Variable Length Strings

append

concatenate

characterAt

Variable Length Strings

Write heap-based implementation for three required string functions:

append – This function takes a string and a character and appends the character to the end of the string

concatenate – This function takes two strings and appends the characters of the second string onto the first

characterAt – This function takes a string and a number and returns the character at that position in the string (with the first character in the string numbered zero)

Assume **characterAt** will be called frequently and the others seldom.

Setting Up a String Type

```
typedef char * arrayString;
```

Setting Up a String Type

```
typedef char * arrayString;
```

Used to make an alias for a type

Setting Up a String Type

```
typedef char * arrayString;
```

The original type

Setting Up a String Type

```
typedef char * arrayString;
```

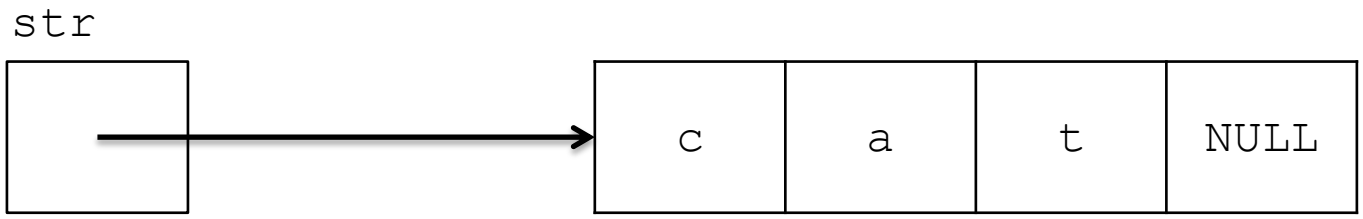
The new alias

Finding the Length of the String

Where else have we needed to find the end of an arbitrary length sequence of characters?

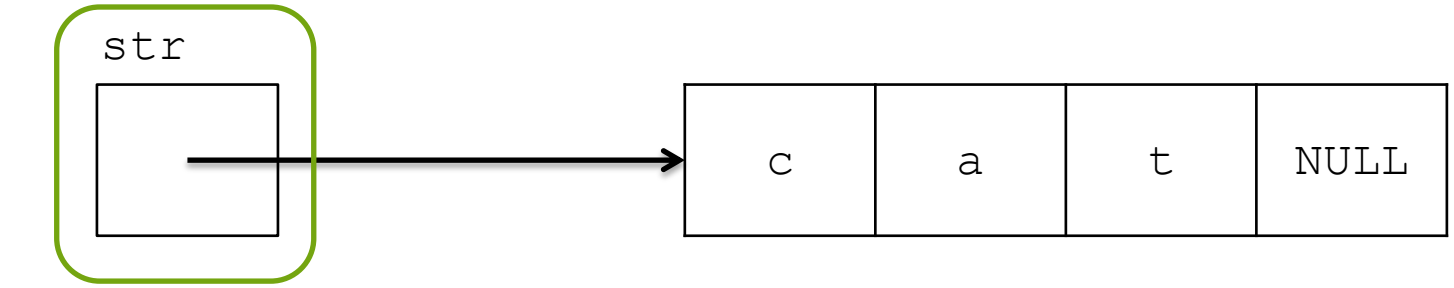
Creating a Test String

```
arrayString str = new char[4];
string[0] = 'c';
string[1] = 'a';
string[2] = 't';
string[3] = '\0';
```



Creating a Test String

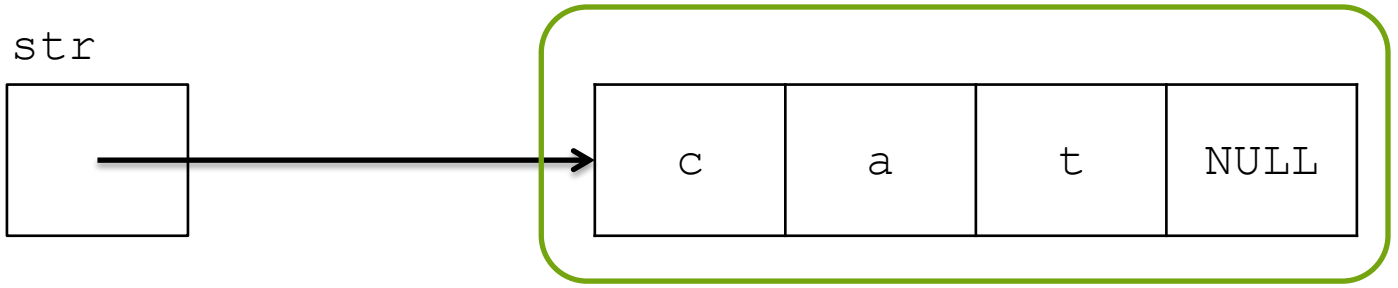
```
arrayString str = new char[4];
string[0] = 'c';
string[1] = 'a';
string[2] = 't';
string[3] = '\0';
```



On the stack

Creating a Test String

```
arrayString str = new char[4];
string[0] = 'c';
string[1] = 'a';
string[2] = 't';
string[3] = '\0';
```



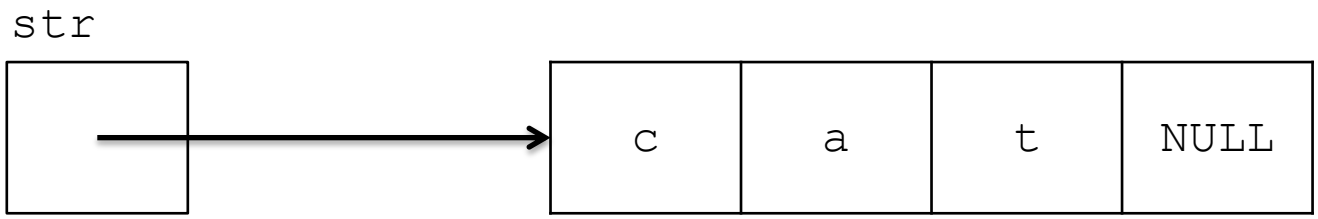
On the heap

characterAt

How do we get a single character from an `arrayString` variable?

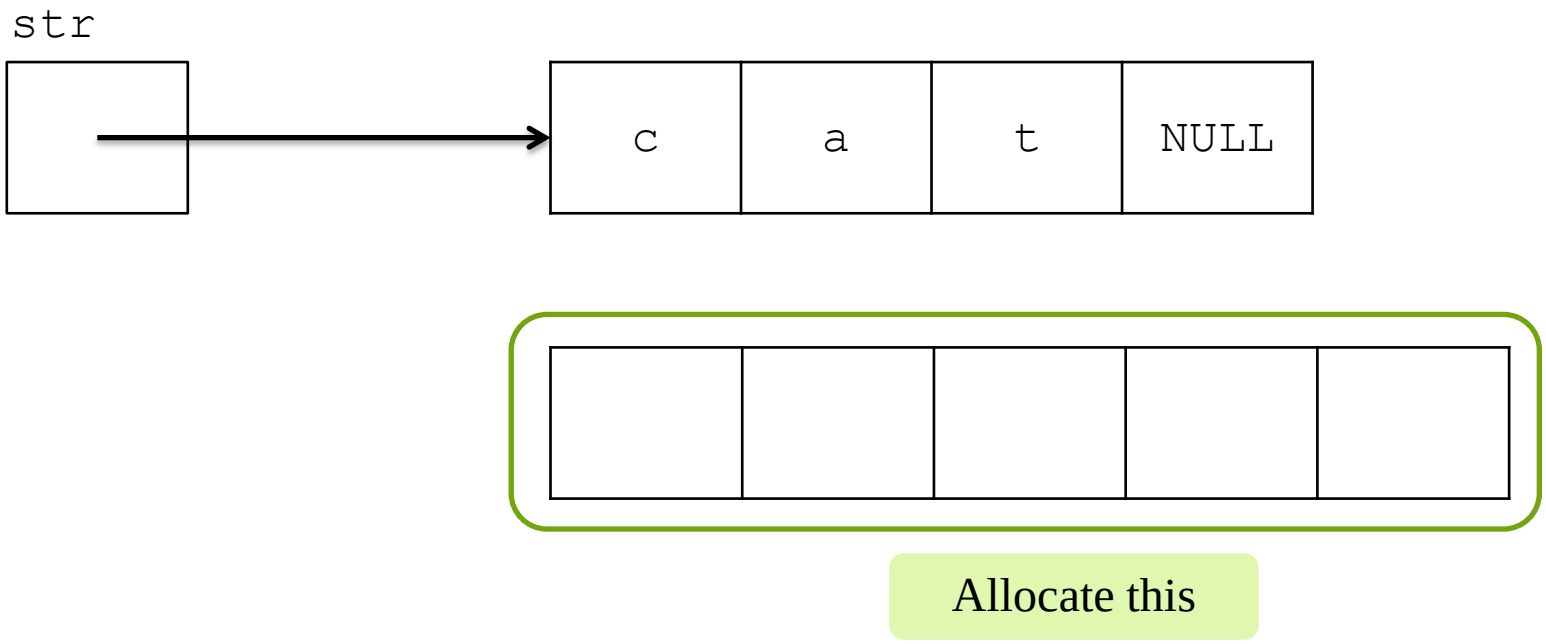
append

Appending character `s` to the test string:



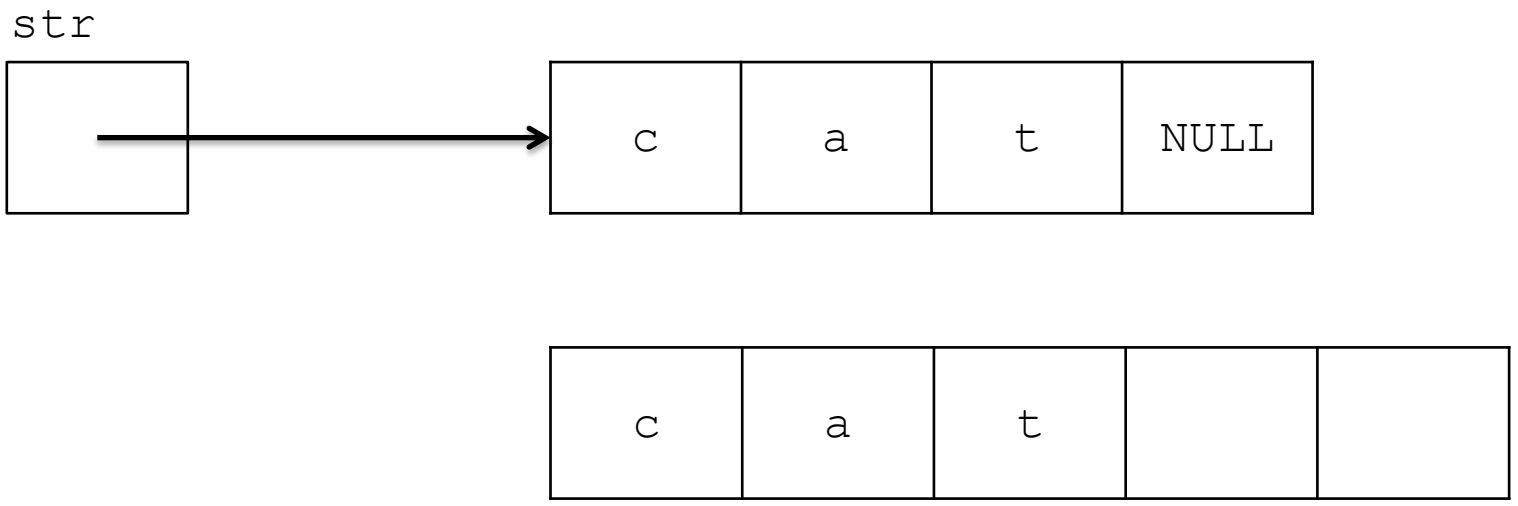
append

Appending character `s` to the test string:



append

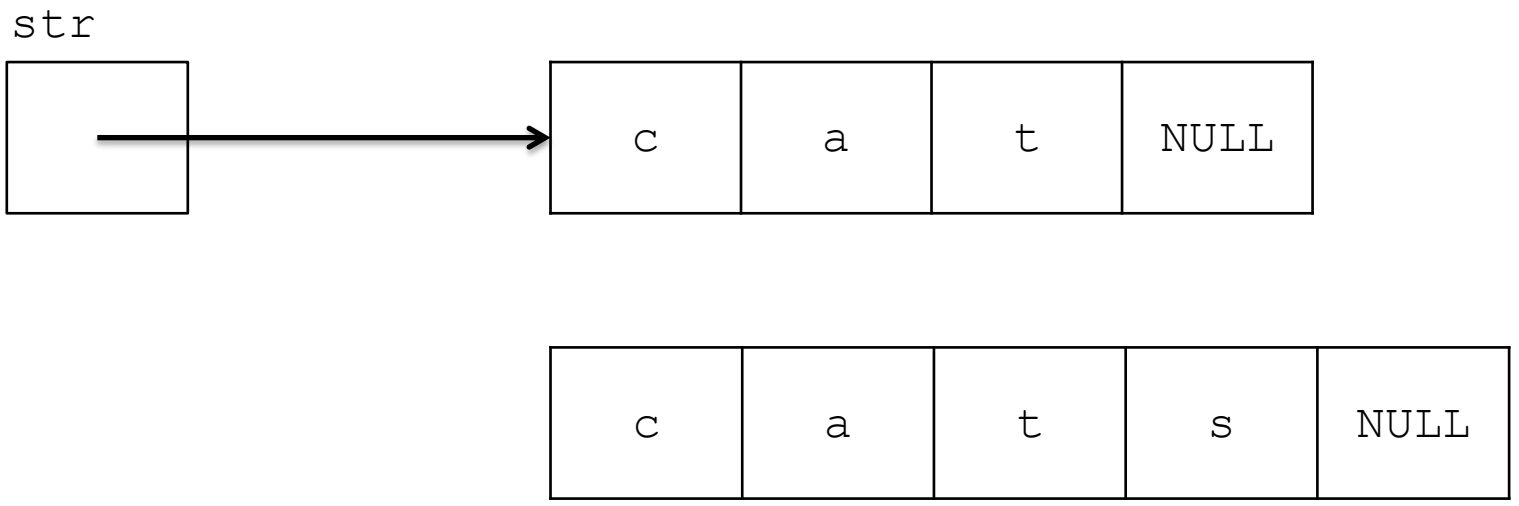
Appending character `s` to the test string:



Copy the characters over

append

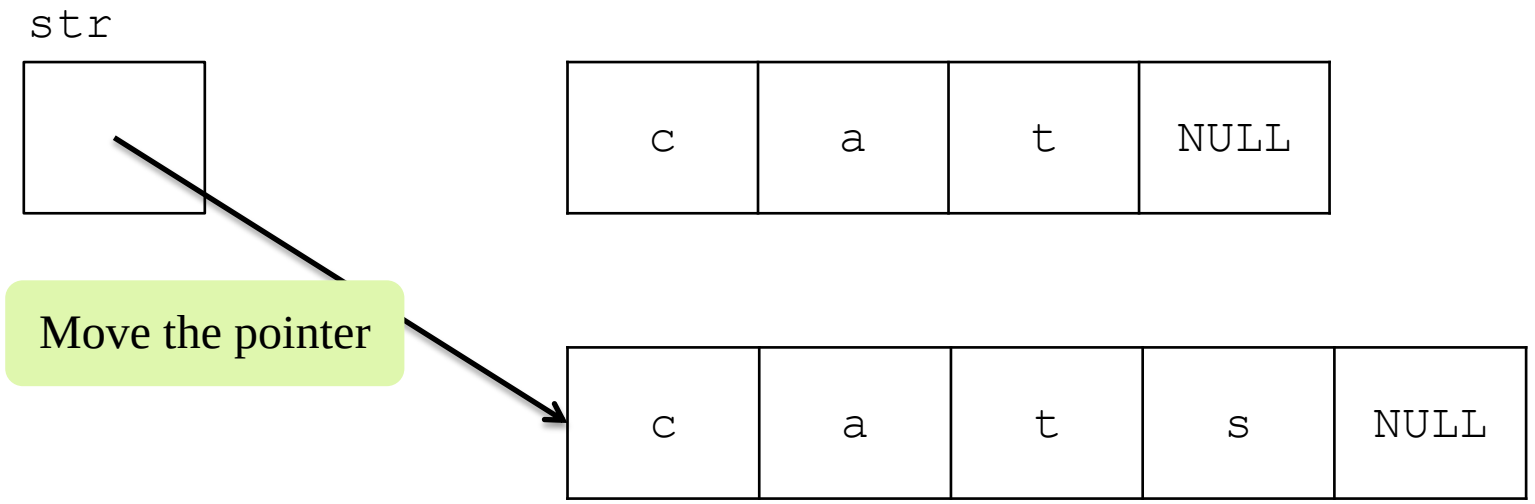
Appending character `s` to the test string:



Add the new character and NULL terminator

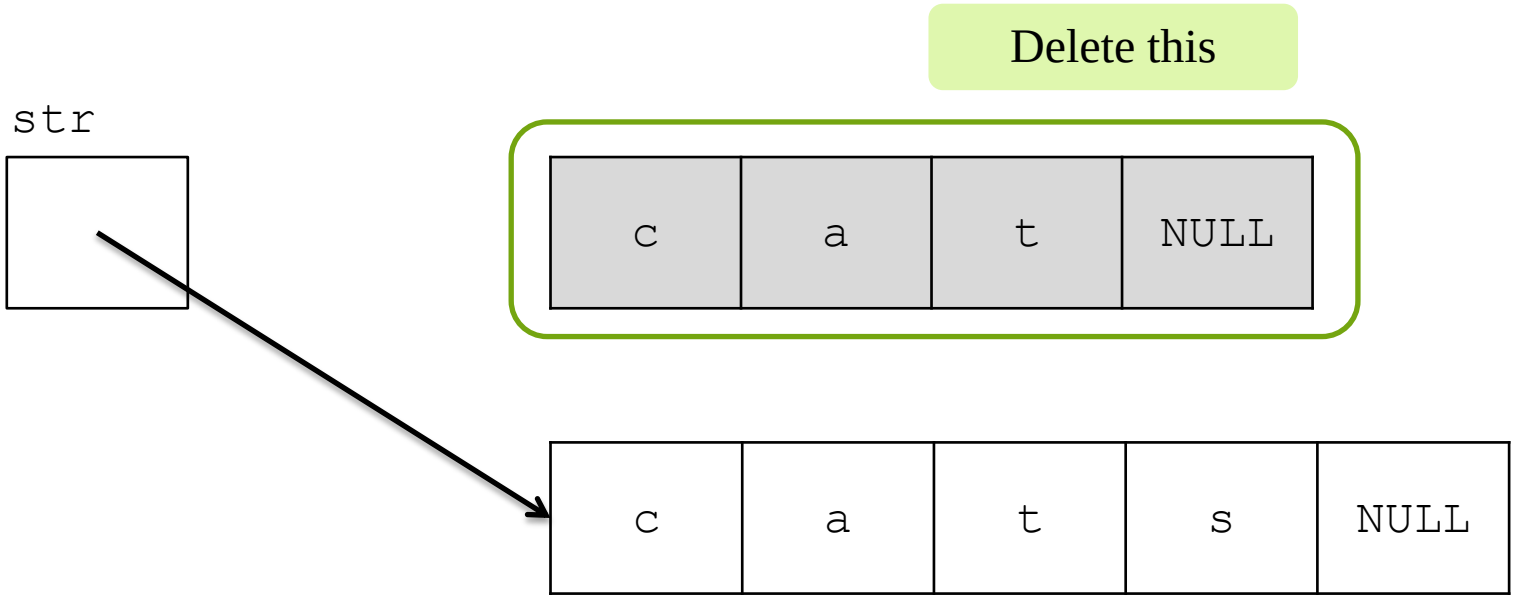
append

Appending character `s` to the test string:



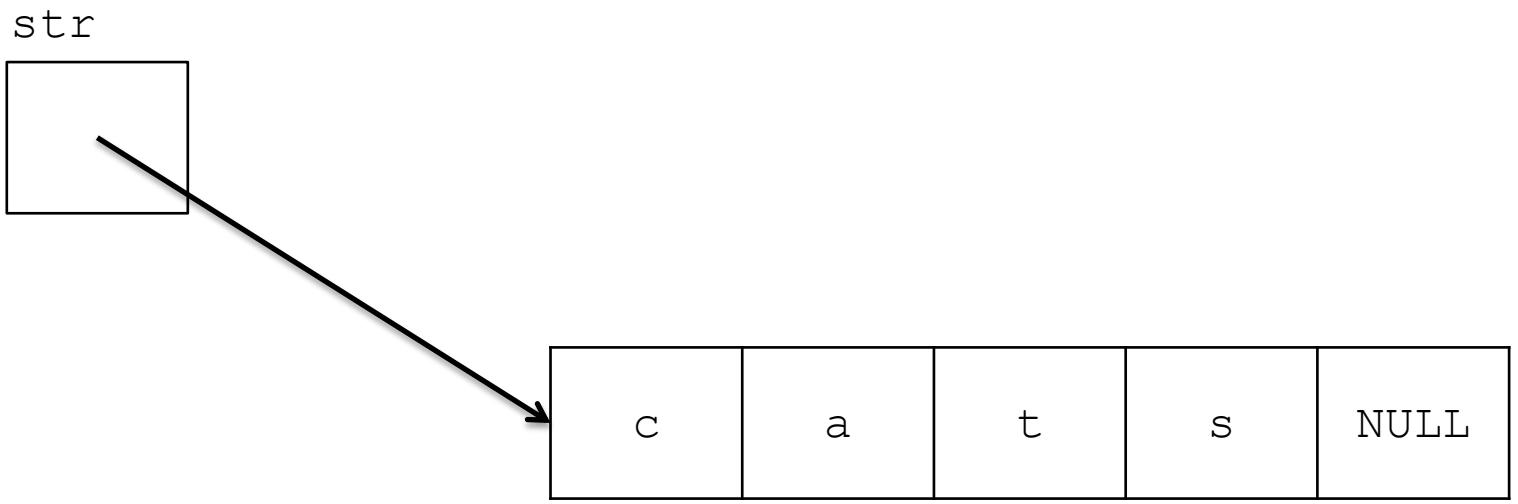
append

Appending character `s` to the test string:



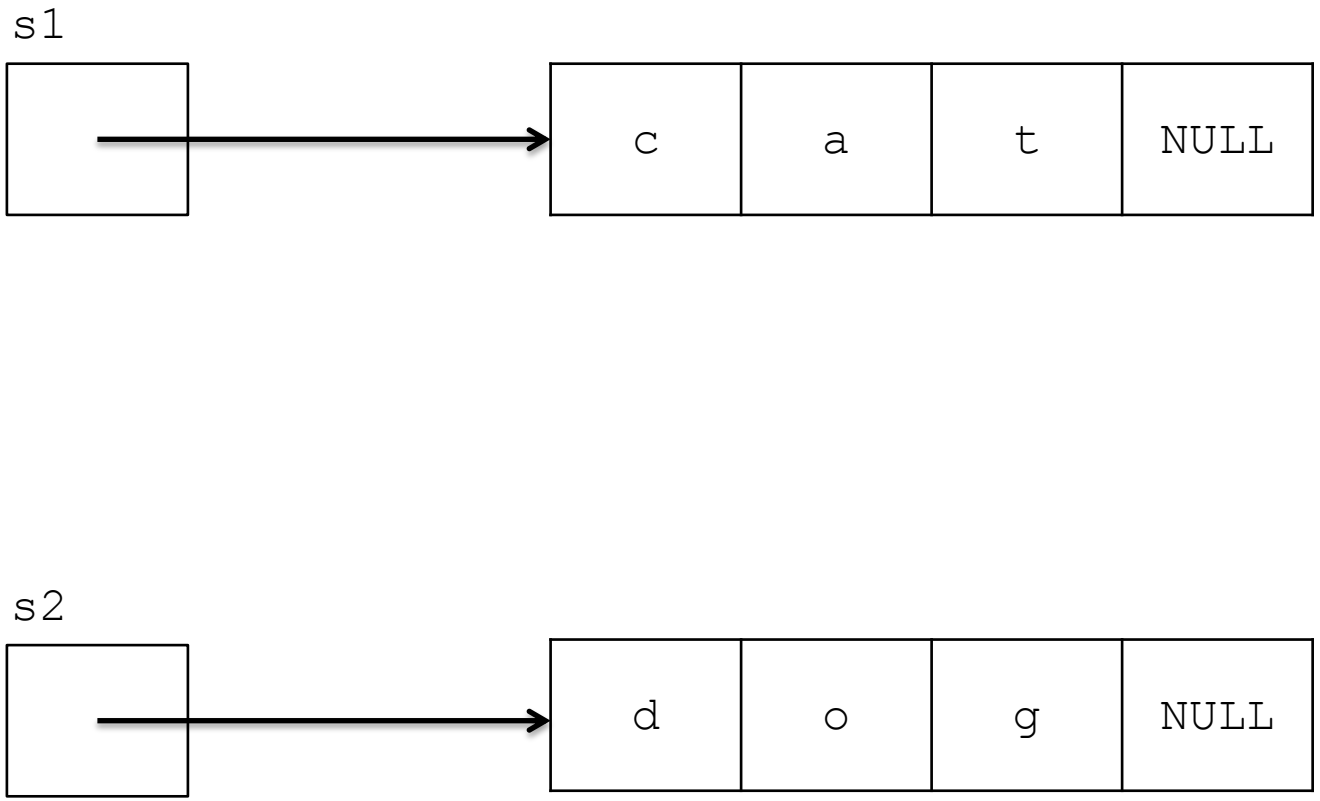
append

Appending character `s` to the test string:



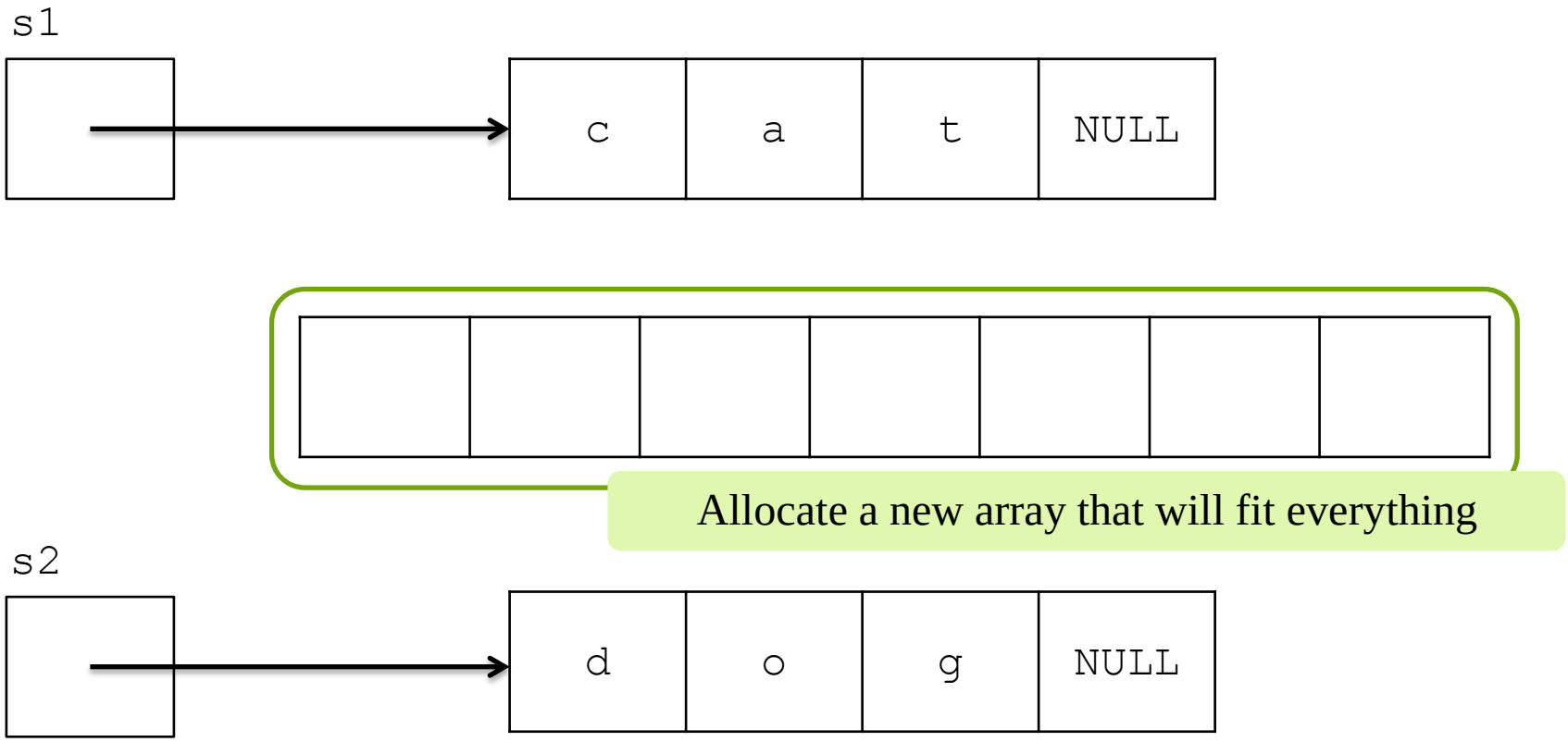
concatenate

Concatenating `s2` to the end of `s1`:



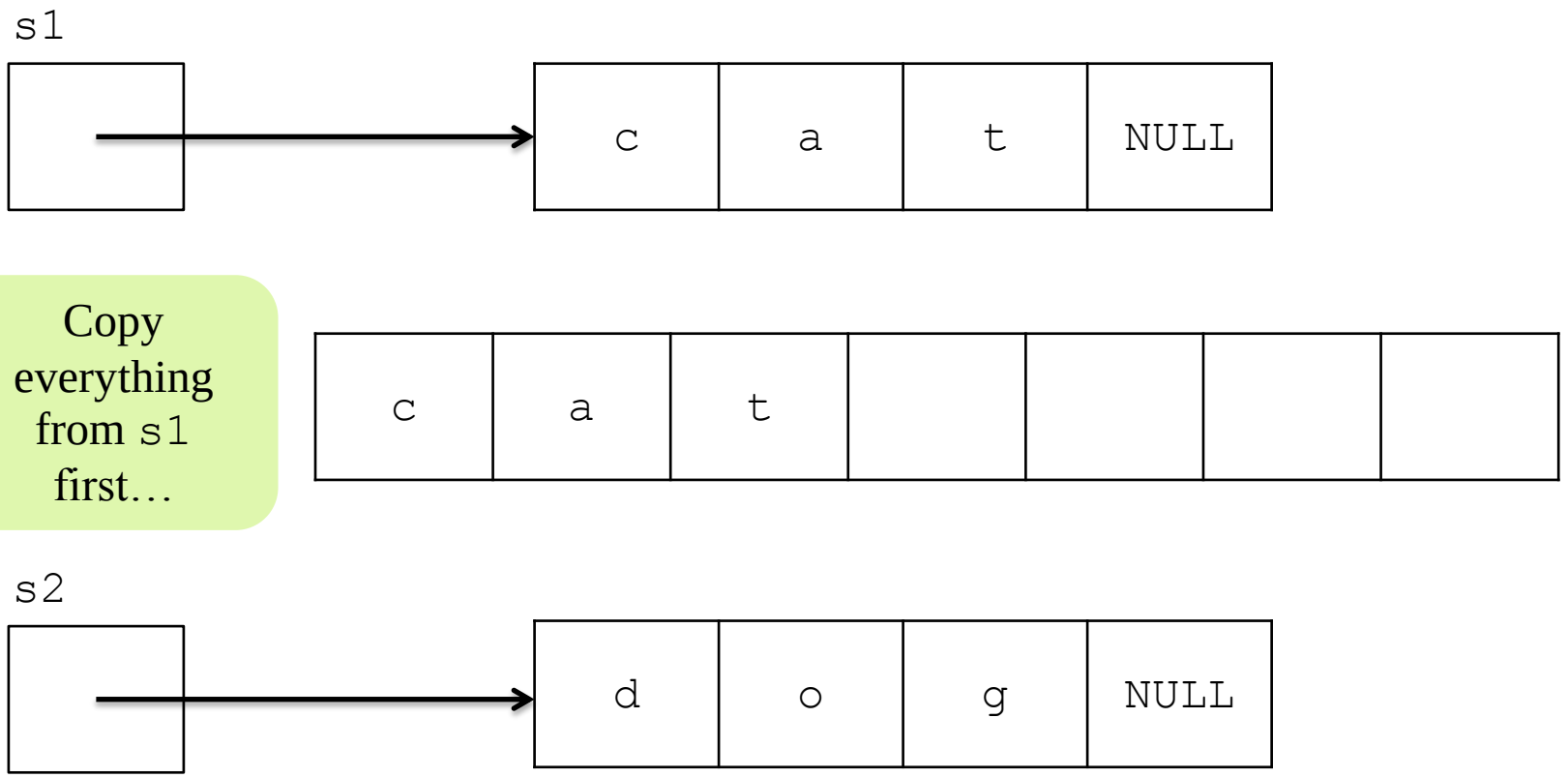
concatenate

Concatenating `s2` to the end of `s1`:



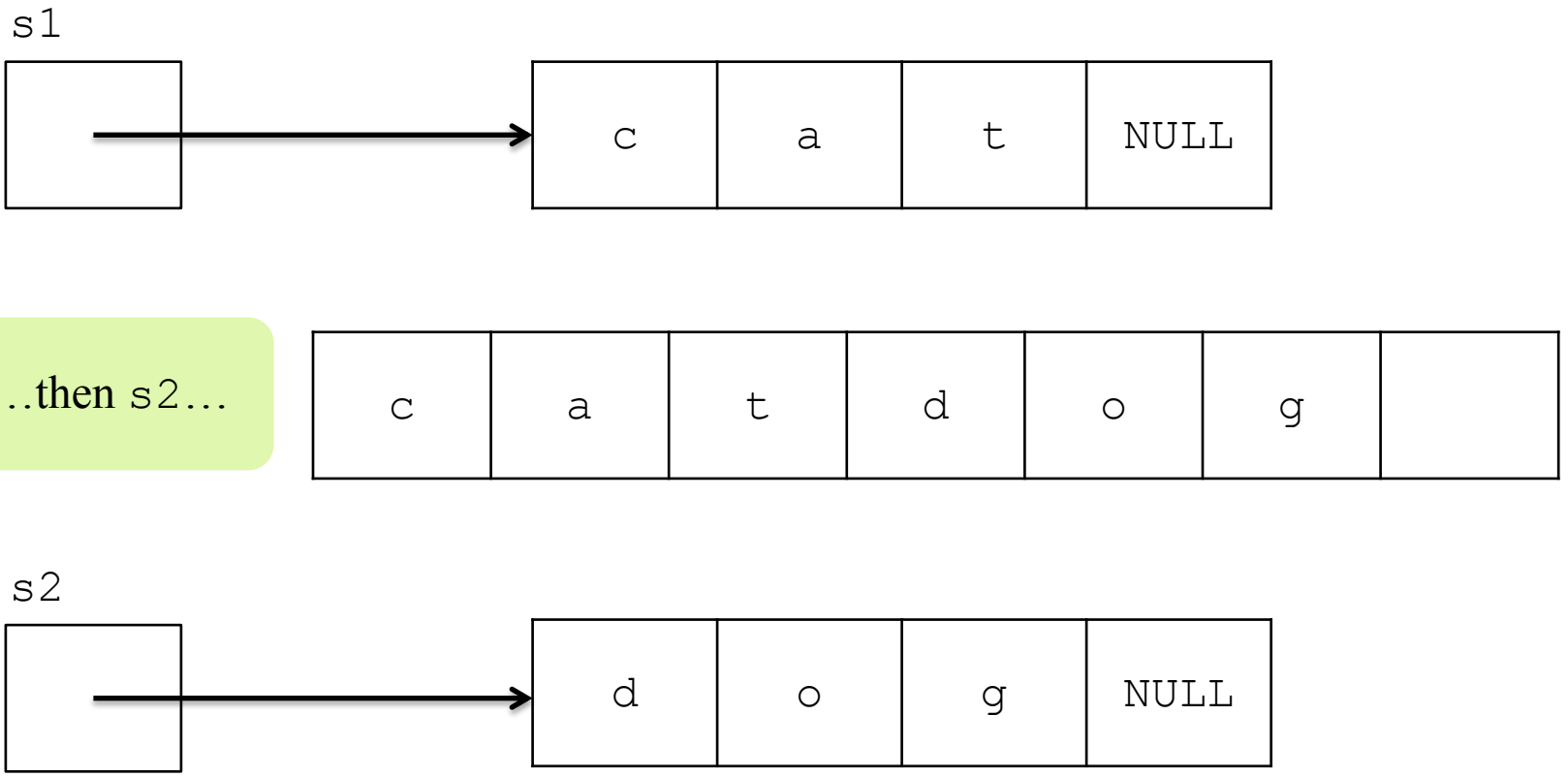
concatenate

Concatenating `s2` to the end of `s1`:



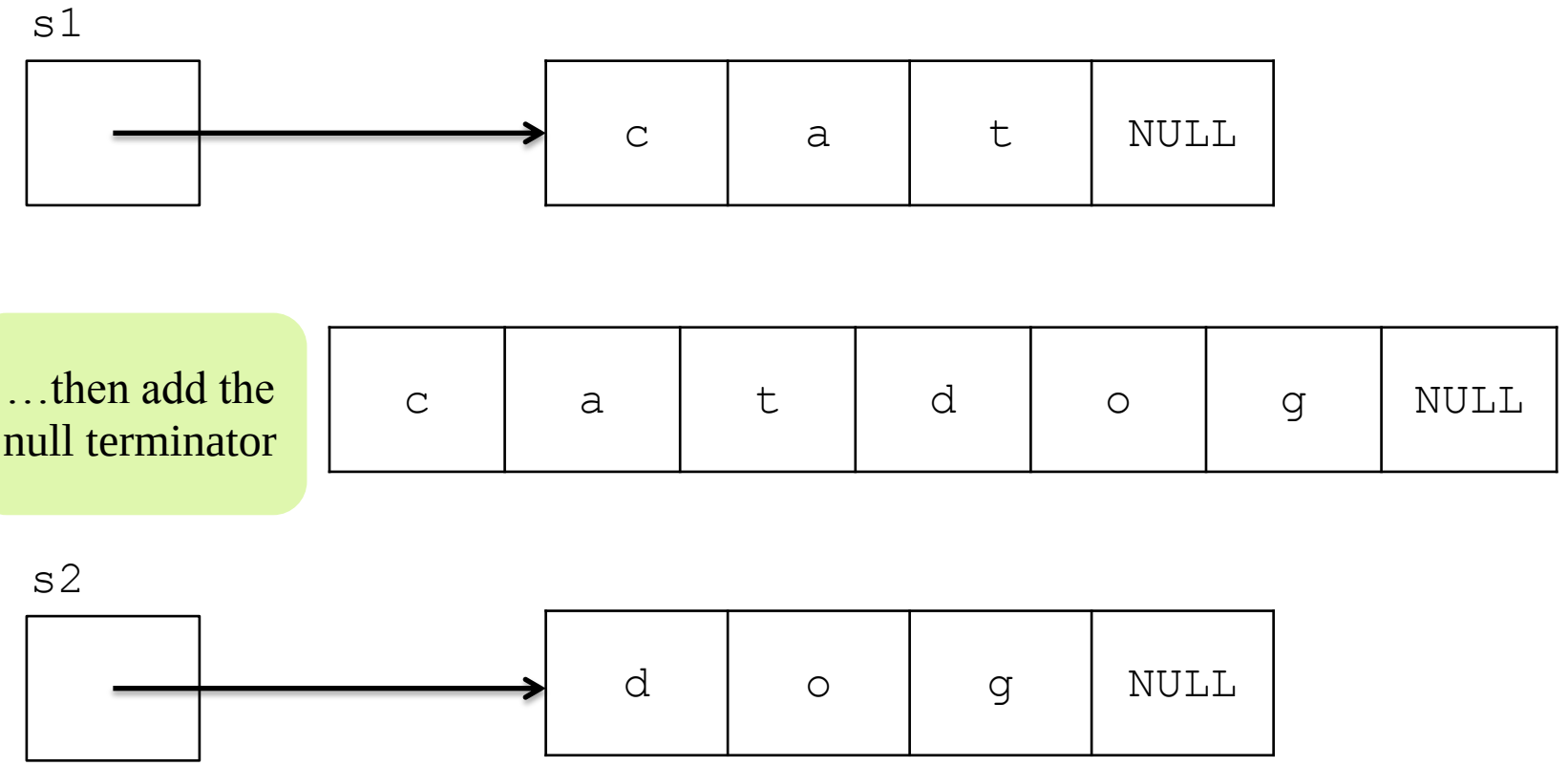
concatenate

Concatenating `s2` to the end of `s1`:



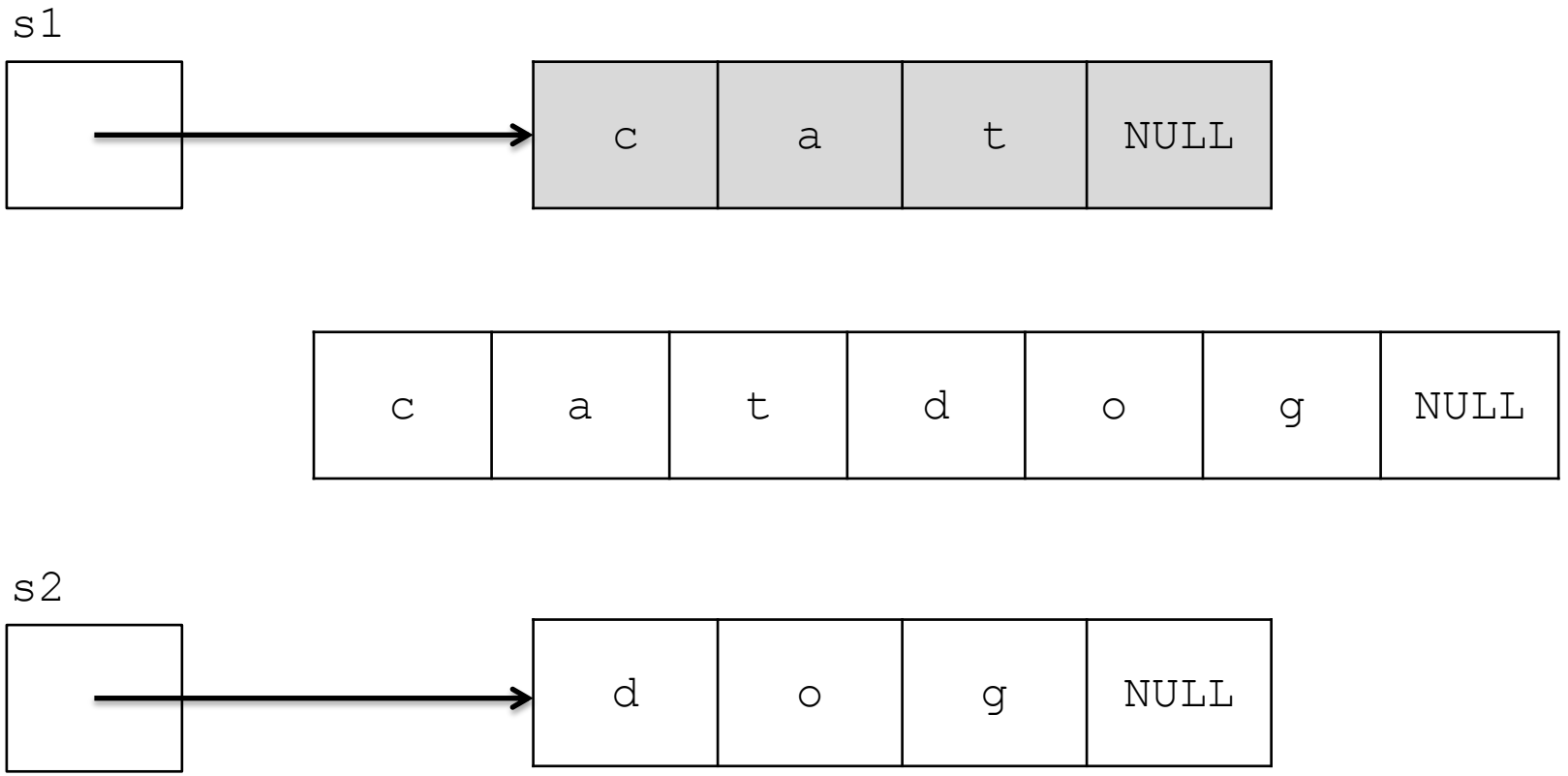
concatenate

Concatenating `s2` to the end of `s1`:



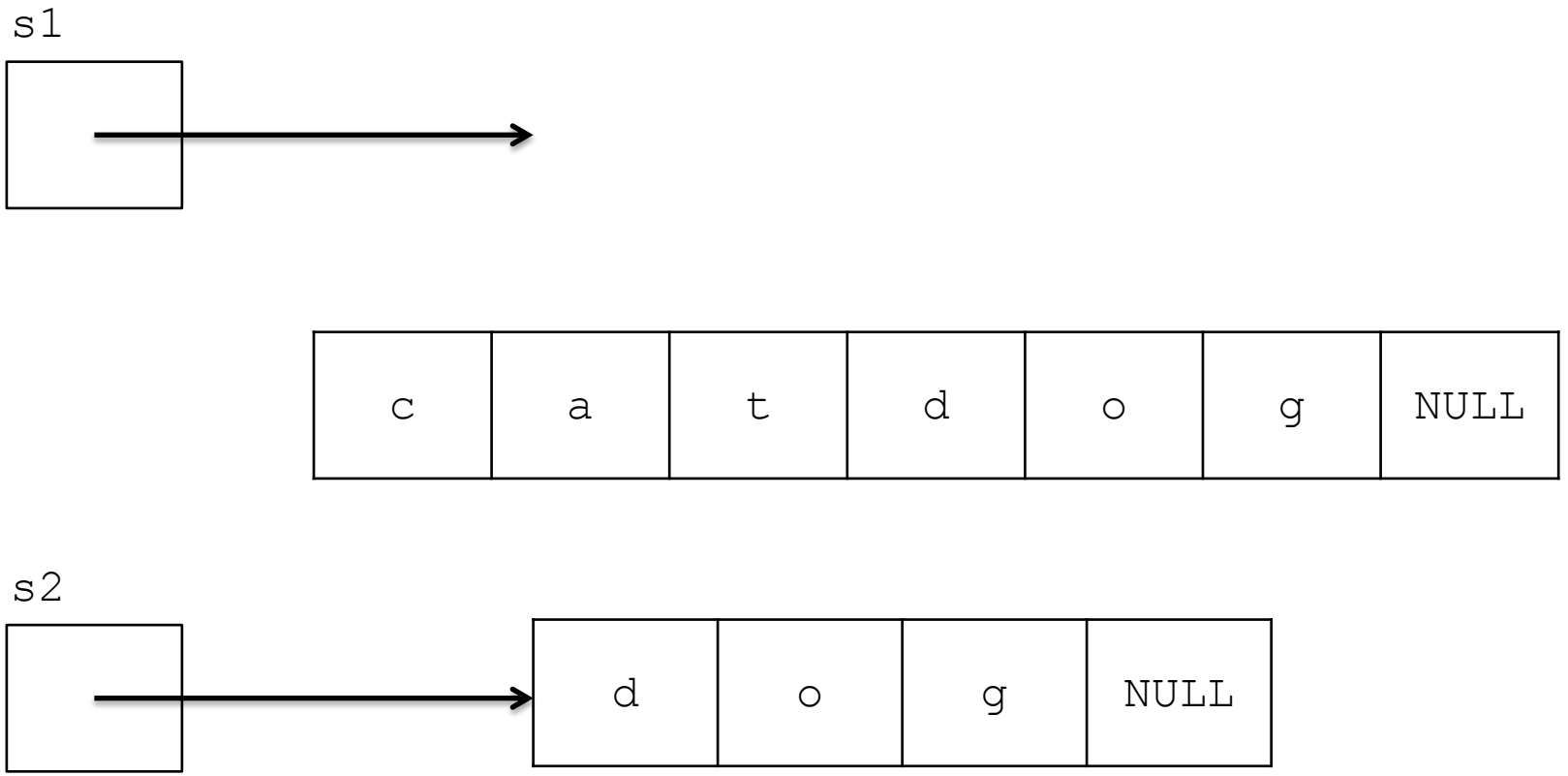
concatenate

Concatenating `s2` to the end of `s1`:



concatenate

Concatenating `s2` to the end of `s1`:



concatenate

Concatenating `s2` to the end of `s1`: