# Solutions to Quick Check Questions

# 9

# Characters and Strings

## 9.1 Characters

1. Determine the output of the following statements:

a.
```
System.out.println( (char) 65 );
```

*A*

b.
```
System.out.println( (int) 'C' );
```

*67*

c.
```
System.out.println( 'Y' );
```

*Y*

d.
```
if ( 'A' < '?' )
   System.out.println( 'A' );
else
   System.out.println( '?' );
```

*?*

2. How many distinct characters can you represent by using eight bits?

$$2^8 = 256$$

## 9.2 Strings

1. Determine the output of the following code:

a.
```
String str = "Programming";
for (int i = 0; i < 9; i+=2) {
   System.out.print( str.charAt( i ) );
}
```

*Pormi*

b.
```
String str = "World Wide Web";
for (int i = 0; i < 10; i ++ ) }
   if ( str.charAt(i) == 'W') {
      System.out.println( 'M' );
   }
   else {
      System.out.print( str.charAt(i) );
   }
}
```

*M*
*orld*
*M*
*ide*

2. Write a loop that prints out a string in reverse. If the string is Hello then the code outputs olleH. Use System.out.

*Answer:*

```
int max = str.length()-1;
for (int i = max; i >= 0; i--)
   System.out.print( str.charAt(i) );
}
```

3. Assuming two String objects str1 and str2 are initialized as follows:

```
String str1 = "programming";
String str2 = "language";
```

Determine the value of each of the following expressions if they are valid. If they are not valid, state the reason why.

a. `str1.compareTo( str2 )`

*positive number*

b. `str2.compareTo( str2 )`

*0*

c. `str2.substring( 1, 1 )`

*“”* *//empty string*

d. `str2.substring( 0, 7 );`

*“languag”*

e. `str2.charAt( 11 );`

*invalid —out of bounds error*

f. `str1.length( ) + str2.length( )`

*19*

4. What is the difference between the two String methods equals and equalsIgnoreCase?

equals *is a case-sensitive comparison while* equalsIgnoreCase *is not.*

## 9.3 Pattern Matching and Regular Expression

1. Describe the string the following regular expression matches:

```
a. a*b

b. b[aiu]d

c. [Oo]bject(s| )
```

*a. Strings that begins with ‘a’ and terminates with ‘b’*

*b. Strings* “bad” ,“bid”, *and* “bud”

*c. Strings* “Objects” ,“objects”, “Object ”,*and* “object ”

2. Write a regular expression for a state vehicle license number whose format is a single capital letter, followed by three digits and four lowercase letters.

   *[A-Z][0-9]{3}[a-z]{4}*

3. Which of the following regular expressions are invalid?

```
a. (a-z)*+
b. [a|ab]xyz
c. abe-14
d. [a-z&&^a^b]
e. [//one]two
```

   *They are all syntactically valid, but from a logical standpoint, expressions (a) and (e) are probably a mistake. The first one looks for zero or more repetitions of the character sequence “a-z”. It is not specifying a single character lowercase character, which is specified as [a-z]. The last expression is equivalent to [/one]two. The two forward slashes have no effect.*

## 9.4 The Pattern and Matcher Classes

1. Replace the following statments with the equivalent ones using the Pattern and Matcher classes:

```
a. str.replaceAll("1", "one");

b. str.matches("alpha");
```

*Answers:*

a.

```
Pattern pattern = Pattern.compile("1");
Matcher matcher = pattern.matcher(str);
matcher.replaceAll("one");
```

b.

```
Pattern pattern = Pattern.compile("alpha");
Matcher matcher = pattern.matcher(str);
matcher.matches();
```

2. Using the find method of the Matcher class, check if the given string document contains the whole word Java.

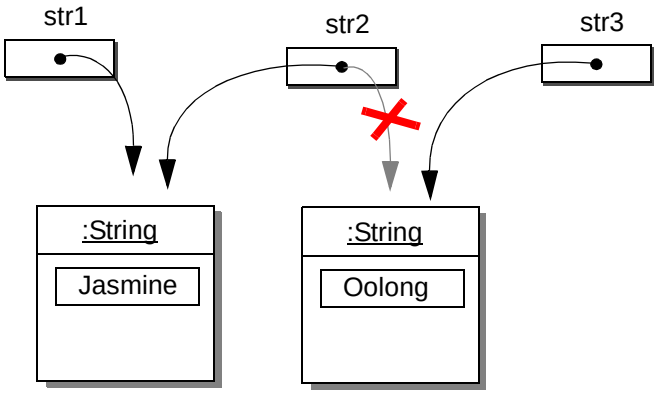
```
Pattern pattern = Pattern.compile("Java",
                    Pattern.CASE_SENSITIVE);

String document = ... ;

Matcher mathcer = pattern.matcher(document);

if (matcher.find()) {
   System.out.println("Found");
} else {
   System.out.println("Not found");
}
```

## 9.5 Comparing Strings

1. Show the state of memory after the following statements are executed:

```
String str1, str2, str3;
str1 = "Jasmine";
str2 = "Oolong";
str3 = str2;
str2 = str1;
```

*This is the same question from Ch 5 to review the comparison of objects.*




## 9.6 StringBuffer and StringBuilder

1. Determine the value of str after the following statements are executed:

a.
```
StringBuffer str
       = new StringBuffer( "Caffeine" );
str.insert(0, "Dr. ");
```

*Dr. Caffeine*

b.
```
String       str    = "Caffeine";
StringBuffer str1   =
   new StringBuffer( str.substring(1, 3) );
str1.append('e');
str = "De" + str1;
```

*Deafe*

c.
```
String       str    = "Caffeine";
StringBuffer str1   =
   new StringBuffer( str.substring(4, 8) );
str1.insert(3,'f');
str = "De" + str1;
```

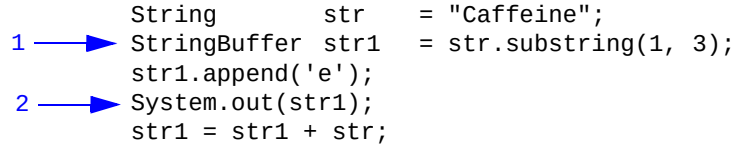
*Deeinfe*

2. Assume a String object str is assigned to a string value. Write a code segment to replace all occurrences of lowercase vowels in a given string to the letter C by using String and StringBuffer objects.

*Answer:*

```
StringBuffer strBuf = new StringBuffer( "" );
int max = str.length();
char letter;

for (int i = 0; i < max; i++) {
    letter = str.charAt( i );

    if (letter = 'a' || letter = 'e' ||
        letter == 'i' || letter == 'o' ||
        letter == 'u' ) {

        strBuf.append('C');
    }
    else {
        strBuf.append( letter );
    }
}
str = strBuf.toString();
```

3. Find the errors in the following code:




*1. Cannot assign a* String *value to a* StringBuffer *variable.*

*2. Method* print *or* println *is missing.*

## 9.7 String Processing and Bioinformatics

*No Quick Check Questions.*

## 9.8 Sample Development: Building Word Concordance

*No Quick Check Questions.*