

# PENGUJIAN PERANGKAT LUNAK (DPH2C2)

**PROGRAM STUDI D3 MANAJEMEN INFORMATIKA – UNIVERSITAS TELKOM  
SEMESTER GENAP TAHUN AKADEMIK 2016-2017**

PERTEMUAN 2

MATERI : KONSEP BLACK BOX TESTING

# Black Box Testing



# Internal & External View of Testing

Knowing the specified function that a product has been designed to perform, tests can be conducted that **demonstrate each function is fully operational** while at the same time searching for errors in each function

**External View = Black Box testing**



Knowing the internal workings of a product, tests can be conducted to ensure that internal operations are performed according to specifications and **all internal components have been adequately exercised**

**Internal View = White Box testing**

Engineered products can be tested in one of **2** ways.

(Pressman, 2015, p. 499)

# White Box Testing vs Black Box Testing

**TABLE 5.9** Difference between White Box Testing and Black Box Testing

	<i>White box testing</i>	<i>Black box testing</i>
Based on	Internal structure, code and database design	Requirement and functionality
Used by	Developer and designer	Functional tester and the customer
Suitable for	Unit and module testing	System and user acceptance test

Source: (Desai, p. 116)

# Black box testing is...

...a software testing **techniques** in which **functionality of the software under test (SUT)** is tested without looking at the internal code structure, implementation details and knowledge of internal paths of the software.

Yang dibutuhkan

This type of testing is **based entirely** on  
the **software requirements and  
specifications.**



# BLACK BOX TESTING

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Behavioral Testing or Functional Testing.

# FOCUS

**...on inputs and output  
of the software system**  
without bothering about  
internal knowledge  
of the software program





# Error Categories in Black Box Testing

- (1) incorrect or missing functions,
- (2) interface errors,
- (3) errors in data structures or external database access,
- (4) behavior or performance errors, and
- (5) initialization and termination errors.

Source: (Pressman, 2015, p. 509)

# Steps

Initially **requirements and specifications** of the system are **examined**

Tester **chooses valid inputs** (positive test scenario), also some **invalid inputs** (negative test scenario)

Tester **determines expected outputs** for all those inputs

Software tester **constructs test cases** with the selected inputs

The test cases are **executed**

Software tester **compares the actual outputs** with the expected outputs

Defects if any are **fixed** and **re-tested**



# Yang Harus Dicek

1. Bagaimana validitas fungsionalnya diuji?
2. Bagaimana perilaku sistem dan performansi diuji?
3. Jenis *input* seperti apa yang akan menghasilkan kasus uji yang baik ?
4. Apakah sistem secara khusus sensitif terhadap nilai *input* tertentu ?
5. Bagaimana batasan-batasan kelas data diisolasi?
6. Berapa rasio data dan jumlah data yang dapat ditoleransi oleh sistem?
7. Apa akibat yang akan timbul dari kombinasi spesifik data pada operasi sistem?

# Proses Pada BBT

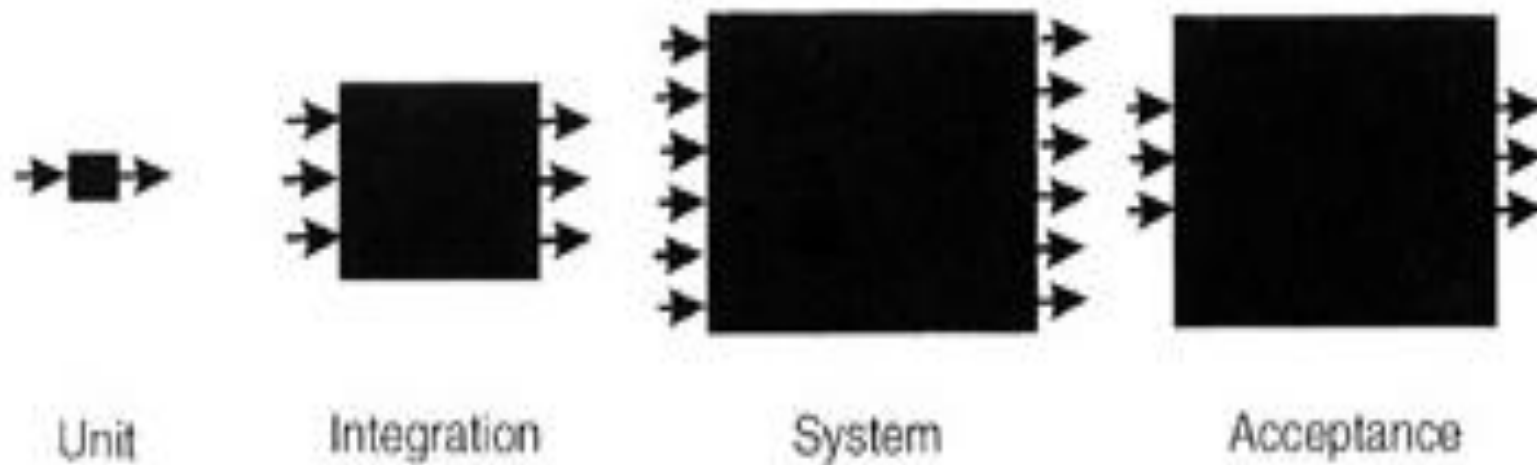
- ▶ Menganalisis kebutuhan dan spesifikasi dari perangkat lunak.
- ▶ Pemilihan jenis *input* yang memungkinkan menghasilkan *output* benar serta jenis *input* yang memungkinkan *output* salah pada perangkat lunak yang sedang diuji.
- ▶ Menentukan *output* untuk suatu jenis *input*.

# Proses pada BBT

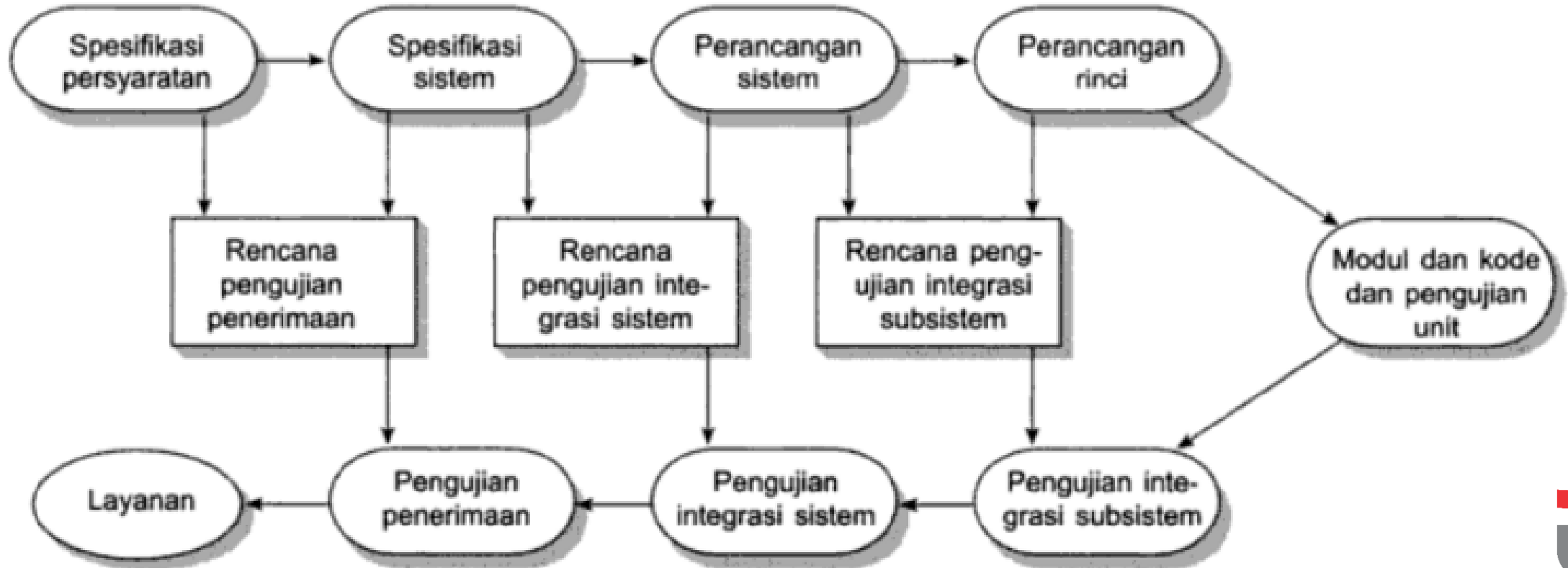
- ▶ Pengujian dilakukan dengan *input-input* yang telah benar-benar diseleksi.
- ▶ Melakukan pengujian.
- ▶ Perbandingan *output* yang dihasilkan dengan *output* yang diharapkan.
- ▶ Menentukan fungsionalitas yang seharusnya ada pada perangkat lunak yang sedang diuji.

# Proses pada BBT

- ▶ Testing dapat dilakukan pada setiap level pembangunan sistem, tapi BBT hanya mungkin dilakukan di tahap: **Integration, System dan Acceptance**



# Fase Pengujian PL



# Teknik-Teknik Black Box Testing

- ▶ **Equivalence partitioning (Equivalence Class Testing):** It is a software test design technique that involves dividing input values into valid and invalid partitions and selecting representative values from each partition as test data. (Pressman, 2015, p. 511; Desai, p. 118, Desikan, p. 90)
- ▶ **Boundary Value Analysis:** It is a software test design technique that involves determination of boundaries for input values and selecting values that are at the boundaries and just inside/ outside of the boundaries as test data. (Pressman, 2015, p. 512; Desikan, p. 84)
- ▶ **Cause Effect Graphing:** It is a software test design technique that involves identifying the cases (input conditions) and effects (output conditions), producing a Cause-Effect Graph, and generating test cases accordingly.



# Teknik-Teknik Black Box Testing

## ▶ Keunggulan

- ▶ Dapat memilih *subset test* yang secara efektif dan efisien dapat menemukan cacat.
- ▶ Dapat membantu memaksimalkan *testing investment*.
- ▶ Black Box Testing is the only method to prove that software does what it is supposed to do and it does not do something that can cause a problem to user/customer. (Limaye, p. 108)
- ▶ It is the only method to show that software is living and it really works. (Limaye, p. 108)
- ▶ Some tips of testing can be done only by black box testing methodologies, e.g. performance and security. (Limaye, p. 108)
- ▶ Tester can be non-technical (Desai, p. 126)
- ▶ Test case can be designed as soon as the functional specification completed (Desai, p. 126)

# Teknik-Teknik Black Box Testing

## ▶ Kelemahan

- ▶ Terdapat kemungkinan masih ada beberapa jalur eksekusi yang belum pernah diuji oleh *tester* (Somerville, 2011, p.206; Limaye, p. 109)
- ▶ Some redundant testing is possible as requirement may executes the same branch of codes again and again. (Limaye, p. 109)

# Contoh. Pengujian

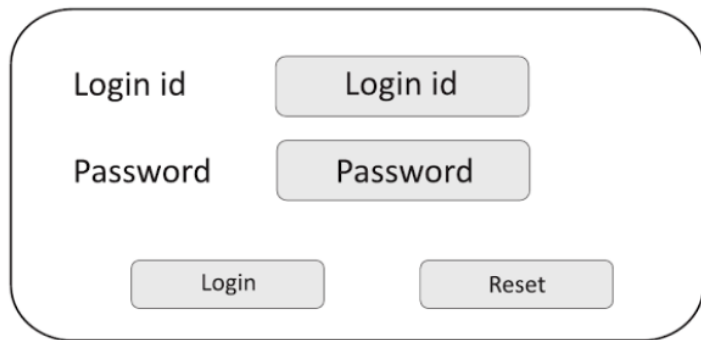


FIG. 5.14 Black box testing example.

- Black Box Testing Test Case

The test case to perform the black box testing is shown in Table 5.10.

TABLE 5.10 Black Box Testing Test Case

<i>Test case id</i>	<i>Test case</i>	<i>Input data</i>	<i>Expected output</i>	<i>Actual output</i>	<i>Status</i>
T0001	Login into the system with a given user id and password	Login id="Sa" Password="sa"	Message given by the system "You have successfully logged into the system"		

Source: (Desai, p. 116)

Menentukan Input data dg Teknik-Teknik Black Box Testing (Slide sebelumnya)

# Soal Praktek

Download dan Instal dari Google Play "KasirToko Portable".

Buatlah Black Box Testing Test Case untuk masing-masing Fungsionalitas berikut ini

- "Pengaturan Toko"
- "Pengaturan Printer"
- "Data Produk"
- "Penjualan"

Catatan: Batasan input data = bebas, karena belum diajarkan teknik tertentu.  
Dianjurkan sudah mengimplementasikan teknik black box testing tertentu.

# References

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- Pressmann, R.S (2010). Software Engineering A Practitioner's approach. New York: McGraw-Hill.
- Agus Pratondo, d. (2009). Jaminan Mutu Sistem Informasi. Bandung: Politeknik Telkom.
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