# Homework: Test Levels and Test Types

## Unit Testing in the Real Life: Testing a Battery

|  |  |
| --- | --- |
| **Test #1** |  |
| **Test #2** |  |
| **Test #3** |  |
| **Test #4** |  |
| **Test #5** |  |

## Unit Testing in the Real Life: Testing a Light Bulb

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| **Test #1** | Take an AA battery of **1.5V** and connected to the bulb. It should light up. |
| **Test #2** | Take the bulb and check it visually locking for problems with the glass part or with the wire part |
| **Test #3** | Check the screw part of the bulb and see if it can correctly be screw it to a flashlight |
| **Test #4** | Check if the screwed bulb can be lighted up |
| **Test #5** | Check the light power of the bulb with an appropriate instrument |
| **Test #6** | Check if the connected to a battery bulb is working properly at different temperature conditions:   * - 5 degrees Celsius; * + 45 degree Celsius; |
| **Test #7** | Check the expiration date/sing on the bulb. It should be future date |
| **Test #8** | Check if the working correctly for one or two hours without stopping |
| **Test #9** | Check if it will work with a battery of **1 V** |
| **Test #10** | Check the size of the bulb and see if its correct for a **bulb E10** |

## Unit Testing in the Software World: Age Checker

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| --- | --- | --- |
| **#** | **Test Description** | **Pass / Fail** |
| **Test #1** | AgeChecker(5) 🡪 child | Pass |
| **Test #2** | AgeChecker(19.5) 🡪 teenager | Pass |
| **Test #3** | AgeChecker(20) 🡪 adult | Pass |
| **Test #4** | AgeChecker(75.3) 🡪 elder | Pass |
| **Test #5** | AgeChecker(-5) 🡪 error | Pass |
| **Test #6** | AgeChecker(0) 🡪 child | Pass |
| **Test #7** | AgeChecker(12.99999999999999) 🡪 child | Fail |
| **Test #8** | AgeChecker(13) 🡪 teenager | Pass |
| **Test #9** | AgeChecker(150) 🡪 elder | Fail |
| **Test #10** | AgeChecker(150.5) 🡪 error |  |
| **Test #11** | AgeChecker(e1e) 🡪 error | ? |
| **Test #12** | AgeChecker(13.2) 🡪 teenager |  |
| **Test #13** | AgeChecker(13.2) 🡪 elder |  |
| **Test #14** | AgeChecker(65.7) 🡪 elder |  |
| **Test #15** | AgeChecker(1656890.7) 🡪 error |  |
| **Test #16** | AgeChecker(149.7) 🡪 elder |  |

## Unit Testing in the Software World: Income Checker

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| **#** | **Test Description** | **Pass / Fail** |
| **Test #1** | IncomeChecker(250) 🡪 low | Pass |
| **Test #2** | IncomeChecker(999.9) 🡪 low |  |
| **Test #3** | IncomeChecker (1000) 🡪 mid |  |
| **Test #4** | IncomeChecker(2300.70) 🡪 mid |  |
| **Test #5** | IncomeChecker(7000) 🡪 high |  |
| **Test #6** | IncomeChecker(-5) 🡪 error |  |
| **Test #7** | IncomeChecker (1000.5) 🡪 mid |  |
| **Test #8** | IncomeChecker(3000) 🡪 high |  |
| **Test #9** | IncomeChecker(3001) 🡪 high |  |
| **Test #10** | IncomeChecker(2999.70) 🡪 mid |  |
| **Test #11** | IncomeChecker(290000000000099.70) 🡪 high |  |
| **Test #12** | IncomeChecker(2e10) 🡪 error |  |
| **Test #13** | IncomeChecker(0) 🡪 low |  |
| **Test #14** | IncomeChecker(0.1) 🡪 low |  |

## Integration Testing in the Real Life: Lighting the Bulb

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| --- | --- |
| **Test #1** | If we connect the battery, wire and the bulb using the following electrical circuit the bulb should lights up.  A picture containing shape  Description automatically generated  This a positive test |
| **Test #2** | If we make a similar electrical circuit but without the part of the electrical wire connected between the battery positive part and the bulb, the bulb should not lighted up.  A picture containing shape  Description automatically generated  This is a negative test. |
| **Test #3** | We can add to the electrical circuit a switch and make a electrical circuit as the one shown below.  Diagram  Description automatically generated  When the switch is on the bulb should lights up. Positive test |
| **Test #4** | When the switch is off the bulb should be not lighted up  Diagram  Description automatically generated  Negative test |
| **Test #5** | If we take out the wire connecting the negative sight of the battery to the bulb, the bulb should not lighted up is the switch is on.  Diagram  Description automatically generated  Negative test |

## \* Integration Testing in the Software World: Ads

|  |  |
| --- | --- |
| **Test #1** | Press the **Login** button on the **Homepage.**    It should redirect to the Login page.  Graphical user interface, application  Description automatically generated |
| **Test #2** | Press the Register button on the **Homepage**. It should redirect you to the **Register** page. |
| **Test #3** | When you are in the **Login page** check to register with a correct **username** and **password**  Graphical user interface, application  Description automatically generated  It should redirect you to the **User Homepage**  Graphical user interface, application, website  Description automatically generated |
| **Test #4** | When you are in the **Login page** try to register with an incorrect **username** and **password.**  You should get an error massage and not redirect to the **User Home page.** |
| **Test #5** | When you are in the **User Home Page,** try to logout by pressing the Logout button.  Graphical user interface, application, website  Description automatically generated  It should redirect you to the Web app **Home Page** |
| **Test #5** | When you are in back in the **Home Page,** try to press the back button on your web browser and check if you stay on the **Home Page** or are returned to the **User Home Page**  Graphical user interface, application, website  Description automatically generated  It should redirect you to the Web app **Home Page** |

## \* Integration Testing in the Software World: Credit Risk

Input ranges and respective credit risk:

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| --- | --- | --- | --- | --- | --- |
|  | **child** | **teenager** | **adult** | **elder** | **negative** |
| **low** | 100% | 60% + 50% - (60% \* 50%) =110%-30%=**80%** | 10% + 50% - (10% \* 50%) = 60% - 5% = **55%** | 20% + 50% - (20% \* 50%) = 70% -10% **= 60%** | error |
| **mid** | 100% | 60% + 30% - (60% \* 30%) =90%-18%=**72%** | 10% + 30% - (10% \* 30%) = 40% -3% = **37%** | 20% + 30% - (20% \* 30%) = 50% - 6% = **44%** | error |
| **high** | 100% | 60% + 10% - (60% \* 10%) =70%-6%=**64%** | 10% + 10% - (10% \* 10%) = 20% - 1% = **19%** | 20% + 10% - (20% \* 10%) = 30% - 3% = 27**%** | error |
| **negative** | error | error | error | error | error |

Test cases with execution results:

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| --- | --- | --- | --- | --- | --- |
| **#** | **Test Description** | **Age group** | **Income group** | **Result** | **Pass / Fail** |
| **Test #1** | CreditRisk(age: 35, income: 700) 🡪 55% | adult 🡪 10% | low 🡪 55% | 55% | Pass |
| **Test #2** | CreditRisk(age: 35, income: 2300) 🡪 37% | adult 🡪 10% | mid 🡪 30% | 37% |  |
| **Test #3** | CreditRisk(age: 35, income: 3500) 🡪 19% | adult 🡪 10% | high 🡪 10% | 19% |  |
| **Test #4** | CreditRisk(age: 15, income: 700) 🡪 55% | teenager 🡪 60% | low 🡪 55% | 80% | Pass |
| **Test #5** | CreditRisk(age: 15, income: 2300) 🡪 37% | teenager 🡪 60% | mid 🡪 30% | 72% |  |
| **Test #6** | CreditRisk(age: 15, income: 3500) 🡪 19% | teenager 🡪 60% | high 🡪 10% | 64% |  |
| **Test #7** | CreditRisk(age: 75, income: 700) 🡪 55% | elder 🡪 20% | low 🡪 55% | 60% | Pass |
| **Test #8** | CreditRisk(age: 75, income: 2300) 🡪 37% | elder 🡪 20% | mid 🡪 30% | 44% |  |
| **Test #9** | CreditRisk(age: 75, income: 3500) 🡪 19% | elder 🡪 20% | high 🡪 10% | 27% |  |
| **Test #10** | CreditRisk(age: 5, income: 700) 🡪 55% | child 🡪 100% | low 🡪 55% | 55% | Pass |
| **Test #11** | CreditRisk(age: 5, income: 2300) 🡪 37% | child 🡪 100% | mid 🡪 30% | 37% |  |
| **Test #12** | CreditRisk(age: 5, income: 3500) 🡪 19% | child 🡪 100% | high 🡪 10% | 19% |  |
| **Test #13** | CreditRisk(age: -25, income: 2300) 🡪 error | error | mid 🡪 30% | error |  |
| **Test #14** | CreditRisk(age: 35, income: -3500) 🡪 error | adult 🡪 10% | Error | error |  |

**Found bugs**

1. When the age or income holds “0”, the messages under the “age” and “incomes” boxes are incorrect:
   * CreditRisk(age: 17, income: 0) 🡪 80%;
   * CreditRisk(age: 0, income: 1000) 🡪 100%;
   * CreditRisk(age: 0, income: 0) 🡪 100%;
2. There is UI bug. When the screen is becoming small or not big enough the downside of the app is getting cut.

## System Testing in the Real Life: Flashlight

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| **Test #1** | **Test switch on / switch off the light**  Take the flashlight and put on a battery into it. When we switch the on the flashlight button it should be lighted up.  When we switched off the flashlight lightening should be off. |
| **Test #2** | **Test the battery replacement**  We can test battery replacement by taking a new battery and replace the existing ones. After this we should test the flashlight on and off switch. |
| **Test #3** | **Test battery duration**  The duration of the battery could be tested by switch on the flashlight and wait and see if the flashlight if on for at least an hour. |
| **Test #4** | **Test the illumination distance**  The illumination distance could be measured if the flashlight is flashing properly at least 30 meters |
| **Test #5** | **Shock resistance test**  Take the flashlight and drop it on the floor. It should stay intact and not become broken. |
| **Test #6** | **Operation under high / low temperature**   * Test how the flashlight will perform under the following temperature conditions: * - 10 degrees Celsius * +50 degrees Celsius |
| **Test #8** | **Outside check**  Take a look at the flashlight surface and see if there is bumps, leakages or scars on the surface |
| **Test #9** | **Test the bulb replacement**  Take the flashlight and dismantle the bulb part. Take a new bulb and replace it. Test if the flashlight is working correctly. |
| **Test #10** | **Test the flashlight length and the bulb diameter**  Measure the length of the flashlight and the bulb diameter and check if they are according to the standards |
| **Test#11** | **Overheating test**  Switch on the flashlight for two hours and check if the surface is hot |
| **Test#12** | **Water resistance test**  Take the flashlight and drop small amount of water on the surface. It’s correct work should be not affected by the amount of water. |

## System Testing in the Real Life: Digital Scale

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| **Test #1** | **Test the correct functioning**  Take exactly two kilograms of products, which are measured on a different scale.  Put it on the digital scale and see how much they weight. The difference should be less around 100 grams. |
| **Test #2** | **Test the battery**  Take off the battery and replace it with a new one. Turn on the scale and check if it functions properly |
| **Test #3** | **Surface check**  Take the scale and look for scratches or bumps on the surfaces and the bottom.  Check the battery compartment – if its closes correctly |
| **Test #4** | **Test the body weight**  Measure the body weight of three different persons:   * with body weight of 30 kg. * with body weight of 85 kg. * with body weight of 110 kg. |
| **Test #5** | **Test the boundaries**  Check what is the maximum weight that this digital scale can measure and test with a weight one kilogram lower. |
| **Test #6** | **Operation under high / low temperature**   * Test how it will perform under the following temperature conditions: * - 10 degrees Celsius * +50 degrees Celsius |
| **Test #7** | **Water resistance test**  Take digital scale and drop small amount of water on the surface. It should continue working correctly |

## System Testing in the Software World: Number Calculator

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| **#** | **Test Description** | **Pass / Fail** |
| **Test #1** | Calculate(5, +, 10) 🡪 15 | Pass |
| **Test #2** | Calculate(2000000000000, +, 5) 🡪 2000000000005 | Fail |
| **Test #3** | Calculate(10x, +, man) 🡪 invalid input | Fail |
| **Test #4** | Calculate(5.1, +, 10.5) 🡪 15.6 |  |
| **Test #5** | Calculate(-2000000000000, +, 5) 🡪 19999999999995 |  |
| **Test #6** | Calculate(10x, +, 5) 🡪 invalid input |  |
| **Test #7** | Calculate(man, +, !) 🡪 invalid input |  |
| **Test #8** | Calculate(2000000000000, -, 5) 🡪 19999999999995 |  |
| **Test #9** | Calculate(10x, -, 5) 🡪 invalid input |  |
| **Test #10** | Calculate(5, - , 10) 🡪 -5 |  |
| **Test #11** | Calculate(15, - , 10) 🡪 5 |  |
| **Test #12** | Calculate(15.5, - , 10.5) 🡪 5 |  |
| **Test #13** | Calculate(2000000000000, \*, 5) 🡪 |  |
| **Test #14** | Calculate(10x, \*, 5) 🡪 invalid input |  |
| **Test #15** | Calculate(5, \* ,- 10) 🡪 -50 |  |
| **Test #16** | Calculate(15, \* , 10) 🡪 150 |  |
| **Test #17** | Calculate(15.5,\* , 10.5) 🡪165? |  |
| **Test #18** | Calculate(2000000000000, /, 5) 🡪 |  |
| **Test #19** | Calculate(10x, /, 5) 🡪 invalid input |  |
| **Test #20** | Calculate(5, / ,- 10) 🡪 -0.5 |  |
| **Test #21** | Calculate(15, / , 10) 🡪 1.5 |  |
| **Test #22** | Calculate(15.5,/ , 10.5) 🡪1.65? |  |
| **Test #23** | Calculate(infinity, \*, 5) 🡪 infinity |  |
| **Test #24** | Calculate(infinity, / ,- 10) 🡪 infinity |  |
| **Test #25** | Calculate(infinity, / ,infinity) 🡪 invalid input |  |
| **Test #26** | Calculate(infinity,/ , 0) 🡪 |  |
| **Test #27** | Calculate(infinity, +, 5) 🡪 infinity |  |
| **Test #28** | Calculate(infinity, -, 5) 🡪 infinity |  |
| **Test #29** | Calculate(15, / , 0) 🡪 |  |
| **Test #30** | Calculate(15, \* , 0) 🡪 0 |  |
| **Test #31** | Calculate(15, - , 0) 🡪 15 |  |
| **Test #32** | Calculate(15, + , 0) 🡪 15 |  |
| **Test #33** | Calculate(15, select operation , 5) 🡪 invalid operations |  |
| **Test #34** | Calculate(0, - ,0 ) 🡪 0 |  |
| **Test #35** | Calculate(0, \* , 0) 🡪 0 |  |
| **Test #36** | Calculate(0, / , 0) 🡪 0 |  |

## Acceptance Testing in the Real Life: Flashlight

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| **Test #1** | The customer/business is going to take the flashlight and **switch on / off** the light button, and assure it works. |
| **Test #2** | The customer/business may check the flash **illumination and how far it goes.** |
| **Test #3** | The customer/business is going to check the easiness of **batteries replacement.** |
| **Test #4** | The customer/business is going to check the easiness of the **bulb replacement.** |
| **Test #5** | The customer/business is going to check the outside surface of the flashlight for bumps, scratches, leakages, etc. |

## Acceptance Testing in the Real Life: Digital Scale

|  |  |
| --- | --- |
| **Test #1** | **Test the body weight**  Measure the body weight of three different persons:   * with body weight of 30 kg. * with body weight of 85 kg. * with body weight of 110 kg. |
| **Test #2** | **Test the scale battery**  Take off the battery and replace it with a new one. Turn on the scale and check if it functions properly |
| **Test #3** | **Surface check**  Take the scale and look for scratches or bumps on the surfaces and on the bottom.  Check the battery compartment – if its closes correctly |
| **Test #4** | **Test the boundaries**  Check what is the maximum weight that this digital scale and test with an weight one kilogram lower. |

## Acceptance Testing in the Software World: Number Calculator

|  |  |  |
| --- | --- | --- |
| **#** | **Test Description** | **Pass / Fail** |
| **Test #1** | Calculate(5, +, 10) 🡪 15 | Pass |
| **Test #2** | Calculate(5.1, +, 10.5) 🡪 15.6 |  |
| **Test #3** | Calculate(5, - , 10) 🡪 -5 |  |
| **Test #4** | Calculate(15, - , 10) 🡪 5 |  |
| **Test #5** | Calculate(15.5, - , 10.5) 🡪 5 |  |
| **Test #6** | Calculate(5, \* ,- 10) 🡪 -50 |  |
| **Test #7** | Calculate(15, \* , 10) 🡪 150 |  |
| **Test #8** | Calculate(15.5,\* , 10.5) 🡪165? |  |
| **Test #9** | Calculate(5, / ,- 10) 🡪 -0.5 |  |
| **Test #10** | Calculate(15, / , 10) 🡪 1.5 |  |
| **Test #11** | Calculate(15.5,/ , 10.5) 🡪1.65? |  |
| **Test #12** | Calculate(15, / , 0) 🡪 |  |
| **Test #13** | Calculate(15, \* , 0) 🡪 0 |  |
| **Test #14** | Calculate(15, - , 0) 🡪 15 |  |
| **Test #15** | Calculate(15, + , 0) 🡪 15 |  |

## Functional and Non-Functional Tests: Flashlight

|  |  |
| --- | --- |
| **Functional Tests** | **Non-Functional Tests** |
| **Test switch on / switch off the light** | **Test battery duration** |
| **Test the bulb replacement** | **Shock resistance test** |
| **Test the battery replacement** | **Operation under high / low temperature** |
|  | **Outside check** |
|  | **Test the flashlight length and the bulb diameter** |
|  | **Overheating test** |
|  | **Water resistance test** |
|  | **Test the illumination distance** |