German University in Cairo
Department of Computer Science
Assoc. Prof. Haythem O. Ismail

Knowledge Representation and Reasoning, Spring Term 2019
Assignment 5

Exercise 5-1

Show that in any Kripke structure $(\mathcal{W}, \mathcal{R})$ where there is $w \in \mathcal{W}$ such that $(w, w) \notin \mathcal{R}$ $\Box P \Rightarrow P$ is not valid.

Exercise 5-2

For each of the following PML WFFs, give a Kripke structure in which it is not valid.

a) $\Box(P \vee Q) \Rightarrow (\Box P \vee \Box Q)$

b) $\Diamond(P \Rightarrow P)$

c) $(\Box P \Rightarrow \Box Q) \Rightarrow \Box(P \Rightarrow Q)$

d) $\Box P \Rightarrow \Box\Box P$

Exercise 5-3 **Submission**
Due by 13:45, Tuesday April 2

Name: **ID:**

Prove that axiom **B** is valid in a Kripke structure $\mathcal{K} = (\mathcal{W}, \mathcal{R})$ if and only if $\mathcal{R}$ is symmetric.