Object-Oriented Programming Fundamentals

Lecture/Workshop (Week 2)

The String class[1]

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Task 1

For the following declarations:

```
int x = 1;
int y = 2;
int z = 3;
String s = "123";
```

what is output to screen by each of the statements below?

```
System.out.println("It's as easy as " + s);
```

```
System.out.println("It's as easy as " + x + y + z);
```

```
System.out.println("It's as easy as " + (x + y + z));
```

```
System.out.println("It's as easy as " + (x + y) + z);
```

```
System.out.println(x + y + z + "It's as easy as ");
```

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[1] Refer to the provided reference sheet with this worksheet (which contains a summary of some useful methods of the `String` class) or access the Java API documentation directly on the web

Task 2

Refer to the summary of some useful methods of the **String** class in the Lecture/Workshop (Week 2) String Reference. To help you understand each method, the following exercises contain examples of each method, then you are asked to answer some questions on each method. For any **println** statements, indicate what is output to screen.

length()

```
String little = "a";
String longer = "aha";
String longest = "aahaa";

System.out.println(little.length());
```

Output: 1

```
System.out.println(longer.length() + longest.length());
```

Output:

```
System.out.println("".length());
```

Output:

```
System.out.println("12".length());
```

Output:

```
System.out.println("u & me".length());
```

Output:

----

isEmpty()

```
String yourGlass = "full";
String myGlass = "empty";
String emptyString = "";

System.out.println(yourGlass.isEmpty());
```

Output: false

```
System.out.println("".isEmpty());
```

Output: true

```
System.out.println(myGlass.isEmpty());
```

Output:

```
System.out.println(emptyString.isEmpty());
```

Output:

charAt()

```
String a1 = "8 bits per byte";

System.out.println(a1.charAt(4));
```

Output: t

```
System.out.println(a1.charAt(0));
```

Output:

```
System.out.println(a1.charAt(14));
```

Output:

```
System.out.println(a1.charAt(-2));
```

Output:

```
System.out.println("eIgHt".charAt(3));
```

Output:

----

equals() and equalsIgnoreCase()

```
String lizard1 = "dragon";
String insect1 = "dragonfly";
String insect2 = "fly";

System.out.println(lizard1.equals("dragon"));
```

Output: true

```
System.out.println(lizard1.equals(insect1));
```

Output: false

```
System.out.println(insect2.equalsIgnoreCase("fLy"));
```

Output:

```
System.out.println("FLY".equals(insect2));
```

Output:

```
System.out.println(insect1.equals(lizard1 + insect2));
```

Output:

3

compareTo() and compareToIgnoreCase()

Are the values given to the integer variables by the **compareTo()** and **compareToIgnoreCase()** statements below *positive*, *negative* or *zero*?

```
String name1 = "fred";
String name2 = "barney";
String name3 = "frederica";
String name4 = "Fred";

int v = name1.compareTo(name2);
```

> *Answer: v is positive (for interest it is 4 as 'f' comes 4 after 'b' in Unicode)*

```
int w = name1.compareTo(name3);
```

> *Answer: w is negative (for interest -5 as "fred" is shorter than "frederica")*

```
int x = name3.compareTo(name4);
```

> *Answer: x is positive (for interest 32 as 'f' comes after 'F' in Unicode)*

```
int y = name1.compareToIgnoreCase(name4);
```

> *Answer: y is zero*

```
int z = name2.compareToIgnoreCase("BaRn");
```

> *Answer: z is positive (for interest 2 as "BaRn" is shorter than "barney"*

```
String robot1 = "data";
String robot2 = "marvin";
String robot3 = "marvin the magnificient";
String robot4 = "Data";

int v1 = robot1.compareTo(robot2);
```

> *Answer: v1 is*

```
int w1 = robot4.compareTo(robot1);
```

> *Answer: w1 is*

```
int x1 = robot2.compareTo(robot3);
```

> *Answer: x1 is*

```
int y1 = robot1.compareToIgnoreCase(robot4);
```

> *Answer: y1 is*

```
int z1 = robot3.compareToIgnoreCase("MARVIN");
```

> *Answer: z1 is*

indexOf() and lastIndexOf()

```
String fruit = "strawberry blueberry";

System.out.println(fruit.indexOf('r'));          Output: 2

System.out.println(fruit.indexOf('R'));          Output: -1

System.out.println(fruit.indexOf('e',9));        Output: 14

System.out.println(fruit.indexOf("err"));        Output: 6

System.out.println(fruit.indexOf("err",18));     Output: -1

System.out.println(fruit.indexOf('l'));          Output:

System.out.println(fruit.indexOf(' '));          Output:

System.out.println(fruit.indexOf('l',4));        Output:

System.out.println(fruit.indexOf("berry"));      Output:

System.out.println(fruit.indexOf("apple",11));   Output:
```

```
String spell = "double toil and trouble";

System.out.println(spell.lastIndexOf('b'));      Output: 20

System.out.println(spell.lastIndexOf(','));      Output: -1

System.out.println(spell.lastIndexOf('b',12));   Output: 3

System.out.println(spell.lastIndexOf("ub"));     Output: 19

System.out.println(spell.lastIndexOf("ub",4));   Output: 2

System.out.println(spell.lastIndexOf('e'));      Output:

System.out.println(spell.lastIndexOf('"'));      Output:

System.out.println(spell.lastIndexOf('e',13));   Output:

System.out.println(spell.lastIndexOf("ble"));    Output:

System.out.println(spell.lastIndexOf("ble",4));  Output:
```

toLowerCase() and toUpperCase()

```
String request = "Quiet please.";

System.out.println(request.toUpperCase());
```

Output: QUIET PLEASE.

```
System.out.println(request);
```

Output: Quiet please. **(Note the original string is not changed!)**

```
request = request.toUpperCase();
System.out.println(request);
```

Output:

```
System.out.println("3 2 1 BLAST OFF!".toLowerCase());
```

Output:

----

replace()

```
String state = "I think therefore I exist!";

System.out.println(state.replace('I','U'));
```

Output: U think therefore U exist!

```
System.out.println(state);
```

Output:

```
state = state.replace('I','Q');
System.out.println(state);
```

Output:

```
System.out.println("computer part".replace('p','m'));
```

Output:

```
String advice = "He who hesitates is lost?";
advice = advice.replace(' ','?');
System.out.println(advice);
```

Output:

<u>**trim()**</u>

```
String reply = "    err, let me think...    ";
reply = reply.trim();

System.out.println(reply);
```

   Output:

```
String answer = "   Cogito,              ergo sum   ";
answer = answer.trim();

System.out.println(answer);
```

   Output:

<u>**substring()**</u>

```
String s1 = "I want to believe";
String s2 = s1.substring(3);
String s3 = s1.substring(7,12);

System.out.println(s2);
```

   Output: ant to believe

```
System.out.println(s3);
```

   Output: to be

```
String s4 = "professional ethics";
String s5 = s4.substring(15);
String s6 = s4.substring(18);
String s7 = s4.substring(19);

System.out.println(s5);
```

   Output:

```
System.out.println(s6);
```

   Output:

```
System.out.println(s7);
```

   Output:

```
System.out.println(s4.substring(3,7));
```

   Output: