Palindrome.java and PalindromeTester.java

"Madam, I'm Adam"
- Adam

"Men, I'm Eminem!"
- M. Salveit, 2000

"A man, a plan, a canal: Panama!"
- L. Mercer, 1914

"A man, a plan, a canoe, pasta, heros, rajahs, a coloratura, maps, snipe, percale, macaroni, a gag, a banana bag, a tan, a tag, a banana bag again (or a camel), a crepe, pins, Spam, a rut, a Rolo, cash, a jar, sore hats, a peon, a canal: Panama!"
- G. Jacobson, 1984

Background:

1. A phrase is a palindrome if it reads the same forwards and backwards. For example, the word

   ```
   level
   ```

   is a palindrome. Palindromes can also contain digits for this exercise. Therefore

   ```
   5mom5
   ```

   is also considered a palindrome.

2. The idea of a palindrome can be extended to phrases or sentences if we ignore details like punctuation. Here are two familiar examples:

   ```
   Madam, I'm Adam
   A man, a plan, a canal: Panama
   ```

   We can recognize these more elaborate examples as palindromes by considering the text that is obtained by removing all spaces and punctuation marks and converting all letters to their lower-case form.

   ```
   Madam, I'm Adam                ==> madamimadam
   A man, a plan, a canal: Panama ==> amanaplanacanalpanama
   ```

3. If the "word" obtained from a phrase in this manner is a palindrome, then the phrase is a palindrome.

`PalindromeTester.java`:

1. Your driver should prompt the user for a String. You will tell them if the String is a palindrome or not. For input, use the Scanner class as outlined in the lecture notes, in the partial API shown in our Canvas course reference sheets, and as shown below (#4).

2. Your interaction with the user should be in a loop to enable them to enter more than one String (see sample output at the end of these specs). Use the sentinel "q" for the user to let you know they are done entering palindrome possibilities.

3. Your driver should:

   a) output an introductory statement that gives the user an idea what the program does
   b) prompt for Strings until they are done (make sure they know how to let you know they are done!)
   c) echo their original String and let them know if it is a palindrome or not as defined above

4. How do you grab an entire line of input and assign it to a String with the Scanner class?

```
Scanner input = new Scanner(System.in); //creates a new Scanner object
String str = input.nextLine(); //grabs ALL the characters until the user pushes enter.
                               //  nextLine() searches for the return character and grabs
                               //  all leading, trailing, and in between white space
```

`Palindrome.java`

1. This Palindrome class does all the String manipulation to determine whether or not the given String is a palindrome. I highly recommend that you compartmentalize the tasks involved into separate methods.

2. Your class should ignore the case of the letter. In other words, an "a" and an "A" should be treated the same.

3. A palindrome is determined by considering only alphabetic characters (a – z, A – Z) and numbers (0 – 9) as valid text. You can check with code like this:

```
if ((ch >= 'a' && ch <= 'z') || (ch >= '0' && ch <= '9'))
```

4. An input string consisting of a single character or no characters (after punctuation and white space has been stripped) is not considered to be a palindrome. For example, none of ???j, n, 7_ should be considered a palindrome)

5. No user interactions should be in this file.

6. In addition to the usual class headers at the top of each file, each method should have a comment immediately above it stating its main idea.

Instructions:

1. Use these sample phrases as inputs for your run outputs:

```
radar
J
Lewd did I live, & evil I did dwel.
I like Java
Straw? No, too stupid a fad, I put soot on warts.
```

2. Here are sample run outputs. Note that these are just suggested input values to check to see if your program is correctly working. DO NOT hardcode these into your driver.

```
Welcome to the Palindrome Program!  Enter the letter q when you are done.

Enter a string: radar
Yes, the string radar is a palindrome.
```

```
Enter a string: J
No, the string J is NOT a palindrome.

Enter a string: Lewd did I live, & evil I did dwel.
Yes, the string Lewd did I live, & evil I did dwel. is a palindrome.

Enter a string: I like Java
No, the string I like Java is NOT a palindrome.

Enter a string: Straw? No, too stupid a fad, I put soot on warts.
Yes, the string Straw? No, too stupid a fad, I put soot on warts is a palindrome.

Enter a string: q
```

3. Upload your source code for both files.

Note: The World's Longest Palindrome, created at 8:02 PM on the 20th of February (a palindromic time/date - 20:02 02/20 2002) is reported at http://www.norvig.com/palindrome.html