JAVA Exercises

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1. Write a program that ignores nonalphanumeric characters in checking whether a string is a palindrome.

   Here are the steps to solve the problem:

   Filter the string by removing the nonalphanumeric characters. This can be done by creating an empty string builder, adding each alphanumeric character in the string to a string builder, and returning the string from the string builder. You can use the **isLetterOrDigit(ch)** method in the **Character** class to check whether character **ch** is a letter or a digit.

   Obtain a new string that is the reversal of the filtered string. Compare the reversed string with the filtered string using the **equals** method.

   Sample Runs:

```
Enter a string: ab<c>cb?a Enter
Ignoring nonalphanumeric characters,
is ab<c>cb?a a palindrome? true
```

```
Enter a string: abcc><?cab Enter
Ignoring nonalphanumeric characters,
is abcc><?cab a palindrome? false
```

2. The split method in the String class returns an array of strings consisting of the substrings split by the delimiters. However, the delimiters are not returned. Implement the following new method that returns an array of strings consisting of the substrings split by the matching delimiters, including the matching delimiters.

   public static String[] split(String s, String regex)

   For example, split("ab#12#453", "#") returns ab, #, 12, #, and 453 in an array of String and split("a?b?gf#e", "[?#]") returns a, ?, b, ?, gf, #, and e in an array of String.

3. The international standard letter/number mapping found on the telephone is shown below:

Write a program that prompts the user to enter a letter and displays its corresponding number.

```
Enter a letter: A Enter
The corresponding number is 2
```

```
Enter a letter: a Enter
The corresponding number is 2
```

```
Enter a letter: + Enter
+ is an invalid input
```

4. Write a program that will grade multiple-choice test. Assume there are eight students and ten questions, and the answers are stored in a two-dimensional array. Each row records a student's answers to the questions, as shown in the following array.

Students' Answers to the Questions:

	0	1	2	3	4	5	6	7	8	9
Student 0	A	B	A	C	C	D	E	E	A	D
Student 1	D	B	A	B	C	A	E	E	A	D
Student 2	E	D	D	A	C	B	E	E	A	D
Student 3	C	B	A	E	D	C	E	E	A	D
Student 4	A	B	D	C	C	D	E	E	A	D
Student 5	B	B	E	C	C	D	E	E	A	D
Student 6	B	B	A	C	C	D	E	E	A	D
Student 7	E	B	E	C	C	D	E	E	A	D

The key is stored in a one-dimensional array:

Key to the Questions:

	0	1	2	3	4	5	6	7	8	9
Key	D	B	D	C	C	D	A	E	A	D

Sample Run:

```
Student 0's correct count is 7
Student 1's correct count is 6
Student 2's correct count is 5
Student 3's correct count is 4
Student 4's correct count is 8
Student 5's correct count is 7
Student 6's correct count is 7
Student 7's correct count is 7
```