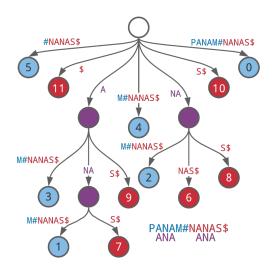
# 9E Find the Longest Substring Shared by Two Strings

## **Longest Shared Substring Problem**

Find the longest substring shared by two strings.

**Input:** Strings  $Text_1$  and  $Text_2$ .

**Output:** The longest substring that occurs in both  $Text_1$  and  $Text_2$ .



# **Formatting**

**Input:** A pair of strings *Text*<sub>1</sub> and *Text*<sub>2</sub>

**Output:** The longest substring that occurs in both  $Text_1$  and  $Text_2$ 

## **Constraints**

• The lengths of  $Text_1$  and  $Text_2$  will be between 1 and  $10^3$ .

## **Test Cases**

#### Case 1

**Description:** The sample dataset is not actually run on your code.

## Input:

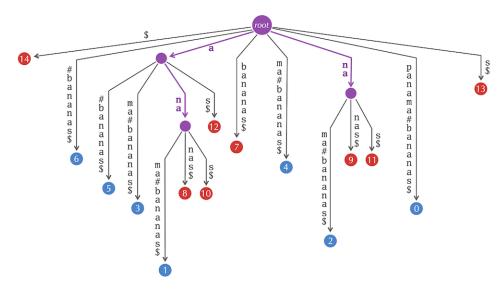
panama

bananas

### **Output:**

ana

### Figure:



Shown above is the suffix tree of the string panama#bananas\$. Blue and red leaves represent suffixes that start in panama and bananas, respectively. An internal node is colored purple if it has both blue and red descendants. Each purple node is a shared substring of panama and bananas. The longest shared substring (purple node) is ana.

Description: Text1 and Text2 have no common substring.  Input: GAGA CTCT  Output:  Case 3  Description: Text1 and Text2 only share 1-mers.  Input: GAGT GGCT  Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text1 = Text2.  Input: GAGCAT GAGCAT GAGCAT CASE 5  Description: The suffix of Text1 and the prefix of Text2 are the same.  Input: GAGCAT CATAGA  Output: GAGCAT CATAGA  Output: CAT	Case 2
GAGA CTCT  Output:  Case 3  Description: Text1 and Text2 only share 1-mers.  Input: GAGT GGCT  Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text1 = Text2.  Input: GAGCAT GAGCAT GAGCAT Case 5  Description: The suffix of Text1 and the prefix of Text2 are the same.  Input: GAGCAT CATAGA Output:	<b>Description:</b> $Text_1$ and $Text_2$ have no common substring.
GAGA CTCT  Output:  Case 3  Description: Text1 and Text2 only share 1-mers.  Input: GAGT GGCT  Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text1 = Text2.  Input: GAGCAT GAGCAT GAGCAT Case 5  Description: The suffix of Text1 and the prefix of Text2 are the same.  Input: GAGCAT CATAGA Output:	Input:
Case 3  Description: Text <sub>1</sub> and Text <sub>2</sub> only share 1-mers.  Input: GAGT GGCT  Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text <sub>1</sub> = Text <sub>2</sub> .  Input: GAGCAT GAGCAT Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA Output:	
Case 3  Description: Text <sub>1</sub> and Text <sub>2</sub> only share 1-mers.  Input: GAGT GGCT  Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text <sub>1</sub> = Text <sub>2</sub> .  Input: GAGCAT GAGCAT Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA Output:	CTCT
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Input: GAGT GGCT  Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text <sub>1</sub> = Text <sub>2</sub> .  Input: GAGCAT GAGCAT  Output: GAGCAT  Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA  Output:	Case 3
GAGT GGCT  Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text <sub>1</sub> = Text <sub>2</sub> .  Input: GAGCAT GAGCAT GAGCAT Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA Output:	<b>Description:</b> $Text_1$ and $Text_2$ only share 1-mers.
Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text <sub>1</sub> = Text <sub>2</sub> .  Input: GAGCAT GAGCAT Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA Output:	Input:
Output: C or G or T (you will not be penalized for having one over the other, but make sure you only output one).  Case 4  Description: Text <sub>1</sub> = Text <sub>2</sub> .  Input: GAGCAT GAGCAT Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA Output:	GAGT
Case 4  Description: Text <sub>1</sub> = Text <sub>2</sub> .  Input: GAGCAT GAGCAT Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA  Output:	GCT
Case 4  Description: $Text_1 = Text_2$ .  Input:  GAGCAT  GAGCAT  Output:  GAGCAT  Case 5  Description: The suffix of $Text_1$ and the prefix of $Text_2$ are the same.  Input:  GAGCAT  CATAGA	
Input:  GAGCAT  GAGCAT  Output:  GAGCAT  Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input:  GAGCAT  CATAGA  Output:	. or G or 1 (you will not be penalized for having one over the other, but make sure you only output one)
Input: GAGCAT GAGCAT  Output: GAGCAT  Case 5  Description: The suffix of Text1 and the prefix of Text2 are the same.  Input: GAGCAT  CATAGA  Output:	Case 4
GAGCAT  Output: GAGCAT  Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT  CATAGA  Output:	<b>Description:</b> $Text_1 = Text_2$ .
Output: GAGCAT  Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA Output:	Input:
Output: GAGCAT  Case 5  Description: The suffix of Text <sub>1</sub> and the prefix of Text <sub>2</sub> are the same.  Input: GAGCAT CATAGA Output:	GAGCAT
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Case 5  Description: The suffix of $Text_1$ and the prefix of $Text_2$ are the same.  Input:  GAGCAT  CATAGA  Output:	Output:
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Input:  GAGCAT  CATAGA  Output:	Case 5
GAGCAT CATAGA  Output:	<b>Description:</b> The suffix of $Text_1$ and the prefix of $Text_2$ are the same.
GAGCAT CATAGA  Output:	(nput
CATAGA  Output:	
	Output:

## Case 6

**Description:** A larger dataset of the same size as that provided by the randomized autograder. Check input/output folders for this dataset.