Pair Programming Practice

Guideline, mechanisms & contingency plan

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Pairing similar, not necessarily equal, abilities as partners

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Collaborative learning environment

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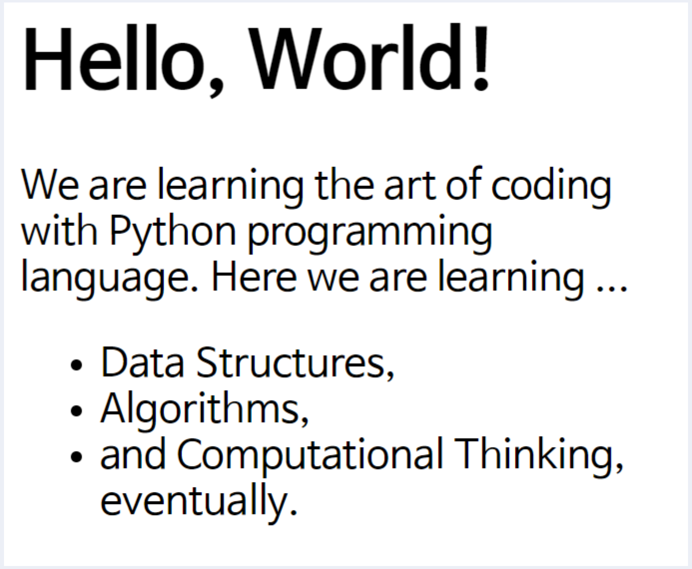
Pair programming

Q1. The HTML document consists of many tags as shown below. Write a program that matches HTML document tags.

Matching HTML Tags

```
<html>
<body>
<h1>Hello, World!</h1>
<p> We are learning the art of coding
with Python programming language.
Here we are learning ... </p>
<ul>
<li> Data Structures, </li>
<li> Algorithms, </li>
<li> and Computational Thinking,
    eventually. </li>
</ul>
</body>
</html>
```



Hello, World!

We are learning the art of coding with Python programming language. Here we are learning ...

- Data Structures,
- Algorithms,
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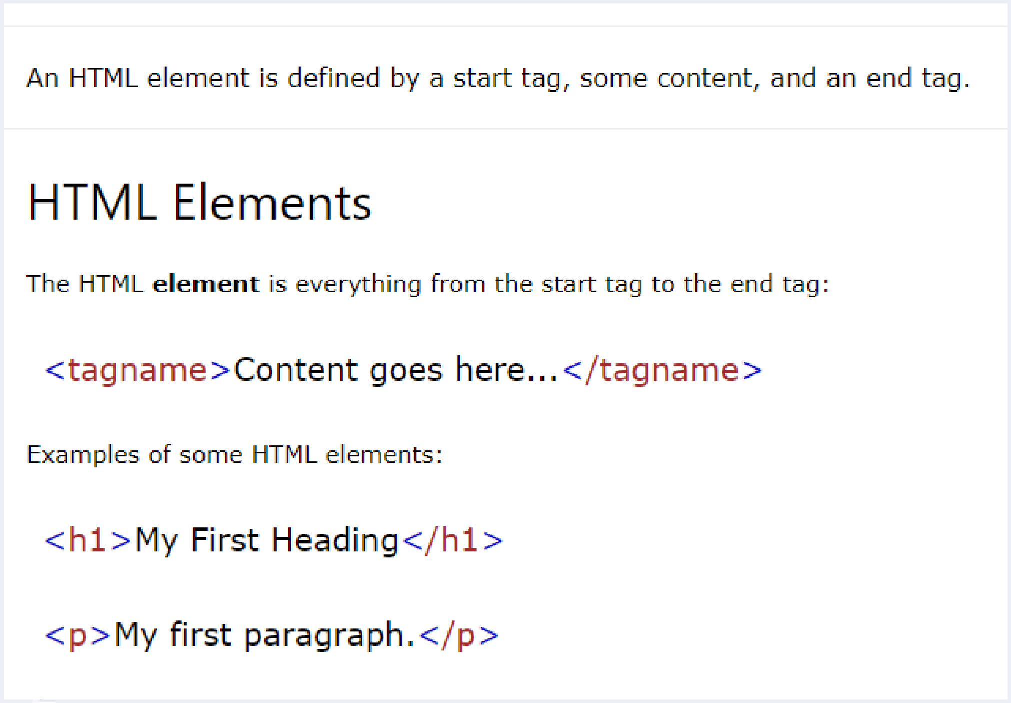
Reference


An HTML element is defined by a start tag, some content, and an end tag.

HTML Elements

The HTML **element** is everything from the start tag to the end tag:

```
<tagname>Content goes here...</tagname>
```

Examples of some HTML elements:

```
<h1>My First Heading</h1>

<p>My first paragraph.</p>
```

https://www.w3schools.com/html/html_elements.asp

TIP

- In Python, the find() method is used to locate the start position of the substring. Find the ‘<‘ and ‘>’ to distinguish HTML document tags.
- If the distinguished tag includes ‘/,’ then it is an open tag, and if not, it is a close tag. Check the HTML tag matching in a similar way of using a stack to match parentheses.

```python
text = input("Input the string of HTML document: ")
```

```
Input the string of HTML document: <html> <body> <h1>Hello, World!</h1> <p> We are learning the art of coding
with Python programming language. Here we are learning ... </p>  <ul> <li> Data Structures, </li> <li> Algorit
hms, </li> <li> and Computational Thinking,      eventually. </li>  </ul> </body> </html>
```

```python
start = text.find('<')
while start != -1:
    end = text.find('>', start + 1)
    tag = text[start:end+1]
    print(tag, end = ' ')
    start = text.find('<', end + 1)
```

```
<html> <body> <h1> </h1> <p> </p> <ul> <li> </li> <li> </li> <li> </li> </ul> </body> </html>
```

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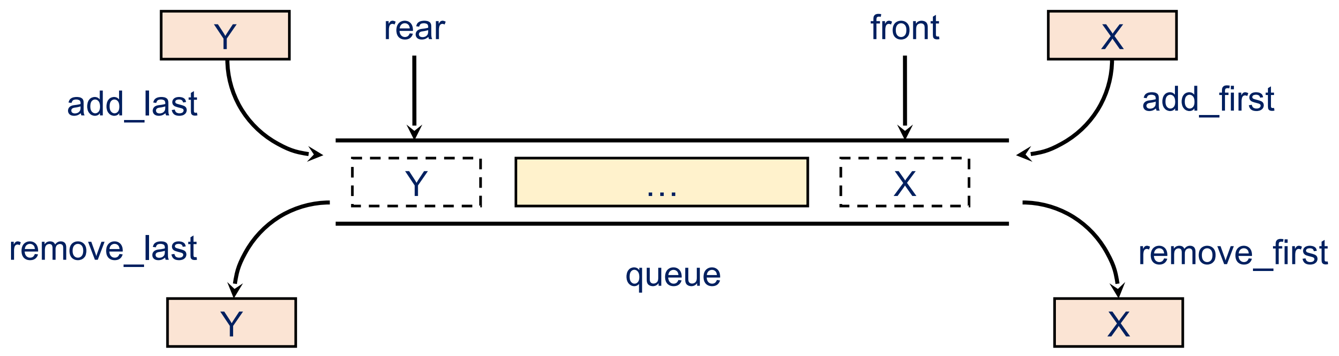
Q1. Refer to the class definition as follows to complete and test the Deque class.

```python
class Deque:

    def __init__(self):
        self.queue = []

    def add_first(self, item):
        ''' Add an item to the front of the queue '''

    def remove_first(self):
        ''' Remove and return the item from the front '''

    def add_first(self, item):
        ''' Add an item to the rear of the queue '''

    def remove_first(self):
        ''' Remove and return the item from the rear '''
```

Pair programming

TIP

- A queue is an abstract data type where only addition is possible on one side and only removal is possible on the other side. In contrast, the Double Ended Queue (Deque) is the data structure where addition and removal are possible on both sides.



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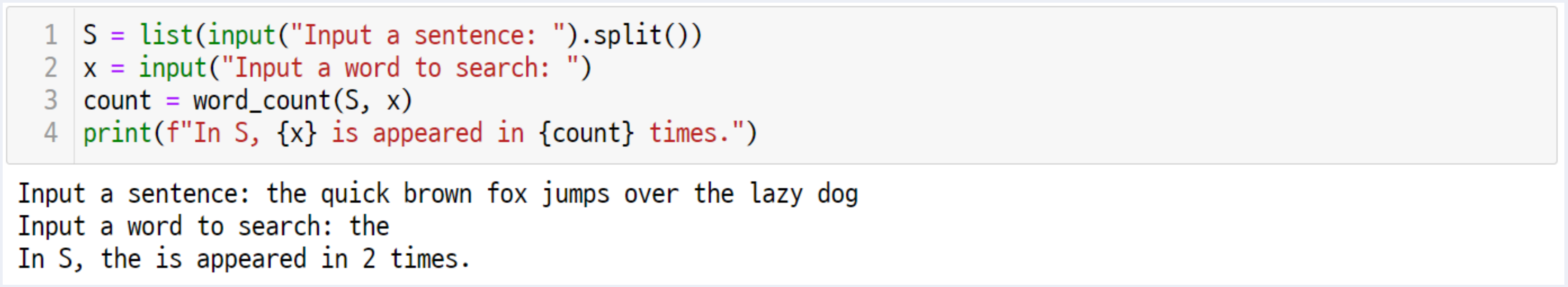
Q1. Write a program to count how many times a specific word was used in the sentence entered by the user.

- In the sentence entered by the user, a word is distinguished by the presence of spacing.
- Use the input().split() function to create the list S that has each string as its element.
- Use the input() function to receive the word that will be searched by the user and save it to x.
- The word_count() function receives S and x as parameters and provides a return by counting how many x are present in the S.



```python
S = list(input("Input a sentence: ").split())
x = input("Input a word to search: ")
count = word_count(S, x)
print(f"In S, {x} is appeared in {count} times.")
```

```
Input a sentence: the quick brown fox jumps over the lazy dog
Input a word to search: the
In S, the is appeared in 2 times.
```

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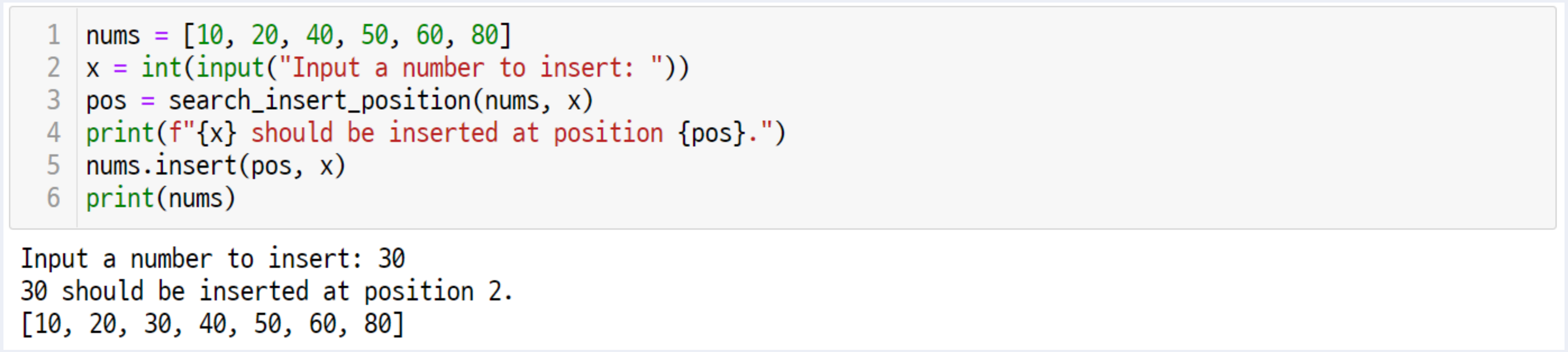
Q1. If an ordered list ’nums’ and a random integer x are given, implement the function that returns the location of index where x will be inserted. However, the S should be an ordered list even after inserting x.



```python
nums = [10, 20, 40, 50, 60, 80]
x = int(input("Input a number to insert: "))
pos = search_insert_position(nums, x)
print(f"{x} should be inserted at position {pos}.")
nums.insert(pos, x)
print(nums)
```

```
Input a number to insert: 30
30 should be inserted at position 2.
[10, 20, 30, 40, 50, 60, 80]
```

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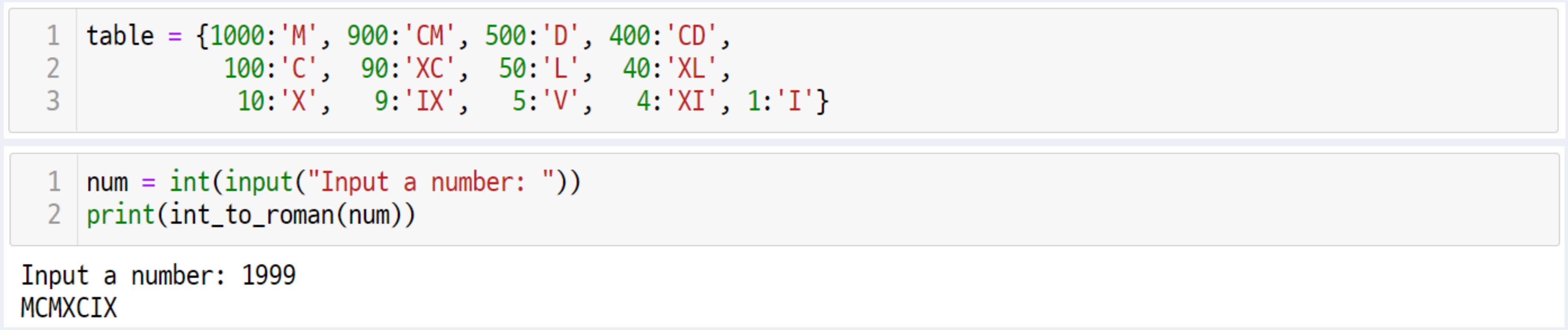
Q1. Create a converter that converts Arabic numerals to Roman numerals by using the hash table provided below.



```python
table = {1000:'M', 900:'CM', 500:'D', 400:'CD',
           100:'C',  90:'XC',  50:'L',  40:'XL',
            10:'X',   9:'IX',   5:'V',   4:'XI', 1:'I'}
```

```python
num = int(input("Input a number: "))
print(int_to_roman(num))
```

```
Input a number: 1999
MCMXCIX
```

Examples of roman numbers:

369, 80, 29, 155, 14, 492, 348, 301, 469, 499

CCCLXIX, LXXX, XXIX, CLV, XIV, CDXCII, CCCXLVIII, CCCI, CDLXIX, CDXCIX,