TMap Foundation

Data Combination Test

Lesson Objectives

- What is DCoT?
- Equivalence Classes
- DCoT Step by Step
- Analysis of DCoT with an example

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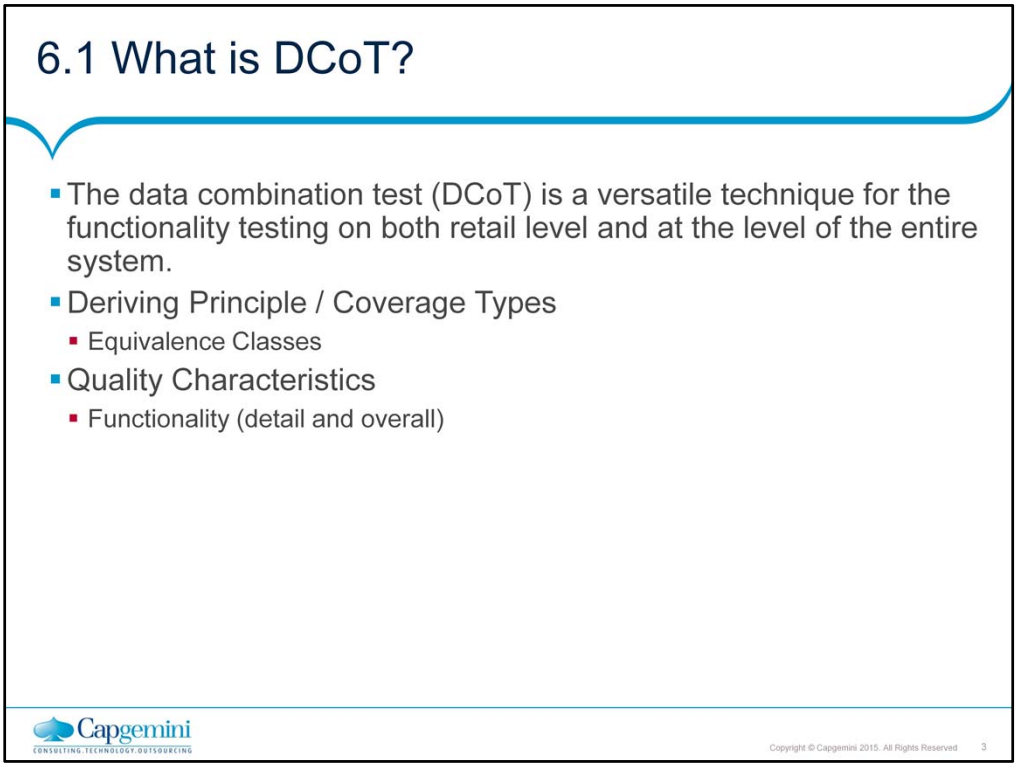

For the DCoT is no specific test basis necessary. Any form of information about the functionality of the system is usable:

formal system documentation, such as functional design, logical data model and requirements

Informal documentation such as manuals, leaflets, subjudice and memos

Matter Expertise that are not documented but in the heads of experts

6.2 Equivalence Classes

- If 18 < age =< 65

Three distinct equivalence partitions for age:

a) age < = 18
b) age has a value in the range 19 through 65
c) Age > 65

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6.3 DCoT – Step by Step

- Identify Test Situations
- Specify Logical Test Cases
- Create Physical Test Cases
- Establish the initial data set
- Assemble the Test Script

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6.3 Example – Health Insurance Policy Test basis

- To calculate the premium for a health insurance policy,
- first age is considered: people younger than 60 pay 750 euro for their premium. If 60 years of age or plus they pay 1,000 euro.
- Next smoking is considered. Of those that do not smoke, the ones that are a customer of 3 years or more, receive a discount of 100 euro on the premium, others get only 50 euro.
- Of those who do smoke , their health is considered. When good, 25 euro is deducted of the premium. When not good, however much is claimed the previous year is considered.

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Health Insurance Example (Cont.)

- If the claimed amount is less than 250 euro, the above mentioned discount of 25 euro will also be given.
- If the claimed amount 2000 euro or more then one has to pay an additional 25 euro. In all other cases there is neither a discount given or an additional payment to be made.
- Claims can only be registered for those with ill health.

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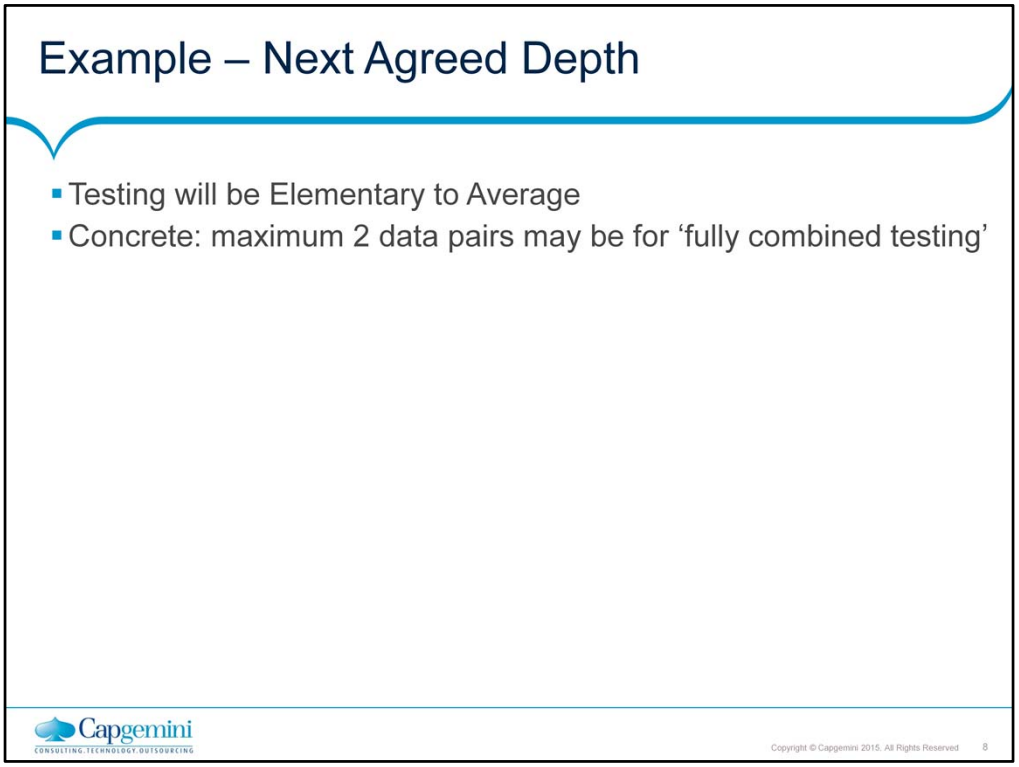
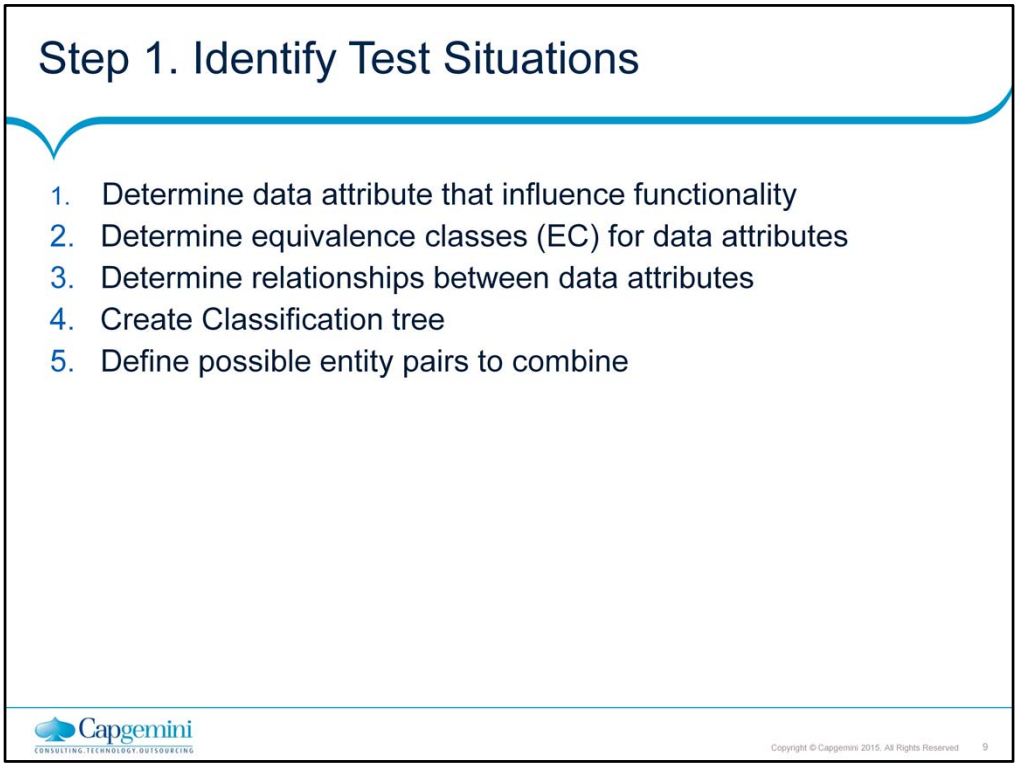


The depth of the step is mentioned in the master plan which is prepared during the planning step



Determine the data that affect the functionality this will not automatically be all data provided by the function be used. It includes the information affecting variations in the behavior of the system. This is therefore the data for which equivalence classes can be determined. The defined data can consist of entities, attributes or functional concepts in general.

Determine the relationships between the data Some data will not affect the behavior of the system under a certain condition, namely if another displayed a value from a specific class of equivalence. That means that the possible variations in that the former is displayed must be combined with that specific value of the latter.

Step 1. Identify Test Situations

- The equivalence classes of each data attribute is used to identify the test situations
- The combination of equivalence classes are used and it is based on the agreed depth
- Guidelines

Elementary	One data pair
Average	Two or more data pairs
Thorough	Average depth + boundary value

- The maximum possible depth is all the equivalence classes combined

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Step 1.1 Determine data attributes

- Age
- Smoking
- Number of years of clients
- Health
- Claimed amount

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Step 1.2 Determine Equivalence Classes

Data Attributes	Equivalence Classes		
Age	<60	>= 60	
Smoking	Yes	No	
# years of client	<3	>=3	
Health	Good	Not Good	
Claimed Amount	<250	>=250 AND <2000	>= 2000

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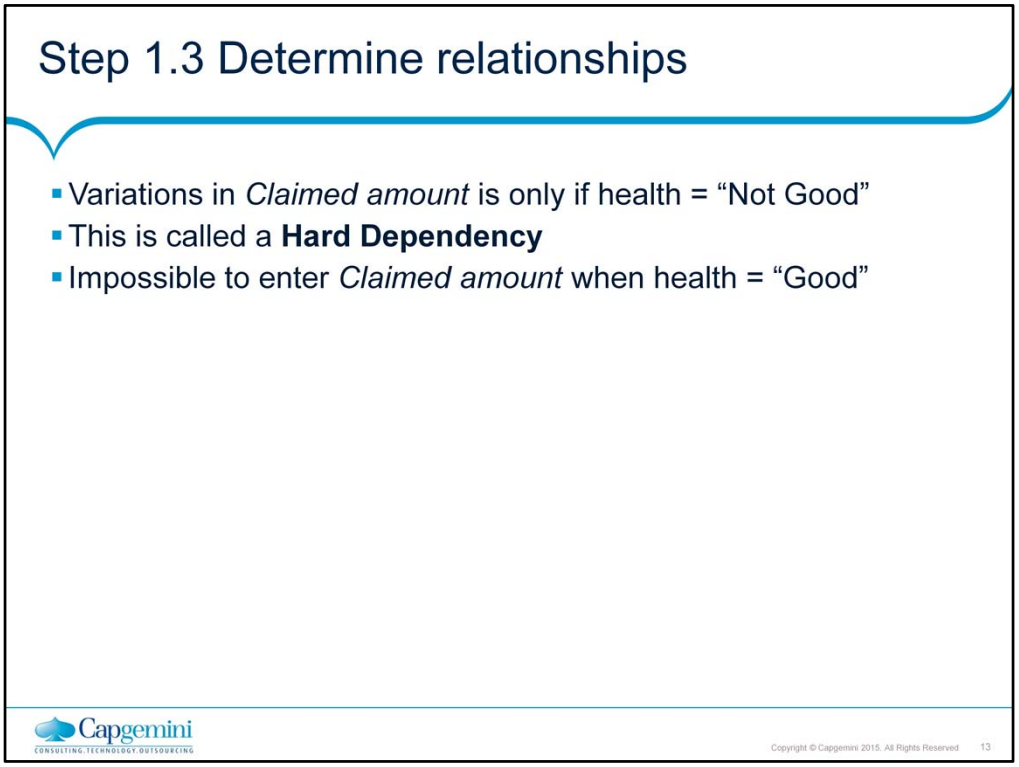
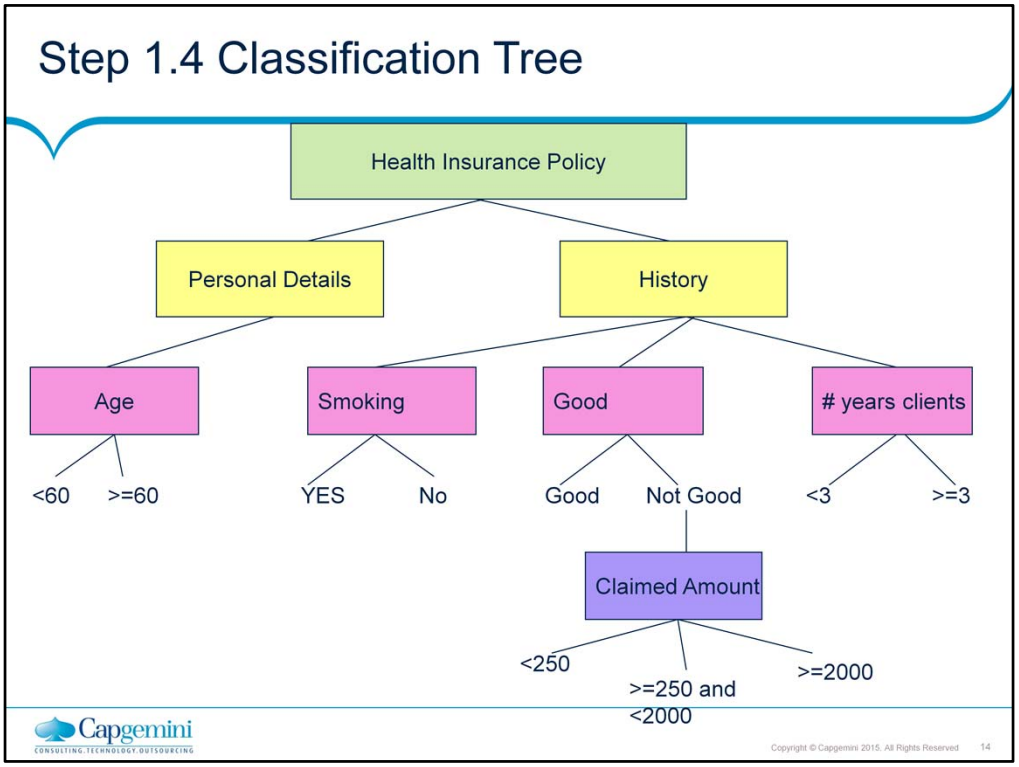


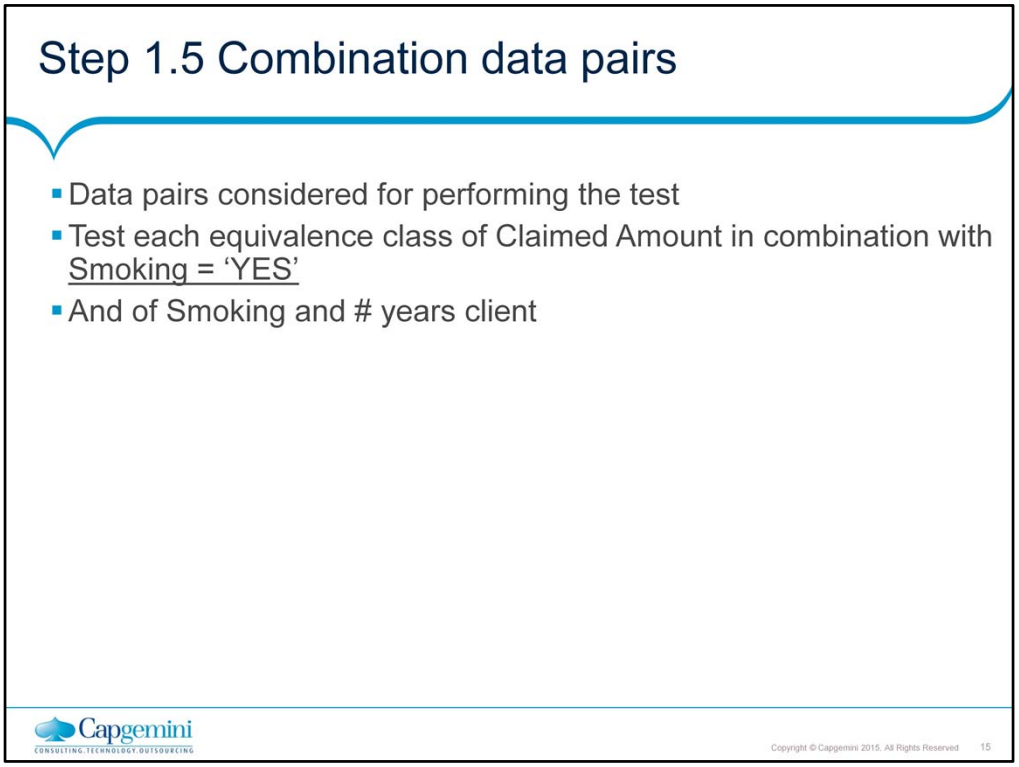
Hard dependency: Entity X can only be of influence when entity Y is in a certain equivalence class



The result can be displayed graphically in a so-called classification tree or in a tabular form:
Classification Tree
Data that logically belong together, can be grouped under an overarching concept, such as "Personal Data" or "employers-types".
relationships between the data can easily be displayed by the relevant parts of the classification tree directly below the relevant equivalence class to hang out.

The advantage of the classification tree with which the test situations must be identified, is an iterative and interactive process involving the stakeholders to inspire one another, correct and complementary

Tabular Form
This way is typically used when is selected for "pairwise testing"



A team of 2 – 5 members is needed for this plan due to this step.
The combinations can be decided with the help of experienced members of the team and through brain storming sessions.

Step 2 Specify logical test cases

- Covering of
  - All equivalence classes
  - All mentioned combinations of data attributes
- Demonstrating ways
  - Classification tree
  - In table form

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Example Step 2 Specify logical test cases

Claimed Amount and Smoking ="YES"

	Age		Smoking		Health			# Years Client	
	<60	>=60	YES	NO	Good	Not Good		<3	>=3
						Claimed Amount			
						<250	>=250 and <2000	>=2000	
TC-1			X			X			
TC-2			X				X		
TC-3			X					X	
TC-4									
TC-5									

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Example Step 2 Specify logical test cases

Smoking and # years client

	Age		Smoking		Health			# Years Client	
	<60	>=60	YES	NO	Good	Not Good		<3	>=3
						Claimed Amount			
						<250	>=250 and <2000	>=2000		
TC-1			X			X			X	
TC-2			X				X			X
TC-3			X					X		
TC-4				X					X	
TC-5				X						X

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Example Step 2 Specify logical test cases

Rest of the equivalence classes

	Age		Smoking		Health			# Years Client	
	<60	>=60	YES	NO	Good	Not Good		<3	>=3
						Claimed Amount			
						<250	>=250 and <2000	>=2000	
TC-1	X		X			X			X	
TC-2		X	X				X			X
TC-3	X		X					X	X	
TC-4		X		X	X				X	
TC-5	X			X				X		X

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This just covers all combinations of the uncovered equivalence classes after the initial pairing.

Step 3 Create Physical Test Cases

- Choose concrete values for all input data
- Each physical test case should have a concrete predicted result

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Step 3 Create Physical Test Cases

Test Case	TC-1	TC-2	TC-3	TC-4	TC-5
Name	Rex	Danny	Christian	Walter	Van Dam
Age	59	60	18	61	44
Smoking	YES	YES	YES	NO	NO
Health	Not Good	Not Good	Not Good	Good	Not Good
# Years Client	2	3	1	2	4
Claimed Amount	249	1999	2000	-	2001
Result					
Premium	725	1000	775	950	675

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Step 4: Establish the Initial Data Set

Database that contains the following personal details

Name	Rex	Danny	Christian	Walter	Van Dam
Address (etc.)					
DOB	19/10/1945	11/03/1945	28/04/1987	02/01/1944	30/09/1960
Date of Entry	24/02/2003	06/082001	02/05/2004	12/11/2002	30/01/2001
Smoking	YES	YES	YES	NO	NO
Health	Not Good	Not Good	Not Good	Good	Not Good
Claims	249	1300 699	200 900 900	-	1850 151

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Example Step 5 Assemble the test script

Step ID.	Action/Check	Description
Initial data set		Fix system date to 12th May 2005
		Restore database “Health_Insu”
		Start application and navigate to ‘determine healthcost premium’
TC-1	A	Select client ‘Rex’
	C	Retrieve claims: 249 Euro
	C	Retrieve premium: 725 Euro
TC-2	A	Select client ‘Danny’
	C	Retrieve claims: 1300 Euro; 999 Euro
	C	Retrieve premium: 1000 Euro
…	…	…

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This step is necessary to keep track of all the actions or the decisions that are being checked

Possible Coverage Depth

- Extra Coverage Types:
- Boundary Value Analysis
  - Possibly selective for specific data
- Complete decision table
  - Multiple Condition Coverage on selected data
- Pair wise testing
  - Multiple Condition Coverage on all data pairs

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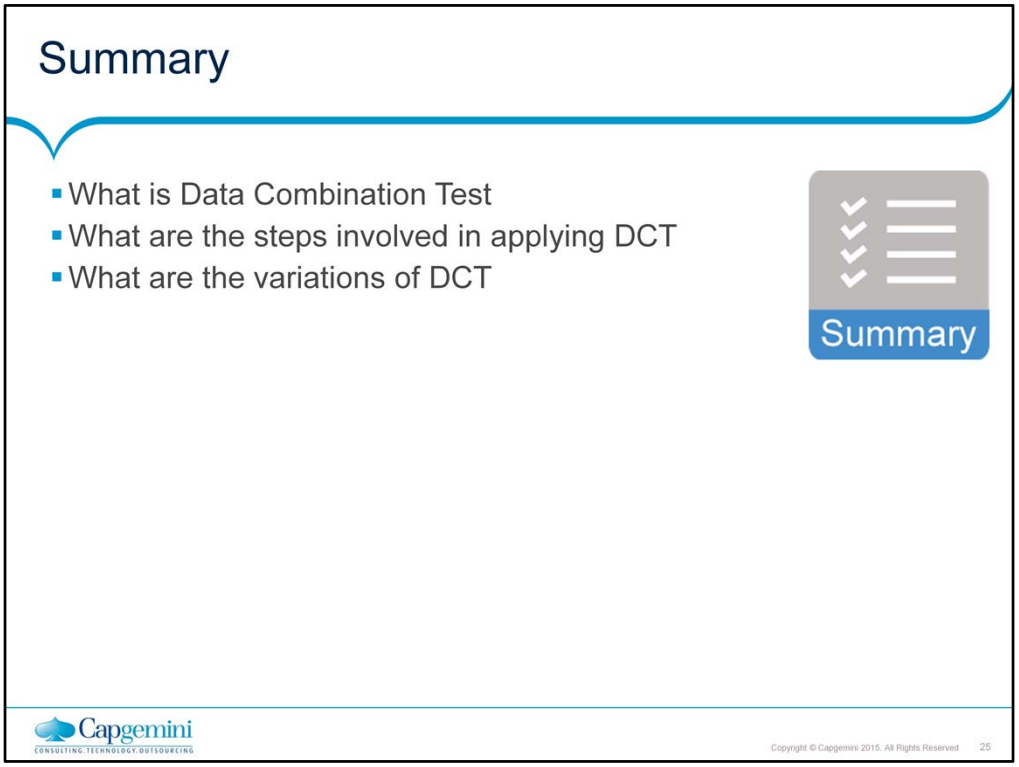

Add the notes here.

Review Question

- The Relationship between Equivalence Class can be marked with
  - Classification Tree
  - Tabular Form
  - Both
  - None of the above
- The DCT is versatile technique that can perform at retail and overall level
  - True
  - False

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Add the notes here.

Exercise

- To reserve Flight Tickets
- user enters a number of data on the composition of the group (adults, children and infants) travel (such as date, destination). Then the user can choose according to what criteria are to be searched for a suitable flight. The system displays the list of possible flights or displays a message if no flight exists which meets the criteria and has the requisite places it.
- Then the user can choose according to what criteria are to be
- searched for a suitable flight. The system displays the list of
- possible flights or displays a message if no flight exists which
- meets the criteria and has the requisite places it.

- This function must be tested with average gravity using the DCoT.

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Additional Reading

- URL
- DCoT
  - https://capgemini.sumtotalsystems.com/sumtotal/app/sys_error.aspx?mode=accessdenied&UserMode=0&ru=/sumtotal/app/management/LMS_ActDetails.aspx%3fUserMode%3d0%26ActivityId%3d151274
- Book
  - Please read TMap Next Page no. 611-612 on the coverage type Equivalence Classes and page no. 648-653 On the TDST DCoT

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