Software Maintenance SS 20
Assignment 2

Nachname	Vorname	Matrikelnummer
Hamedl	Tobias	11808141
Joao	Gerson Miguel	11804202
Khalil	Mahmoud	01651551
Piber	Constantin	11921514

GROUP <12>

Assignment			max. points	received points	max. points	received points
Theory	2.1	a	2,5		10	
	2.1	b	2,5			
	2.2	a	2,0			
	2.2	b	3,0			
Programming	Backward Slicing		3,5		10	
	Forward Slicing		3,5			
	Slicing Tables		3,0			
	Bug Report		-10%			
Total points					20	

1 Backward Slicing Template

Nr	Def	Ref	Gen	Kill	In	Out	inSlice
2.	a	∅	∅	a	a	∅	T
3.	b	∅	∅	b	a, b	a	T
4.	c	a	a	c	a, b, c	a, b	T
5.	d	a	a	d	a, b, c, d	a, b, c	T
6.	∅	a, c	a, c	∅	a, b, c, d	a, b, c, d	T
8.	c	c	c	c	a, b, c, d	a, b, c, d	T
9.	∅	b, c	b, c	∅	a, b, c, d	a, b, c, d	T
11.	d	a, c	a, c, d	d	a, b, c, d	a, b, c, d	T
14.	∅	a, b	a, b	∅	a, b, c, d	a, b, c, d	T
16.	b	a, c	a, c	b	a, b, c	a, c	T
17.	d	∅	∅	d	a, b, c, d	a, b, c	T
21.	d	∅	∅	d	a, b, c, d	a, b, c	T
24.	a	b	b	a	a, b, c, d	b, c, d	T
27.	res	a, d		res			F
28.	∅	res					F

Slice = {2,3,4,5,6,8,9,11,14,16,17,21,24}

2 Forward Slicing Template

Nr	Def	Ref	Gen	Kill	In	Out	inSlice
2.	a	∅	∅	a	∅	∅	F
3.	b	∅	b	b	∅	b	T
4.	c	a	∅	c	b	b	F
5.	d	a	∅	d	b	b	F
6.	∅	a, c	∅	∅	a, b, c, d	a, b, c, d	T
8.	c	c	c	c	a, b, c, d	a, b, c, d	T
9.	∅	b, c	∅	∅	a, b, c, d	a, b, c, d	T
11.	d	a, c	d	d	a, b, c, d	a, b, c, d	T
14.	∅	a, b	∅	∅	a, b, c, d	a, b, c, d	T
16.	b	a, c	b	b	a, b, c, d	a, b, c, d	T
17.	d	∅	d	d	a, b, c, d	a, b, c, d	T
21.	d	∅	d	d	a, b, c, d	a, b, c, d	T
24.	a	b	a	a	a, b, c, d	a, b, c, d	T
27.	res	a, d	res	res	a, b, c, d	res, a, b, c, d	T
28.	∅	res	∅	∅	res, a, b, c, d	res, a, b, c, d	T

Slice = {3,6,8,9,11,14,16,17,21,24,27,28}

3 Delta Debugging Templates

3.1 ddmin2

Step	n	Subset/Complement	Result	Rule	Action
0	-	Δ = 0123456789ABCDEFGHIJ	FAIL		ddmin2(0123456789ABCDEFGHIJ, 2)
1	2	Δ_1 = 0123456789 = ∇_2	UNRES		
2	2	Δ_2 = ABCDEFGHIJ = ∇_1	UNRES	(3)	ddmin2(0123456789ABCDEFGHIJ, 4)
3	4	Δ_1 = 01234	UNRES		
4	4	Δ_2 = 56789	UNRES		
5	4	Δ_3 = ABCDE	UNRES		
6	4	Δ_4 = FGHIJ	PASS		
7	4	∇_1 = 56789ABCDEFGHIJ	UNRES		
8	4	∇_2 = 01234 ABCDEFGHIJ	UNRES		
9	4	∇_3 = 0123456789 FGHIJ	UNRES		
10	4	∇_4 = 0123456789ABCDE	FAIL	(2)	ddmin2(0123456789ABCDE, 3)
11	3	Δ_1 = 01234	UNRES		
12	3	Δ_2 = 56789	UNRES		
13	3	Δ_3 = ABCDE	UNRES		
14	3	∇_1 = 56789ABCDE	UNRES		
15	3	∇_2 = 01234 ABCDE	UNRES		
16	3	∇_3 = 0123456789	UNRES	(3)	ddmin2(0123456789ABCDE, 6)
17	6	Δ_1 = 012	UNRES		
18	6	Δ_2 = 345	PASS		
19	6	Δ_3 = 678	UNRES		
20	6	Δ_4 = 9A	PASS		
21	6	Δ_5 = BC	PASS		
22	6	Δ_6 = DE	UNRES		
23	6	∇_1 = 3456789ABCDE	UNRES		
24	6	∇_2 = 012 6789ABCDE	FAIL	(2)	ddmin2(0126789ABCDE, 5)
25	5	Δ_1 = 012	UNRES		
26	5	Δ_2 = 678	UNRES		
27	5	Δ_3 = 9A	PASS		
28	5	Δ_4 = BC	PASS		
29	5	Δ_5 = DE	UNRES		
30	5	∇_1 = 6789ABCDE	UNRES		
31	5	∇_2 = 012 9ABCDE	UNRES		
32	5	∇_3 = 012678 BCDE	FAIL	(2)	ddmin2(012678BCDE, 4)
33	4	Δ_1 = 012	UNRES		
34	4	Δ_2 = 678	UNRES		
35	4	Δ_3 = BC	PASS		
36	4	Δ_4 = DE	UNRES		
37	4	∇_1 = 678BCDE	UNRES		
38	4	∇_2 = 012 BCDE	UNRES		
39	4	∇_3 = 012678 DE	FAIL	(2)	ddmin2(012678DE, 3)

Step	n	Subset/Complement	Result	Rule	Action
40	4	Δ_1 = 012	UNRES		
41	4	Δ_2 = 678	UNRES		
42	4	Δ_3 = DE	UNRES		
43	4	∇_1 = 678DE	UNRES		
44	4	∇_2 = 012 DE	UNRES		
45	4	∇_3 = 012678	UNRES	(3)	ddmin2(012678DE, 6)
46	4	Δ_1 = 01	UNRES		
47	4	Δ_2 = 26	PASS		
48	4	Δ_3 = 7	PASS		
49	4	∇_1 = 8	UNRES		
50	4	∇_2 = D	FAIL	(1),(4)	ddmin2(D, 2) → return D
51	4	∇_3 = E	UNRES		

3.2 dd2

Step	n	c_s	c_f	Δ	TC	Test Input	Result	Rule	Action
1	-	-	0123456789ABCDEFGHIJ	0123456789ABCDEFGHIJ	c_s	-	PASS		
2	-				c_f	0123456789ABCDEFGHIJ	FAIL		dd2(-, 0123456789ABCDEFGHIJJ, 2)
3	2	-	0123456789ABCDEFGHIJ	0123456789ABCDEFGHIJ	$c'_s \cup \Delta_1$	0123456789	UNRES		
4	2				$c'_s \cup \Delta_2$	ABCDEFGHIJ	UNRES		
5	2				$c'_f \backslash \Delta_1$	ABCDEFGHIJ	UNRES		
6	2	-			$c'_f \backslash \Delta_2$	0123456789	UNRES	(5)	dd2(-, 0123456789ABCDEFGHIJ, 4)
7	4	-	0123456789ABCDEFGHIJ	0123456789ABCDEFGHIJ	$c'_s \cup \Delta_1$	01234	UNRES		
8	4				$c'_s \cup \Delta_2$	5678	UNRES		
9	4				$c'_s \cup \Delta_3$	ABCDE	UNRES		
10	4				$c'_s \cup \Delta_4$	FGHIJ	UNRES		
11	4				$c'_f \backslash \Delta_1$	56789ABCDEFGHIJ	UNRES		
12	4				$c'_f \backslash \Delta_2$	01234 ABCDEFGHIJ	UNRES		
13	4				$c'_f \backslash \Delta_3$	0123456789 FGHIJ	UNRES		
14	4				$c'_f \backslash \Delta_4$	0123456789ABCDE	FAIL	(4)	dd2(-, 0123456789ABCDE, 3)
15	3	-	0123456789ABCDE	0123456789ABCDE	$c'_s \cup \Delta_1$	01234	UNRES		
16	3				$c'_s \cup \Delta_2$	56789	UNRES		
17	3				$c'_s \cup \Delta_3$	ABCDE	UNRES		
18	3				$c'_f \backslash \Delta_1$	56789ABCDE	UNRES		
19	3				$c'_f \backslash \Delta_2$	01234 ABCDE	UNRES		
20	3				$c'_f \backslash \Delta_3$	0123456789	UNRES	(5)	dd2(-, 0123456789ABCDE, 6)
21	6	-	0123456789ABCDE	0123456789ABCDE	$c'_s \cup \Delta_1$	012	UNRES		
22	6				$c'_s \cup \Delta_2$	345	UNRES		
23	6				$c'_s \cup \Delta_3$	678	UNRES		
24	6				$c'_s \cup \Delta_4$	9A	UNRES		
25	6				$c'_s \cup \Delta_5$	BC	UNRES		
26	6				$c'_s \cup \Delta_6$	DE	UNRES		

Step	n	c_s	c_f	Δ	TC	Test Input	Result	Rule	Action
27	6				$c'_f \backslash \Delta_1$	3456789ABCDE	UNRES		
28	6				$c'_f \backslash \Delta_2$	012 6789ABCDE	FAIL	(4)	dd2(-, 0126789ABCDE, 5)
29	6				$c'_f \backslash \Delta_3$	012345 9ABCDE	FAIL	(4)	
30	6				$c'_f \backslash \Delta_4$	012345678 BCDE	UNRES		
31	6				$c'_f \backslash \Delta_5$	0123456789A DE	FAIL	(4)	
32	6				$c'_f \backslash \Delta_6$	0123456789ABC	UNRES		
33	5	-	0126789ABCDE	0126789ABCDE	$c'_s \cup \Delta_1$	012	UNRES		
34	5				$c'_s \cup \Delta_2$	678	UNRES		
35	5				$c'_s \cup \Delta_3$	9A	UNRES		
36	5				$c'_s \cup \Delta_4$	BC	UNRES		
37	5				$c'_s \cup \Delta_5$	DE	UNRES		
38	5				$c'_f \backslash \Delta_1$	6789ABCDE	UNRES		
39	5				$c'_f \backslash \Delta_2$	012 9ABCDE	FAIL	(4)	dd2(-, 0129ABCDE, 4)
40	5				$c'_f \backslash \Delta_3$	012678 BCDE	UNRES		
41	5				$c'_f \backslash \Delta_4$	0126789A DE	FAIL	(4)	
42	5				$c'_f \backslash \Delta_5$	0126789ABC	UNRES		
43	4	-	0129ABCDE	0129ABCDE	$c'_s \cup \Delta_1$	012	UNRES		
44	4				$c'_s \cup \Delta_2$	9A	UNRES		
45	4				$c'_s \cup \Delta_3$	BC	UNRES		
46	4				$c'_s \cup \Delta_4$	DE	UNRES		
47	4				$c'_f \backslash \Delta_1$	9ABCDE	UNRES		
48	4				$c'_f \backslash \Delta_2$	012 BCDE	UNRES		
49	4				$c'_f \backslash \Delta_3$	0129A DE	FAIL	(4)	dd2(-, 0129ADE, 3)
50	4				$c'_f \backslash \Delta_4$	0129ABC	UNRES		
51	3	-	0129ADE	0129ADE	$c'_s \cup \Delta_1$	012	UNRES		
52	3				$c'_s \cup \Delta_2$	9A	UNRES		
53	3				$c'_s \cup \Delta_3$	DE	UNRES		
54	3				$c'_f \backslash \Delta_1$	9ADE	UNRES		
55	3				$c'_f \backslash \Delta_2$	012 DE	UNRES		
56	3				$c'_f \backslash \Delta_3$	0129A	UNRES	(5)	dd2(-, 0129ADE, 6)

Step	n	c_s	c_f	Δ	TC	Test Input	Result	Rule	Action
57	6	-	0129ADE	0129ADE	$c'_s \cup \Delta_1$	01	UNRES		
58	6				$c'_s \cup \Delta_2$	2	UNRES		
59	6				$c'_s \cup \Delta_3$	9	UNRES		
60	6				$c'_s \cup \Delta_4$	A	UNRES		
61	6				$c'_s \cup \Delta_5$	D	UNRES		
62	6				$c'_s \cup \Delta_6$	E	UNRES		
63	6				$c'_f \backslash \Delta_1$	29ADE	UNRES		
64	6				$c'_f \backslash \Delta_2$	01 9ADE	FAIL	(4)	
65	6				$c'_f \backslash \Delta_3$	012 ADE	UNRES		
66	6				$c'_f \backslash \Delta_4$	0129 DE	FAIL	(4)	
67	6				$c'_f \backslash \Delta_5$	0129A E	UNRES		
68	6				$c'_f \backslash \Delta_6$	0129AD	PASS	(2)	dd2(0129AD, 0129ADE, 2)
67	2	0129AD	0129ADE	E		-	-	(6)	(0129AD, 0129ADE)