Faculty of Computers, Informatics and Microelectronics
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Software Testing

Laboratory work #4

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White-box Testing

I created a test for checking whether a user (child) can work or not depending on his age. After inputting an age, the application will write the rights that this user has to work. For this, I used 3 if statements in my application to make the verifications.

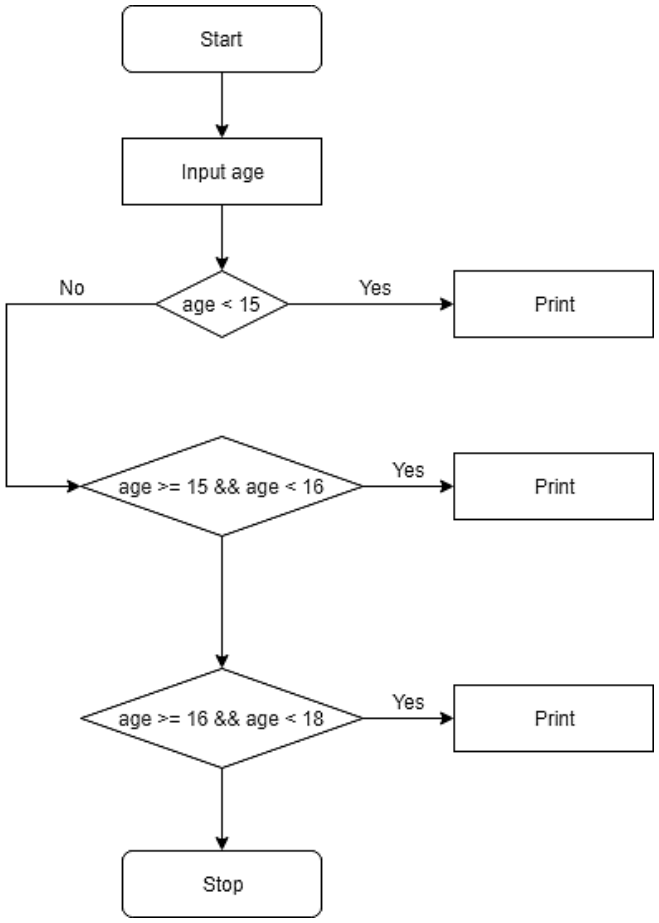
Steps for verification:

1. User opens the application
2. Enters his age
3. Views the result (his rights for working)

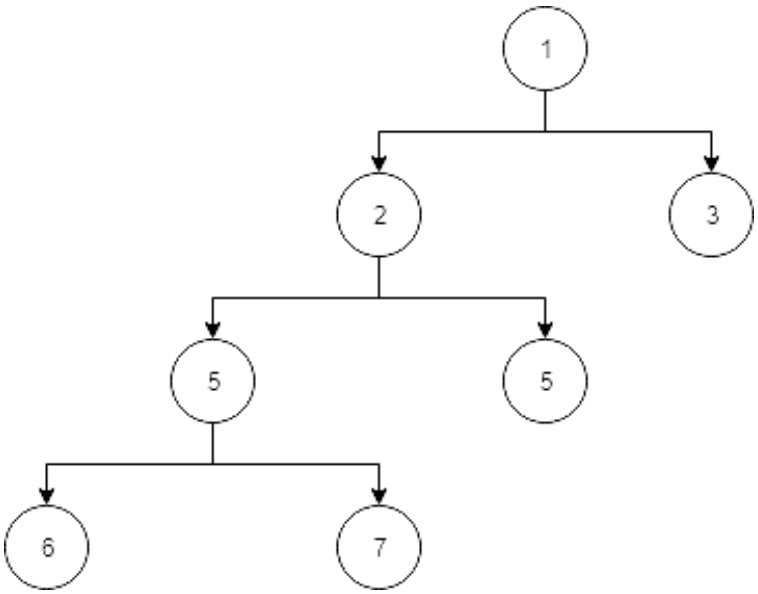
Below is a decision table that contains the input and output for the test cases. There are 3 decision points: 1st one checks if the user age is below 15, 2nd one checks if its exactly 15 and 3rd one checks if its between 16 and 18.

Test case	Description	Input	Output
T1.1	Follows no path from all decision points.	4	You can't work at this age!
T2.1	Follows yes path from 2nd decision and no from other (1st & 3rd) decision paths.	15	You can work at most 5 hours a day only with accordance of your parents!
T2.2	Follows yes path from 1st decision and no from other (2nd & 3rd) decision paths.	9	You can't work at this age!
T2.3	Follows yes path from 3rd decision and no from other (1st & 2nd) decision paths.	16	You are eligible to work at most 7 hours a day!
T3.1	2nd decision point: T T	15	You can work at most 5 hours a day only with accordance of your parents!
T3.2	2nd decision point: F T	5	You can't work at this age!
T3.3	2nd decision point: T F	17	You are eligible to work at most 7 hours a day!
T3.4	3rd decision point: T F	19	-
T3.5	3rd decision point: T T	17	You are eligible to work at most 7 hours a day!
T3.6	3rd decision point: F T	13	You can't work at this age!

Flow graph:



Decision paths:



McCabe Cyclomatic number formula:

$$C = E - N + 2 = 1$$

where:

E – number of edges

N – total number of nodes

In my case number of edges is equal to 6 and number of nodes is equal to 7 resulting in McCabe Cyclomatic number being 1.

Conclusions:

In this laboratory work I understood how white-box testing works. It is used to test internal structures or workings of an application, as opposed to its functionality. In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases. It can also be called: clear box testing, open box testing or glass box testing and others. Unlike black box testing, white box testing uses specific knowledge of programming code to examine outputs. That's why I created a simple application in java to check whether or not an user is eligible to work.