Model Specification: conception.games.swat

July 23, 2007

The Simple Word Association Test (SWAT) is a game played individually, where a word or phrase is presented to the player as a *stimulus*, and the player responds with one or more words or phrases.

This document is a formal specification of a model for this game.

1 Types

Given the set of character strings.

$[STRING]$

A SWAT game is divided into a number of rounds. Each round begins with a single stimulus and captures a sequence of responses to that stimulus. The same response cannot be repeated. A response cannot be the same as a stimulus.

SwatGameRound

$$stimulus : STRING$$
$$responses : \operatorname{iseq} STRING$$
$$stimulus \notin \operatorname{ran} responses$$

A SWAT game can be at one of three stages, either pending, playing or over.

$$SwatGameStage ::= pending \mid playing \mid over$$

During play, there is a current round in progress, and a sequence of completed rounds. All stimuli are strings drawn from a common, non-empty source.

There may be more than one source of stimuli available for use in any one game. The stimulus source must be chosen prior to the start of the game, and is fixed once the game has started.

SwatGame

$$stage : SwatGameStage$$
$$stimuli : \mathbb{P}\, STRING$$
$$stimulusSources : STRING \pfun \mathbb{P}\, STRING$$
$$currentRound : SwatGameRound$$
$$completedRounds : \operatorname{seq} SwatGameRound$$
$$stimuli \neq \varnothing$$

2 Safe Operations

These operations do not change the state of the game.

Return the current game stage.

getGameStage

$$\Xi SwatGame$$
$$stage! : SwatGameStage$$
$$stage! = stage$$

Return a list of names of available stimulus sources (can only be done when game is pending).

getStimulusSources

$\Xi SwatGame$
$sourceNames! : \mathbb{P}\, STRING$

$stage = pending$
$sourceNames! = \text{dom}\, stimulusSources$

Return the current game round.

getCurrentRound

$\Xi SwatGame$
$round! : SwatGameRound$

$round! = currentRound$

Return all completed rounds.

getCompletedRounds

$\Xi SwatGame$
$rounds! : \text{seq}\, SwatGameRound$

$rounds! = completedRounds$

3 Operations with Side-Effects

These operations may change the state of the game.

Set the stimulus source (can only be done when game is pending).

setStimulusSource

$\Delta SwatGame$
$sourceName? : STRING$

$stage = pending$
$sourceName? \in \text{dom}\, stimulusSources$
$stimuli' = stimulusSources(sourceName?)$

Start the game.

startGame

$\Delta SwatGame$

$stage = pending$
$stage' = playing$

End the game.

gameOver

$\Delta SwatGame$

$stage = playing$
$stage' = over$
$completedRounds' = completedRounds \frown \langle currentRound \rangle$

Request a new stimulus (start a new round of the game).

stimulate

$\Delta SwatGame$
$stimulus! : STRING$

$stimulus! \in stimuli$
$completedRounds' = completedRounds \frown \langle currentRound \rangle$
$currentRound'.stimulus = stimulus!$
$currentRound'.responses = \langle\rangle$

Respond to a stimulus.

respond

$\Delta SwatGame$
$response? : STRING$

$currentRound'.responses = currentRound.responses \frown \langle response? \rangle$

Revision : 1.1