

In Molecular Genetics, there is a notion of an Open Reading Frame (ORF). An ORF is a portion of DNA that is used as the blueprint for a protein. All ORFs start with a particular sequence, and end with a particular sequence.

In this task, we wish to find all sections of a genome which start with a given sequence of characters, and end with a (possibly) different given sequence of characters.

To solve this problem, you will need to create a class `OrfFinder`. The constructor for this class takes a string `genome` as a parameter. Additionally, this class will need a method `find(start, end)`.

## 1.1 Input

`genome` is a single non-empty string consisting only of uppercase [A-D]. `genome` is passed as an argument to the `__init__` method of `OrfFinder` (i.e. it gets used when creating an instance of the class).

`start` and `end` are each a single non-empty string consisting of only uppercase [A-D].

## 1.2 Output

`find` returns a list of strings. This list contains all the substrings of `genome` which have `start` as a prefix and `end` as a suffix. There is no particular requirement for the order of these strings. `start` and `end` must not overlap in the substring (see the last two cases of the example below).

## 1.3 Example

```
genome1 = OrfFinder("AAABBBCCC")
genome1.find("AAA","BB")
>>> ["AAABB", "AAABBB"]
genome1.find("BB","A")
>>> []
genome1.find("AA","BC")
>>> ["AABBBC", "AAABBBC"]
genome1.find("A","B")
>>> ["AAAB", "AAABB", "AAABBB", "AAB", "AABB", "AABBB", "AB", "ABB", "ABBB"]
genome1.find("AA","A")
>>> ["AAA"]
#note that "AA" is not valid, since start and end would need to overlap
genome1.find("AAAB","BBB")
>>> []
# note that "AAABBB" is not valid, since start and end would need to overlap
```

## 1.4 Complexity Requirements

- The `__init__` method of `OrfFinder` must run in time complexity  $O(N^2)$ , where  $N$  is the length of `genome`.
- Let  $T$  be the length of the string `start`,  $U$  be the length of the string `end`, and  $V$  be the number of characters in the output list (for a correctly generated output list according to the instructions in 1.2), then `find` must run in time complexity  $(T + U + V)$ .

As an example of what the complexity for `find` means, consider a string consisting of  $\frac{N}{2}$  "B"s followed by  $\frac{N}{2}$  "A"s. If we call `find("A", "B")`, the output is empty, so  $V$  is  $O(1)$ . On the other hand, if we call `find("B", "A")` then  $V$  is  $O(N^2)$ .