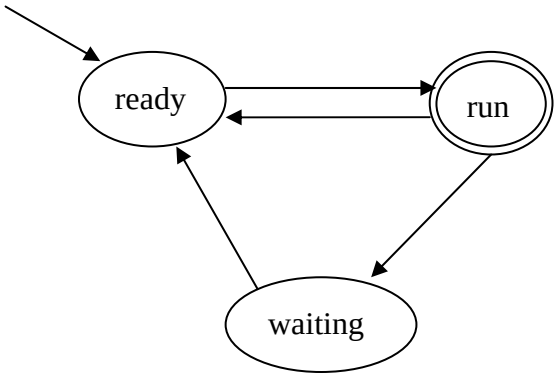
FLOLAC 2009

Model-checking *Farn Wang*

Exercise 1: Models and specifications with temporal logics

1. Please construct the LTL formula that fully describes the set of traces of the following Kripke structure that visit state run infinitely many times.



2. Please construct a Kripke structure that can tell $\forall\Box\Diamond p$ from $\forall\Box\exists\Diamond p$?

3. Please prove (or argue) why we cannot tell $\forall\Box\forall\Diamond p$ from $\forall\Box\Diamond p$ with any Kripke structure.

4. Please construct a Kripke structure that can tell

$$\forall((\Box \textit{you-have-no-lover}) \rightarrow \Diamond \textit{marry-you})$$

from

$$\forall\Box(\textit{you-have-no-lover} \rightarrow \forall \Diamond \textit{marry-you}).$$

5. Please construct a Kripke structure that can tell

$$(\forall\Box \textit{you-have-no-lover}) \rightarrow \forall \Diamond \textit{marry-you}$$

from

$$(\forall\Box \textit{you-have-no-lover}) \rightarrow \exists \Diamond \textit{marry-you}$$

6. Please construct a Kripke structure that can tell

$$(\forall\Box \textit{you-have-no-lover}) \rightarrow \exists \Diamond \textit{marry-you}$$

from

$$(\exists\Box \textit{you-have-no-lover}) \rightarrow \forall \Diamond \textit{marry-you}$$