#### IT Quality and Software Test

#### Lesson 5 Test Design Techniques Dynamic Testing I Quiz V1.2

Uwe Gühl



Winter 2011/ 2012

# 1. Dynamic Testing I State Transition Testing (1/2)





Test Case	1	2	3	4	5
Start State	S1	S2	S2	S3	S3
Input	Power on	Power off	RCtrl on	RCtrl off	Power off
Expected output	TV Stand By	TV off	TV play	TV Stand By	TV off
Finish State	S2	S1	S3	S2	S1

Uwe Gühl - IT Quality and Software Test 05

http://www.istqb.org <sup>2</sup>

1. Dynamic Testing I State Transition Testing (2/2)



Which of the following statements about the given state table is TRUE?

- a) The state table can be used to derive both valid and invalid transitions.
- b) The state table represents all possible single transitions.
- c) The state table represents only some of all possible single transitions.
- d) The state table represents sequential pairs of transitions.



#### 1. Dynamic Testing I State Transition Testing

Which of the following statements about the given state table is TRUE?

- a) The state table can be used to derive both valid and invalid transitions.
- b) The state table represents all possible single transitions.
- c) The state table represents only some of all possible single transitions.
- d) The state table represents sequential pairs of transitions.



Which of the following statements are TRUE for the equivalence partitioning test technique?

- a) Divides possible inputs into classes that have the same behaviour.
- b) Uses both valid and invalid partitions.
- c) Makes use only of valid partitions.
- d) Must include at least two values from every equivalence partition.
- e) Can be used only for testing equivalence partitions inputs from a Graphical User Interface.



Which of the following statements are TRUE for the equivalence partitioning test technique?

- a) Divides possible inputs into classes that have the same behaviour.
- b) Uses both valid and invalid partitions.
- c) Makes use only of valid partitions.
- d) Must include at least two values from every equivalence partition.
- e) Can be used only for testing equivalence partitions inputs from a Graphical User Interface.



http://www.istqb.org,

Which of the following solutions below could be categorized as Black Box design techniques?

- a) Equivalence Partitioning, decision tables, state transition, and boundary value.
- b) Equivalence Partitioning, decision tables, use case.
- c) Equivalence Partitioning, decision tables, checklist based, statement coverage, use case.
- d) Equivalence Partitioning, cause-effect graph, checklist based, decision coverage, use case.
- e) Equivalence Partitioning, cause-effect graph, checklist based, decision coverage and boundary value.



http://www.istqb.org

Which of the following solutions below could be categorized as Black Box design techniques?

- a) Equivalence Partitioning, decision tables, state transition, and boundary value.
- b) Equivalence Partitioning, decision tables, use case.
- c) Equivalence Partitioning, decision tables, checklist based, statement coverage, use case.
- d) Equivalence Partitioning, cause-effect graph, checklist based, decision coverage, use case.
- e) Equivalence Partitioning, cause-effect graph, checklist based, decision coverage and boundary value.

An employee's bonus is to be calculated. It cannot become negative, but it can be calculated to zero. The bonus is based on the duration of the employment.

An employee can be employed for less than or equal to 2 years, more than 2 years but less than 5 years, 5 to 10 years, or longer than 10 years.

Depending on this period of employment, an employee will get either no bonus or a bonus of 10%, 25% or 35%.

How many equivalence partitions are needed to test the calculation of the bonus?

An employee's bonus is to be calculated. It cannot become negative, but it can be calculated to zero. The bonus is based on the duration of the employment.

An employee can be employed for less than or equal to 2 years, more than 2 years but less than 5 years, 5 to 10 years, or longer than 10 years.

Depending on this period of employment, an employee will get either no bonus or a bonus of 10%, 25% or 35%.

How many equivalence partitions are needed to test the calculation of the bonus?

#### 5. Dynamic Testing I **Use Case Testing**



Which of the following statements about the benefits of deriving test cases from use cases are most likely to be true?

- a) Deriving test cases from use cases is helpful for system and acceptance testing.
- b) Deriving test cases from use cases is helpful only for automated testing.
- c) Deriving test cases from use cases is helpful for component testing.
- d) Deriving test cases from use cases is helpful for testing the interaction between different components of the system. http://www.istqb.org

26/01/12

#### 5. Dynamic Testing I **Use Case Testing**



Which of the following statements about the benefits of deriving test cases from use cases are most likely to be true?

- a) Deriving test cases from use cases is helpful for system and acceptance testing.
- b) Deriving test cases from use cases is helpful only for automated testing.
- c) Deriving test cases from use cases is helpful for component testing.
- d) Deriving test cases from use cases is helpful for testing the interaction between different components of the system. http://www.istqb.org,

26/01/12

#### 6. Dynamic Testing I Test Design Techniques



Which of the following would be the best test approach when there are poor specifications and time pressures?

a) Use Case Testing.

b) Condition Coverage.

c) Exploratory Testing.

d) Path Testing.

#### 6. Dynamic Testing I Test Design Techniques



Which of the following would be the best test approach when there are poor specifications and time pressures?

a) Use Case Testing.

b) Condition Coverage.

c) Exploratory Testing.

d) Path Testing.

## 7. Dynamic Testing I Black-box Techniques (1/2)



You have started specification-based testing of a program. It calculates the greatest common divisor (GCD) of two integers (A and B) greater than zero.

calcGCD (A, B);

The following test cases have been specified.

Test Case	A	В
1	1	1
2	INT_MAX	INT_MAX
3	1	0
4	0	1
5	INT_MAX + 1	1
6	1	INT_MAX + 1

INT\_MAX: largest Integer

# 7. Dynamic Testing I Black-box Techniques (2/2)



Which test technique has been applied in order to determine test cases 1 through 6?

a) Boundary value analysis.

b) State transition testing.

c) Equivalence partitioning.

d) Decision table testing.

#### 7. Dynamic Testing I Black-box Techniques



Which test technique has been applied in order to determine test cases 1 through 6?

a) Boundary value analysis.

b) State transition testing.

c) Equivalence partitioning.

d) Decision table testing.



Which of the following statements are TRUE?

8. Dynamic Testing I

State Transition Testing (2/2)

- a) The test case table exercises the shortest number of transitions.
- b) The test case gives only the valid state transitions.
- c) The test case gives only the invalid state transitions.
- d) The test case exercises the longest number of transitions.



## 8. Dynamic Testing I State Transition Testing



Which of the following statements are TRUE?

- a) The test case table exercises the shortest number of transitions.
- b) The test case gives only the valid state transitions.
- c) The test case gives only the invalid state transitions.
- d) The test case exercises the longest number of transitions.





# 1 Task Identifying Test Cases (1/3)



- We want you to write a set of test cases with specific sets of data to properly test a relatively simple program.
- Create a set of test data for the program data the program must handle correctly to be considered a successful program.
- Here's a description of the program:

Source: Glenford J. Myers: The Art of Software Testing, Second Edition, 2004

# 1 Task Identifying Test Cases (2/3)



- The program reads three3 integer values from an input dialogue.
- The three values represent the lengths of the sides of a triangle.
- The program displays a message that states whether the triangle is



Uwe Gühl - IT Quality and Software Test 05









#### 1 Proposal Identifying Test Cases (1/5)

Valid triangles (a, b, c)

- 1. (2, 3, 4) Valid scalene
- 2. (3, 3, 4) Valid isosceles
- 3. (3, 4, 3) Valid isosceles (permuted)
- 4. (4, 3, 3) Valid isosceles (permuted)
- 5. (3, 3, 3) Valid equilateral



## 1 Proposal Identifying Test Cases (2/5)



Not valid triangles (a, b, c), one value 0

- 6. (0, 3, 4) Not valid triangle, value 0
- 7. (3, 0, 4) Not valid triangle, value 0 (permuted)
- 8. (3, 4, 0) Not valid triangle, value 0 (permuted)

Not valid triangles (a, b, c), one value < 0

- 9. (-1, 3, 4) Not valid triangle, value 0
- 10. (3, -1, 4) Not valid triangle, value 0 (permuted)
- 11. (3, 4, -1) Not valid triangle, value 0 (permuted)

# 1 Proposal Identifying Test Cases (3/5)



Not valid triangles (*a*, *b*, *c*), 2 added sides same length like 3rd side

- 12. (1, 2, 3) Not valid triangle, value a + b = c
- 13. (1, 3, 2) Not valid triangle, value a + c = b
- 14. (3, 1, 2) Not valid triangle, value b + c = a
  - Not valid triangles (a, b, c), 2 added sides smaller length than 3rd side
- 15. (1, 2, 4) Not valid triangle, value a + b < c
- 16. (1, 4, 2) Not valid triangle, value a + c < b
- **17.** (4, 1, 2) **Not valid triangle, value b + c < a** Uwe Gühl IT Quality and Software Test 05

# 1 Proposal Identifying Test Cases (4/5)



#### Not valid values

- 18. (2.5, 3, 4) Not valid values, no integer
- 19. (3, 2.5, 4) Not valid values, no integer (permuted)
- 20. (3, 4, 2.5) Not valid values, no integer (permuted)

Not valid number of arguments

- 21. (3, 4) Not valid, less values than requested (if possible)
- 22. (3, 4, 5, 6) Not valid, more values than requested (if possible)



# 1 Proposal Identifying Test Cases (5/5)

Valid triangles (a, b, c) considering boundaries

- 23. (2, 3, MAX\_INT) Valid scalene
- 24. (MAX\_INT, MAX\_INT, 4) Valid isosceles
- 25. (MAX\_INT, MAX\_INT, MAX\_INT) Valid equilateral

Valid triangles (*a*, *b*, *c*) considering right calculation of boundaries (overrun?)

#### 26. (Max\_int/2 + 1, Max\_int/2 + 1, Max\_int/2 + 10) Valid isosceles

# 2 Task Designing Test Cases (1/3)



- You got following User Stories (see next 2 slides)
- You should test scheduling web pages (extract)
  - http://doodle.com/?locale=en
  - http://www.scheduleonce.com/
  - http://www.meetifyr.com/
  - https://dudle.inf.tu-dresden.de/
- Write 2 test cases following the template "TestCase-Template\_1.0.xls" (see https://mike.cpe.ku.ac.th/~uwe/219498/)

# 2 Task Designing Test Cases (2/3)



As a <type of="" user=""></type>	I want <some goal=""></some>	so that <some reason=""></some>
Scheduler	to initiate an appointment	the best fitting appointment date could be determined
Scheduler	to invite people	the best fitting appointment date could be determined
Scheduler	to update a given appointment	I could add another / delete given date
Scheduler	to delete a given appointment	I don't have to give a party
Scheduler	to check a given appointment	I could see the status of the invitees
Scheduler	to finalize a given appointment	I could invite all the guests

# 2 Task Designing Test Cases (3/3)



As a <type of="" user=""></type>	I want <some goal=""></some>	so that <some reason=""></some>
Invitee	to get an invitation to an appointment	determine the dates fitting best to me
Invitee	to choose appointment dates	the best fitting date could be found
Invitee	to update appointment dates	
Invitee	add comments	I could express additional ideas, requests

# 2 Proposal Designing Test Cases (1/4)



TC ID	Name	Prio	Step	Role / Action	Result	Test Data	Status	Comments
4	Schodulo an overt	1-high	0	Schodulor	Meeting scheduled, link		Unterted	
-	Schedule an event	r-nign	0	Scheduler	available		Untested	
1			10	Calling webpage, scheduling meeting; Call Create Poll		doodle.com		
1			20	General Enter mandatory data, [Next]		Title: CYND Party Your name: Uwe		
1			30	Days, enter date, [Next]		Date: 23.01.2012		
1			40	Time, enter 3 time slots [Next]		Time1: 7:00 PM Time2: 8:00 PM Time3: 9:00 PM		
1			50	Basic Poll [Next]				
1			60	You send the invitation [Finish]				
1			70	Poll created successfully	"Send this link to anyone you wish to invite."	http://www.doodle.com/ grkxn2ffdggw9b72		

# 2 Proposal Designing Test Cases (2/4)



ID Name	ne Prio Stej	p Role / Action	Result	Test Data	Status	Comments
Send out invita	d out invitation 1=high	0 Scheduler	Invitation sent out with link		Untested	Precondition: TC1
		10 Send out Email invitation		To: Inbox of CNYD- Guest1@spambog.com , Inbox of CNYD- Guest2@spambog.com Link: http://www.doodle.com/ grkyn2ffdagw9b72		
	1	10 Send out Email invitation		Guest2@spambog.com Link: http://www.doodle.com/ qrkxn2ffdqgw9b72		

## 2 Proposal Designing Test Cases (3/4)



TC ID	Name	Prio	Step	Role / Action	Result	Test Data	Status	Comments
					Got invitation, choosen a			
3	Choose date by Guest 1	1=high	0	Guest1	time	CNYD-Guest1@spambo	Untested	Precondition: TC1, TC2
				Opening mail account,				
				getting email: Invitation with		http://www.doodle.com/		
3			10	link		qrkxn2ffdqgw9b72		
						Name: CYND Party		
						January 2012, Mon 23		
				Calling webpage, getting		7:00 PM		
				invitation page with		8:00 PM		
3			20	scheduled dates		9:00 PM		
						Name: Guest1		
						Click on 7:00 pm		
3			30	Entering data, [Save]		Click on 8:00 pm		
						Thanks, Guest1		
				Feedback from system		Your choices have		
3			40	[Return to poll]		been submitted.		
3			50	Values are given				

## 2 Proposal Designing Test Cases (4/4)



TC ID	Name	Prio	Step	Role / Action	Result	Test Data	Status	Comments
					Got invitation, choosen a			
4	Choose date by Guest 2	1=high	0	Guest2	time	CNYD-Guest2@spambo	Untested	Precondition: TC1, TC2, TC3
				Opening mail account,				
				getting email: Invitation with		http://www.doodle.com/		
4			10	link		qrkxn2ffdqgw9b72		
						Name: CYND Party		
						January 2012, Mon 23		
				Calling webpage, getting		7:00 PM		
				invitation page with		8:00 PM		
4			20	scheduled dates		9:00 PM		
						Name: Guest2		
						Click on 8:00 pm		
4			30	Entering data, [Save]		Click on 9:00 pm		
						Thanks, Guest2		
				Feedback from system		Your choices have		
4			40	[Return to poll]		been submitted.		
4			50	Values are given				

# 3 Task Executing Test Cases (1/4)



- You should test a scheduling web page
  - http://www.meetifyr.com/
  - Test should be done in the role of an invited guest
  - First activity: Accepting specific dates
  - Second activity: Updating acceptance
- Please open spreadsheet [link]

https://docs.google.com/spreadsheet/ccc?key=0AmsmOz0XDIGdHNwOFpTM1dGTnAzWWJfX2NKUjJmQ kE

# 3 Task Executing Test Cases (2/4)



 Sheet [Test Data]
Please choose test data corresponding to your student-ID (Example: Guest04)



# 3 Task Executing Test Cases (3/4)



- 1. Open Sheet [Test Plan]
- Find corresponding test cases, (Example: 4. Guest04 confirms and updates appointment dates)
- 3. Open lines to see the test steps
- 4. Execute the test cases
- 5. Document results (Passed / Failed)

# 3 Task **Executing** Test Cases (4/4)



#### Sheet [Test Plan]

schedulertest\_1.0 ☆

File Edit View Insert Format Data Tools Help All changes saved

		••	→ ▲ · ■ S % ·	123 - 10pt	‡   B	Abc <u>A</u> <u> </u>	- Β.Ξ Ξ <b>Ξ</b> - Ϊ <b>ΙΙ</b> Ϊ, Υ			
	Ťх	Unteste	ed				1	1		
		А	В	С	D	E	F	G	н	
2	49	3.4	Update appointment dates	2=medium	0	Guest03			Untested	Prec
$\mathbf{r}$	- 52	4. Gue	st04 confirms and up	odates app	ointr	nent dates				R
	53 Tester: << <tester name="">&gt;&gt; Test Da</tester>			Test Date:		<< <dd.mm.yyyy>&gt;&gt;</dd.mm.yyyy>				U
4	54	4.1	Check mail	1=high	0	Guest04		Pass	ĥ	ail che
	55	4.1			10	Open Mailbox at www.spambog.com	An invitation mail is in the mail box	219498- Guest04@spar Fail	<u>4.</u> )	
	56	4.1			20	Open Link to meetifyr.com	A new tab / windows open	http://www.mee /nETN9ngJDw	ed	
	57	4.2	Enter appointment dates	1=high	0	Guest04			Untested	
5	r 61	4.3	Find link to scheduler web page in mail	2=medium	0	Guest04			Untested	Prec
	r 64	4.4	Update appointment dates	2=medium	0	Guest04			Untested	Prec
	r 67	5. Gue	st05 confirms and up	odates app	ointr	nent dates				
	68	Tester:	<< <tester name="">&gt;&gt;</tester>	Test Date:		<< <dd.mm.yyyy>&gt;&gt;</dd.mm.yyyy>				
	69	4								Mail
		+ =	Test data Test Plan	▼ Test Plan	n Temp	late Test Case Examples 1	Test Case Template			
	26/	01/12	<b>n</b>	·	Uwe	Gühl - IT Ouality and S	Software Test 05		,	40