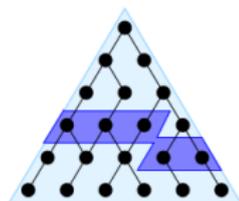


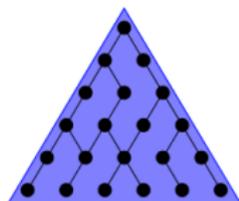
CTL intuitively

finally P



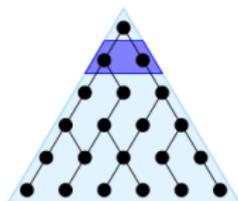
$AF P$

globally P



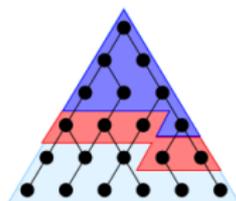
$AG P$

next P



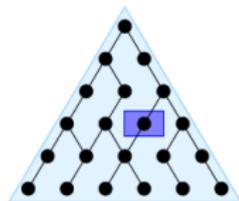
$AX P$

P until q

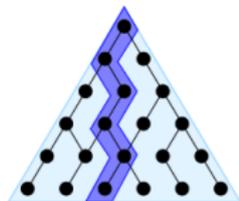


$A [P U q]$

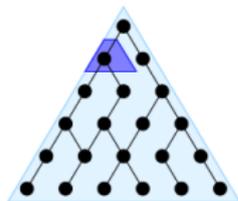
$EF P$



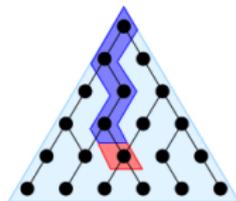
$EG P$



$EX P$



$E [P U q]$



(C) Alessandro Artale

Express in CTL and in LTL if possible:

- Whenever system receives a request *Req* then it generates an acknowledgement *Ack* eventually
- In every run there are infinitely many *b*
- A state where *a* is true, but *b* is not, is reachable
- There is always an option to reset the system (reach state *Restart*)

Express in CTL:

- All the paths lead to Rome
- All the time if I did not loose, then I have a move where I do not loose
- All the time if I get robbed then I can react by defending myself or not defending myself

Read CTL formula:

- $AG[\text{error} \implies E(\text{repair } U \text{ operational})]$
- $AG[\text{error} \implies A(!\text{error } W \text{ operational})]$
- $AG[EF(\text{restart})]$
- $A[p \ U \ A(q \ U \ r)]$