG}\phi \mid \mathbf{EG}\phi \mid \mathbf{A}[\phi \mathcal{U} \phi] \mid \mathbf{E}[\phi \mathcal{U} \phi]\end{aligned}$$

With p as a literal (atomic formula), AX, EX, AF, EF, AG e EG unary operators.

Syntax

Intuition

content...

In previous chapters...

Temporal Logic

Motivation and Intuition

Motivation

Intuition

How to communicate

Syntax of CTL

Semantics of CTL

Semantics