proj04: Lists

**Part I:**

Take a list, say for example this one:

a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]

and write a program that prints out all the elements of the list that are less than 5.

*Extensions*

1. Instead of printing the elements one by one, make a new list that has all the elements less than 5 from this list in it and print out this new list.
2. Ask the user for a number and return a list that contains only elements from the original list a that are smaller than that number given by the user.

**Part II:**

Take two lists, say for example these two:

a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
b = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]

and write a program that creates and prints a list that contains only the elements that are common between the lists (without duplicates). Make sure your program works on two lists of different sizes.

*Hints:*

One of the interesting things you can do with lists in Python is figure out whether something is inside the list or not. For example:

```
>>> a = [5, 10, 15, 20]
>>> 10 in a
        True
>>> 3 in a
        False
```

You can of course use this in loops, conditionals, and any other programming constructs.

```
list_of_students = ["Michele", "Sara", "Cassie"]
name = input("Type name to check: ")
if name in list_of_students:
        print("This student is enrolled.")
```

*Extension*s:

1. Randomly generate two lists to test this
2. Write this in one line of Python (don't worry if you can't figure this out at this point - we'll get to it soon)

**Part III:**
Take a list, say for example this one:

d = [“b”, “c”, “t”, “y”, “v”, “a”, “n”, “a”, “y”, “r”]

and write a program that replaces all “a” with “*”.

You can of course use this in loops, conditionals, and any other programming constructs.

```
list_of_students = ["Michele", "Sara", "Cassie"]
old_name = input("Type name to change: ")
new_name = input("Type new name: ")
counter = 0
if list_of_students[counter] == old_name:
        list_of_students[counter] = new_name
        counter = counter + 1
```

**Part IV:**

Ask the user for a string and print out whether this string is a palindrome or not.
(A **palindrome** is a string that reads the same forwards and backwards.)

Example:
Enter a word: *banana*
Banana is not a palindrome.

Enter a word: *racecar*
Racecar is a palindrome.

*Hints:*
To compare the first and last letter in the list, use list[0] == list[-1]
To remove the first and last letter from the list, use list = list[1:-1]

*Extensions:*

- Make your program case in-sensitive (‘Racecar’ is still a palindrome, not just ‘racecar’).
- Make you program ignore spaces (‘A man a plan a canal panama’ is a palindrome.