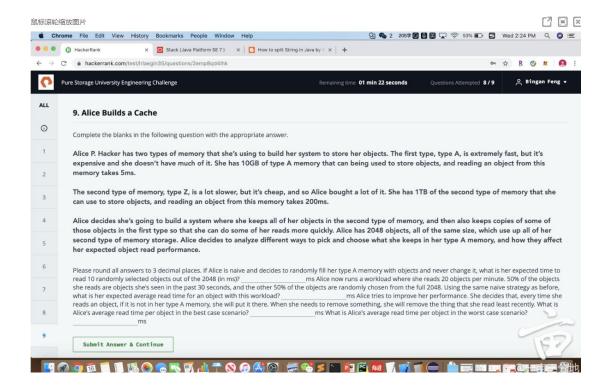
# $\frac{\text{https://www.1point3acres.com/bbs/forum.php?mod=viewthread\&tid=562504\&extra=page\%3D5\%26filter\%3Dsortid\%26sortid\%3D311\%26sortid\%3D311}{\text{constant}}$

mony that can being used to store objects, and readile second type of memory, type Z, is a lot slower, but it is es 500ms.  To decides she's going to build a system where she ke requickly. Alice has 2048 objects, all of the same size they affect her expected object real performance, aser round all answers to 3 decimal places like is naive and decides to randomly fill her type A more than the same round should be the same size of the same size o	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga an object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads a which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and herency with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?  Her minute. 50% of the objects she reads are objects she's seen in the past 30 seconds, and the other 50% of the objects are randomly chosen from the full 2048; excited everage read time for an object with this workload?  Levery time she reads an object, if it is not in her type A memory, she will put it there. When she needs to remove something, she will remove the thing that she case scenario?
perplete the blanks in the following quest care. P. Hacker has two types of memory that she's using mory that can being used to store objects, and reading second type of memory, type Z, is a lot slower, but it is \$60ms.  The decides she's going to build a system where she late the quickly. Alice has 2048 objects, all of the same size to they affect her expected object read performance. See round all answers to 3 decimal places round all answers to 3 decimal places round all smews to 3 decimal places. But they affect her expected object read performance. See now runs a workload where she reads 20 objects grip the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before. What is her exping the same naive strategy as before, what is her exping the same naive strategy as before. What is her exping the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before, what is her exping the same naive strategy as before, which is the same naive strategy as before, which is the same naive strategy as before, which is the same naive strategy as th	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga an object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads a which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and herency with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?  Her minute. 50% of the objects she reads are objects she's seen in the past 30 seconds, and the other 50% of the objects are randomly chosen from the full 2048; excited everage read time for an object with this workload?  Levery time she reads an object, if it is not in her type A memory, she will put it there. When she needs to remove something, she will remove the thing that she case scenario?
complete the blanks in the following quest the P. Hacker has two types of memory that she's using mory that can being used to store objects, and readin to second type of memory, type Z, is a lot slower, but it to soloms.  The soloms of the soloms of the soloms objects, and of the same size they affect her espected objects, all of the same size they affect her espected objects, all of the same size they affect her espected object read preformance.  It is naive and decides to randomly fill her type A m ms  Let now runs a workload where she reads 20 objects p ng the same naive stratingy as before, what is her exp mg the same naive stratingy as before, what is her exp mg the same naive stratings as before.  Let tries to improve her performance. She decides that of least recembly.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory seps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads to the objects in the first type so that she can do some of her reads to the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads to the up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and seconds with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?  When the objects she reads are objects she's seen in the past 30 seconds, and the other 50% of the objects are randomly chosen from the full 2048; extend everage read time for an object with this workload?  It every time she reads an object, if it is not in her type A memory, she will put it there. When she needs to remove something, she will remove the thing that she
proplete the blanks in the following quest to P. Hacker has two types of memory that she's using mony that can being used to store objects, and readi es second type of memory, type Z, is a lot slower, but it es stooms.  To decides she's going to build a system where she is er quickly. Alce has 2048 objects, all of the same size they affect her expected object read performance, ase round all answers to 3 decimal places lice is naive and decides to randomly fill her type A in ms  To be now runs a workload where she reads, 20 objects; ng the same naive strategy as before, what is her exp ms  To be tried to improve her performance. She decides that el feast recently.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory seps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads to the objects in the first type so that she can do some of her reads to the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads to the up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and seconds with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?  When the objects she reads are objects she's seen in the past 30 seconds, and the other 50% of the objects are randomly chosen from the full 2048; extend everage read time for an object with this workload?  It every time she reads an object, if it is not in her type A memory, she will put it there. When she needs to remove something, she will remove the thing that she
pemplete the blanks in the following quest the P. Hacker has two types of memory that she's using mony that can being used to store objects, and readil se second type of memory, type Z, is a lot slower, but it se 500ms.  The conditions of the con	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A gain object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory steps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads to which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and hermory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?  When the objects she reads are objects she's seen in the past 30 seconds, and the other 50% of the objects are randomly chosen from the full 2048; excited everage read time for an object with this workload?
pemplete the blanks in the following quest the P. Hacker has two types of memory that she's using mony that can being used to store objects, and readil se second type of memory, type Z, is a lot slower, but it se 500ms.  The conditions of the con	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A gain object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory steps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads to which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and hermory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?  When the objects she reads are objects she's seen in the past 30 seconds, and the other 50% of the objects are randomly chosen from the full 2048; excited everage read time for an object with this workload?
perplete the blanks in the following quest the P. Hacker has two types of memory that she's using mony that can being used to store objects, and readin es escond type of memory; type Z, is a lot slower, but it es 500ms. The special control of the special control of the equickly, Alice has 2048 objects, all of the same size whey affect her espected object read performance, see round all answers to 3 decimal palaces ities is naive and decides to randomly fill her type A na ms.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory steps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and the memory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?
perplete the blanks in the following quest the P. Hacker has two types of memory that she's using mony that can being used to store objects, and readin es escond type of memory; type Z, is a lot slower, but it es 500ms. The special control of the special control of the equickly, Alice has 2048 objects, all of the same size whey affect her espected object read performance, see round all answers to 3 decimal palaces ities is naive and decides to randomly fill her type A na ms.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory steps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and the memory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?
perplete the blanks in the following quest the P. Hacker has two types of memory that she's using mony that can being used to store objects, and readin es escond type of memory; type Z, is a lot slower, but it es 500ms. The special control of the special control of the equickly, Alice has 2048 objects, all of the same size whey affect her espected object read performance, see round all answers to 3 decimal palaces ities is naive and decides to randomly fill her type A na ms.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory steps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and the memory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?
pemplete the blanks in the following quest ce P. Hacker has two types of memory that she's using mory that can being used to store objects, and readin as second type of memory, type Z, is a lot slower, but it as 500ms. The second type of the second type of the second re quickly, Alice has 2048 objects, all of the same size to they affect her espected object read performance. as round all answers to 3 decimal places to 3 decimal places like is naive and decides to randomly fill her type A n ms.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory steps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and the memory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?
perplete the blanks in the following quest  ce P. Hacker has two types of memory that she's using mony that can being used to store objects, and readin second type of memory, type Z, is a lot slower, but it es 500ms.  The decides she's going to build a system where she ke re quickly. Also has 2048 objects, all of the same size whey affect her expected object read performance, asser round all answers to 3 decimal places like is naive and decides to randomly fill her type A n ms	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A as an object from this memory takes 2ms.  's cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory seeps all of her objects in the first type so that she can do some of her reads to the objects in the first type so that she can do some of her reads to the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads to the objects in the first type so that she can do some of her reads to the objects in the first type so that she can do some of her reads to the objects and choose what the keeps in her type A memory, and seemory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)?
permitted the blanks in the following quest ce P. Hacker has two types of memory that the's using mony that can being used to store objects, and readin es second type of memory, type Z, is a lot slower, but it es 500ms. ce decides she's going to build a system where she lo ce quickly, Alice has 2048 objects, all of the same size whey affect her espected object read performance. are round all answers to 3 decimal places to 3 decimal places lice is naive and decides to randomly fill her type A in	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seeps all of her objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and
permitted the blanks in the following quest ce P. Hacker has two types of memory that the's using mony that can being used to store objects, and readin es second type of memory, type Z, is a lot slower, but it es 500ms. ce decides she's going to build a system where she lo ce quickly, Alice has 2048 objects, all of the same size whey affect her espected object read performance. are round all answers to 3 decimal places to 3 decimal places lice is naive and decides to randomly fill her type A in	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seeps all of her objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and
permitted the blanks in the following quest ce P. Hacker has two types of memory that the's using mony that can being used to store objects, and readin es second type of memory, type Z, is a lot slower, but it es 500ms. ce decides she's going to build a system where she lo ce quickly, Alice has 2048 objects, all of the same size whey affect her espected object read performance. are round all answers to 3 decimal places to 3 decimal places lice is naive and decides to randomly fill her type A in	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seeps all of her objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and
proplete the blanks in the following quest be P. Hadder has two types of memory that she's using mony that can being used to store objects, and readine second type of memory, type Z, is a lot slower, but it es 500ms. On decides she's going to build a system where she is re quickly, Alice has 2086 objects, all of the same size they affect her expected object read performance, asser round all answers to 3 decimal places.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga no object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seeps all of her objects in the first type so that she can do some of her reads, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and
permitted the blanks in the following quest ce P. Hacker has two types of memory that she's using mony that can being used to store objects, and reading second type of memory, type Z, is a lost slower, but it es 500ms.  The decides she's going to build a system where she lo re quickly, Alice has 2048 objects, all of the same size they affect her expected object read performance.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A as an object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seeps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads
emplete the blanks in the following quest ce P. Hacker has two types of memory that she's using mony that can being used to store objects, and readin es second type of memory, type Z, is a lot slower, but it es 500ms. co decides she's going to build a system where she lo re quickly, Alice has 2048 objects, all of the same size	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A as an object from this memory takes 2ms.  Is cheap, and so Alice bought a lot of it. She has 11B of the second type of memory that she can use to store objects, and reading an object from this memory seeps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads
emplete the blanks in the following quest ce P Hacker has two types of memory that she's using mony that can being used to store objects, and readin second type of memory; type Z, is a lot slower, but it so 500ms.	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ag an object from this memory takes 2ms.  's cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory
omplete the blanks in the following quest ce P. Hacker has two types of memory that she's using mory that can being used to store objects, and reading cescond type of memory, type Z, is a lot slower, but it	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga nobject from this memory takes 2ms.
omplete the blanks in the following quest ce P. Hacker has two types of memory that she's using mory that can being used to store objects, and reading cescond type of memory, type Z, is a lot slower, but it	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A ga nobject from this memory takes 2ms.
emplete the blanks in the following quest ce P. Hacker has two types of memory that she's using	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A
emplete the blanks in the following quest ce P. Hacker has two types of memory that she's using	to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A
omplete the blanks in the following quest	
	ion with the appropriate answer.
Alice Builds a Cache	
Alice Builds a Cache	
<ul> <li>Program will crash, throw an error, or exhibit som</li> </ul>	e other undefined behavior
© ["fff", "fff"]	
© ["hhh", "hhh"]	
© ["hhh", "fff"]	
© ["fff", "hhh"]	
Pick one of the choices	
What will be the output if you use this compare	function to sort the list ["fff", "hhh"]? At the end of sorting, compare will return True when comparing the first and second element of the list.
return True	
return False // if they're the same word.	we'll exit the loop and it doesn't matter what we return
else if alphabet.indexOf(	<pre>letter2) &gt; alphabet.indexOf(letter1)</pre>
if alphabet.indexOf(letter return True	rl) > alphabet.indexOf(letter2)
letter2 = word2.get_chara	cter_at(letter_index)
letter_index += 1 letter1 = word1.get_chara	cter at(letter index)
while letter_index < word1.le	ngth()
// this should return frue if letter_index = 0	value 1 is alphabetically before value 2, false otherwise
function compare(word1, word2):	and a first test of the first of the first of the standard
Your instructor shows you the following function	, and tells you that "alphabet" is just a list of the alphabet starting at "a" and going all the way to "z":
	words are lowercase, and that all strings and lists begin with index 0.
they are attempting to do in order to help you or	ild like you to review what they wrote and evaluate what it outputs for a set of inputs. Since they have a great coding style, they've even provided comments trying to explain a set.
Knowing that you re <u>brillant</u> , your instructor wou	
Knowing that you're <u>brilliant</u> , your instructor wou	
	alphabet, so your instructor's goal is to have compare("a", "b") return True.
	s alphabet, so your instructor's goal is to have compare("a", "b") return True.

https://www.1point3acres.com/bbs/forum.php?mod=viewthread&tid=560787&extra=page%3D19%26filter%3Dsortid%26sortid%3D311%26sortid%3D311



https://www.1point3acres.com/bbs/forum.php?mod=viewthread&tid=558438&extra=page%3D23%26filter%3Dsortid%26sortid%3D311%26sortid%3D311

https://www.1point3acres.com/bbs/forum.php?mod=viewthread&tid=561456&extra=page%3D23%26filter%3Dsortid%26sortid%3D311%26sortid%3D311

https://www.lpoint3acres.com/bbs/thread-561456-1-1.html

https://www.lpoint3acres.com/bbs/thread-565406-1-1.html

Pick ONE option				
O It will take u	s 200 ns for the array and 5 million ns fo	or the linked list.		
It will take u	s 200 ns for the array and 10 million ns t	for the linked list.		
It will take u	s 5 million ns for the array and 5 million	ns for the linked list.		
It will take u	s 5 million ns for the array and 10 million	n for the linked list.		
It will take u	s 5 million ns for the array and 200 ns fo	or the linked list.		
It will take us	s 10 million ns for the array and 200 ns t	for the linked list.		

#### 2. Sorting on a Custom Alphabet

Your instructor comes to you and tells you that they desperately need you to help them write a function for them that can compare two words for alphabetic sorting. They want it to return True if the first word comes first alphabetically, and False otherwise.

For example, "a" comes before "b" in the English alphabet, so your instructor's goal is to have compare("a", "b") return True.

Knowing that you're <u>brilliant</u>, your instructor would like you to <u>review what they wrote</u> and evaluate what it outputs for a set of inputs. Since they have a great coding style, they've even provided comments trying to explain what they are attempting to do in order to help you out.

You can assume that all syntax is correct, that all words are lowercase, and that all strings and lists begin with index 0.

Your instructor shows you the following function, and tells you that "alphabet" is just a list of the alphabet starting at "a" and going all the way to "z":

```
function compare(word1, word2):
    // this should return True if value 1 is alphabetically before value 2, false otherwise
    letter_index = 0
    while letter_index word1.length()
    letter_index += 1
    letter1 = word1.get_character_at(letter_index)
    letter2 = word2.get_character_at(letter_index)
    if alphabet.indexOf(letter1) > alphabet.indexOf(letter2)
        return True
    else if alphabet.indexOf(letter2) > alphabet.indexOf(letter1)
        return False
    // if they're the same word, we'll exit the loop and it doesn't matter what we return
    return True
```

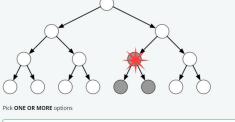
#### 题干相同

What will be the output if you use this compare function to sort the list ["xxx", "zzz"]? At the end of sorti	ng, compare will return True when comparing the first and second elem
Pick <b>ONE</b> option	
["xxx", "zzz"]	
["xxx", "xxx"]	
("zzz", "xxx"]	
["2ZZ", "ZZZ"]	
Program will crash, throw an error, or exhibit some other undefined behavior	
Clear Selection	

["ahc" "ahcd"]						
["abc", "abcd"]						
["abcd", "abc"]						
["abcd", "abcd"]						
["abc", "abc"]						
O Program will crash, three	ow an error, or exhibit some other undefi	ined behavior				
Clear Selection						
	this compare function to sort the list ["xyzxyz"	', "yyyxxx"]? At the end o	f sorting, compare will ret	urn True when comparin	g the first and second element	of the list.
ick ONE option  ["xyzxyz", "yyyxxx"]						
["yyyxxx", "xyzxyz"]						
["yyyxxx", "yyyxxx"]						
["xyzxyz", "xyzxyz"]						
Program will crash, thro	v an error, or exhibit some other undefin	ed behavior				
5. Binary Tree Failure: Your system consists of nodes the red star has failed). You ra one) has failed, potentially cat	connected in a full binary search tree of he ndomly select a node from the tree, and w sing your traversal to fail, depending on w	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno
the red star has failed). You ra one) has failed, potentially cat has failed, which of the follow	connected in a full binary search tree of he ndomly select a node from the tree, and w sing your traversal to fail, depending on w	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno
5. Binary Tree Failures  Your system consists of nodes the red star has failed). You ra one) has failed, potentfully ca	connected in a full binary search tree of he ndomly select a node from the tree, and w sing your traversal to fail, depending on w	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno
5. Binary Tree Failure: Your system consists of nodes the red star has failed). You ra one) has failed, potentially cat has failed, which of the follow!	connected in a full binary search tree of he ndomly select a node from the tree, and w sing your traversal to fail, depending on w	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno
5. Binary Tree Failure: Your system consists of nodes the red star has failed). You ra one) has failed, potentially cat has failed, which of the follow!  Pick ONE option  The likelihood of su	connected in a full binary search tree of heindomly select a node from the tree, and washing your traversal to fall, depending on wing statements is true?	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno
5. Binary Tree Failure: Your system consists of nodes the red star has failed). You ra one) has failed, potentially cat has failed, which of the follow!  Pick ONE option  The likelihood of su  The likelihood of su	connected in a full binary search tree of helindomly select a node from the tree, and was sing your traversal to fall, depending on wing statements is true?	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno
5. Binary Tree Failure:  Your system consists of nodes the red star has failed). You ra one) has failed, potentially cat has failed, which of the follow!  Pick ONE option  The likelihood of su  The likelihood of su	connected in a full binary search tree of helindomly select a node from the tree, and was sing your traversal to fall, depending on wing statements is true?  Coccess is between 90–100%  Coccess is between 80–89.99%.	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno
5. Binary Tree Failure:  Your system consists of nodes the red star has failed). You ra one) has failed, potentially cat has failed, which of the follow last failed, which of the follow.  Pick ONE option  The likelihood of su  The likelihood of su  The likelihood of su	connected in a full binary search tree of helpholomly select a node from the tree, and was sing your traversal to fail, depending on wing statements is true?  Coccess is between 90–100%  Coccess is between 80–89.99%.	ant to traverse from the	root of the tree to you	r selected node. You a	re unaware that one node (y	ou don't kno

### 6. Binary Tree Failures

Your system consists of nodes connected in a full binary search tree of height 6. If a node has failed, it is unreachable, as are all of its descendants, as shown in the figure below (the node with the red star has failed). You randomly select a node from the tree, and want to traverse from the root of the tree to your selected node. You are unaware that one node (you don't know which one) has failed, potentially causing your traversal to fail, depending on which node you're looking for and which node failed. All nodes are equally likely to fail. Assuming that exactly one node has failed, which of the following statements is true? There may be more than one true statement.



There is always at least one reachable node.

The majority of possible failures only make a single node unreachable.

The likelihood of success increases as the height of the tree increases.

#### 7. Number Scores

You have developed a scoring system for positive integers that works as follows:

- $\bullet\,\,$  +1 points for every 7 found in the number. For example, 7571 would score 2 points.
- +3 points for each pair of consecutive 5s. If there are more than two 5s in a row, add +3 for each additional 5, since it makes an additional pair (for example, four consecutive 5s gives +15).
- +N<sup>2</sup> points for a sequence of length N (N >= 1) where each digit is 1 less than the previous digit. For example, 9765320 (9-765-32-0) would be 1 + 3<sup>2</sup>  $+ 2^2 + 1 = 15$  points.
- +2 if the entire number is a multiple of 3
- +4 for each even digit (note that 0 is even)

Each component of the score is evaluated separately, so a given digit may contribute to more than one component. For example, the number 765 would score 9 for the sequence of length 3, 4 for one even digit (6), 1 for the 7 digit, and 2 because 765 is a multiple of 3, for a total of 9 + 4 + 1 + 2

Write a function compute\_number\_score that computes (and returns) a score for an integer passed to it. The number will be in the range 0<=number<1000000000.

#### 8. Lock Use Analyzer

Suppose we want to monitor how locks are used in our system. As the first step, we log moments of acquire and release for each lock in the following format:

- ACQUIRE X
- RELEASE X

where X is some integer ID (1 <= X <= 1,000,000) of the lock.

All locks must be released in the reverse order of acquiring them; for example, this is a correct event sequence:

- 1. ACQUIRE 364
- 2. ACQUIRE 84
- 3. RELEASE 84
- 4. ACQUIRE 1337
- 5. RELEASE 1337
- 6. RELEASE 364

However, the following sequence violates this rule, because lock 84 is still acquired while releasing lock 364:

- 1. ACQUIRE 364
- 2. ACQUIRE 84
- 3. **RELEASE 364**
- 4. RELEASE 84

so such sequence is incorrect, too:

1. ACQUIRE 364

2. ACQUIRE 84

3. RELEASE 84

since lock 364 is never released

Third type of problem is lock misuse: it's never good to release a lock that has never been acquired, e.g.:

1. ACQUIRE 364

2. RELEASE 84

3. RELEASE 364

and it is as bad to acquire an already acquired lock (usually resulting in a deadlock):

1. ACQUIRE 364

It's also dangerous to leave locks acquired after application termination, as other processes in the system may be blocked while waiting on them,

3. ACQUIRE 364

-

2. ACQUIRE 84

4. RELEASE 364

Write a program that, given a list of **N** (0<=N<=1,000,000) lock acquire and release events (counting from 1), checks if there were any problems (acquire-release order violation, dangling acquired lock, acquiring a lock twice or releasing a free lock), and if so, tells the earliest time that could be detected. Note that there's no limit on how many nested locks may be acquired at any given moment.

More formally, you are given an array of strings where each string is either "ACQUIRE X" or "RELEASE X", where all **X**s are integers in the range [1..1000000].

Return:

- 0, if there were no lock-related problems even after program termination
- $\bullet \ \ \, \textbf{N+1}, \text{if the only issue after program termination were dangling acquired locks}$
- **K**, in case event number **K** violated any of the principles (release a lock not acquired previously, acquire an already held lock OR violate lock acquire-release ordering).

#### Examples:

Input:

- 1. ACQUIRE 364
- 2. ACQUIRE 84
- 3. RELEASE 84
- 4. RELEASE 364

Output: 0 (nothing bad happened)

Inn. it

## Input: 1. ACQUIRE 364 2. ACQUIRE 84 3. RELEASE 364 4. RELEASE 84 Output: 3 (lock 84 should have been released before releasing 364) 1. ACQUIRE 123 2 ACOUIRE 364 3. ACQUIRE 84 4. RELEASE 84 5. RELEASE 364 6. ACQUIRE 456 Output: 7 (upon terminating, not all locks were released, namely 123 and 456, but we can't know that until actually exiting) 1. ACQUIRE 123 2. ACQUIRE 364 3. ACQUIRE 84 4. RELEASE 84

Output: 7 (releasing a lock not acquired before)

Input:

1. ACQUIRE 364

5. RELEASE 364

- 2. ACQUIRE 84
- 3. ACQUIRE 364
- 4. RELEASE 364

Output: 3 (acquiring an already held lock)

#### 9. Alice Builds a Cache

Complete the blanks in the following question with the appropriate answer.

Alice P. Hacker has two types of memory that she's using to build his system in which to store her objects. The first type, type A, is extremely fast, but it's expensive and she doesn't have much of it. She has 10GB of type A memory that can being used to store objects, and reading an object from this memory takes 2ms.

The second type of memory, type Z, is a lot slower, but it's cheap, and so Alice bought a lot of it. She has 1TB of the second type of memory that she can use to store objects, and reading an object from this memory takes 500ms.

Alice decides she's going to build a system where she keeps all of her objects in the second type of memory, and then also keeps copies of some of those objects in the first type so that she can do some of her reads more quickly. Alice has 2048 objects, all of the same size, which use up all of her second type of memory storage. Alice decides to analyze different ways to pick and choose what she keeps in her type A memory, and how they affect her expected object read performance.

Please round all answers to 3 decimal places If Alice is naive and decides to randomly fill her type A memory with objects and never change it, what is her expected time to read 10 randomly selected objects out of the 2048 (in ms)? 4951.367 ms Alice now runs a workload where she reads 20 objects per minute. 50% of the objects she reads are objects she's seen in the past 30 seconds, and the other 50% of the objects are randomly chosen from the full 2048. Using the same naive strategy as before, what is her expected average read time for an object with this workload? 495.137 ms Alice tries to improve her performance. She decides that, every time she reads an object, if it is not in her type A memory, she will put it there. When she needs to remove something, she will remove the thing that she read least recently. What is Alice's average read time per object in the best case scenario? 2 ms What is Alice's average read time per object in the worst case scenario? 500 ms

Submit Answer & Continue