# Homework: Test Levels and Test Types

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

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| **Test #1** | Put the batteries into a flashlight (or other electric device) and check if it works |
| **Test #2** | Check the battery size (height + diameter). Does it comply with the “AA” size standard? |
| **Test #3** | Check the battery voltage: measure the voltage using a digital multimeter. |
| **Test #4** | Check the physical condition of the battery: are there any damages? |
| **Test #5** | Check the labels on the battery. Are they accurate? |

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

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| --- | --- |
| **Test #1** | Check the physical condition of the glass from bulb. |
| **Test #2** | Check the physical condition of the bulb socket. |
| **Test #3** | Check the physical condition of the burn element in the bulb. |
| **Test #4** | Mount the bulb to a light fixture and check that it works. |

## Unit Testing in the Software World: Age Checker

Unit Test Cases:

| **Test Case** | **Age Input** | **Expected Output** |
| --- | --- | --- |
| Lower Bound | 0 | child |
| Lower Bound | 12.9 | child |
| Lower Bound | 13 | teenager |
| Lower Bound | 19.9 | teenager |
| Lower Bound | 20 | adult |
| Upper Bound | 64.9 | adult |
| Upper Bound | 65 | elder |
| Upper Bound | 150 | elder |
| Upper Bound | 150.1 | error |
| Upper Bound | -1 | error |

## Unit Testing in the Software World: Income Checker

Unit Test Cases:

| **Test Case** | **Input (Income)** | **Expected Output** |
| --- | --- | --- |
| 1 | 250 | low |
| 2 | 1000 | mid |
| 3 | 2300.70 | mid |
| 4 | 7000 | high |
| 5 | -5 | error |
| 6 | 1000.01 | mid |
| 7 | 2999.99 | mid |
| 8 | 3000 | high |
| 9 | 0 | low |
| 10 | -1000 | error |

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

Integration Test Cases:

| **Test Case** | **Input** | **Expected Output** |
| --- | --- | --- |
| 1 | Connect the battery and bulb in series | Bulb lights up |
| 2 | Connect the switch button in series with the battery and bulb | Bulb lights up when switch is turned on |
| 3 | Connect the switch button in parallel with the battery and bulb | Bulb lights up when switch is turned on |
| 4 | Connect the switch button in series with the battery and bulb, and then connect it to another identical circuit | Both bulbs light up when switch is turned on |
| 5 | Connect the switch button in parallel with the battery and bulb, and then connect it to another identical circuit | Both bulbs light up when switch is turned on |

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

Here is a list of integration tests that can verify the functionality of the three components of the web app:

***1. Verify that user registration and login work correctly by testing the following steps:***

*a. Navigate to the login page*

*b. Click on the link to register and fill out the required fields*

*c. Navigate back to the login page and enter the newly created credentials*

*d. Verify that the user home page is displayed*

***2. Verify that browsing ads by categories and towns works correctly by testing the following steps:***

*a. Login to the web app*

*b. Navigate to the user home page*

*c. Check that the list of published ads is displayed*

*d. Filter the ads by a specific category and verify that only ads belonging to that category are displayed*

*e. Filter the ads by a specific town and verify that only ads belonging to that town are displayed*

***3. Verify that publishing a new ad works correctly by testing the following steps:***

*a. Login to the web app*

*b. Navigate to the user home page*

*c. Click on the option to publish a new ad*

*d. Fill out the required fields for the new ad*

*e. Verify that the new ad is displayed in the list of published ads*

***4. Verify that editing own profile works correctly by testing the following steps:***

*a. Login to the web app*

*b. Navigate to the user home page*

*c. Click on the option to edit own profile*

*d. Modify some of the profile fields*

*e. Verify that the changes are reflected in the profile information*

***5. Verify that logging out works correctly by testing the following steps:***

*a. Login to the web app*

*b. Navigate to the user home page*

*c. Click on the logout button*

*d. Verify that the user is redirected to the login page.*

***6. Verify that invalid login credentials are handled correctly by testing the following steps:***

*a. Navigate to the login page*

*b. Enter incorrect credentials*

*c. Verify that an error message is displayed indicating that the login failed.*

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | child | teenager | adult | elder | negative |
| low | 100% | 80% | 55% | 60% | Error |
| mid | 100% | 72% | 37% | 44% | Error |
| high | 100% | 64% | 19% | 28 | Error |
| negative | Error | Error | Error | Error | Error |

Graphical user interface, application

Description automatically generated

https://pastebin.com/dpeCehnb

## System Testing in the Real Life: Flashlight

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| --- | --- |
| **Test #1** | Switch On/Off Test: Verify the flashlight turns on and off when the switch is activated. |
| **Test #2** | Battery Replacement Test: Check if the battery can be easily removed and replaced. |
| **Test #3** | Bulb Replacement Test: Verify that the bulb can be easily replaced and the flashlight still functions. |
| **Test #4** | Battery Duration Test: Measure the length of time the flashlight operates on a set of fresh batteries. |
| **Test #5** | Illumination Distance Test: Measure the distance at which the flashlight illuminates and verify it meets specifications. |
| **Test #6** | Shock Resistance Test: Check that the flashlight can withstand a specified level of impact without malfunctioning. |
| **Test #7** | High/Low Temperature Test: Verify the flashlight operates within specified temperature limits, both high and low. |

## System Testing in the Real Life: Digital Scale

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| --- | --- |
| **Test #1** | Weight Capacity Test: Confirm that the scale can measure the full range of weights it is designed to support. |
| **Test #2** | Tare/Zero Function Test: Check if the tare/zero function accurately subtracts the weight of an object or container to give the net weight. |
| **Test #3** | Stability Test: Verify that the scale provides consistent readings when used on different surfaces and in different positions. |
| **Test #4** | Display Test: Check that the display shows the weight reading clearly and accurately. |
| **Test #5** | Power Source Test: Verify that the scale operates as expected using different types of batteries and/or power sources. |
| **Test #6** | Repeatability Test: Check that multiple readings of the same weight produce consistent results. |
| **Test #7** | Environmental Test: Verify that the scale operates accurately and consistently in different environmental conditions (e.g. temperature, humidity). |
| **Test #8** | User Interface Test: Check that the buttons and controls on the scale are easy to use and provide the desired functionality. |

## System Testing in the Software World: Number Calculator

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| --- | --- |
| **Test #1** | Basic Operations Test: Test the addition, subtraction, multiplication, and division operations with valid numbers and verify that the results are accurate. |
| **Test #2** | Decimal and Fractional Numbers Test: Test the calculator with decimal and fractional numbers to verify that it can handle these inputs correctly. |
| **Test #3** | Exponential Numbers Test: Test the calculator with exponential numbers (e.g. 2^3) to verify that it can handle these inputs correctly. |
| **Test #4** | Infinity Test: Test the calculator with infinity values (e.g. 1/0) to verify how it handles these inputs. |
| **Test #5** | Invalid Input Test: Test the calculator with invalid inputs (e.g. letters, special characters) to verify that it handles them correctly. |
| **Test #6** | Invalid Operations Test: Test the calculator with invalid operations (e.g. dividing by zero) to verify that it handles them correctly. |
| **Test #7** | Large Numbers Test: Test the calculator with very large numbers to verify that it can handle them correctly and does not overflow. |
| **Test #8** | Order of Operations Test: Test the calculator with expressions that require the correct order of operations (e.g. 1+2\*3) to verify that it handles them correctly. |

## Acceptance Testing in the Real Life: Flashlight

|  |  |
| --- | --- |
| **Test #1** | Verify the light turns on and off when the switch is engaged. |
| **Test #2** | Check that the light is bright enough to adequately illuminate an object or area. |
| **Test #3** | Confirm that the batteries can be easily removed and replaced. |
| **Test #4** | Test the light's run time on a set of fresh batteries. |
| **Test #5** | Verify that the light has a consistent beam pattern and does not flicker. |
| **Test #6** | Check for any physical defects or damage to the flashlight. |
| **Test #7** | Test the flashlight's resistance to impact or rough handling. |
| **Test #8** | Verify that the light operates in extreme temperature conditions. |

## Acceptance Testing in the Real Life: Digital Scale

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| --- | --- |
| **Test #1** | Verify that the scale displays correct weight readings when tested with a known weight. |
| **Test #2** | Ensure that the scale is accurate over a range of weights, from the minimum weight to the maximum weight the scale can measure. |
| **Test #3** | Test that the scale displays the correct units (e.g. kilograms, pounds, stones). |
| **Test #4** | Check that the scale is able to handle overweight/underweight conditions and display an error message. |
| **Test #5** | Test the scale's stability by verifying that it does not move or tilt when a weight is placed on it. |
| **Test #6** | Check the accuracy of the scale's auto-zero function. |
| **Test #7** | Confirm that the scale's battery life is sufficient and that it can be easily replaced. |
| **Test #8** | Check that the scale is easy to clean and maintain. |
| **Test #9** | Test the scale's durability and resistance to impact. |

## Acceptance Testing in the Software World: Number Calculator

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| --- | --- |
| **Test #1** | Test the addition functionality by inputting two numbers and verifying that the result is correct. |
| **Test #2** | Test the subtraction functionality by inputting two numbers and verifying that the result is correct. |
| **Test #3** | Test the multiplication functionality by inputting two numbers and verifying that the result is correct. |
| **Test #4** | Test the division functionality by inputting two numbers and verifying that the result is correct. |
| **Test #5** | Test if the calculator handles decimals correctly. |
| **Test #6** | Test if the calculator can handle large numbers. |
| **Test #7** | Test the clear functionality to ensure it resets the calculator to default state. |
| **Test #8** | Test the negative number functionality. |
| **Test #9** | Test the calculator's response to invalid inputs (e.g. letters, symbols). |
| **Test #10** | Test the calculator's response to divide by zero error. |
| **Test #11** | Test the calculator's performance for extended use. |
| **Test #12** | Test if the calculator works correctly on different devices and screen sizes. |

## Functional and Non-Functional Tests: Flashlight

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| --- | --- |
| **Functional Tests** | **Non-Functional Tests** |
| Verify that the flashlight turns on and off. | Evaluate the ease of use of the flashlight and the ergonomics of its design. |
| Check the brightness levels of the flashlight. | Verify that the flashlight is portable and lightweight. |
| Test the durability of the flashlight by dropping it from various heights. | Check the aesthetic appeal of the flashlight. |
| Verify that the flashlight can withstand different weather conditions (e.g. rain, snow). | Evaluate the overall reliability and stability of the flashlight. |
| Check the battery life of the flashlight and the ease of replacing the batteries. | Verify that the flashlight is easy to clean and maintain. |