Software Engineering

هندسة البرمجيات

جامعة بغداد
كلية التربيه للعلوم الصرفه/ابن الهيثم
قسم علوم الحاسبات
المرحلة الثالثة

م.د.علي يحيى غني

نظري
محاضرة الاسبوع الثاني والعشرون

Software Testing

Topics covered

- What is Software Testing?
- Software Validation
- Software Verification
- Testing Approaches
  - Functionality testing (Black-box testing)
  - Implementation testing (White-box testing)

What is Software Testing?

- Software Testing is evaluation of the software against requirements gathered from users and system specifications. Testing is conducted at the phase level in software development life cycle or at module level in program code. Software testing comprises of Validation and Verification.

Software Validation

✧ Software Validation is process of examining whether or not the software satisfies the user requirements. It is carried out at the end of the SDLC. If the software matches requirements for which it was made, it is validated.

- Validation ensures the product under development is as per the user requirements.
- Validation answers the question – "Are we developing the product which attempts all that user needs from this software ?".
- Validation emphasizes on user requirements.

Software Verification

- ✧ Software Verification is the process of confirming if the software is meeting the business requirements, and is developed adhering to the proper specifications and methodologies.
- Verification ensures the product being developed is according to design specifications.
- Verification answers the question– "Are we developing this product by firmly following all design specifications ?"
- Verifications concentrates on the design and system specifications.

Testing Approaches

- Functionality testing (Black-box testing)
- Implementation testing (White-box testing)

When functionality is being tested without taking the actual implementation in concern it is known as **black-box** testing. The other side is known as **white-box testing** where not only functionality is tested but the way it is implemented is also analyzed.

Exhaustive tests are the best-desired method for a perfect testing. Every single possible value in the range of the input and output values is tested. It is not possible to test each and every value in real world scenario if the range of values is large.

Black-box testing

- It is carried out to test functionality of the program and also called 'Behavioural' testing. The tester in this case, has a set of input values and respective desired results. On providing input, if the output matches with the desired results, the program is tested 'ok', and problematic otherwise.
- In this testing method, the design and structure of the code are not known to the tester, and testing engineers and end users conduct this test on the software.

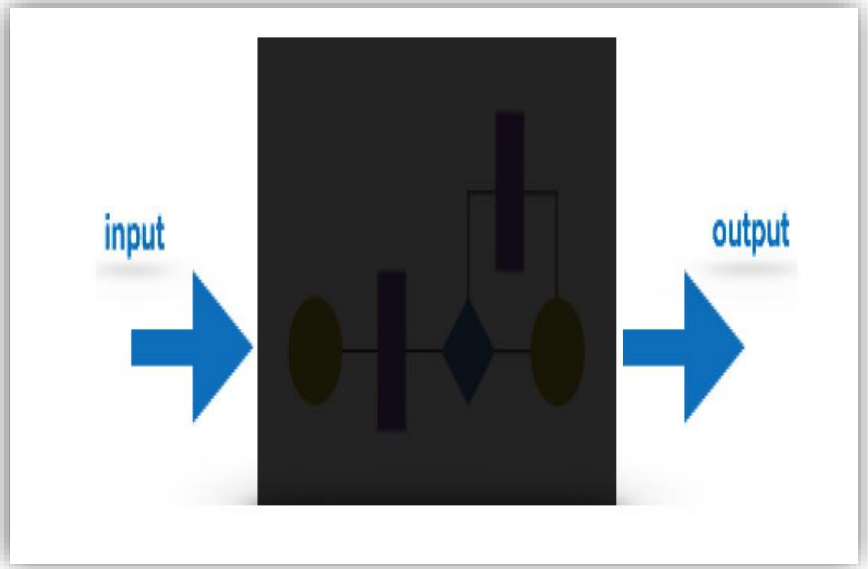

Figure 41: Black-box testing

White-box testing

- It is conducted to test program and its implementation, in order to improve code efficiency or structure. It is also known as 'Structural' testing. In this testing method, the design and structure of the code are known to the tester. Programmers of the code conduct this test on the code.

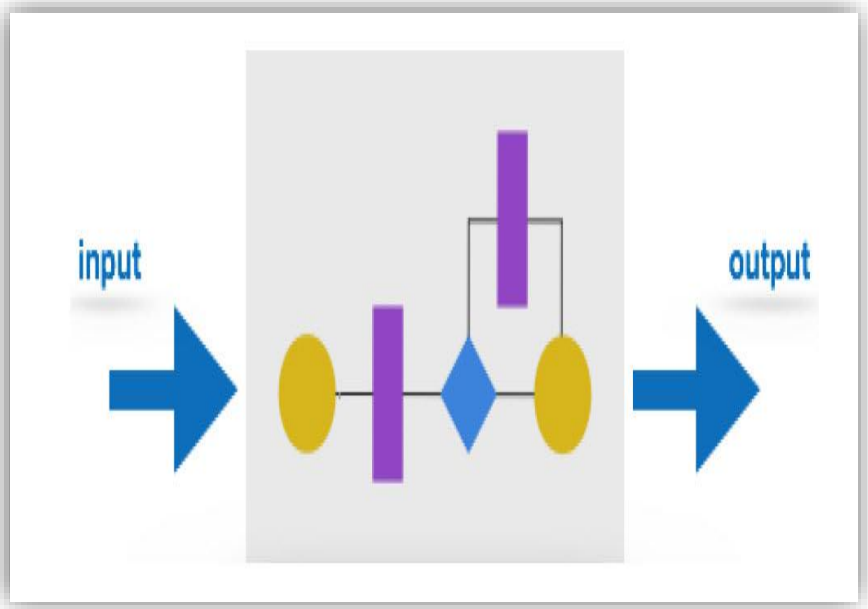

Figure 42: White-box testing

Thanks