

# Problem Set 2 - Part 2

## Temporal Logic

Fall 2004, cs112 – James Pustejovsky

**Handed Out:** Friday October 15, 2004

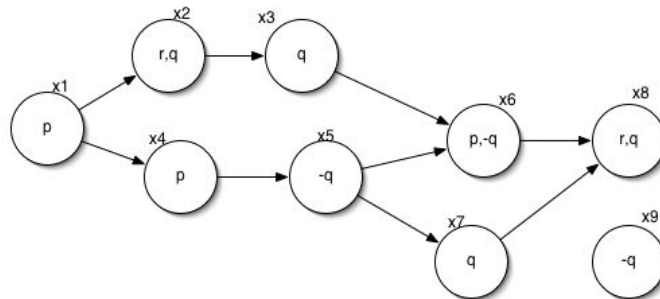
**Due Date:** Friday October 22, 2004

This Problem Set is to be submitted **ON PAPER, IN CLASS** on the due date.

### Exercise 1 Temporal Kripke Structure

#### 1.1

Consider the following temporal model:



Decide whether the following formulas are valid in this model:

1.  $r \rightarrow H(\neg q \vee p)$
2.  $\neg q \rightarrow FGq$
3.  $G(P\neg q \rightarrow p)$

### Exercise 2 Representing Interval Structure

#### 2.1

The following story is used to help first graders with reading comprehension. Try to give a representation of the events and times in it. Then show what relationships the events have with each other and the times. For example, you might represent the following sentence using this representation:

*John taught on Monday.*

event1='taught'

time1='Monday'

time1 INCLUDES event1

Once you have decided on relationship types for your representation, create any axioms you need to perform closure.

Finally, using your representation and axioms, show why the following statements are true:

1. Bobby yelled after Michelle stumbled.
2. Michelle hopped her part of the race after Tanya.
3. Tomorrow, Tanya will be six.

## A Happy Birthday

It was Tanya's birthday! Today she would be six, and she had a bunch of friends over for a party. Since it was the middle of summer, it was very hot outside. Tanya and her mother had planned games that would help them all stay cool.

One of the games was a relay race. A relay race is a game between teams! They decided that each team would have three people. Tanya and her friends Michelle and Bobby were on one team. There were two other teams.

They had to hop on one foot to the other side of the yard. On the other side of the yard there was a table with a big dish of ice cream. Each person had to eat three spoonfuls of ice cream, and then hop back to tap the next team member. The first team to finish their bowl of ice cream would win!

Tanya went first. She hopped with all her might and quickly shoveled three spoonfuls of ice cream into her mouth. It was cold! She began to hop back and watched her friends laugh at her. The ice cream was running off Tanya's chin and running onto her white shorts. She looked funny!

Tanya then tapped Bobby. He hopped to the table even faster than Tanya had. Bobby ate three spoonfuls and hopped back in a snap! Michelle then took her turn. She stumbled but made it to the table in good time. She took big bites to finish the ice cream. Bobby and Tanya yelled and cheered while Michelle headed back. She crossed the finish line before anyone else, and they won!