COMP21111 Assignment 10
20 marks

Deadline: 17th Dec., time 12:00, SSO

Show your working.

Problem 1 (5 marks)

Write down LTL formulas expressing the following properties of paths:

- If F holds then sometime in the future $\neg F$ holds.
- There are infinitely many states in which F holds but G does not.
- F holds exactly at two states.
- If F holds in a state s_k then G does not hold in a previous state s_{k-1}, for $k \geq 1$.

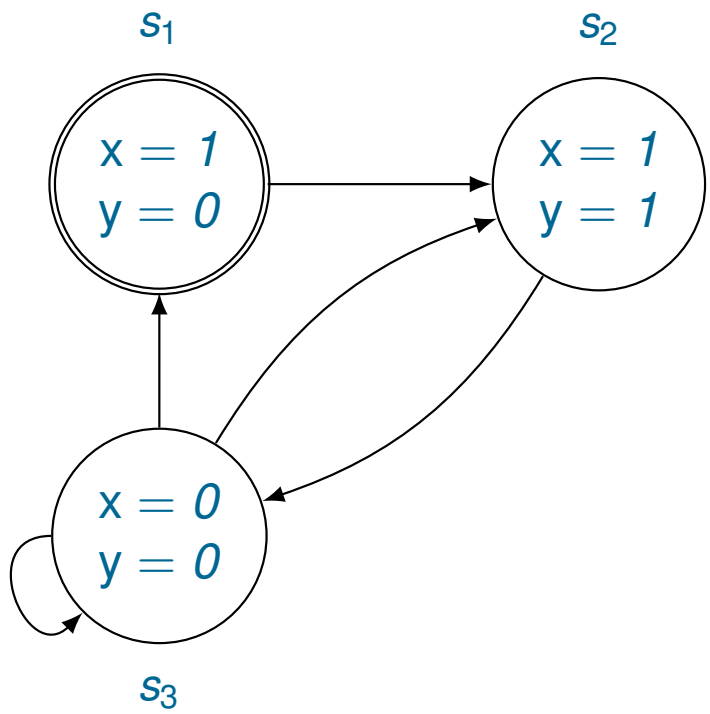
Problem 2 (5 marks)

Show that the following formulas are not equivalent by giving a path that satisfies one of them but not the other:

$$\Box\Diamond(p \wedge q)$$
$$\Box\Diamond p \wedge \Box\Diamond q$$

Problem 3 (10 marks)

Consider a transition system with the following state transition graph.



Which of the following formulas are true on all of the paths starting from the initial state? If a formula is false on a path draw one such path.

1. $\Box x \vee \Box \neg y$
2. $\Diamond(x \leftrightarrow y)$
3. $\Diamond \Box (x \rightarrow y)$
4. $\Box \Diamond (x \leftrightarrow y)$
5. $x \,\mathbf{U}\, \Diamond y$