# Homework: Software Quality Assurance Introduction

## Think Testing: Gas Station

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| **Problem #1** | The fuel filler opening may not be completely closed |
| **Problem #2** | The car key may not be inserted |
| **Problem #3** | Wrong type of fuel loaded |
| **Problem #4** | Battery problems |
| **Problem #5** | Getting into the wrong car by mistake |
| **Problem #6** | Starter motor does not work |
| **Problem #7** | The immobilizer does not work |
| **Problem #8** | Engine problems. |
| **Problem #9** | Engine intake issues |
| **Problem #10** | Electrical or wiring problems |
| **Problem #11** | Issues with the alternator drive belt and the wiring |
| **Problem #12** | Spark plugs. |

## Think Testing: Tooth Brushing

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| **Steps** | 1. Open the bathroom drawer 2. Take your own brush 3. Take out the tooth paste 4. Wet the brush with water 5. Open the tooth paste 6. Put small amount of toothpaste, equal to a pea gain, on your tooth brush 7. Close the tooth paste and put it back in the drawer 8. Start brushing your teeth with circular movements 9. Brush the lower teeth from left to right for at least 30 seconds. Make sure you wash them front and back 10. Proper Tooth Brushing and Flossing Techniques | Patient Education | Kois  CenterThen brush the upper teeth from left to right for at least 30 seconds. Again, make sure you wash them front and back. 11. Go through all teeth one last time to make sure you cleaned them all 12. Put some water in your mouth and gurgle with it 13. Spit all the water from the gurgling that contains the toothpaste 14. Make sure you do that enough times so there is no toothpaste left in your mouth 15. Make sure to now swallow any water with toothpaste 16. Clean your mouth and face if there is any toothpaste left on it 17. Clean your tooth brush from the tooth paste 18. Put the tooth brush back in the drawer 19. Repeat twice a day at the morning and before bed 20. Brushing Teeth Vector Art, Icons, and Graphics for Free DownloadMake it a daily and fun habit! |

## Think Testing: 5 Kg Bag

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| **Test #1 Look and feel** | We open the bag to check:  If it’s really a paper shopping bad, capable of holding contents weighing 5 kilograms  Does the bag have handles  Does the bag have a bottom  Is the bag torn |
| **Test #2 Checking the handles** | Step 1: We fill the bag with apples  Checking: We lift the bag to check if the handles are able to hold the apples  We check if the apples fell out  We take out the apples to check if taking out the contents is easy or the bag is too tight |
| **Test #3 Checking capacity and convenience** | We make a test with 5 kg of apples  Step 1: We weight 5 kilograms of apples on the scale  Step 2: We take the bag and fill it up with 5 kg apples  We need to check:  We lift up the bag to check if the handles are able to hold the apples  We carry the bag for 5-10 minutes (average time it takes to go from the shop to your home) while we run with it, throw it around and shake it  After our trip we check if the bag is in a healthy condition – no holes or ruptures |
| **Test #3 Checking with less and more than the intended weight** | We check if the bag is able to hold:   1. 5 kg of contents 2. Less than 5kg 3. More than 5kg, but not too much (max 6) |
| **Test #4 Testing durability** | We test the durability of the bag by putting sharp fruits or objects  Since the bag is from paper, we can try putting something slightly wet to make sure the bag wouldn’t tear apart fast |
| **Test #5 Environmental traces** | We need to check if the bag leaves a scent after usage  We need to check if it colors the hands after carrying it  It should neither leave a scent nor color your hands. |
| **Test #6 Stress test from dropping the bag** | We take an empty bag.  We put 2 packages of rice of 1 kg each.  We raise it to a height of 1 m. and drop it on the floor.  The floor must be parquet.  We check to see if the bag is in a healthy condition.  There should be no tearing or damage. |

## Login Form UX Problems

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| **Problem #1** | First field should be User/Email. Second should be Password. |
| **Problem #2** | There shouldn’t be a “log out” button |
| **Problem #3** | We move the forgotten password button on the bottom. We *may* change it from “Lost” to “Forgotten” since it’s more common |
| **Problem #4** | There should be a “Register” button |
| **Problem #5** | Buttons should be aligned and symmetrical |
| **Problem #6** | We can check if the “eye icon” works or it’s just an image. If it is intended to work, we need to make sure the password hides and reveals accordingly |
| **Problem #7** | The “Remember me” checkbox should be right after the password field |
| **Problem #8** | The domain URL should say “my-wonderful-shop” instead of “your-wonderful-shop” |
| **Problem #9** | The URL path of the login form should be “login” instead of “add-to-basket” |
| **Redesign** |  |

## Weather Forecast Bug

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| **Mistake** | Temperatures in the weather forecast are displayed in Fahrenheit, whereas in Sofia/Bulgaria are measured in Celsius.  Example: Min temp 50F, Max temp 100F instead of Min Temp 10C, Max temp 38C  **The developer hasn’t taken into consideration that the weather comes in Fahrenheit from the source and it needs to be converted. The whole temperature should be converted, not just the sign (C or F) itself.** |
| **Bug (location)** | The bug is in the code which displays the temperature on the screen. The temperature should be shown in Celsius. (**°C)** |
| **Failure (symptoms)** | When the temperature is displayed on the screen, it should be in Celsius, not Fahrenheit, so people in Bulgaria understand it, since it’s the one they use.  Note: In order for the app to me used by foreigners, who read the temperature in Fahrenheit, a button may be created that allows the switch between displaying temperature in F and C.  How to select Celsius or Fahrenheit on iPhone and Apple devices  Wrong / Correct |

## Age Checking Machine

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| 1. If age cannot be read, then print “Card/age cannot be read”. 2. If age > 0, and age < 18, then print “You are too young to visit our bar”. The door stays closed. 3. If age >= 18, then print “Welcome to our bar. Enjoy” and the door opens 4. Otherwise, print “Invalid age. Please try again”. The door stays closed. |

## Testing an Electric Water Kettle

### Test Scenario #1: Boil water

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| Test case | **Boil 1 liter of water -> Success** |
| Description | Pour 1 liter of water, start the kettle, wait until the water gets hot |
| Steps | 1. Fill 1 liter of cold water in the kettle 2. Close the lid 3. Plug the power base in the power socket 4. Switch on the kettle 5. Wait a few minutes until the water gets got and the kettle automatically switches off |
| Expected results | The boiling process should be completed in less than 4 minutes  The water should be hot  The kettle should automatically turn off when the water gets hot enough  The kettle lid should stay closed  The power button/switch should go back to its original position (turned off)  The power plug should be on  The kettle should stay over on its base |

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| Test case | **Try boiling not enough water -> fail** |
| Description | Try boiling less water than expected |
| Steps | 1. Turn the kettle on 2. Pour 100ml water in 3. Turn on the kettle |
| Expected results | The kettle should try starting but stop after around 5 seconds |

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| Test case | **Boil an empty kettle -> fail** |
| Description | Try to boil an empty kettle with no water inside and make sure the boiling stops automatically almost immediately after starting |
| Steps | 1. Empty the kettle (pour out any existing water) 2. Close the boiler lid 3. Plug the boiler into the power base 4. Switch on the kettle 5. Wait until the kettle automatically switches off |
| Expected results | The process should complete in less than 2 seconds  The kettle should automatically power off, shortly after the start  The kettle lid should stay closed  The kettle shouldn’t be hot |

### Test Scenario #2: Look and feel

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| Test case | **Confirm the kettle is not broken** |
| Description | Confirm if the kettle is not broken and can hold water |
| Steps | 1. Pour 800ml-1l water in 2. Take the kettle and make sure it doesn’t pour out from somewhere |
| Expected results | The kettle should be able to contain the water |

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| Test case | **Check the overall look** |
| Description | Check the kettle, base, power plug, cables, switch, for obvious problems |
| Steps | 1. Check the kettle and its base 2. Observe the power plug and cables and make sure it’s not torn somewhere 3. Try switching the switch |
| Expected results | The kettle should be safe and ready to use  The cables should be safe to touch or if small amount of water spills on them  The switch should be easy to use, switching On and Off without difficulty or pressure needed |

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| Test case | **Check the kettle capacity** |
| Description | Check if the kettle capacity is 1 liter |
| Steps | 1. Open the kettle 2. Take 1 liter water bottle 3. Try pouring the whole bottle in the kettle |
| Expected results | The kettle should hold all the water from the 1 liter bottle |

### Test Scenario #3: Safety tests

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| Test case | **Check power consumption for the kettle** |
| Description | Check if the power consumption of the kettle is around 1500 watts |
| Steps | 1. Use Shelly Plug S or other smart plug / wattmeter to measure the power of consumption |
| Expected results | The power consumption should be 0 watts when off  The power consumption should be around 1400-1600 watts when on |

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| Test case | **Measure the boiled water temperature** |
| Description | Measure the temperature of the boiled water and make sure it’s around 100 °C |
| Steps | 1. Put water in the kettle 2. Boil the water 3. Measure the boiled water with a thermometer |
| Expected results | The temperature of the water should be around 90-120°C |

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| Test case | **Check the kettle and base to match** |
| Description | Check if the kettle can be plugged correctly in the base |
| Steps | 1. Take the kettle 2. Try plugging it directly to the base |
| Expected results | The kettle should fit exactly in the base |

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| Test case | **Power off with the button during boiling** |
| Description | Turn on the kettle, put enough water and try boiling |
| Steps | 1. Turn on the kettle 2. Open the lid and put water 3. Turn on the switch for boiling 4. Wait around 10 seconds and switch the button off |
| Expected results | The kettle should stop boiling after switching off the button |

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| Test case | **Power off from the power plug during boiling** |
| Description | Turn on the kettle, put enough water and try boiling |
| Steps | 1. Turn on the kettle 2. Open the lid and put water 3. Turn on the switch for boiling 4. Wait around 10 seconds and plug out the cable from the power supply |
| Expected results | The kettle shouldn’t have sparks flying due to electricity shortage  The kettle should stop boiling after plugging out the cable  The kettle should be safe to use immediately after |

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| Test case | **Check if the handle is overheating** |
| Description | Turn on the kettle, put enough water and try boiling, when it’s done check the temperature of the handle |
| Steps | 1. Turn on the kettle 2. Open the lid and put water 3. Turn on the switch for boiling 4. Wait until boiled 5. Try touching the handle of the kettle |
| Expected results | The handle of the kettle shouldn’t be too hot to touch  The handle should be safe to touch immediately after boiling |

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| Test case | **Check if the power plug is overheating** |
| Description | Turn on the kettle, put enough water and try boiling, when it’s done check the temperature of the power plug |
| Steps | 1. Turn on the kettle 2. Open the lid and put water 3. Turn on the switch for boiling 4. Wait until boiled 5. Examine the power plug and its temperature |
| Expected results | The power plug shouldn’t be overheating  The power plug should be safe to be touched  The power plug should be safe to be plugged out with bare hands |

### Test Scenario #4: Extreme tests

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| Test case | **Boil ice cubes, instead of water -> fail** |
| Description | Turn on the kettle, put ice cubes instead of water and try boiling |
| Steps | 1. Turn on the kettle 2. Open the lid and put ice cubes instead of water 3. Turn on the switch for boiling |
| Expected results | The kettle shouldn’t start, or at least should stop after ~5 seconds |

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| Test case | **Boil juice (or a different beverage) instead of water -> fail** |
| Description | Turn on the kettle, put juice instead of water and try boiling |
| Steps | 1. Turn on the kettle 2. Open the lid and put juice instead of water 3. Turn on the switch for boiling |
| Expected results | The kettle shouldn’t start |

## Testing a Coffee Machine

### Test Scenario #1: Brew a Coffee

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| Test case | **Brew a coffee -> Success** |
| Description | Start the machine, put enough coffee and water, and try brewing a small coffee (60ml) |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water in the container 4. Put coffee in the coffee outlet 5. Wait until the water heats up and the indicator stops flickering 6. Press the “short coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The brewing process should be less than 50 seconds  A 100ml cup should hold the small coffee  The coffee should be hot  The machine should stay powered on  The water container is not empty yet, so the machine shouldn’t beep  The coffee should taste good (not too much water, less water…) |

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| Test case | **Brew a large coffee -> Success** |
| Description | Start the machine, put enough coffee and water, and try brewing a long coffee (120ml) |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water in the container 4. Put coffee in the coffee outlet 5. Wait until the water heats up and the indicator stops flickering 6. Press the “long coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The brewing process should be less than 50 seconds  A 150ml cup should hold the long coffee  The coffee should be hot  The machine should stay powered on  The water container is not empty yet, so the machine shouldn’t beep  The coffee should taste good (not too much water, less water…) |

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| Test case | **Brew a small coffee with 55ml or less water available in the container -> success** |
| Description | Start the machine, put coffee, and try brewing a small coffee with less than the expected amount of water |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the 50ml water 4. Put coffee in the coffee outlet and tighten it enough 5. Wait until the water heats up and the indicator stops flickering 6. Press the “small coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The coffee should be less than 60ml  The coffee should be hot  The machine should start beeping around the end of the brewing process  The machine should stop the process as soon as the water ends  The machine should continue beeping until powered off or until enough water is filled inside the container |

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| Test case | **Brew a large coffee with 100ml or less water available in the container -> success** |
| Description | Start the machine, put water, try brewing a large coffee with less than the expected amount of water |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up 100ml water 4. Put coffee in the coffee outlet and tighten it enough 5. Wait until the water heats up and the indicator stops flickering 6. Press the “large coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The coffee should be less than 120ml  The coffee should be hot  The machine should start beeping around the end of the brewing process  The machine should stop the process as soon as the water ends  The machine should continue beeping until powered off or until enough water is filled inside the container |

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| Test case | **Brew a large coffee with exactly 120ml water available in the container -> success** |
| Description | Start the machine, put water, try brewing a large coffee with 120ml water |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up exactly 120ml water 4. Put coffee in the coffee outlet and tighten it enough 5. Wait until the water heats up and the indicator stops flickering 6. Press the “large coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The coffee should be 120ml and hot  The machine should start beeping after finishing the process  The machine should continue beeping until powered off or until enough water is filled inside the container |

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| Test case | **Brew a coffee with no water in the container -> fail** |
| Description | Start the machine, don’t put water and leave the container empty, try brewing a coffee |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Leave the water container empty 4. Put coffee in the coffee outlet and tighten it enough 5. Press the “large coffee” button to start brewing |
| Expected results | The coffee machine should not start the brewing process  The coffee machine should beep until plugged off or water is poured |

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| Test case | **Brew coffee without any coffee in the outlet but enough water -> fail** |
| Description | Turn on the machine, put water, try brewing a coffee without putting any coffee in the outlet |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container 4. Don’t put any coffee in the outlet 5. Wait until the water heats up and the indicator stops flickering 6. Press the “large coffee” button to start brewing |
| Expected results | The machine shouldn’t start the brewing process at all |

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| Test case | **Brew coffee with a very small amount of coffee in the outlet** |
| Description | Turn on the machine, put water, try brewing a coffee with a small amount of coffee in the outlet |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container 4. Put a small amount of coffee that wouldn’t be enough for a small coffee 5. Wait until the water heats up and the indicator stops flickering 6. Press the “brew small coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The coffee should be more watery  The coffee should be hot |

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| Test case | **Brew coffee with already used coffee in the outlet -> fail** |
| Description | Turn on the machine, put water, try brewing a coffee with a already used coffee in the outlet (from a previous brewing) |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container 4. Don’t put new coffee in the outlet but use old one 5. Wait until the water heats up and the indicator stops flickering 6. Press the “brew small coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The brewing process shouldn’t start |

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| Test case | **Brew coffee with the coffee outlet put halfway through -> fail** |
| Description | Try brewing a coffee with enough water but the coffee outlet is not correctly put |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container 4. Put enough coffee in the coffee outlet 5. Don’t tighten the outlet till the end, put it halfway through 6. Wait until the water heats up and the indicator stops flickering 7. Click the “brew short coffee” button 8. Wait until the process finishes |
| Expected results | The brewing process shouldn’t start, because the outlet isn’t correctly put |

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| Test case | **Try brewing a coffee and click the “brew” button before the process has ended -> success** |
| Description | Start the machine, put water and coffee, click “brew large coffee”, wait around 5 seconds and hit the “brew coffee” button again |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container 4. Put enough coffee in the coffee outlet and tighten it enough 5. Wait until the water heats up and the indicator stops flickering 6. Click the “brew short coffee” button 7. Wait 5 seconds and click the “brew short coffee” button again |
| Expected results | The machine should stop after the second clicking of the button  The process is unfinished |

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| Test case | **Try brewing a coffee 1 hour after the machine was started -> success** |
| Description | Start the machine, put water and coffee, wait around an hour and hit the “brew coffee” button |
| Steps | 1. Make sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container 4. Put enough coffee in the coffee outlet and tighten it enough 5. Wait for around an hour 6. Click the “brew short coffee” button 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The brewing process should start after clicking the button  The water should remain hot because it wasn’t switched off  The coffee should be hot |

### Test Scenario #2: Look and feel

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| Test case | **Check the machine, container, outlet, buttons** |
| Description | Check how the machine looks, if the container is not broken, if the outlet is in good condition, if buttons are working |
| Steps | 1. Look at the machine and check if there are any visible defects 2. Check if the container is broken and if it could hold water 3. Try the outlet and if it is easy to put and remove from the machine 4. Check if all buttons are lighting up accordingly |
| Expected results | The machine should not have any visible defects  The container should be strong and able to hold water without it spilling  The outlet should be easy to be put and removed  The power button is able to be clicked easily, without much pressure needed  The hot water indicator should light up when the water is hot enough |

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| Test case | **Check if the water container can hold at least 130ml water (enough for one large coffee)** |
| Description | Take the container and fill it up with at least 130ml water |
| Steps | 1. Take the container 2. Fill it up with 130ml water 3. Put it back on the machine |
| Expected results | The container should hold at least 150ml water |

### Test Scenario #3: Extreme tests

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| Test case | **Test the brewing process with orange juice / beverage different than water -> fail** |
| Description | Power the machine, put coffee, put juice instead of water and test a coffee brewing process |
| Steps | 1. 6 Best Orange Juice Brands - Orange Juice Taste TestMake sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container with juice 4. Put enough coffee in the coffee outlet 5. Tighten the outlet 6. Wait until the heat indicator stops flickering 7. Click the “brew short coffee” button |
| Expected results | The process shouldn’t start or the machine should beep, indicating there is no water |

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| Test case | **Put coffee beans instead of ground coffee -> fail** |
| Description | Turn the machine on, put enough water, put coffee beans instead of ground coffee, test the brewing process |
| Steps | 1. Coffee bean - WikipediaMake sure the machine is connected to the power socket 2. Turn ON the machine with the power button 3. Fill up the water container 4. Put enough beans in the coffee outlet 5. Tighten the outlet 6. Wait until the heat indicator stops flickering 7. Click the “brew short coffee” button |
| Expected results | The coffee brewing process should not start |

### Test Scenario #4: Safety tests

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| Test case | **Check the water temperature** |
| Description | Turn on the machine, fill enough water and check its temperature |
| Steps | 1. Water thermometer stock image. Image of shadow, centigrade - 21921023Make sure the machine is connected to the power socket 2. Fill up the water container 3. Turn ON the machine with the power button 4. Wait until the temp indicator stops flickering 5. Check the temperature of the water with a thermometer |
| Expected results | The water should be hot enough for brewing coffee |

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| Test case | **Try starting the coffee machine with less power** |
| Description | Try starting the coffee machine with less electrical power than expected |
| Steps | 1. Make sure the machine is connected to a power socket with small amount of electricity 2. Turn ON the machine with the power button 3. Fill up the water in the container 4. Put coffee in the coffee outlet 5. Wait until the water heats up and the indicator stops flickering 6. Press the “short coffee” button to start brewing 7. Wait until the process finishes 8. Taste the coffee |
| Expected results | The coffee machine should be able to brew the coffee  The process may take longer than usual, but less than 2 minutes |

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| Test case | **Remove the water container during brewing process** |
| Description | Start a normal brewing process and halfway through remove the water container |
| Steps | 1. Make sure the machine is connected to a power socket 2. DeLonghi Nespresso Espresso/Cappuccino Machine EN520 Water Tank (Water Jug)  | Cappuccino machine, Cappuccino, Nespresso lattissimaTurn ON the machine with the power button 3. Fill up the water in the container 4. Put coffee in the coffee outlet 5. Wait until the water heats up and the indicator stops flickering 6. Press the “short coffee” button to start brewing 7. Wait around 8 seconds and remove the water container |
| Expected results | The process should stop as soon as the container is removed |

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| Test case | **Try brewing a coffee without plugging the machine to a power supply** |
| Description | Try brewing a coffee without plugging the machine to a power supply |
| Steps | 1. Don’t plug the machine to a power socket 2. Hit “Power on” 3. Hit “Brew coffee” |
| Expected results | The machine shouldn’t start at all  No buttons should light up  The power button should still be clickable |

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| Test case #2 | **…** |
| Description | … |
| Steps | 1. … 2. … 3. … |
| Expected results | …  …  … |