Assignment 3
Introduction to MBT

Model-Based Testing
DIT848/GU and TDA260/Chalmers

April, 2013

1   Introduction

The focus of this course and this assignment is on model-based testing, that is how to design meaningful models useful for the (automatic) extraction of test cases from the model.

2   Submitting your work

If you want to have feedback on your assignment, check with Hamid Ebadi (`hamide #@# chalmers.se`). If you want to submit, please attach a .zip or .tar.gz archive, containing a .txt, .pdf or .doc file describing your answers. For subject of your email and also to name your archive file, please use the assignment number and your (last) name as in the following example: `assignment03_names.zip`.
The deadline for this assignment is **Wednesday, 24 April 2013**.

3   What to do

A FSM can be represented as a *state transition table*: a matrix specifying for each input symbol what are the states connected by the corresponding symbol. There are different ways of representing such tables, for instance by writing all the states in the first column and the events in the first row, as shown below. For instance in the state table below the row containing U, V, U, U represents the following transitions: from state U to state V with event a, from state U to state U with event b, from state U to state U with event c.

State Table

	a	b	c
U	V	U	U
V	V	Y	W
W	Z	W	W
X	U	Y	X
Y	X	Z	Y
Z	Z	Z	Y

Given the state table above, answer the following questions (U is the initial state).

3.1   Part 1

Check the FSM for the following properties :

- Deterministic

- Initially connected

- Complete

- Minimal

- Strongly connected

Note: Read page 148 (chapter 5, section 5.1.2) of Uttang & Legeard book *Practical Model-Based Testing* if you are not aware of the above terminology about graphs.

3.2 Part 2

Which coverage criteria can be satisfied with the following inputs (transition paths)
1.(a;c;a;b;c;a;c;a;a;a;b) 2.(a;a;c;a;a;c;a;a;c;a;a;c)

- All-states coverage

- All-configurations coverage

- All-transitions coverage

- All-transition-pairs coverage

- All-loop-free-paths coverage

- All-round-trips coverage

- All-paths coverage

- All input values

3.3 Part 3

Since our SUT operations are very slow, it is useful to find short tests that can satisfy our coverage criteria.

- Find a transition tour of the FSM.

- Find the shortest path for full state coverage.