Recursion

Here's an easy question. How does the following program run?

```
def foo(x):
    return x+1
def main():
    z = foo(3)
    print(z)
main()
```

This is easy: we start in main( ) and call foo(3), which returns 4. This is the value assigned to z, so the print statement prints 4.

So how about this?

```
def foo(s):
        if len(s) == 1:
                return s
        else:
                return foo(s[1:]) + s[0]
def main():
        print( foo( "a" ) )
main()
```

This is almost as easy. We call foo with string "a" and print whatever foo("a") returns. Since "a" has length 1, foo("a") returns "a", and that is printed.

If s is a string of length 1,then foo(s) returns s.

Remember that if s is a string, s[1:] is the portion of s after the first letter. If s == "Bob", then s[1:] is "ob".

So what will this print?

```
def foo(s):
    if len(s) == 1:
        return s
    else:
        return foo(s[1:]) + s[0]
def main():
    print( foo( "ab" ) )
main()
```

A: It will print "ab"

B: It will print "b"

C: It will print "ba"

D: It will run forever.