3.14 Character operations

Including the **cctype library** via **#include <cctype>** provides access to several functions for working with characters. ctype stands for character type. The first c indicates the library is originally from the C language.

Table 3.14.1: Character functions return values.

isalpha (c)	true if alphabetic: a-z or A-Z	<pre>isalpha('x') // true isalpha('6') // false isalpha('!') // false</pre>	toupper(c)	Uppercase version	<pre>toupper('a') // A toupper('A') // A toupper('3') // 3</pre>
isdigit(c)	true if digit: 0-9.	<pre>isdigit('x') // false isdigit('6') // true</pre>	tolower(c)	Lowercase version	<pre>tolower('A') // a tolower('a') // a tolower('3') // 3</pre>
isspace(c)	true if whitespace.	<pre>isspace(' ') // true isspace('\n') // true isspace('x') // false</pre>			

Note: Above, false is zero, and true is non-zero.

See http://www.cplusplus.com/reference/cctype/ for a more complete list (applies to both C and C++).

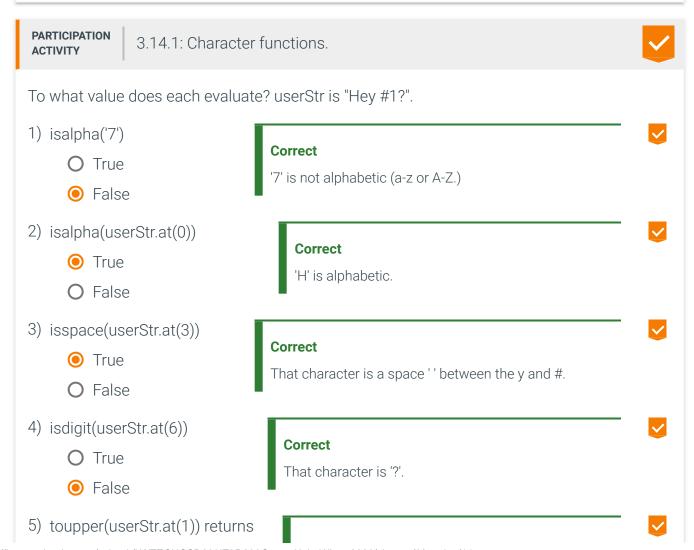
Feedback?

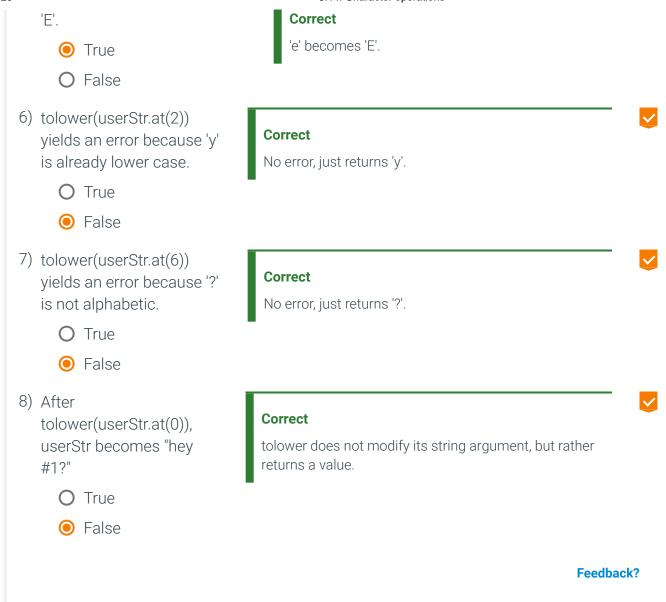
Figure 3.14.1: State abbreviation capitalization.

```
#include <iostream>
#include <cctype>
using namespace std;
int main() {
   char let0;
   char let1;
   cout << "Enter a two-letter state abbreviation: ";</pre>
   cin >> let0;
   cin >> let1;
   if ( ! (isalpha(let0) && isalpha(let1)) ) {
      cout << "Error: Both are not letters." << endl;</pre>
   else {
      let0 = toupper(let0);
      let1 = toupper(let1);
      cout << "Capitalized: " << let0 << let1 <<</pre>
endl;
   return 0;
}
```

```
Enter a two-letter state abbreviation:
az
Capitalized: AZ
...
Enter a two-letter state abbreviation:
AZ
Capitalized: AZ
...
Enter a two-letter state abbreviation:
Mn
Capitalized: MN
...
Enter a two-letter state abbreviation:
5x
Error: Both are not letters.
...
Enter a two-letter state abbreviation:
A@
Error: Both are not letters.
```

Feedback?







```
20
   21
           cout << "Has no digit." << endl;</pre>
   22
   23
          ✓ All tests passed
  Run
✓ Testing: abc
                          Has no digit.
           Your output

✓ Testing whether your code used .at()

                           Used .at()
                 Yours

✓ Testing: a_5

           Your output
                          Has a digit.
✓ Testing: 32x
           Your output
                          Has a digit.
✓ Testing: ?7a
           Your output
                          Has a digit.
✓ Testing: ???
           Your output
                          Has no digit.
                                                                              Feedback?
CHALLENGE
            3.14.2: Alphabetic replace.
ACTIVITY
Replace any alphabetic character with '_' in 2-character string passCode. Ex: If
passCode is "9a", output is:
```

9_ Hint: Use two if statements to check each of the two characters in the string, using isalpha(). 1 #include <iostream> #include <string> 3 #include <cctype> 4 using namespace std; int main() { string passCode; 8 9 cin >> passCode; 10 /* Your solution goes here */ 11 if(isalpha(passCode.at(0))){ 12 passCode.at(0) = '_'; 13 14 if(isalpha(passCode.at(1))){ 15 passCode.at(1) = '_'; 16 17 18 cout << passCode << endl;</pre> 19 20 return 0; 21 ✓ All tests passed Run ✓ Testing: "9a" Your output ✓ Testing: "Ef" Your output ✓ Testing: "7?" Your output ✓ Testing: "*Y" Your output Feedback?