Project Title

— Final Project —

Your Name

May 5, 2025

Abstract

Your abstract goes here. This should be a brief summary of your project, outlining the problem and addressed and key findings. (3 - 5 sentences)

1 Introduction

You may want to cite Carnap (1947), or include the page number where Prior (1967, p. 7) credits Mctaggart's (1908) (passive) argument that time is unreal, but only if relevant.

2 Using Formal Notation

This is similar to the problem sets. For instance, $\Box\varphi \to \varphi$ is the T axiom. Use the appropriate commands defined in `notation.sty` such as $\mathcal{K}$, or define new commands as convenient. In tense logic, we use $\Diamond_P$ for "it was the case that" and $\Diamond_F$ for "it is going to be the case that". And so on.

3 Using Theorem Environments

Definition 3.1 (Kripke Frame) A *Kripke frame* is a pair $\mathcal{F} = \langle \mathbb{W}, R \rangle$ where:

(1) $\mathbb{W}$ is a non-empty set of possible worlds

(2) $R \subseteq \mathbb{W} \times \mathbb{W}$ is an accessibility relation on $\mathbb{W}$

As we can see in Definition 3.1, a Kripke frame consists of two components.

Lemma 3.1 A well-formed formula φ is a theorem of $\mathcal{K}$ *iff* ...

Proof. This is a proof of a lemma. $\square$

Lemma 3.1 establishes an important cornerstone of...

Theorem 3.1 (Optional Name) For any modal system $\mathcal{K}$, if φ is a theorem, then $\Box\varphi$ is also a theorem.

Proof. We know by Lemma 3.1... $\square$

As shown in Theorem 3.1, the necessitation rule is fundamental to normal modal systems.

Corollary 3.1 In the modal system $\mathcal{S}5$, if $\Diamond\varphi$ is true at some world, then . . .

Rule 3.1 (Some Inference) From φ and $\varphi \to \psi$, we may infer ψ.

1.	$p \wedge q$	**Premise**
2.	$p \to r$	**Premise**
3.	p	**$\wedge$-Elimination**
4.	r	**Modus Ponens**

4 Modal Logic Diagrams

System T: Reflexive Accessibility

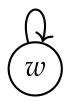
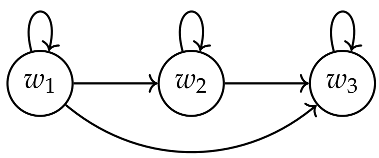


Figure 1: A model with a single reflexive world, characteristic of System T.



System S4: Reflexive and Transitive Accessibility

Figure 2: A model with transitive accessibility relation, characteristic of System S4.

As shown in Figure 3, System S5 can be represented as a fully connected graph where each world is accessible from every other world.

System S5: Equivalence Relation

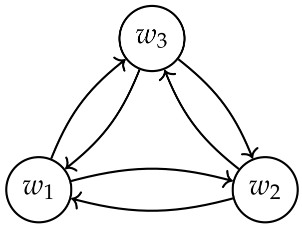
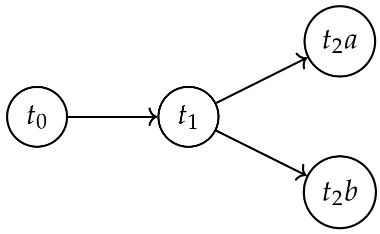


Figure 3: A model where all worlds access each other, characteristic of System S5.



Branching Time Model

Figure 4: A branching time model with a single past and multiple possible futures.

References

Carnap, Rudolf. 1947. *Meaning and Necessity*. University of Chicago Press.

Mctaggart, J. Ellis. 1908. "The Unreality of Time." *Mind* XVII:457–474. ISSN 0026-4423, 1460-2113. doi: 10.1093/mind/XVII.4.457.

Prior, Arthur N. 1967. *Past, Present and Future*. Oxford, New York: Oxford University Press. ISBN 978-0-19-824311-3.