TMap

Process Cycle Test

Lesson Objectives

- Introduction to Process Cycle Test
- Coverage
- Paths: Basic Test used in PCT
- Creating a Process Flow Diagram
- Steps in PCT
- Analysis of steps with an example
- Variations in depth

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7.1 Introduction – Process Cycle Test

- Aim
  - Testing on suitability (automated part vs. administrative organization)
  - Testing of process
- Test basis
  - Structured description of business or operating processes
  - Organizational procedures
  - Process flows
- Deriving Principle
  - Coverage type : 'Paths' (test depth level 2)
- Quality characteristics
  - Suitability

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7.2 Coverage

- The Process Cycle Test focuses on the coverage of the variations in the processing. In the coverage of paths, various levels are possible. The more thorough the level, greater the probability of finding the defects.
- The most elementary form of path coverage only provide the guarantee that each path has been traveled once.
- Test depth level is used to decide the depth of coverage. Test depth level N is the certainty that all the combinations of N consecutive paths are covered.
- Test depth level 1, Test depth level 2 and Test depth level 3 are considered as per the required coverage.

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7.3 Paths:-Basic Technique Used in PCT

- The basic technique used in this is Paths.
- The coverage path is applicable if the system behavior is described with the aid of decision points and paths. A chart of decision points and paths shows in structured way how the process runs from the start to end and what the various possibility in the course of process are. At each decision point the process can go various ways, indicated by the various path that continue from the particular decision point. The condition in which it takes one path or another are described in the decision points themselves.

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7.4 Points To Remember

- Divide the Process Flow Diagram logically in the actions executed by the user.
- While numbering the path from the decision point give, even number to the positive decision value and odd number to the negative decision value.
- Sequential actions between two decision points receive a common number.

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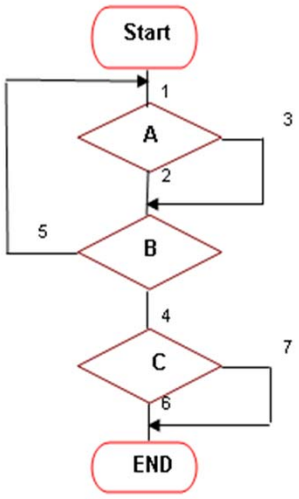
7.5 Example:- Flow Diagram for Paths



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7.6 Steps

- Identify test situations
- Specify logical test cases
- Create physical test cases
- Establish the initial data set
- Assemble the test script

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7.6 Steps

7.6.1 Example -Test basis-1

Order handling

- Customers (restaurant owners) can place an order with a supplier for different products for restaurants, by means of an order form for one or more (types of) products. This can be a completely new order or a update of an existing order.

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7.6 Steps

7.6.2 Test basis-2

Order handling (continued)

- The employee adds a new order by means of the function “Add order” and adds an update by means of the function “Update order”. Orders of a total amount of more than 1000 euro need to be evaluated by the head of department.

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7.6 Steps

7.6.3 Test basis-3

- Order handling (continued)
- Approval will be given by the head of department for instance when it involves a ‘Special Customer’. Without this approval the employee conveys to the customers to supply a smaller amount of products at a time. Hereby the employee can update the order as well as enter the order again as new (as per choice)

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7.6 Steps

7.6.4 Test basis-4

Order handling (continued)

- For all approved orders(<1.000 or by head of department) the employee checks whether the ordered quantity of the products is in stock. If this is the case, delivery will be initiated and a bill is made by the employee will order for the product and sends a confirmation of this to the customers

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7.7 Step 1: Identify test situations

- Analyze test basis
  - Process flow needed: when not present in test basis , then assemble yourself
  - Identify decision points and paths
- Use coverage type ‘paths test depth level-2’

=>test situations
(path combinations)

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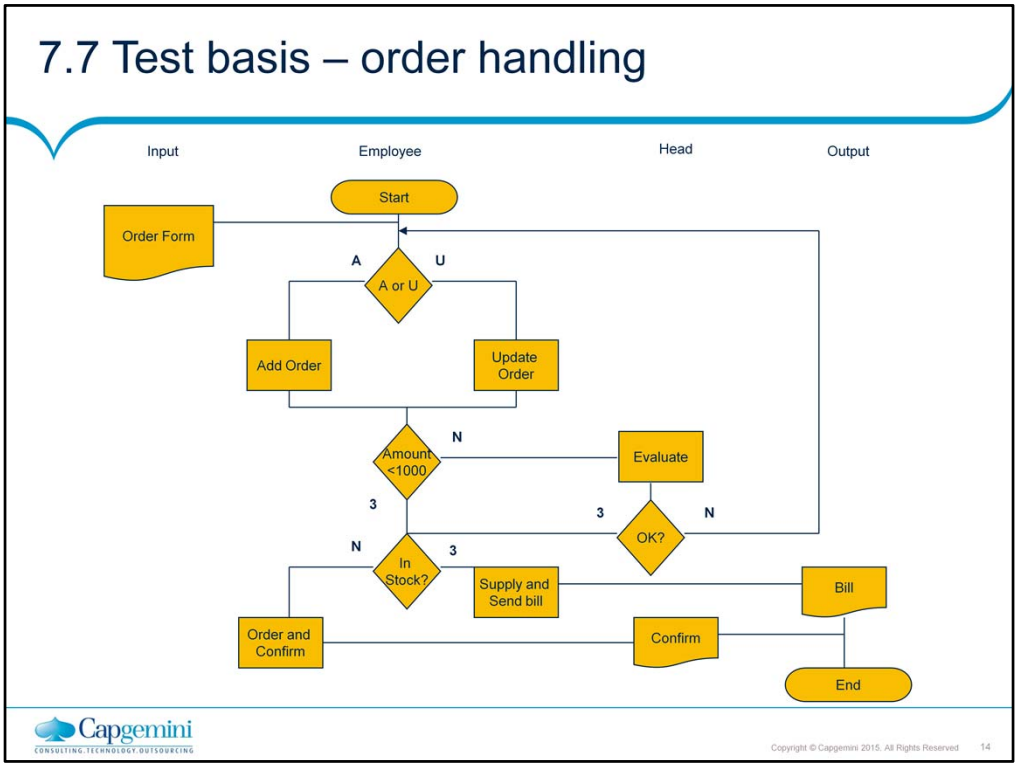
7.7 Test basis – order handling
Input
Employee
Head
Output
Start
Order Form
A
U
A or U
Add Order
Update Order
Amount <1000
N
Evaluate
3
3
N
OK?
N
In Stock?
3
Supply and Send bill
Bill
Order and Confirm
Confirm
End
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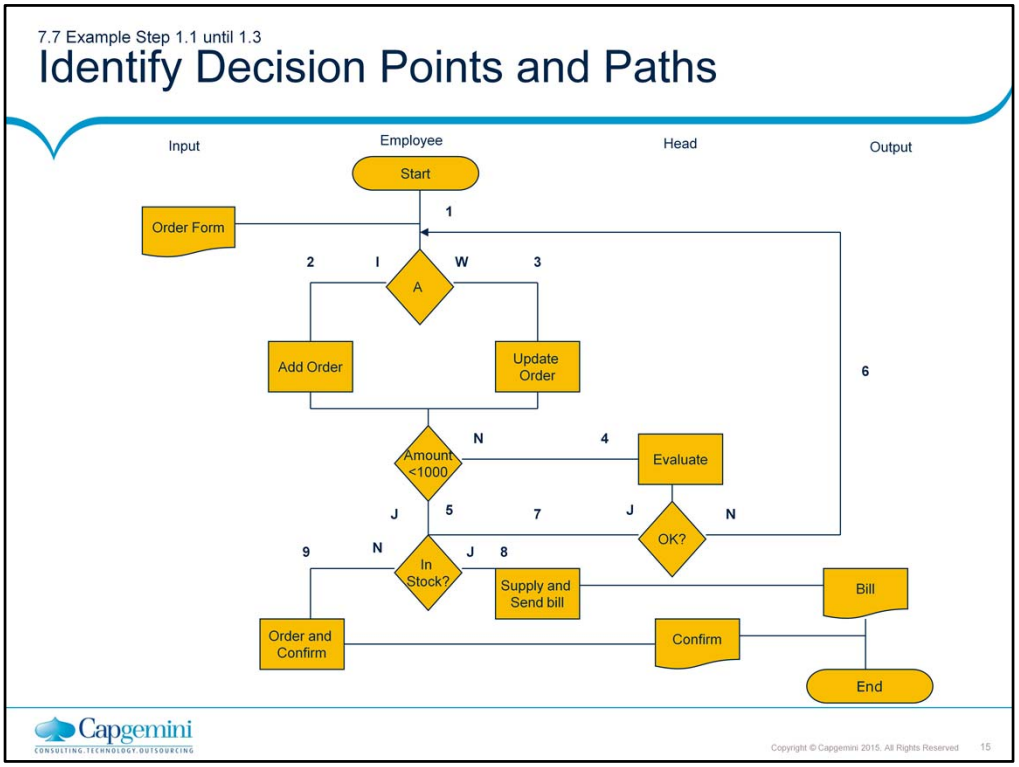
7.7 Example Step 1.1 until 1.3
Identify Decision Points and Paths
Input
Employee
Head
Output
Start
Order Form
1
2
I
A
W
3
Add Order
Update Order
6
Amount <1000
N
4
Evaluate
J
5
7
J
OK?
N
9
N
In Stock?
J
8
Supply and Send bill
Bill
Order and Confirm
Confirm
End
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7.7 Example – Step 1.4

Make Path Combinations: Test Situations

- Determine path combinations per decision point according to test depth level-2

Decision Point	In	Out	Path Combinations
A	1 6	2 3	1-2;1-3;6-2;6-3
B	2 3	4 5	2-4;2-5;3-4;3-5
C	4	6 7	4-6;4-7
D	5 7	8 9	5-8;5-9;7-8;7-9

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7.8 Step 2. Specify logical test cases

- Assemble set of logical test cases:
  - The tester is free to choose in which way the process will be gone through, as long as all test situations are covered at least once.
  - Possible tactic: Keep going through the flow diagram from start to end and select each decision point the first mentioned path combination, that has not yet been covered by a test cases.
- Describe per logical test case the consecutive actions.

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7.8.1 Example- Step 2.1

Extract set of logical test cases

- TC-1: 1,2,4,6,2,5,8

Decision Point	In	Out	Path Combinations
A	1	2	1-2; 1-3; 6-2; 6-3
	6	3	
B	2	4	2-4; 2-5; 3-4; 3-5
	3	5	
C	4	6	4-6; 4-7
		7	
D	5	8	5-8; 5-9; 7-8; 7-9
	7	9	

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7.8.2 Example- Step 2.1

Extract set of logical test cases

- TC-1: 1,2,4,6,2,5,8
- TC-2 : 1,3,4,7,8

Decision Point	In	Out	Path Combinations
A	1 6	2 3	1-2; 1-3; 6-2; 6-3
B	2 3	4 5	2-4; 2-5; 3-4; 3-5
C	4	6 7	4-6; 4-7
D	5 7	8 9	5-8; 5-9; 7-8; 7-9

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7.8.2 Example- Step 2.1

Extract set of logical test cases

- TC-1: 1,2,4,6,2,5,8
- TC-2 : 1,3,4,7,8
- TC-3: 1,3,5,9

Decision Point	In	Out	Path Combinations
A	1	2	1-2; 1-3; 6-2; 6-3
	6	3	
B	2	4	2-4; 2-5; 3-4; 3-5
	3	5	
C	4	6	4-6; 4-7
		7	
D	5	8	5-8; 5-9; 7-8; 7-9
	7	9	

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7.8.2 Example- Step 2.1

Extract set of logical test cases

- TC-1: 1,2,4,6,2,5,8
- TC-2: 1,3,4,7,8
- TC-3: 1,3,5,9

Decision Point	In	Out	Path Combinations
A	1	2	1-2; 1-3; 6-2; 6-3
	6	3	
B	2	4	2-4; 2-5; 3-4; 3-5
	3	5	
C	4	6	4-6; 4-7
		7	
D	5	8	5-8; 5-9; 7-8; 7-9
	7	9	

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7.8.3 Example – Step 2.2

Describe actions per test case

Executed for TC-1: 1,2,4,6,2,5,8

- A1-1 Fill Order Form (Customer)
- A1-2 Receive Order Form (Employee)
- A1-3 Add date Order (Employee)
- A1-4 Evaluation by Head: (Head)
  No approval
- A1-5 Re-enter order after consulting customer with lower amount (<1.000 euro) (Employee)
- A1-6 Check if order is in stock (Employee)
- A1-7 Initiate delivery and create bill (Employee)

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7.9 Step 3. Create physical test case

- Don’t only make data physical in system, but also:
  - Describe role division(different kind of employees)
  - Describe what has to be filled on the forms
- Describe role per test case the consecutive actions

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7.9.1 Example Step 3

Create physical test case -1

Executed for TC-1: 1,2,4,6,2,5,8

Customer:

A1-1 Fill order form within the following data:

- Name : Van DIJK, J
- Address: utrechtsestraat 7
  1017, VN Amsterdam
- Product: Chop Sticks
- No of Products: 2.500
- Total amount 1.250 euro

Employee:

A1-2/3 Add order data after receiving order form by means of the function 'Add Order'

(with total amount = 1.250 euro)

(the system will send the order to the Head)

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7.9.2 Example – Step 3

Create physical test case -2

Continued TC-1: 1,2,4,6,2,5,8

Head:

A1-4 The head states that this customer places an order of which the amount is too high (the customer is not a 'special customer') and gives the employee instruction to agree with the customer to place an order for lesser amount.

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7.9.2 Example – Step 3

Create physical test case -2

Continued TC-1: 1,2,4,6,2,5,8

Employee:

A1-5 Discusses with the customer, who agrees to a delivery of only 2000 chop sticks. A new order is entered: 2000 chop sticks for 1000 euro

A1-6 Checks whether the ordered quantity of the product is in stock. This is the case.

A1-7 Initiates supply of the order and creates the bill:

Name	:	Van Dijk,J
Address	:	utrechtsestraat 7 1017, VN Amsterdam
Product	:	Chop Sticks
No of Products	:	2.500
Total amount	:	1.000 euro
Deadline payment:		3 weeks after date of reception bill

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7.10 Step 4. Establish the initial data set

- Not only are the data relevant that have to be present in the system beforehand.
- But also, for instance:
  - User-id's for each role, with relevant authorizations
  - Forms, filled or not

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7.10.1 Example- Step 4

Establish the initial data set

For TC-1:

Customer Data:

Name :	Van Dijk,J
Address:	utrechtsestraat 7,1017, VN Amsterdam
Indication special customer:	No

Product Data:

Product:	Chop Stick
Price per unit:	0,50 euro
In stock:	7.364

User-ids:

The user-ids EMPL_01 and Head_01 have to be present in the system with corresponding authorizations

Forms:

Order Form

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7.11 Step 5. Assembling the test script

- Form and content organization specific
- Does not differ per test specification technique

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7.12Variations in depth

Other Possible depth levels:

- Paths: depth level-1
  - Less thorough test coverage
- Paths: depth level-3 or more
  - More thorough test coverage

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7.13 Cross-ref combos/test cases (optional)

	12	13	24	25	34	35	46	47	58	59	62	63	78	79
TC1-1246258	X		X	X			X		X		X			
TC2-13478		X			X			X					X	
TC3-1359		X				X				X				
TC4-12463479	X		X		X		X	X				X		X

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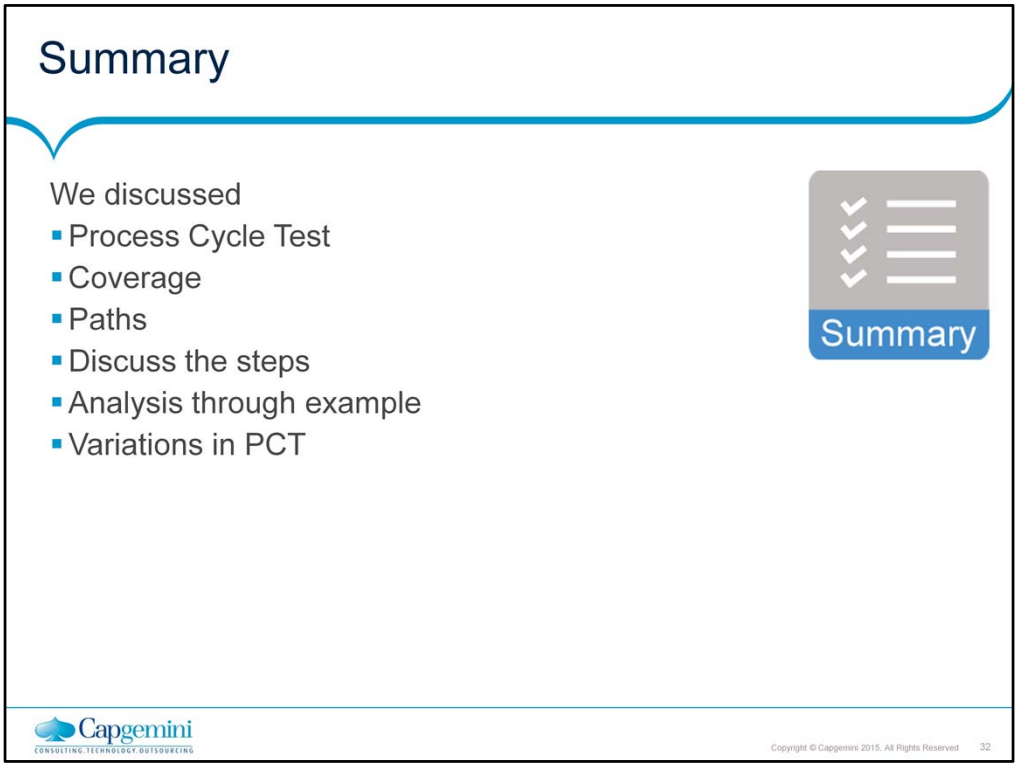

Add the notes here.

Review Question

- A Process Cycle Test is a
  - Structure Test
  - Design Test
  - Both
  - None of the above
- To ensure all paths are covered _____ technique is used
  - Cross Free Matrix
  - Flow Diagram

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Add the notes here.

Reference

- Book
  - Please read TMap Next Page no. 598-602 on Coverage type: Paths and Page no. 675-681 on the TDST PCT

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