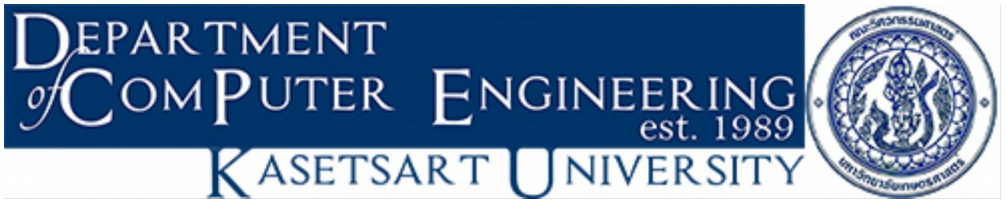


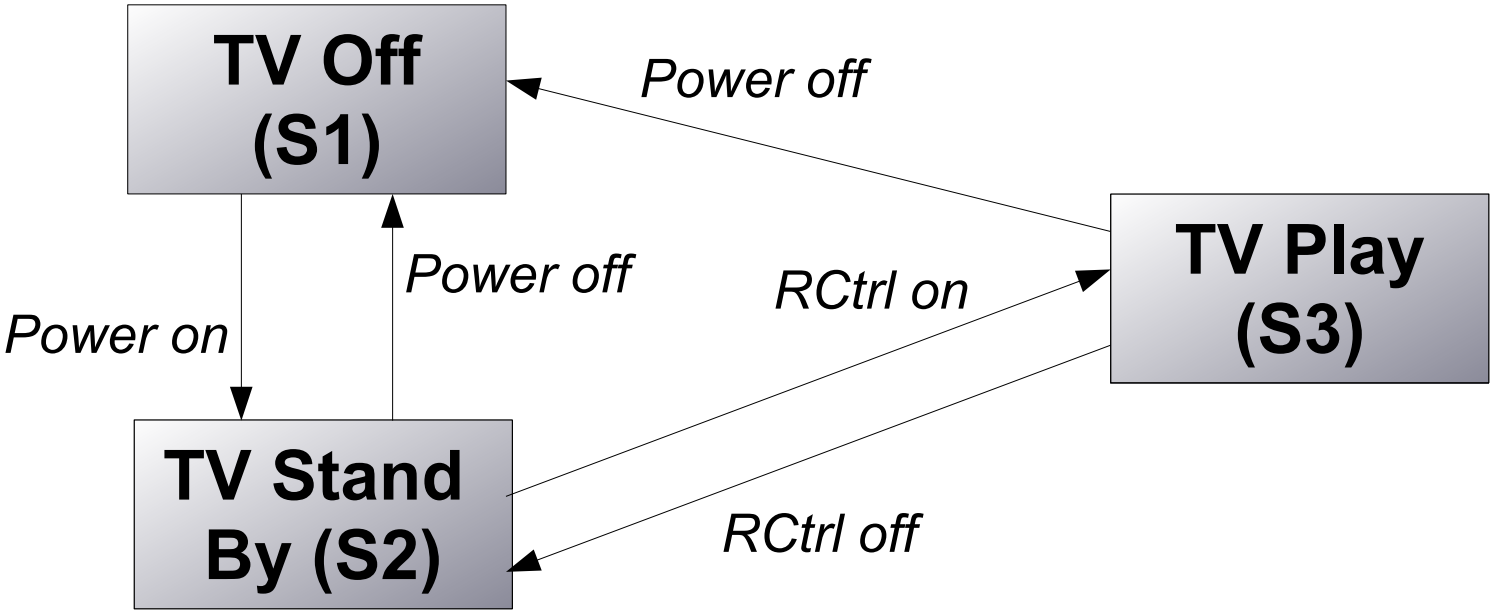
Software Testing

Lesson 6 – Dynamic Testing II
Quiz

Uwe Gühl

Winter 2015 / 2016

1. Dynamic Testing II
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

1. Dynamic Testing II
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. ○

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1. Dynamic Testing II
State Transition Testing

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d) The state table represents sequential pairs of transitions. ○

http://www.istqb.org

2. Dynamic Testing II
Equivalence Partitioning Testing

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

a) Divides possible inputs into classes that have the same behaviour. ◯

b) Makes use only of valid partitions. ◯

c) Must include at least two values from every equivalence partition. ◯

d) Can be used only for testing equivalence partitions inputs from a Graphical User Interface. ◯

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2. Dynamic Testing II
Equivalence Partitioning Testing

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

a) Divides possible inputs into classes that have the same behaviour. ✓

b) Makes use only of valid partitions. ○

c) Must include at least two values from every equivalence partition. ○

d) Can be used only for testing equivalence partitions inputs from a Graphical User Interface. ○

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3. Dynamic Testing II
Equivalence Partitioning Testing

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, checklist based, statement coverage, use case. ○

c) Equivalence Partitioning, cause-effect graph, checklist based, decision coverage, use case. ○

d) Equivalence Partitioning, cause-effect graph, checklist based, decision coverage and boundary value. ○

3. Dynamic Testing II
Equivalence Partitioning Testing

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

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d) Equivalence Partitioning, cause-effect graph, checklist based, decision coverage and boundary value.

4. Dynamic Testing II
Equivalence Partitioning Testing

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?

a) 2 ◯

b) 3 ◯

c) 4 ◯

d) 5 ◯

4. Dynamic Testing II
Equivalence Partitioning Testing

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

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

a) 2 ◯

b) 3 ◯

c) 4 ✓

d) 5 ◯

5. Dynamic Testing II
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 not 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. ◯

5. Dynamic Testing II
Use Case Testing

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d) Deriving test cases from use cases is helpful for testing the interaction between different components of the system. ✓

6. Dynamic Testing II
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 II
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 II
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	B
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 II
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 II
Black-box Techniques

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

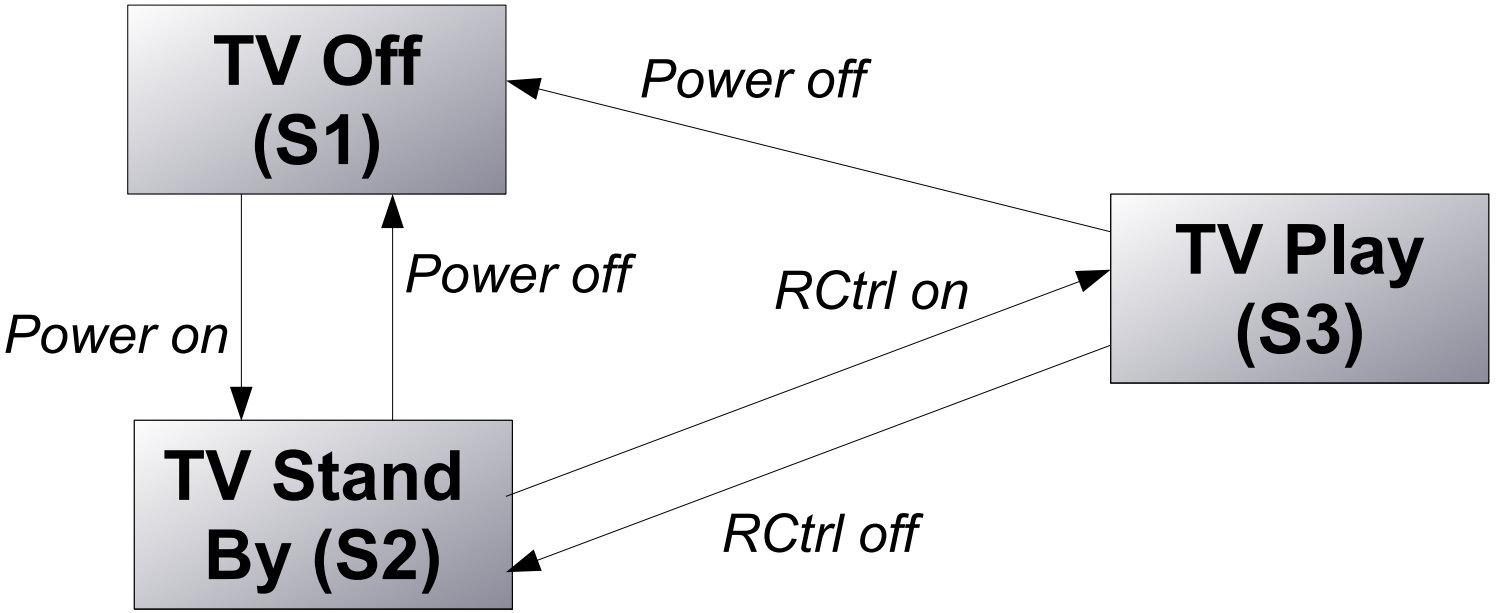
a) Boundary value analysis. ✓

b) State transition testing.

c) Equivalence partitioning.

d) Decision table testing.

8. Dynamic Testing II
State Transition Testing (1/2)



Test Case	1	2	3	4	5	6	7
Start State	S1	S1	S2	S2	S3	S3	S3
Input	Power On	Power On	RCtrl On	RCtrl On	RCtrl Off	Power Off	RCtrl Off
Expected output	TV Stand By	TV Stand By	TV Play	TV Play	TV Stand By	TV Off	TV Stand By
Next state	S2	S2	S3	S3	S2	S1	S2
Input	Power Off	RCtrl On	Power Off	RCtrl Off	RCtrl On	Power On	Power Off
Expected output	TV Off	TV Play	TV Off	TV Stand By	TV Play	TV Stand By	TV Off
Finish State	S1	S3	S1	S2	S3	S2	S1

8. Dynamic Testing II
State Transition Testing (2/2)

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. ○

http://www.istqb.org

8. Dynamic Testing II
State Transition Testing

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http://www.istqb.org

Tasks

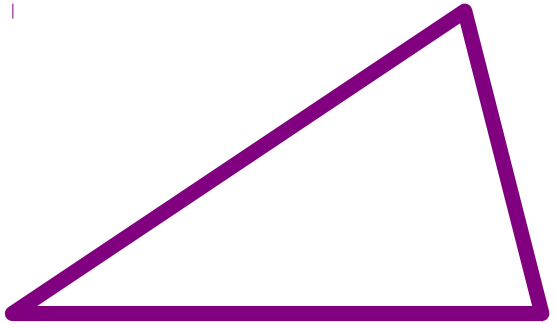
1 Task
Identifying Test Cases (1/3)

- 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:

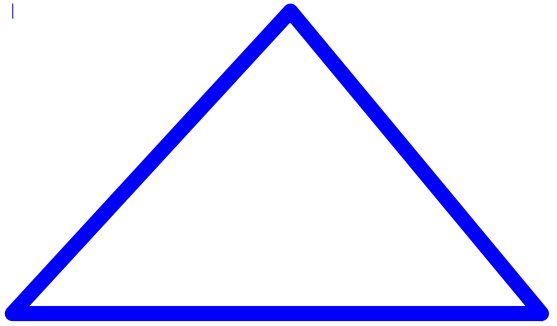
Source: Glenford J. Myers: The Art of Software Testing, Third Edition, 2012

1 Task
Identifying Test Cases (2/3)

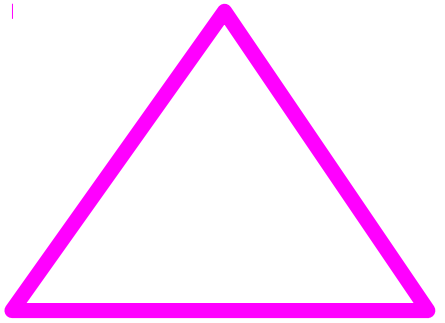
- The program reads three integer values from an input dialogue.
- The three values represent the lengths of the sides of a triangle.
- The program displays a message that states whether the triangle is



scalene,

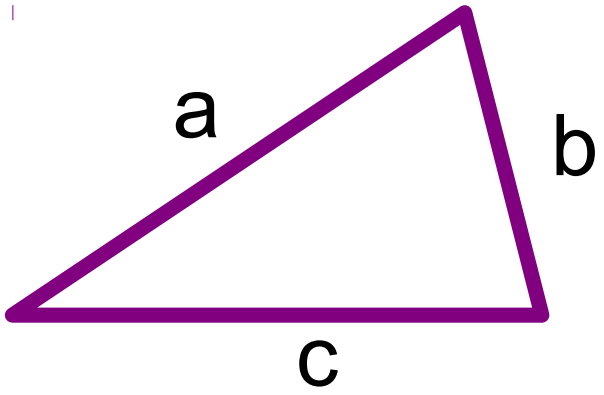


isosceles,



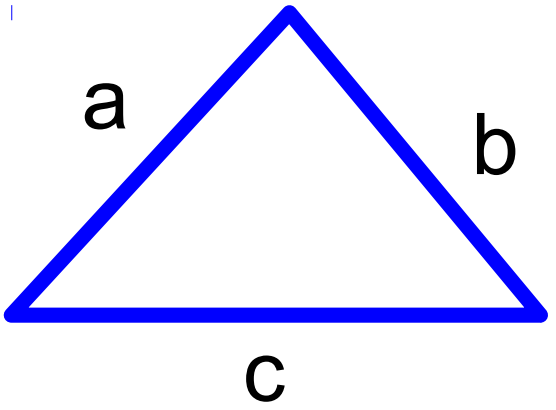
equilateral.

1 Task
Identifying Test Cases (3/3)



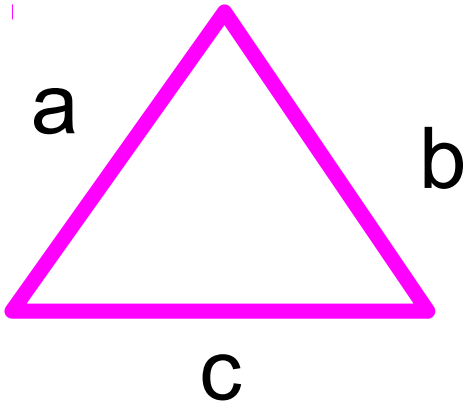
$a \neq b \neq c$

scalene



$a = b \neq c$
$a = c \neq b$
$a \neq b = c$

isosceles



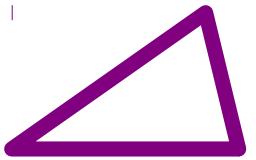
$a = b = c$

equilateral

1 Proposal
Identifying Test Cases (1/5)

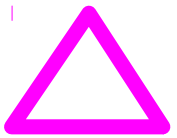
Valid triangles (*a, b, c*)

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

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)

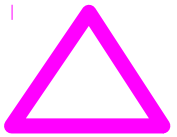
1 Proposal
Identifying Test Cases (5/5)

Valid triangles (*a, b, c*) considering boundaries

23. (2, MAX_INT-1, 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/?lang=en
- Write 2 test cases following the Test case template
  Download @ https://mike.cpe.ku.ac.th/~uwe/01219343/
  (Link: https://mike.cpe.ku.ac.th/~uwe/01219343/Template_TestCase_v1.0.xlsx)

2 Task
Designing Test Cases (2/3)

As a <type of user>	I want <some goal>	so that <some reason>
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>	**I want <some goal>**	**so that <some reason>**
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	to correct the dates I entered
Invitee	add comments	I could express additional ideas, requests

2 Proposal
Designing Test Cases (1/4)

TC ID	Name	Prio	Step	Role / Action	Expected result	Test Data
I. Initiate schedule meeting						
1	*Schedule an event*	1=high	0	*Role: Scheduler*		
1			10	*Preconditions: Firefox, Windows10; email program available for required test user*	*Firefox browser opened*	uwe2@yopmail.com
1			20	*Calling webpage, scheduling meeting; Call "Schedule an event"*	*"Schedule an event" page opens "http://doodle.com/create"*	doodle.com/?locale=en
1			30	*General Enter mandatory data, [Next]*	*"Schedule an event" page opens with Date proposals "http://doodle.com/create#dates"*	Title: Songkran Party Your name: Uwe Email: uwe2@yopmail.com
1			40	*Days, click on 15.04.2016 enter date, [Next]*	*Date "15.04.16" gets highlighted in calendar, Selected dates lists "Fri, 4/15/16"*	Date: 15.04.2016
1			50	*Time, enter 3 time slots [Next]*	*Times are accepted "Schedule an event" page shows Basic poll "http://doodle.com/create#options"*	Time1: 7:00 PM Time2: 8:00 PM Time3: 9:00 PM
1			60	*Basic Poll [Next]*	*"Schedule an event" page shows Sharing settings*	
1			70	*Choose "Everyone with a link can participate" You send the invitation [Finish]*	*Info, that poll has been created successfully "Thanks, uwe, Your poll has been created" Link gets updated (similar to) http://doodle.com/created?pollId=d77iasxnd7gvbx89&adminKey=7u3rr49k*	
1			80	*Postcondition: 2 emails were sent: 1 with admin information 1 to forward*	*1) Similar to Hi uwe, You have created your Doodle poll "Songkran Party" with [Administer poll] button 2) Similar to Hi uwe, You have initiated a poll "Songkran Party" at Doodle. The link to your poll is: http://doodle.com/poll/d77iasxnd7gvbx89*	

2 Proposal
Designing Test Cases (2/4)

TC ID	Name	Prio	Step	Role / Action	Expected result	Test Data
2	*Send out invitation*	1=high	0	*Role: Scheduler*		
2			10	Precondition: Firefox, Windows10	*Firefox browser opened*	
2			20	Open poll with administration link called by pressing [Administer poll] button	*"Schedule an event" page opens Similar to "http://doodle.com/poll/d77iasxnd7gvbx897u3rr49k/admin#admin"*	
2			30	Pressing rider "Administration", click "Invite participants"	*Songkran Party page opens with particpation link Similar to http://doodle.com/poll/d77iasxnd7gvbx89 Invite participants page opens Type the e-mail addresses here:*	
2			40	Enter 2 e-mail addresses		sg01@discard.email, sg02@discard.email
2			50	Postcondition: participants get email	*Similar to Hi there, uwe (uwe2@yopmail.com) invites you to participate in the Doodle poll "Songkran Party." with [Participate now] button*	

2 Proposal
Designing Test Cases (3/4)

TC ID	Name	Step	Role / Action	Expected result	Test Data
II. Participate to schedule meeting					
11	*Choose some options*	0	*Role: Attendee*		*Guest1*
11		10	Precondition: TC 2 executed, mail has been sent out		
11		20	Opening mail account, email arrived: Invitation with link	*Mail sent by uwe2@yopmail.com* *Doodle poll "Songkran Party."*	sg01@discard.email
11		30	Pressing [Participate now] to get invitation page with scheduled dates	*Doodle page for participant opens* *and offers for 15.04.2016 three options* *Similar to* *http://doodle.com/poll/d77iasxnd7gvbx89*	Poll: Songkran Party April 2016 Fri 15 7:00 PM, 8:00 PM, 9:00 PM
11		40	Entering name Click on two options [Save]	*Updated webpage,* *info:* *Thanks, guest1,* *your choices have been submitted.*	Name: guest1 Times to choose: 7:00 pm 8:00 pm
11		50	Postcondition: uwe2 gets informed with an email	*Hi uwe,* *"guest1" just participated in the poll "Songkran* *Party"*	uwe2@yopmail.com
11		60	Postcondition: values are stored	*Recalling the poll shows line with guest1 and ticks* *with 7:00 pm, 8:00 pm; and red with 9:00 pm*	Sum: 7:00 PM 1 8:00 PM 1 9:00 PM 0

2 Proposal
Designing Test Cases (4/4)

TC ID	Name	Step	Role / Action	Expected result	Test Data
12	*Choose other options*	0	*Role: Attendee*		*Guest2*
12		10	Precondition: TC 2 executed, mail has been sent out, TC 11 executed, guest 1 entered his data		
12		20	Opening mail account, email arrived: Invitation with link	*Mail sent by uwe2@yopmail.com* *Doodle poll "Songkran Party."*	sg02@discard.email
12		30	Pressing [Participate now] to get invitation page with scheduled dates	*Doodle page for participant opens* *and offers for 15.04.2016 three options* *Similar to* *http://doodle.com/poll/d77iasxnd7gvbx89*	Poll: Songkran Party April 2016 Fri 15 7:00 PM, 8:00 PM, 9:00 PM
12		40	Entering name Click on two options [Save]	*Updated webpage,* *info:* *Thanks, guest1,* *your choices have been submitted.*	Name: guest1 Times to choose: 8:00 pm 9:00 pm
12		50	Postcondition: uwe2 gets informed with an email	*Hi uwe,* *"guest1" just participated in the poll "Songkran Party"*	uwe2@yopmail.com
12		60	Postcondition: values are stored	*Recalling the poll shows line with guest1 and ticks with 7:00 pm, 8:00 pm; and red with 9:00 pm*	Sum: 7:00 PM 1 8:00 PM 2 9:00 PM 1