**Questions**

Note: all questions below should be answered using Java programming language.

**Question 1:** Given a list with duplicate values, implement a solution to remove duplicate values from this list.

Example:

* Input: [1, 10, 2, 2, 10, 3, 3, 3, 4, 5, 5]
* Output: [1, 10, 2, 3, 4, 5]
* Input: ["G", "e", "e", "k", "s"]
* Output: ["G", "e", "k", "s"]

**Question 2**: Given two arrays of integers, compute the pair of values (one value in each array) with the smallest (non-negative) difference and then return the difference.

Example:

* Input: {1, 3, 15, 11, 2},{23, 127, 235, 19, 8}
* Output: Smallest difference: 3, pair: (11,8)

**Question 3**: Implement a method to perform basic string compression using the counts of repeated characters. If the “compressed” string doesn’t become smaller than the original string, your method should return the original string. You can assume the string has only uppercase and lowercase letters(a-z).

Example:

* Input: aabcccccaaa
* Output: a2b1c5a3
* Input: abc
* Output: abc (instead of a1b1c1)

**Question 4:** In this question, we would like to evaluate your ability to create and implement automations following below test cases using **Selenium + Java** considering the principles of Object-Oriented Programming. For that, you should use **this page**: <http://automationpractice.com>.

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| **Test Case ID** | **Test Case Summary** | **Test Steps** | **Expected Results** |
| #1 | Automate User Registration Process | 1. Open this URL http://automationpractice.com/index.php  2. Click on the 'Sign in' button.  3. Enter your email address in the 'CREATE AN ACCOUNT' section.  4. Click on Create an Account button.  5. Enter your Personal Information, Address, and Contact info.  6. Click on the Register button.  7. Validate that the user is created. | User validated and created |
| #2 | Verify invalid email address error. | 1. Open this url http://automationpractice.com/index.php  2. Click on sign in link.  3. Enter invalid email address in the email box and click enter.  4. Validate that an error message is displaying saying "Invalid email address." | Error message should show up: "Invalid email address." |
| #3 | Verify error messages for mandatory fields. | 1. Open this url http://automationpractice.com/index.php  2. Click on the 'Sign in' button.  3. Enter a valid email address and click on Create an Account button.  4. Leave the mandatory fields (marked with \*) blank and click the Register button.  5. Verify that error has been displayed only for the mandatory fields. | Error messages should display for the mandatory fields |
| #4 | Verify error messages for entering incorrect values in fields. | 1. Open this url http://automationpractice.com/index.php  2. Click on sign in link.  3. Enter email address and click on Create an Account button.  4. Enter incorrect values in fields like enter numbers in first and last name, alphabets in Mobile no, invalid Zip postal code etc., and click on the 'Register' button.  5. Verify that error messages for respective fields are displaying. | Error messages should display for the fields with wrong values |
| #5 | Automate 'Search Product' Functionality | 1. Open link http://automationpractice.com/index.php  2. Move your cursor over Women's link.  3. Click on sub menu 'T-shirts'  4. Get Name/Text of the first product displayed on the page.  5. Now enter the same product name in the search bar present on top of page and click the search button.  6. Validate that the same product is displayed on a searched page with the same details which were displayed on T-Shirt's page. | Have the same product displayed on a searched page with the same details which were displayed on T-Shirt's page |
| #6 | Automate 'Buy Product' | 1. Open link http://automationpractice.com/index.php  2. Login to the website.  3. Move your cursor over Women's link.  4. Click on the sub menu 'T-shirts'.  5. Mouse hover on the second product displayed.  6. 'More' button will be displayed, click on 'More' button.  7. Increase quantity to 2.  8. Select size 'L'  9. Select color.  10. Click the 'Add to Cart' button.  11. Click the 'Proceed to checkout' button.  12. Complete the buy order process till payment.  13. Make sure that Product is ordered. | Product ordered in > My account > Order history: http://automationpractice.com/index.php?controller=history |
| #7 | Verify that 'Add to Wishlist' only works after login. | 1. Open link <http://automationpractice.com/index.php> 2. Make sure you are not logged in with any user. If yes, please, proceed with the ‘Sign out’.  3. Move your cursor over Women's link.  4. Click on the sub menu 'T-shirts'.  5. Mouse hover on the second product displayed.  6. 'Add to Wishlist' will appear on the bottom of that product, click on it.  7. Verify that the error message is displayed 'You must be logged in to manage your wishlist.' | User should not be able to add to wishlist before logged in |
| #8 | Add to Wishlist | 1. Open link <http://automationpractice.com/index.php> 3. Move your cursor over Women's link.  4. Click on the sub menu 'T-shirts'.  5. Mouse hover on the second product displayed.  6. 'Add to Wishlist' will appear on the bottom of that product, click on it.  7. Verify if the product is on your Whishlist under My account > My wishlists | User should be able to see the products in the wishlist |
| #9 | Verify that Total Price is reflecting correctly if user changes quantity on 'Shopping Cart Summary' Page | 1. Open link http://automationpractice.com/index.php  2. Login to the website.  3. Move your cursor over Women's link.  4. Click on the sub menu 'T-shirts'.  5. Mouse hover on the second product displayed.  6. 'More' button will be displayed, click on 'More' button.  7. Make sure the quantity is set to 1.  8. Select size 'M'  9. Select the color of your choice.  10. Click the 'Add to Cart' button.  11. Click the 'Proceed to checkout' button.  12. Change the quantity to 2.  13. Verify that Total price is changing and reflecting the correct price. | Total Price should reflect correctly with users changes in the Cart |

**Question 5:** Write an Object-Oriented program in Java implementing this scenario:

Imagine you need to create a Test Management program to test smartphones. End-users should be able to create test plans, test cycles, test cases, and also execute those test cases. Test cases should be shared by many test cycles.

Entries:

* **Test Execution Result**: a set of data generated by a test case execution. Data includes the tester responsible for the execution, the execution date, the defects raised, the environment, and the status of the execution (e.g., passed or failed).
* **Test Case**: a test artifact developed for a particular test condition, such as to exercise a particular program path or to verify compliance with a specific requirement. A test case should have a set of steps under which a tester will determine whether a system under test satisfies requirements or works correctly. Test cases should be reused trough test cycles
* **Test Cycle**: a list of test cases assigned to testers and test environments created to achieve specific testing goals (usually a longer test run, such as regression tests, build verification tests, end-to-end tests, etc.).
* **Test Plan**: an artifact used to track testing progress throughout an entire release or version. You can associate several test cycles to a test plan to get real-time progress reports. Test plan fields should allow you to track scope, risks, strategy, and test environment.

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Suggested operations:

* Create a Test case, Test Plan, and Test Cycle;
* Manage Test Cases in Test Cycle;
* Manage Test Cycles in Test Plan;
* Add Test Execution result;

Note: you don’t need to really implement those methods, only create a mockup with methods and class.