Software Testing Project Estimation

A World of Difference

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Outline

- Purposes
- Software testing project estimation
  - Best guess
  - Ad-hoc method
  - Experience based
  - Work breakdown structure (WBS) and three-point method
  - Delphi technique
  - Function point
  - Test case point
  - Combination of different estimate methods
- Testing effort distribution
- Project references

Purposes

- This presentation introduces some methods used for estimating a software testing project

Best Guess

- Based on experience a little bit
- Based on feeling
- Guess
- Uncertainty
  - ~100%

Ad-hoc Method

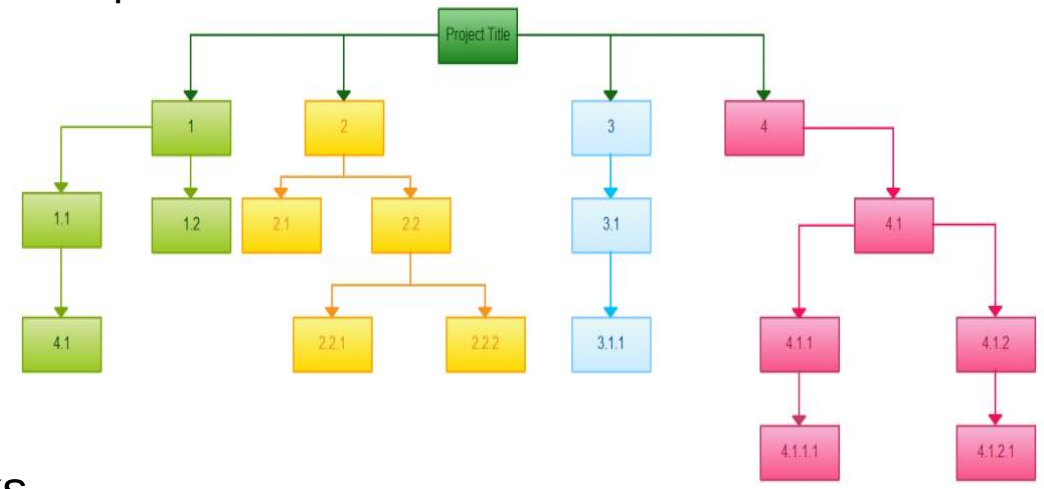
- Based on timeframe, usually set by
  - Boss
  - Client
  - Sale/marketing person
  - Manager
- Without experience or guess
- Uncertainty
  - ~100% - 200%

Experience-based

- Based on
  - Collecting metrics of similar previous projects (domain, industry, technology…)
  - Already tested similar projects
  - Getting ideas of experts who have a lot of experiences or know the application very well

WBS and Three-point Method

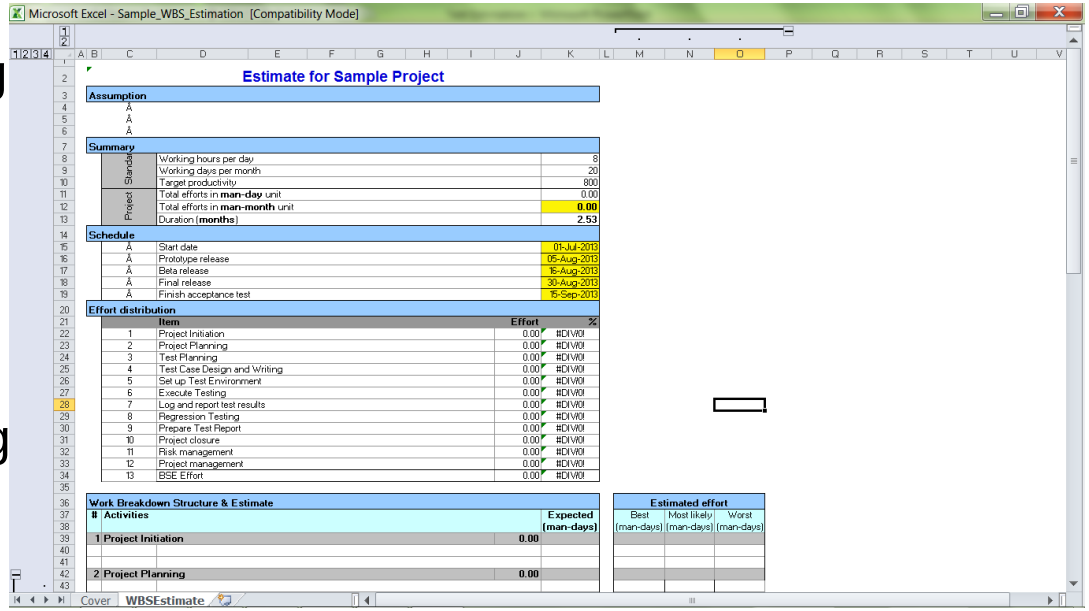
- Work break-down
  - Modules -> sub-modules -> smallest modules as possible
  - Features -> sub-features -> smallest features as possible
  - Tasks -> sub-tasks -> smallest task as possible
  - Rule of thump
    - 08- 80 hour rule
    - should NOT be longer than a single reporting period
    - if it makes sense



- Estimate effort for smallest tasks
  - Three point method
    - Estimate effort for a task in three cases
      - Best
      - Most likely
      - Worst
    - Expected effort = (1 * Best + 4 * Most likely + 1 * Worst)/6

WBS and Three-point Method (Task-based estimation)

1. Project Initiation
2. Project Planning
3. Test Planning
4. Test Case Design and Writing
5. Set up Test Environment
6. Execute Testing
    - 6.1 Integration Testing
    - 6.2 System Testing
    - 6.3 Performance Testing
    - 6.4 Etc.
7. Bug, log and report test results
8. Regression Testing
9. Prepare Test Report
10. Project closure



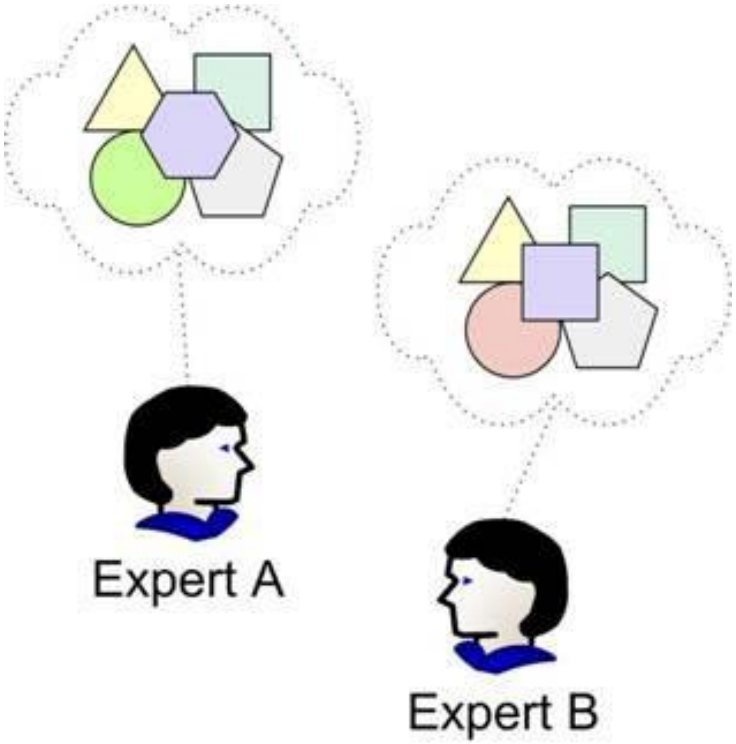
See the Excel template file for details

WBS and Three-point Method (Test case-based estimation)

- List all the test cases
- Estimate testing effort required for each test case
- Use three-point method for estimating effort needed for each test case
- Get total expected effort

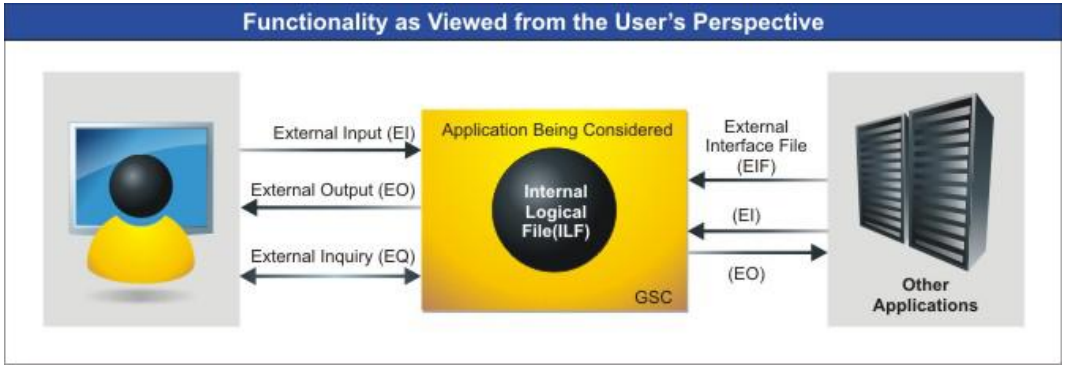
Delphi Technique

- The same with WBS and three-point method
- Assign team members/experts to estimate tasks/functionalities they will do
- Collect and calculate total effort



Function Point

- To calculate Function Point for a project, refer to *"FP-Counting Project Estimate"* course of GCS



- Use Caper Jones' formula
  - Total number of test cases = (Count of Function Points) raised to the power of 1.2.
- User David Longstreet's formula
  - Total number of **UAT** test cases, which is = 1.2 x (Count of Function Points)
- Basing on FPs
  - Calculate total development effort of project
  - Estimate testing effort based on project effort distribution
    - Testing effort distribution : **20% - 50%** of total development effort

Test Case Point (TCP) Analysis

- Test case's complexity is based on
  - Number of steps
  - Number of checkpoints
  - Complexity of test setup or precondition
  - Complexity of test data
  - Types of test
  - Domain of test

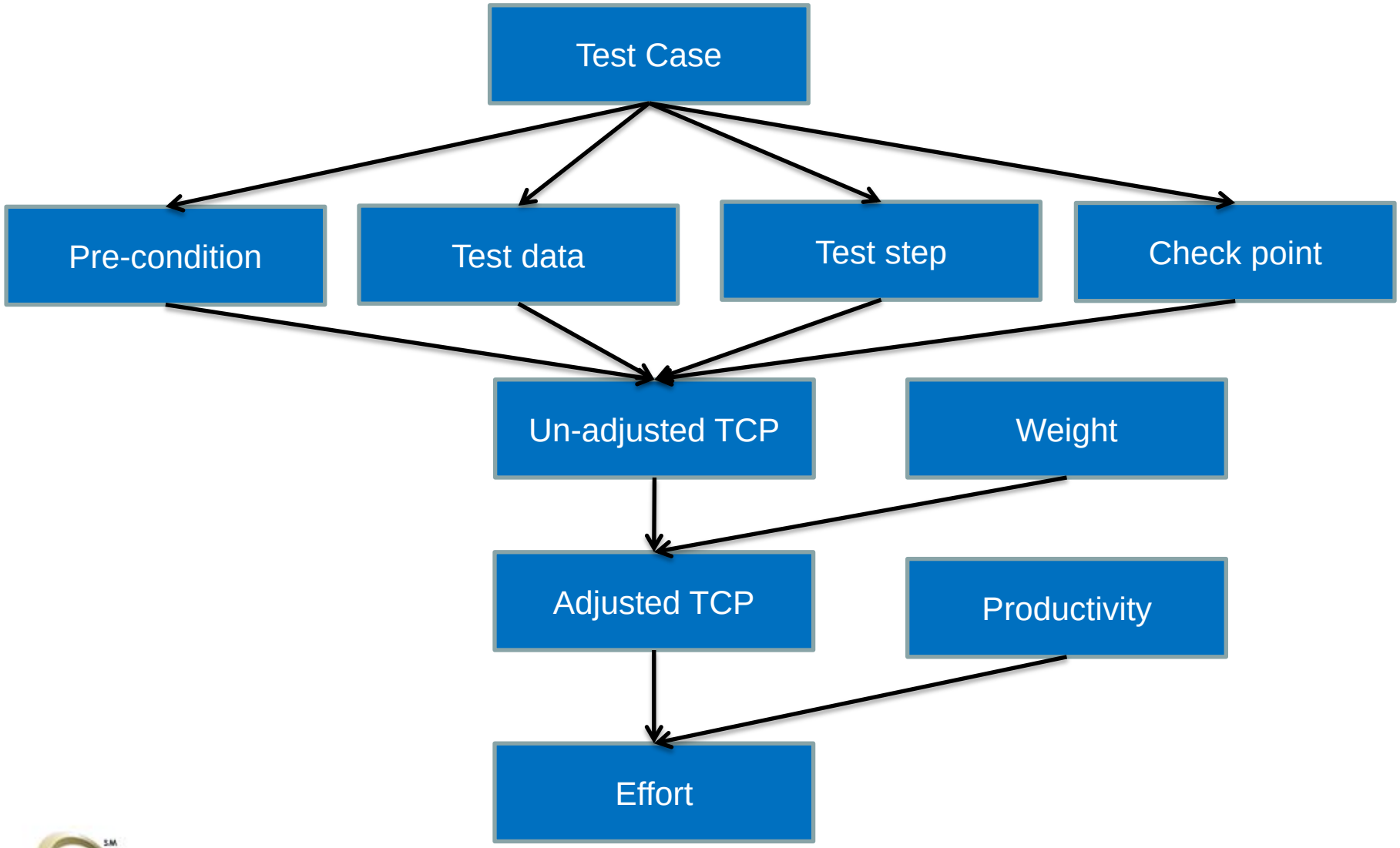
Date: _____ System: _____ Objective: _____ Function: _____ Version / Release: _____ Status: _____ (Draft / In Process / Approved)	Tested by: _____ Environment: _____ Test ID: _____ Req. ID: _____ Screen: _____ Test Type: _____ (Unit, Integration, System, Acceptance)

Step Sr.	Step Description	Path & Action	Test Data	Expected Results	Actual Result Pass / Fail	Comments
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
End						

TCP Counting

- Step 1: Select test case
- Step 2: Count number of test step, checkpoint, determine complexity of Precondition and Test data
- Step 3: Calculate Un-adjusted TCP
- Step 4: Determine weight (type of testing)
- Step 5: Calculate Adjusted TCP
- Step 6: Determine productivity
- Step 7: Calculate Effort

TCP Counting



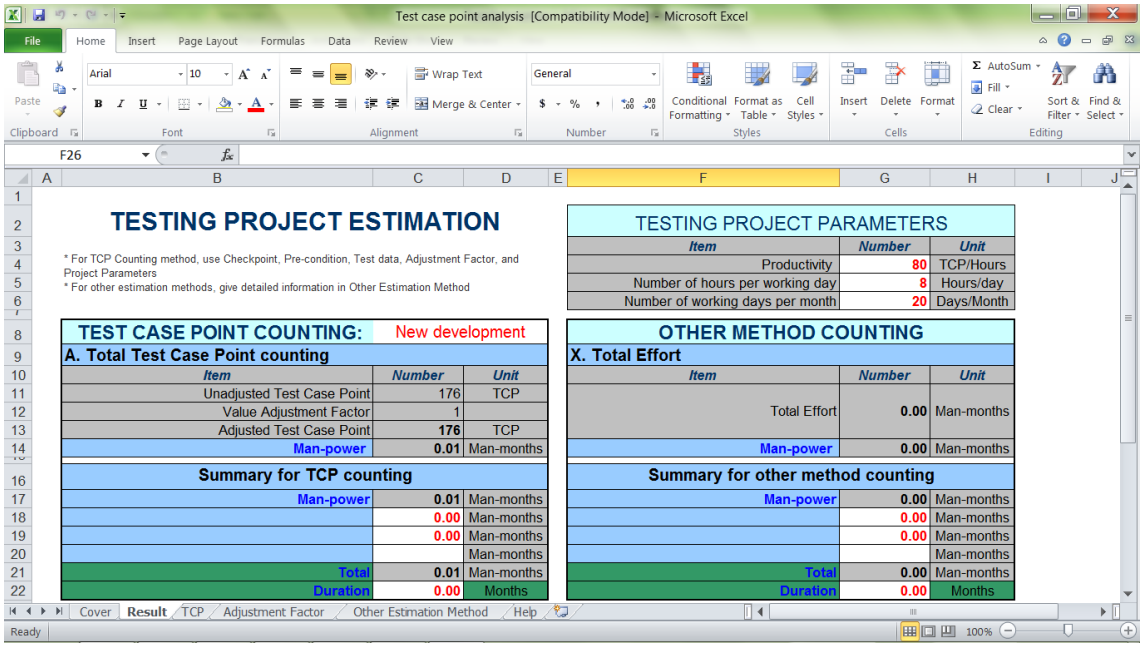
TCP Counting

	Number	TCP
Test step	a	**a**
Checkpoint	b	**b**
	Complexity	**TCP**
Pre-condition	None	**0**
	Low	**1**
	Medium	**3**
	High	**5**
Test data	None	**0**
	Low	**1**
	Medium	**3**
	High	**6**

Type of Test	Weight
User Interface and functional testing	1
API	1.22
Database	1.36
Security	1.39
Installation	1.09
Networking	1.27
Algorithm and computing	1.38
Usability testing	1.12
Performance	1.33
Recovery testing	1.07

TCP Counting

- Need to determine (should base on historical information):
  - Weight
  - Productivity
  - Adjust variables



Test case point analysis [Compatibility Mode] - Microsoft Excel

TESTING PROJECT ESTIMATION

* For TCP Counting method, use Checkpoint, Pre-condition, Test data, Adjustment Factor, and Project Parameters
* For other estimation methods, give detailed information in Other Estimation Method

TESTING PROJECT PARAMETERS

Item	Number	Unit
Productivity	80	TCP/Hours
Number of hours per working day	8	Hours/day
Number of working days per month	20	Days/Month

TEST CASE POINT COUNTING: New development

A. Total Test Case Point counting

Item	Number	Unit
Unadjusted Test Case Point	176	TCP
Value Adjustment Factor	1	
Adjusted Test Case Point	176	TCP
Man-power	0.01	Man-months

Summary for TCP counting

Man-power	0.01	Man-months
	0.00	Man-months
	0.00	Man-months
		Man-months
Total	0.01	Man-months
Duration	0.00	Months

OTHER METHOD COUNTING

X. Total Effort

Item	Number	Unit
Total Effort	0.00	Man-months
Man-power	0.00	Man-months

Summary for other method counting

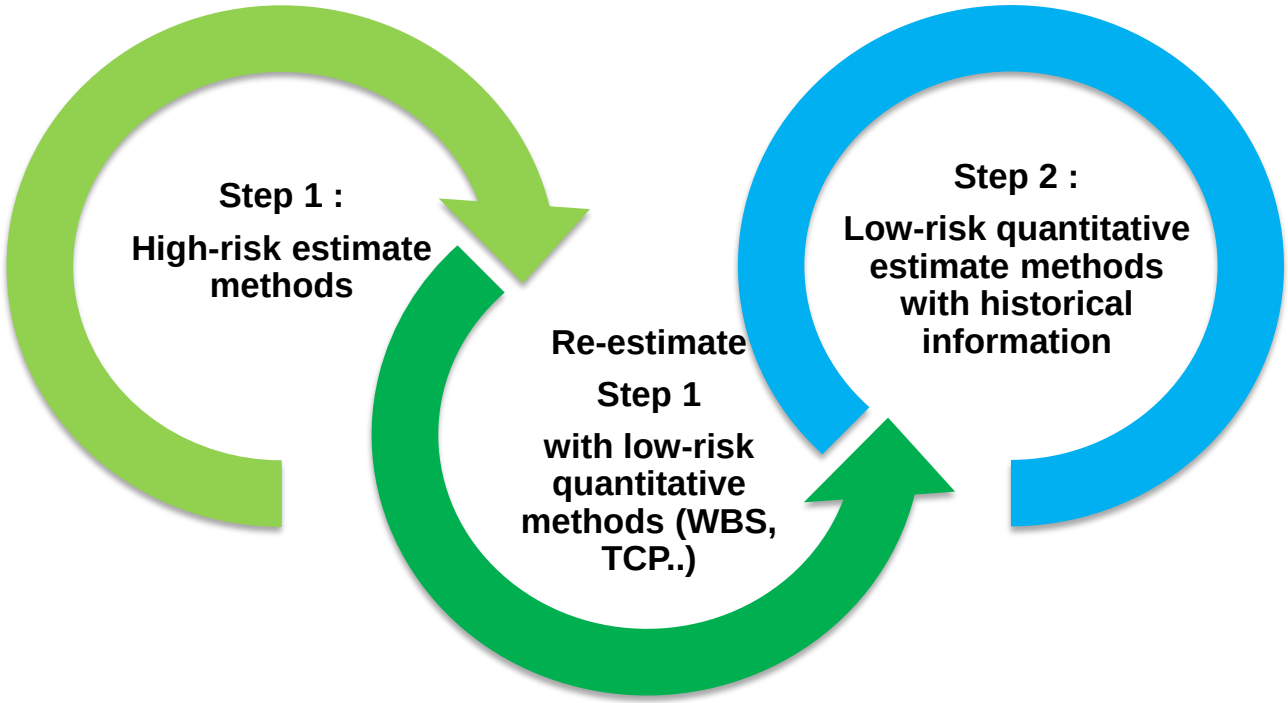
Man-power	0.00	Man-months
	0.00	Man-months
	0.00	Man-months
		Man-months
Total	0.00	Man-months
Duration	0.00	Months

Cover | Result | TCP | Adjustment Factor | Other Estimation Method | Help

See the Excel template file for details

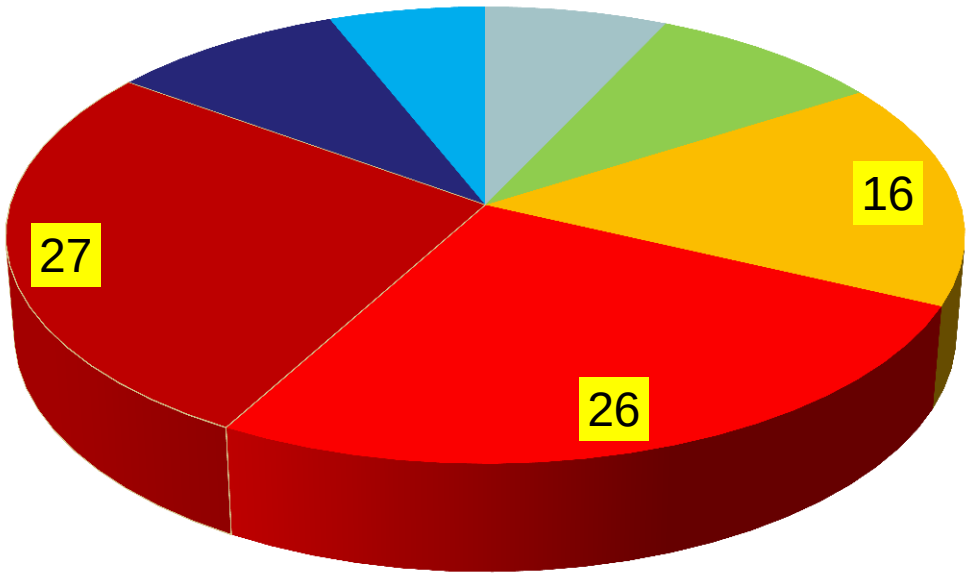
Combination of Different Methods

- Depending on each project, we can use two or many methods to estimate, then compare each others
- At the beginning, project may be unclear, we can use high-risk method first.



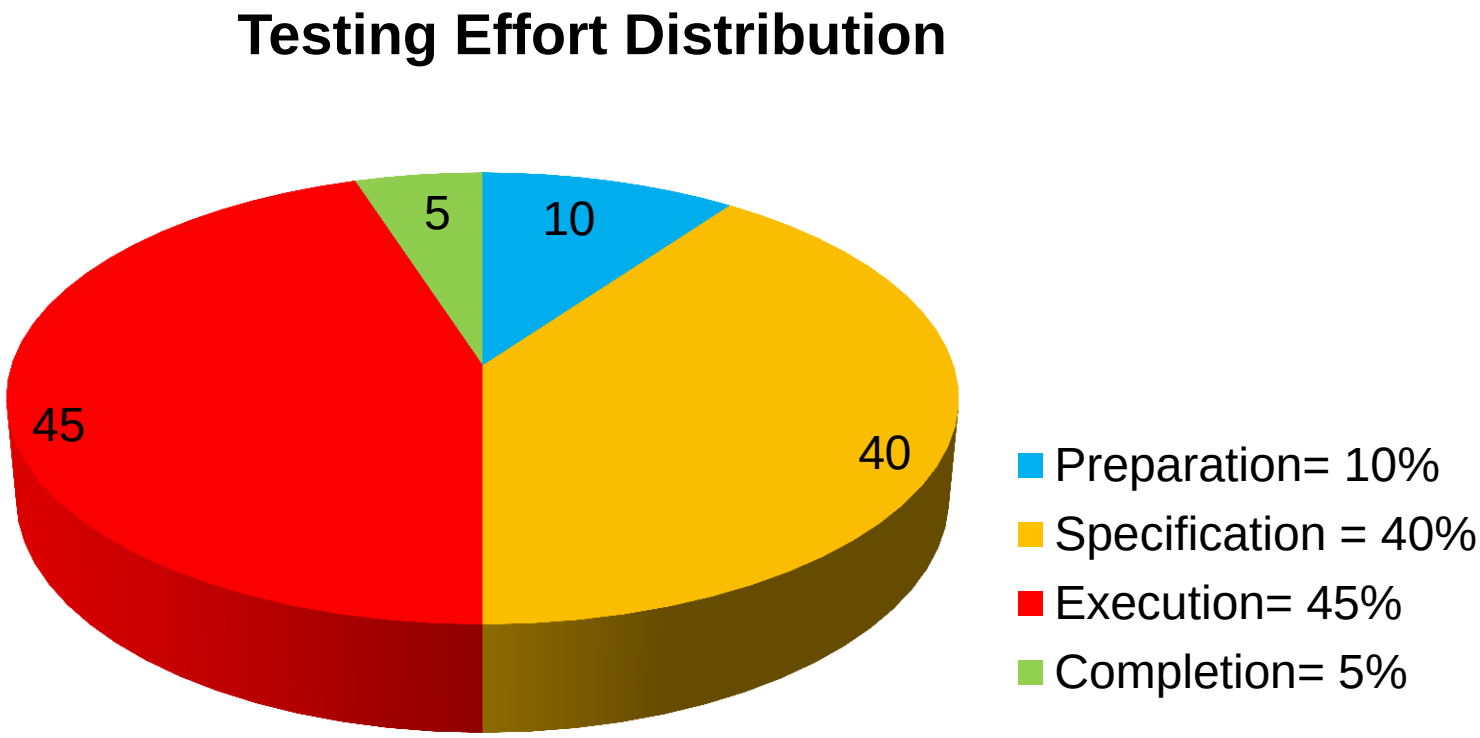
Testing Effort Distribution

Software Development Effort Distribution



- Project management 7%
- Requirements 9%
- Design 16%
- Coding 26%
- Test (all test phases) 27%
- Documentation 9%
- Installation and training 6%

Testing Effort Distribution



Project References

DTV-US	
Total number of test cases	1570
Total number of test steps	15103
Total number of TCPs	35640
Actual effort	642.7 man-hours(4.01 mm)
Productivity	55 TCP/man-hour
	01 TC/24 minutes (average)

Thank you very much !