A close-up of a logo

Description automatically generated

Modelling Of Software

Intensive Systems

Assignment 4: Statecharts

1st Master computer science

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Exercises:

**Exercise A**

Event y never gets raised because the model never stays in stateA for 2 seconds without an event occurring. Instead, each second event x gets raised and the model moves back to stateA, resetting the timer.

**Exercise B**

The model starts in the composite state Outer, within this state it starts in the Inner state. After 2 seconds, the inner event gets raised and within the Outer state we move back to Inner. 1 second later (at 3s) the outer transition occurs, raising event outer and the model moves back to Outer, re-initializing the timers of both Outer and Inner. This process repeats: at 5s, inner gets raised and moves back to Inner, 1 second later (at 6s), outer gets raised and timers are reset again.

**Exercise C**

1) Intuitively we would expect that after 1 second, the model moves from Initial state to Temp state, incrementing x with 1. Then the transition with guard clause [x==1] triggers and we move to state One.

2) The model gets stuck in state Temp, unable to move to any subsequent state because no more events get triggered so the guard clauses aren’t checked.

3) Replacing Temp by a choice element fixes the issue

**Exercise D**

At 5 seconds, the model is in state One, T. Initially, the model is in state Initial, S. After 1 second, the model moves to state Temp, S and x gets incremented by 1. The statechart stays in state Temp, S until time gets to 5 seconds, which triggers the transition from S to T. Since this event gets processed, the guard clause [x==1] gets evaluated which moves the model from state Temp to state One in r1. So finally at t = 5 seconds, the model is in state One, T.

**Exercise E**

1) Similar to previous exercise, guard clause [v==0] only gets checked when an event triggers, so after 1 second y gets raised and consequently also x

2) In orthogonal states, events get raised from left to right. So after 1 second, the transition out of stateA gets fired and x gets raised, afterwards y gets raised.