

MARTIN v0.1: Menzies' version of the ArRT INterpreter

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July 5, 2001

1 Hello

MARTIN is \approx 250 lines of Prolog that is a ghost of the ARRT system [1].

eg002.pl (see Figure 1) is stuff in the format of what you are generating from arrt

Internally, MARTIN's models are a directed graphs of nodes and edges. This graph is shown textually in Figure 2 and graphically in Figure 3.

At runtime, some faults and pacts are declared active and the coverage of the top most goal is computed. At the end of this paper (in Figure 4) are 10 runs (each assumes some randomly selected subset of the faults and pacts are active).

References

- [1] M. Feather, H. In, J. Kiper, J. Kurtz, and T. Menzies. First contract: Better, earlier decisions for software projects. In *Submitted to the ACM CIKM 2001: the Tenth International Conference on Information and Knowledge Management*, 2001. Available from <http://tim.menzies.com/pdf/01first.pdf>.

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:- [arrrt].
+source(v1,u0,when(2001,4,6,17,45,32)).
+aka(goal,"goal",v1).
+aka(u0,"Baseline",v1).
+aka(r9,"Top Level Requirement 1",v1).
+aka(r11,"Subsidiary Requirment 1.1",v1).
+aka(r12,"Subsisiary Requirement 2.1",v1).
+aka(r10,"Top Level Requirement 2",v1).
+aka(f13,"Failure Mode 1",v1).
+aka(f14,"Failure Mode 2",v1).
+aka(f15,"Failure Mode 3",v1).
+aka(p16,"PACT 1",v1).
+aka(p17,"PACT 2",v1).
+aka(p18,"PACT 3",v1).
+r(r10,10,1,0,v1).
+r(r12,1,1,0,v1).
+r(r11,1,1,0,v1).
+r(goal,1,0,0,v1) :- r9.
+r(r9, 1,0,0,v1) :- r11,r12,r10.
+f(f15,0,1,0,v1).
+f(f14,0,1,0,v1).
+f(f13,0,1,0,v1).
+p(p18,0,0.5,100,v1).
+p(p17,0,0.5,10,v1).
+p(p16,0,0.5,1,v1).
+impact(f13,r11,0.1,v1).
+impact(f14,r11,0.2,v1).
+impact(f15,r11,0.3,v1).
+impact(f13,r12,0.4,v1).
+impact(f14,r12,0.5,v1).
+impact(f15,r12,0.6,v1).
+effect(f14,p16,0.22,v1).
+effect(f15,p16,0.33,v1).
+effect(f14,p17,0.55,v1).
+effect(f15,p17,0.66,v1).
+effect(f14,p18,0.88,v1).
+effect(f15,p18,0.99,v1).

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Figure 1: A sample KB exported from ARRT.

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edge(r9, goal, 1, +).
edge(r11, r9, 1, +).
edge(r12, r9, 1, +).
edge(r10, r9, 1, +).
edge(f13, r11, 0.9, *).
edge(f14, r11, 0.8, *).
edge(f15, r11, 0.7, *).
edge(f13, r12, 0.6, *).
edge(f14, r12, 0.5, *).
edge(f15, r12, 0.4, *).
edge(p16, f14, 0.22, -).
edge(p16, f15, 0.33, -).
edge(p17, f14, 0.55, -).
edge(p17, f15, 0.66, -).
edge(p18, f14, 0.88, -).
edge(p18, f15, 0.99, -).

node(r, r10, 10).
node(r, r12, 1).
node(r, r11, 1).
node(r, goal, 0).
node(r, r9, 0).
node(f, f15, 0).
node(f, f14, 0).
node(f, f13, 0).
node(p, p18, 0).
node(p, p17, 0).
node(p, p16, 0).

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Figure 2: A text dump of the internals of MARTIN.

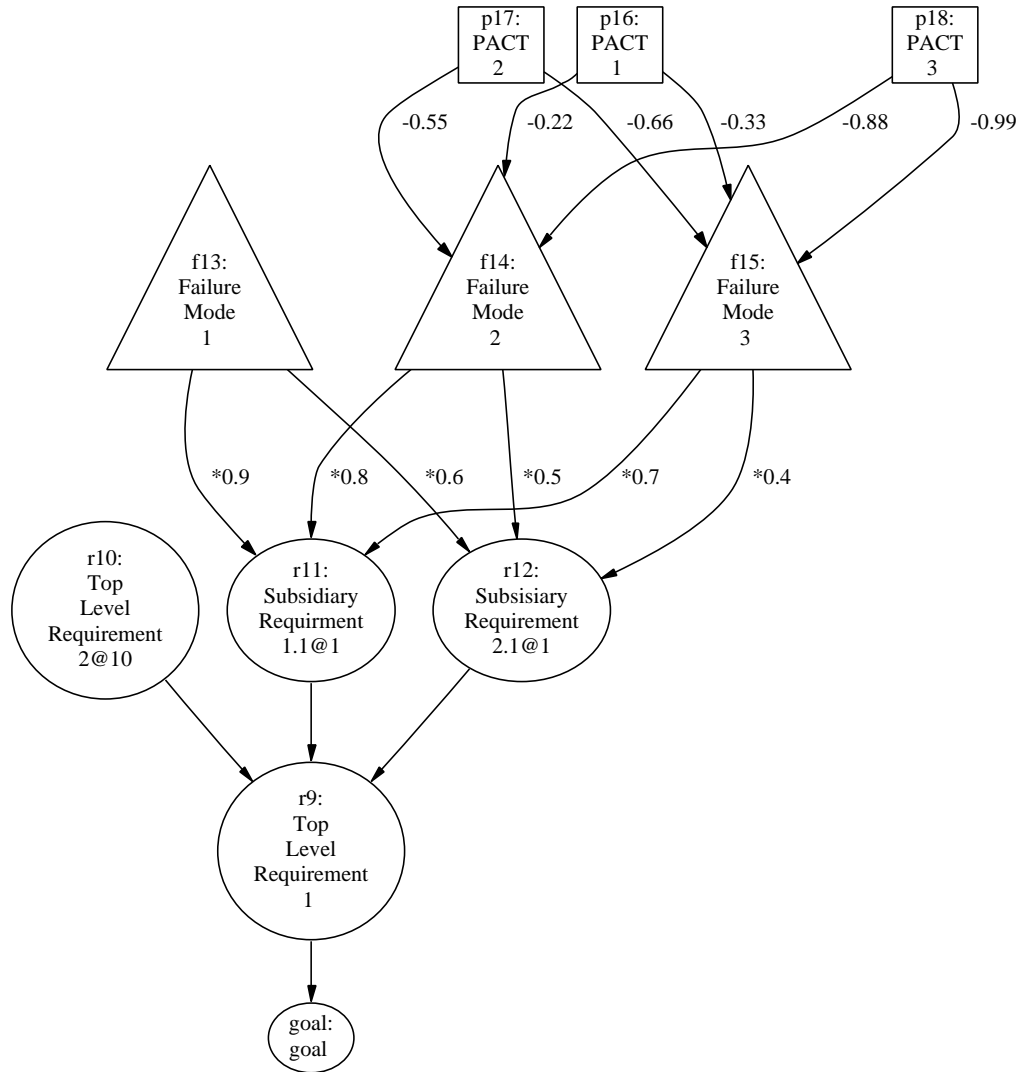


Figure 3: A graphical view of Figure 2.

IF true		IF true
f13		f13
f14		f14
f15		f15
p17		p18
p18		THEN f13 = 1
THEN f13 = 1	IF true	f14 = 0.12
f14 = 0	p16	f15 = 0.01
f15 = 0	p17	r10 = 10
r10 = 10	THEN r10 = 10	r11 = 0
r11 = 0.1	r11 = 1	r12 = 0.336
r12 = 0.4	r12 = 1	goal = 10.336
goal = 10.5	goal = 12	r9 = 10.336
r9 = 10.5	r9 = 12	-----
-----	IF true	IF true
IF true	f13	f13
f13	f14	f14
p16	f15	THEN f13 = 1
p17	p16	f14 = 1
p18	p17	r10 = 10
THEN f13 = 1	p18	r11 = 0
r10 = 10	THEN f13 = 1	r12 = 0
r11 = 0.1	f14 = 0	goal = 10
r12 = 0.4	f15 = 0	r9 = 10
goal = 10.5	r10 = 10	-----
r9 = 10.5	r11 = 0.1	IF true
-----	r12 = 0.4	p16
IF true	goal = 10.5	THEN r10 = 10
f13	r9 = 10.5	r11 = 1
f14	-----	r12 = 1
f15	IF true	goal = 12
p16	f13	r9 = 12
p18	f14	-----
THEN f13 = 1	f15	IF true
f14 = 0	p17	f13
f15 = 0	THEN f13 = 1	p16
r10 = 10	f14 = 0.45	p17
r11 = 0.1	f15 = 0.34	p18
r12 = 0.4	r10 = 10	THEN f13 = 1
goal = 10.5	r11 = 0	r10 = 10
r9 = 10.5	r12 = 0.039	r11 = 0.1
	goal = 10.039	r12 = 0.4
	r9 = 10.039	goal = 10.5
		r9 = 10.5

Figure 4: 10 random outputs