Testing object: Ballpoint pen with a replaceable blue rod.

Testing the pen at different levels of testing:

1. **Unit testing:**
    - ❖ Verify that the pen writes on paper.
    - ❖ Take the pen in hand and draw a straight line of 5 cm on a white sheet of paper.
    - ❖ Test that the pen's ink dries quickly and doesn't smudge or smear on paper.
    - ❖ Test that the pen's casing is secure and doesn't break or crack when pressure is applied.
    - ❖ Take a separate element of the pen, for example, the cap, and check if it screws onto the pen or slides onto the pen, if it is not too small or too big, if it fits securely onto the pen, if it is a strong cap.

2. **Integration testing:**
    - ❖ Ensure that the rod can be removed from the pen (System 1 is the cartridge, System 2 is the pen body).
    - ❖ Test that the pen works seamlessly with other office equipment, such as paper, notebooks, and filing systems.
    - ❖ Test that the pen's blue ink matches industry standards for color and consistency.

3. **System testing:**
    - ❖ Take the pen in hand and draw a straight line of 5 cm on a white sheet of paper. Ensure that the line is blue in color.
    - ❖ Unscrew the cap and remove the rod. Replace the rod and screw the cap back on and ensure that it is available for purchase and easy to find in stores.
    - ❖ Test the pen's compatibility with different types of paper, such as glossy or coated paper, to ensure that the ink adheres properly and doesn't smudge or rub off.

4. **Acceptance testing:**
    - ❖ Verify that the pen writes in blue on paper and doesn't require significant effort.
    - ❖ Verify that the pen is comfortable to hold.

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Testing the pen by testing types:

1. **Functional testing** is divided into:
   - ❖ *Security*. Test whether the ink and pen body are safe for health.
   - ❖ *Interoperability*. Test whether the pen can be attached to clothing.
   - ❖ *Functional*. Take the pen in hand and draw a straight line of 5 cm on a white sheet of paper. Ensure that the line is blue in color. Unscrew the cap and remove the rod. Replace the rod and screw the cap back on.

2. **Non-functional testing:**
   - ❖ *Stress*. Verify that the cartridge in the pen will last for 1.5 km of writing.
   - ❖ Usability. Verify that the pen writes in blue on paper and doesn't require significant effort. Verify that the pen is comfortable to hold.
   - ❖ *Configuration*. Verify that the pen writes at room temperature of -20 degrees, 0 degrees, and 20 degrees. Verify that the pen writes on paper, cardboard, and skin.

3. **Changes related:** (suppose that a rubber eraser for ballpoint pen paste is put on top of the screw-on cap of the pen).
   - ❖ *Regression*. Take the pen in your hand. Draw a straight line 5 cm long on a white sheet of paper. Make sure the line is in blue color. Remove the rubber eraser from the cap. Unscrew the cap and remove the ink rod. Put the rod back in place and screw the cap back on. Put the rubber eraser on top of the cap.
   - ❖ Re-testing. Suppose the rubber eraser can'e be put on the cap. The developer widened the hole in the cap. The tester checks if the rubber eraser can be put on the cap.
   - ❖ *Smoke.* Take the pen in your hand. Draw a straight line on a white sheet of paper and make sure the pen writes in blue color.
   - ❖ *Sanity.* Suppose the pen body was previously plastic, and now it's made of wood. Check that the pen looks visually the same size, has a twist-on cap, and a blue ink rod.