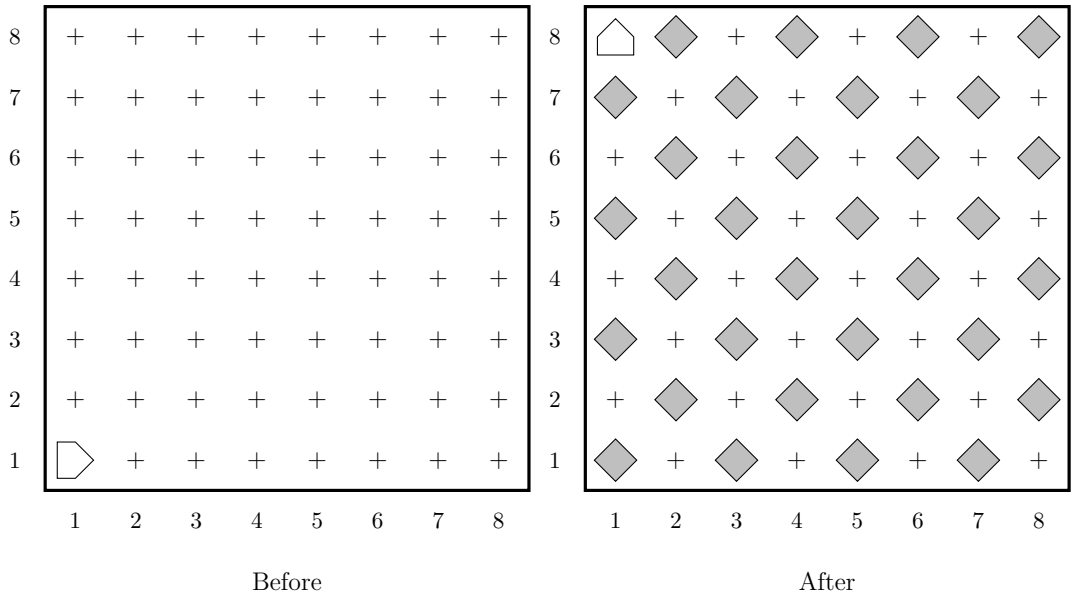
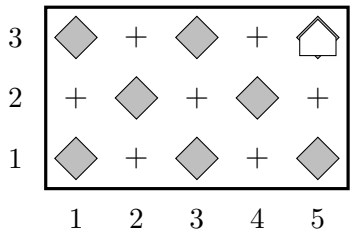
This problem set has one problem relating to Karel and then two problems concerning more generic Python programming. All have starting templates included in the repository. Do not forget to adjust the README to indicate you have completed the assignment before your final commit!

1. Karel, tired of painting, is thinking more abstractly, and wants to lay out a checkerboard pattern of beepers inside an empty rectangular world. An example of a before and after for an 8x8 world is shown below:



   This problem has a nice decomposition structure along with some interesting algorithmic issues. As you think about how you will solve the problem, you should make sure that your solution works with checkerboards that are different in size from the standard 8x8 checkerboard shown in the example above. Odd-sized checkerboards are trickier, and you should make sure that your program generates the following pattern in a 5x3 world:



   Another special case you need to consider is that of a world which is only one column wide or one row high. The repository includes several sample worlds for you to test your program against, including: `1x8.w`, `5x3.w`, `5x5.w`, and `8x1.w`. You can safely assume that Karel always starts in the bottom left corner and facing to the east with an infinite supply of beepers in its bag. In does not matter where Karel finishes or which

specific spaces have beepers, except that the world should be completely checkerboarded. To get full points on this problem, your program should show clear evidence of how you decomposed the problem and successfully recreate a checkerboard on any empty rectangular world.

2. Problem courtesy of Eric Roberts.

> *It is a beautiful thing, the destruction of words.*
>
> —Syme in George Orwell's *1984*

In Orwell's novel, Syme and his colleagues at the Ministry of Truth are engaged in simplifying English into a more regular language called *Newspeak*. As Orwell describes in his appendix entitled "The Principles of Newspeak," words can take a variety of prefixes to eliminate the need for the massive number of words we have in English. For example, Orwell writes,

> Any word—this again applied in principle to every word in the language—could be negatived by adding the affix *un-*, or could be strengthened by the affix *plus-*, or, for still greater emphasis, *doubleplus-*. Thus, for example, *uncold* meant "warm", while *pluscold* and *doublepluscold* meant, respectively, "very cold" and "superlatively cold."

Define three functions—`negate`, `intensify`, and `reinforce`—that take a string as input and add the prefixes `"un"`, `"plus"`, and `"double"` to that string, respectively, returning the result. For instance, if you were to enter in `negate("cold")` you should get out the string `"uncold"`. Below are several more examples of expected input and output. These are all also printed in the given template so that you can check your code.

```
                    negate("cold") →  "uncold"
                 intensify("cold") →  "pluscold"
          reinforce(intensify("cold")) →  "doublepluscold"
reinforce(intensify(negate("good"))) →  "doubleplusungood"
```

3. Write a program that displays the integers between 1 and 100 that are divisible by either 6 or 7 but not both. Your program should print one number on each line. I'm supplying you a template file, but it is largely empty in this situation, so you have lots of flexibility in how you want to approach this. Note here that you want to actually print each number from within the function, you do *not* want to return them.