Tinker Academy® Publishing

Java Fundamentals Workbook: Strings, Basic Data Types, Control Flow

Draft Edition

Cupertino

Tinker Academy Publishing

ISBN: 978-1530465378

Worksheets

Worksheet 01 Create Your Hello World Program

In this worksheet you will code your first Java Program!

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet01.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet01 {
4.      public static void main(String[] args) {
5.          System.out.println("Hello World");
6.      }
7.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Hello World
```

Key Learning

Every Java Source File ends with .java and contains lines of code.

Java source Files contain 1 or more statements. Line 5 has 1 Java Statement. Every statement ends in a semicolon.

Statements get "executed" when the program runs.

When Line 5 is executed, it will output the text within doublequotes.

Texts are also called Strings in java and is always enclosed within double quotes.

Strings are made up of units called chars (short for characters).

The String "Hello World" has 11 chars. Each char has a location in the String called its index.

The indexes for each char is shown below.

0	1	2	3	4	5	6	7	8	9	10
'H'	'e'	'l'	'l'	'o'	' '	'W'	'o'	'r'	'l'	'd'

Worksheet 02 Create Art

In this worksheet you will change add more output

Step 1
Open Workbook Project
Step 2
Open source file Worksheet02.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet02 {
4.      public static void main(String[] args) {
5.          System.out.print("\u25AF");System.out.print(" ");System.out.println("\u25AF");
6.          System.out.print(" ");System.out.print("-");System.out.print(" ");
7.      }
8.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
▯ ▯
 -
```

Key Learning

A line can have more than 1 statement. Line 5 has 3 statements separated by a semicolon. Line 6 has 3 statements separated by a semicolon.

Each statement outputs the chars within the double quote when they get executed.

The pattern \u followed by 4 chars is called an escape sequence **and represent 1 char.**

Line 5 outputs 3 chars ("\u25AF", " ", " \u25AF")

Line 6 outputs 3 chars (" ", "-", " ")

Worksheet 03 Unicode Escape Sequences

In this worksheet you will represent chars for the String "Hello World" using Unicode Escape Sequences

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet03.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet03 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "\u0048\u0065\u006C\u006C\u006F\u0020\u0057\u006F\u0072\u006C\u0064";
7.          System.out.println(sentence);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has no output

Hello World

Key Learning

Java is an extremely well designed and flexible language.

Any char such as 'H' can also be represented by its escape sequence in a String.

The String "Hello World" on line 6 is represented by its escape sequence.

The escape sequence list for some of the chars is below.

The indexes for each char is shown below.

'H'	'e'	'l'	'o'	' '	'W'	'r'	'd'
\u0048	\u0065	\u006C	\u006F	\u0020	\u0057	\u0072	\u0064

The complete list of escape sequences is given in the next worksheet

Worksheet 04 Unicode Escape Sequence Reference

Unicode Escape Sequences

This is a reference worksheet. Don't attempt to memorize this table!

A	\u0041
B	\u0042
C	\u0043
D	\u0044
E	\u0045
F	\u0046
G	\u0047
H	\u0048
I	\u0049
J	\u004A
K	\u004B
L	\u004C
M	\u004D
N	\u004E
O	\u004F
P	\u0050
Q	\u0051
R	\u0052
S	\u0053
T	\u0054
U	\u0055
V	\u0056
w	\u0057
X	\u0058
Y	\u0059
Z	\u005A

a	\u0061
b	\u0062
c	\u0063
d	\u0064
e	\u0065
f	\u0066
g	\u0067
h	\u0068
i	\u0069
j	\u006A
k	\u006B
l	\u006C
m	\u006D
n	\u006E
o	\u006F
p	\u0070
q	\u0071
r	\u0072
s	\u0073
t	\u0074
u	\u0075
v	\u0076
w	\u0077
x	\u0078
y	\u0079
z	\u007A

0	\u0030
1	\u0031
2	\u0032
3	\u0033
4	\u0034
5	\u0035
6	\u0036
7	\u0037
8	\u0038
9	\u0039
Space	\u0020
!	\u0021
"	\u0022
#	\u0023
$	\u0024
%	\u0025
&	\u0026
'	\u0027
(	\u0028
)	\u0029
*	\u002A
+	\u002B
,	\u002C
-	\u002D
.	\u002E
/	\u002F

Worksheet 05 Use Unicode Escape Sequences

In this worksheet you will represent chars using Unicode Escape Sequences

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet05.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet05 {
4.
5.      public static void main(String[] args) {
6.          String str = "\u004A\u0061\u0076\u0061";
7.          System.out.println(str);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has no output

Java

Key Learning

Refer to the previous "Worksheet on "Unicode Escape Sequence Refereces"

The escape sequence for the following 3 characters J, a, v are

'J'	'a'	'v'
\u004A	\u0061	\u0076

Line 6 lays them out in a sequence to spell "Java".

Worksheet 06 Declare A String Variable

In this worksheet you will declare a String variable

Step 1
Open Workbook Project
Step 2
Open source file Worksheet06.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet06 {
4.      public static void main(String[] args) {
5.          String sentence = "I'll be famous one day, but for now I'm stuck in middle school with a bunch of morons.";
6.          System.out.println(sentence);
7.      }
8.  }
```

Fix any errors, run your program and verify your program has the output shown below

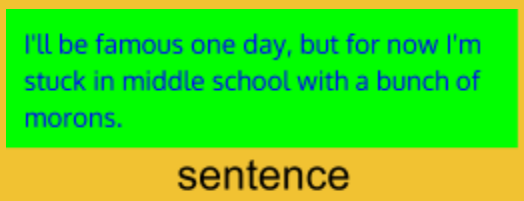
```
I'll be famous one day, but for now I'm stuck in middle school with a bunch of morons.
```

Key Learning

Line 5 and Line 6 are Java statements.

Line 5 is called the String **variable declaration statement.**

Visually it does:



Line 6 will output the string stored in sentence.

Worksheet 07 Assign A Value To A String Variable

In this worksheet you will assign a new value to a String variable

Step 1
Open Workbook Project
Step 2
Open source file Worksheet07.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet07 {
4.      public static void main(String[] args) {
5.          String strval = "I know who I am";
6.          strval = "I am a string";
7.          System.out.println(strval);
8.      }
9.  }
```

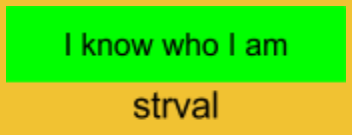
Fix any errors, run your program and verify your program has the output shown below

```
I am a string
```

Key Learning

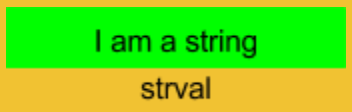
Line 5 is a variable declaration.

Visually it does:



Line 6 is a variable assignment

Visually it does:



Worksheet 08 Declare Multiple String Variables

In this worksheet you will declare multiple String variables in a single line of code

Step 1
Open Workbook Project
Step 2
Open source file Worksheet08.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet08 {
4.      public static void main(String[] args) {
5.          String s1 = "Hello", s2 = " ", s3 = "World";
6.          System.out.println(s1);
7.          System.out.println(s2);
8.          System.out.println(s3);
9.      }
10. }
```

Fix any errors, run your program and verify your program has the output shown below

```
Hello

World
```

Key Learning

Line 5 has 3 variable declaration statements on line line

Visually it does:

s1 wll contain "Hello", s2 will contain a single blank space " " and s3 will contain "World".

Worksheet 09 Declare Multiple String Variables

In this worksheet you will declare multiple String variables in a single line of code

Step 1
Open Workbook Project
Step 2
Open source file Worksheet09.java
Step 3
Type in the code below

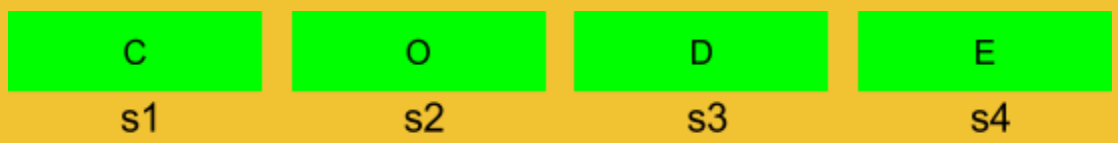
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet09 {
4.      public static void main(String[] args) {
5.          String s1 = "C", s2 = "O", s3 = "D", s4 = "E";
6.          System.out.println(s1);
7.          System.out.println(s2);
8.          System.out.println(s3);
9.          System.out.println(s4);
10.     }
11. }
```

Fix any errors, run your program and verify your program has the output shown below

```
C
O
D
E
```

Key Learning

Line 5 does this:



Lines 6 - 9 will output the value in each s1, s2, s3 and s4 on separate lines.

Worksheet 10 Get Part Of A Sentence

In this worksheet you will use get part of a sentence

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet10.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet10 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "I'll be famous one day, but for now I'm stuck in middle school with a bunch of morons.";
7.          String part = sentence.substring(5, 14);
8.          System.out.println(part);
9.      }
10. }
```

Fix any errors, run your program and verify your program has no output

be famous

Key Learning

Line 7 is a variable declaration statement with a **method expression**.

There are various types of method expressions.

The method expression on Line 7 will pick chars from index 5 to 13 to create a new String.

The first 16 indexes of the string stored in sentence are shown below

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I	'	l	l		b	e		f	a	m	o	u	s		o

Worksheet 11 Join Together String Variables

In this worksheet you will get parts of a String and join them together

Step 1
Open Workbook Project
Step 2
Open source file Worksheet11.java
Step 3
Type in the code below

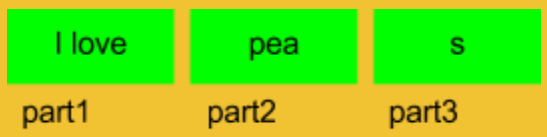
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet11 {
4.      public static void main(String[] args) {
5.          String sentence = "I love a peanut butter and jelly sandwich";
6.          String part1 = sentence.substring(0, 7);
7.          String part2 = sentence.substring(9, 12);
8.          String part3 = sentence.substring(33, 34);
9.          System.out.println(part1 + part2 + part3);
10.     }
11. }
```

Fix any errors, run your program and verify your program has the output shown below

```
I love peas
```

Key Learning

Lines 6, 7 and 8 does:



Line 9 will join the String parts to create the new String "I love peas"

part1 + part2 + part3 is called a String expression.

Worksheet 12 Get Parts Of A Sentence

In this worksheet you will get parts of a String and join them together

Step 1
Open Workbook Project
Step 2
Open source file Worksheet12.java
Step 3
Type in the code below
Step 4
Add code on Line 10 to output the String expression part1 + part2 + part3

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet12 {
4.
5.     public static void main(String[] args) {
6.        String sentence = "I love a peanut butter and jelly sandwich";
7.        String part1 = sentence.substring(0, 9);
8.        String part2 = sentence.substring(16, 17);
9.        String part3 = sentence.substring(34, 37);
10.
11.    }
12. }
```

Fix any errors, run your program and verify your program has the output shown below

```
I love a band
```

Lets Code This!
This is like the puzzle you used to play? We will need to build "I love a band" using chars from the setence
First look for the pattern strings "I love a " "b" "and". Next find their start and end indexes. Finally complete the code on Line 7, 8 and 9 using the substring method expression.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I		l	o	v	e		a		p	e	a	n	u	t	
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
b	u	t	t	e	r		a	n	d		j	e	l	l	y
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	
	s	a	n	d	w	i	c	h							

Worksheet 13 Join Together String Variables

In this worksheet you will join together multiple String variables

Step 1
Open Workbook Project
Step 2
Open source file Worksheet13.java
Step 3
Type in the code below

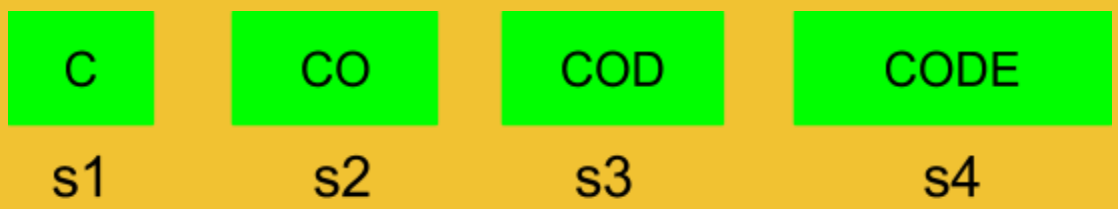
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet13 {
4.      public static void main(String[] args) {
5.          String s1 = "C";
6.          String s2 = s1 + "O";
7.          String s3 = s2 + "D";
8.          String s4 = s3 + "E";
9.          System.out.println(s4);
10.     }
11. }
```

Fix any errors, run your program and verify your program has the output shown below

CODE

Key Learning

Visually it does:



Worksheet 14 Declare An int Variable

In this worksheet you will declare an int variable.

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet14.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet14 {
4.
5.      public static void main(String[] args) {
6.          int intvar = 10;
7.          System.out.println(intvar);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
10
```

Key Learning

Line 6 is an int variable declaration.

Visually it does:

Worksheet 15 Count The Number Of Characters In A String

In this worksheet you will count the number of characters in a String

Step 1
Open Workbook Project
Step 2
Open source file Worksheet15.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet15 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          int count = sentence.length();
8.          System.out.println(count);
9.      }
10. }
```

Fix any errors, run your program and verify your program has the output shown below

```
230
```

Key Learning

Line 7 uses a method expression

The method expression counts the numbers of chars in the String and then store the value in the count variable.

Visually it does:

© Harry Potter and the Philosopher's Stone

Worksheet 16 Declare A char Variable

In this worksheet you will declare a char variable.

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet16.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet16 {
4.      public static void main(String[] args) {
5.          char chvar = 'H';
6.          System.out.print(chvar);
7.      }
8.  }
```

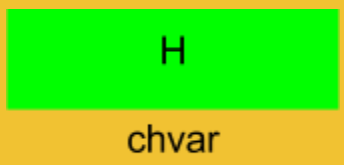
Fix any errors, run your program and verify your program has the output shown below

```
H
```

Key Learning

Line 5 declares an char variable

Visually it does:



Line outputs the value.

Worksheet 17 Get A char From A String

In this worksheet you will get a char from a String

Step 1
Open Workbook Project
Step 2
Open source file Worksheet17.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet17 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          char ch = sentence.charAt(0);
8.          System.out.print(ch);
9.      }
10. }
```

Fix any errors, run your program and verify your program has the output shown below

```
B
```

Key Learning

Line 7 uses a method expression.

The method expression creates a copy of the char at index 0

The char at index 0 of the string in sentence is 'B'

0	1	2	3	4	5	6	7	8	9	10	11	12	13
'B'	'e'	'f'	'o'	'r'	'e'	' '	'w'	'e'	' '	'b'	'e'	'g'	'i'

Worksheet 18 Locate a char in a String

In this worksheet you will locate a char in a String

Step 1
Open Workbook Project
Step 2
Open source file Worksheet18.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet18 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          int idx = sentence.indexOf('B');
8.          System.out.print(idx);
9.      }
10. }
```

Fix any errors, run your program and verify your program has the output shown below

```
0
```

Key Learning

Line 7 uses a method expression.

The method expression returns the index of the **first** 'B' in the String.

The first occurence of the char 'B' is at index 0

0	1	2	3	4	5	6	7	8	9	10	11	12	13
B	e	f	o	r	e		w	e		b	e	g	i

Worksheet 19 Create A boolean Expression

In this worksheet you will create a boolean expression.

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet19.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet19 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          System.out.print(sentence.indexOf('B') == 0);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
true
```

Key Learning

A boolean expression is any expression that returns either true or false

Line 7 uses a boolean expression.

Line 7 uses the **equals** boolean expression.

The expression will return true if the index of the first occurence 'B' is equals to 0and false otherwise.

The first occurence of the char 'B' is at index 0.

0	1	2	3	4	5	6	7	8	9	10	11	12	13
B	e	f	o	r	e		w	e		b	e	g	i

Worksheet 20 Create A boolean Expression

In this worksheet you will create a boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet20.java
Step 3
Type in the code below
Step 4
Update Line 7 with a boolean expression to output true

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet20 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are:
    Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world!
    But he is a bit mad, yes. Potatoes, Harry?";
7.          boolean isEqual =
8.          System.out.print(isEqual);
9.      }
10. }
```

Fix any errors, run your program and verify your program has the output shown below

```
true
```

Lets Code This!

The index of the chars is below

0	1	2	3	4	5	6	7	8	9	10	11	12	13
B	e	f	o	r	e		w	e		b	e	g	i

Create a indexOf boolean expression on Line 7 that returns true. You can pick any char.

Worksheet 21 Declare A boolean Variable

In this worksheet you will declare a boolean variable.

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet21.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet21 {
4.      public static void main(String[] args) {
5.          boolean boolvar = true;
6.          System.out.println(boolvar);
7.      }
8.  }
```

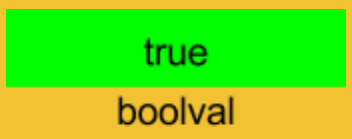
Fix any errors, run your program and verify your program has the output shown below

```
true
```

Key Learning

Line 5 declares an boolean variable

Visually it does:



Worksheet 22 Use Boolean Expressions

In this worksheet you will use boolean expressions in variables

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet22.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet22 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          boolean isEqual = sentence.charAt(0) == 'B';
8.          System.out.print(isEqual);
9.      }
10. }
```

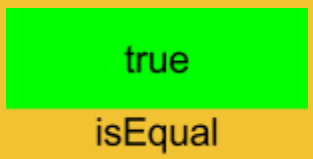
Fix any errors, run your program and verify your program has the output shown below

```
true
```

Key Learning

Line 7 uses the equals boolean expression

When Line 7 is executed, it create the variable isEqual and will store the value of the boolean expression into it



0	1	2	3	4	5	6	7	8	9
B	e	f	o	r	e		w	e	

Worksheet 23 If Control Blocks

In this worksheet you will be introduced to If control blocks

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet23.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet23 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          boolean isEqual = sentence.charAt(0) == 'B';
8.          if (isEqual) {
9.              System.out.print("B good!");
10.         }
11.     }
12. }
```

Fix any errors, run your program and verify your program has the output shown below

```
B good!
```

Key Learning

Lines 8 to 10 represent the If Control Block.

The program halts at Line 8. Since isEqual is true, the program will "enter" the Block and execute Line 9.

Worksheet 24 If Control Blocks

In this worksheet you will be introduced to If control blocks

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet24.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet24 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          boolean isEqual = sentence.charAt(0) == 'C';
8.          if (isEqual) {
9.              System.out.print("B good!");
10.         }
11.         System.out.print("C good!");
12.     }
13. }
```

Fix any errors, run your program and verify your program has the output shown below

```
C good!
```

Key Learning

Lines 8 to 10 represent the If Control Block.

The program halts at Line 8. Since isEqual is false, the program will "skip" the If Block and execute Line 11.

Worksheet 25 If Else Control Blocks

In this worksheet you will be introduced to If else control blocks

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet24.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet25 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "Before we begin our banquet, I would like to say a few words. And here they are: Nitwit! Blubber! Oddment! Tweak! Thank you. Is he a bit mad? Mad? He's a genius! Best wizard in the world! But he is a bit mad, yes. Potatoes, Harry?";
7.          boolean isEqual = sentence.charAt(4) == 'e';
8.          if (isEqual) {
9.              System.out.print("e all be good");
10.         } else {
11.             System.out.print("e all still be good");
12.         }
13.     }
14. }
```

Fix any errors, run your program and verify your program has the output shown below

```
e all still be good
```

Key Learning

Lines 8 to 12 represent the If **Else** Control Block. Line 9 represents the If Block. Line 11 represents the Else Block.

The program halts at Line 8.

'e' is at index 1. isEqual is therefore false.

Since isEqual is false, the program will "skip" the If Block, "enter" the Else Block and execute Line 11.

Worksheet 26 Compare integers

In this worksheet you will compare integers

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet26.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet26 {
4.
5.      public static void main(String[] args) {
6.          boolean isEqual = 2 + 2 == 4;
7.          if (isEqual) {
8.              System.out.print("2 + 2 == 4");
9.          }
10.     }
11. }
```

Fix any errors, run your program and verify your program has the output shown below

```
2 + 2 == 4
```

Key Learning

Line 6 uses an arithmetic expression.

All of you have seen similar arithmetic expressions before!

What is 2 + 2? Is it equal to 4? This is elementary school stuff. The expression 2 + 2 == 4 will return true.

Since isEqual is true, Line 8 will get executed which will output the String "2 + 2 == 4".

Worksheet 27 Compare Strings

In this worksheet you will compare 2 strings

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet27.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet27 {
4.
5.      public static void main(String[] args) {
6.          boolean isEqual = "Hello".equals("Hello");
7.          System.out.println(isEqual);
8.      }
9.
10. }
```

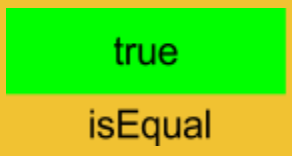
Fix any errors, run your program and verify your program has the output shown below

```
true
```

Key Learning

Line 6 uses a method expression.

The method expression compares 2 Strings and returns true if the 2 Strings are equal and false otherwise.



Worksheet 28 Compare String expressions

In this worksheet you will compare string expressions

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet28.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet28 {
4.
5.      public static void main(String[] args) {
6.          String s1 = "H" + "e" + "l" + "l" + "o";
7.          String s2 = "Hello" + "";
8.          boolean isEqual = s1.equals(s2);
9.          System.out.println(isEqual);
10.     }
11. }
```

Fix any errors, run your program and verify your program has the output shown below

```
true
```

Key Learning

Line 6 is the String "Hello".

Line 7 is a String expression "H" + "e" + "l" + "l" + "o" that returns the String "Hello"

The 2 strings are equal since they match char by char.

Worksheet 29 Using The Post Increment Operator

In this worksheet you will use the post increment operator

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet29.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet29 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          i++;
7.          System.out.println(i);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

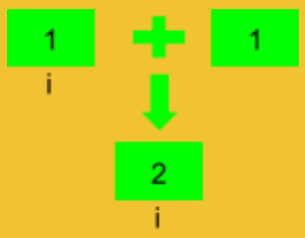
```
2
```

Key Learning

Line 6 uses a post increment operator.

Line 6 does 2 steps in 1 statement

1. gets the value i + 1
2. stores the new value back into i



Worksheet 30 Using The Post Increment In An Assignment

In this worksheet you will use the post increment operator in an assignment

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet30.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet30 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          int j = i++;
7.          System.out.println(i);
8.          System.out.println(j);
9.      }
10. }
```

Fix any errors, run your program and verify your program has the output shown below

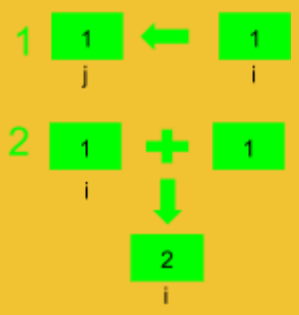
```
2
1
```

Key Learning

Line 6 uses a post increment operator in an variable assignment statement

Line 6 does 3 steps in 1 statement

1. store the current value of i into j
2. gets the value i + 1
3. stores the new value back into i



Worksheet 31 Using The Post Decrement Operator

In this worksheet you will use the post decrement operator

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet31.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet31 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          i--;
7.          System.out.println(i);
8.      }
9.  }
```

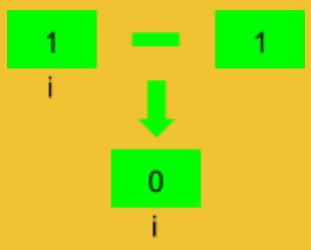
Fix any errors, run your program and verify your program has the output shown below

```
0
```

Key Learning

Line 6 does 2 steps in 1 statement

1. gets the value i - 1
2. stores the new value back into i



Worksheet 32 Using The Post Decrement In An Assignment

In this worksheet you will use the post decrement operator in an assignment

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet32.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet32 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          int j = i--;
7.          System.out.println(i);
8.          System.out.println(j);
9.      }
10. }
```

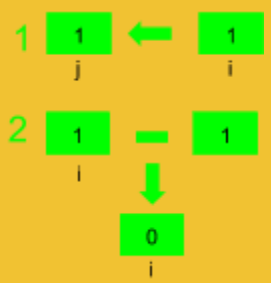
Fix any errors, run your program and verify your program has the output shown below

```
0
1
```

Key Learning

Line 6 does 3 steps in 1 statement

1. store the current value of i into j
2. gets the value i - 1
3. stores the new value back into i



Worksheet 33 Using The Pre Increment Operator

In this worksheet you will use the pre increment operator

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet33.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet33 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          ++i;
7.          System.out.println(i);
8.      }
9.  }
```

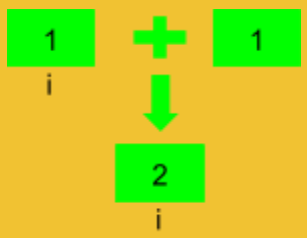
Fix any errors, run your program and verify your program has the output shown below

```
2
```

Key Learning

Line 6 does 2 steps in 1 statement

1. gets the value i + 1
2. stores the new value back into i



Worksheet 34 Using The Pre Increment Operator In An Assignment

In this worksheet you will use the pre increment operator in an assignment

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet34.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet34 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          int j = ++i;
7.          System.out.println(i);
8.          System.out.println(j);
9.      }
10. }
```

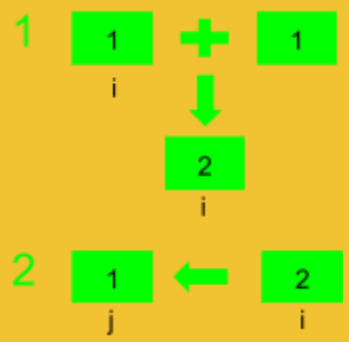
Fix any errors, run your program and verify your program has the output shown below

```
2
2
```

Key Learning

Line 6 does 3 steps in 1 statement

1. gets the new value i + 1
2. stores the new value back into i
3. store the new value of i into j



Worksheet 35 Using The Pre Decrement Operator

In this worksheet you will use the pre decrement operator

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet35.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet35 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          --i;
7.          System.out.println(i);
8.      }
9.  }
```

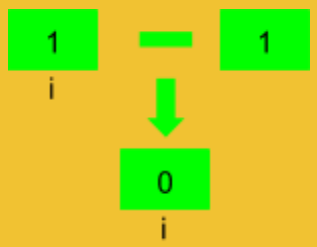
Fix any errors, run your program and verify your program has the output shown below

```
0
```

Key Learning

Line 6 does 3 steps in 1 statement

1. gets the new value i - 1
2. stores the new value back into i



Worksheet 36 Using The Pre Decrement In An Assignment

In this worksheet you will use the pre decrement operator in an assignment

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet36.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet36 {
4.      public static void main(String[] args) {
5.          int i = 1;
6.          int j = --i;
7.          System.out.println(i);
8.          System.out.println(j);
9.      }
10. }
```

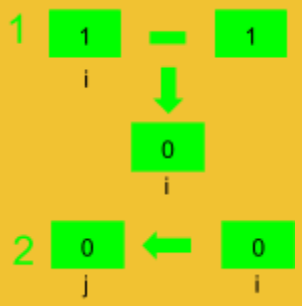
Fix any errors, run your program and verify your program has the output shown below

```
0
0
```

Key Learning

Line 6 does 3 steps in 1 statement

1. gets the new value i - 1
2. stores the new value back into i
3. store the new value of i into j



Worksheet 37 Using A For Loop

In this worksheet you will use a for loop

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet37.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet37 {
4.      public static void main(String[] args) {
5.          int sum = 0;
6.          int firstNum = 1;
7.          int lastNum = 100;
8.          for (int i = firstNum; i <= lastNum; i++) {
9.              sum = sum + i;
10.         }
11.         System.out.println("sum from "+firstNum+" to "+lastNum+" is "+sum);
12.     }
13. }
```

Fix any errors, run your program and verify your program has the output shown below

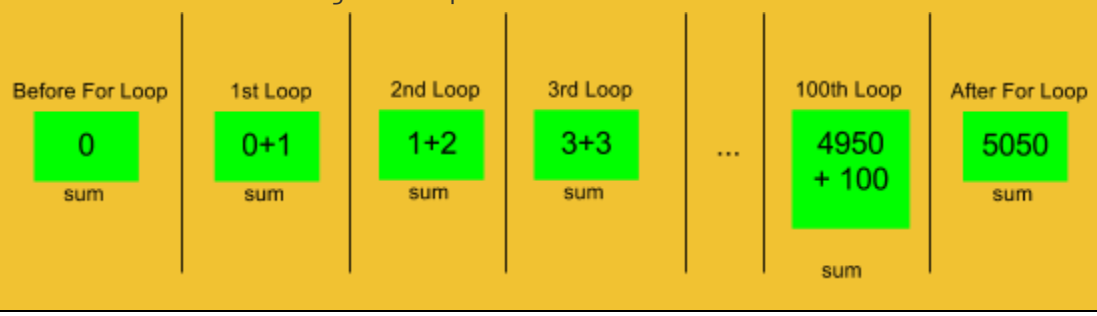
```
sum from 1 to 100 is 5050
```

Key Learning
For Loops are extremely powerful control structures.

Line 9 is the loop code. Line 9 is executed 100 times.

i is the loop variable. The loop variable is 1 in the 1st loop, 2 in the 2nd loop, ..., 100 in the 100th loop

The value stored in sum increases during each loop



Worksheet 38 Using A For Loop

In this worksheet you will use a for loop

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet38.java
Step 3
Type in the code below
Step 4
Add code for a For Loop on Lines 8 to 10

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet38 {
4.     public static void main(String[] args) {
5.        int sum = 0;
6.        int firstNum = 10;
7.        int lastNum = 80;
8.
9.
10.
11.       System.out.println("sum from "+firstNum+" to "+lastNum+" is "+sum);
12.    }
13. }
```

Fix any errors, run your program and verify your program has the output shown below

```
sum from 10 to 80 is 3195
```

Lets Code This

Line 9 should contain the loop code. Line 9 is executed 71 times (80 - 10 + 1 = 71)

The loop variable is 10 in the 1st loop, 11 in the 2nd loop, ..., 80 in the 71st loop

Worksheet 39 Using A For Loop

In this worksheet you will use a for loop

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet39.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet39 {
4.      public static void main(String[] args) {
5.          int sum = 0;
6.          int firstNum = 80;
7.          int lastNum = 0;
8.          for (int i = firstNum; i <= lastNum; i++) {
9.              sum = sum + i;
10.         }
11.         System.out.println("sum from "+firstNum+" to "+lastNum+" is "+sum);
12.     }
13. }
```

Fix any errors, run your program and verify your program has the output shown below

```
sum from 80 to 0 is 0
```

Key Learning

Line 9 should contain the loop code.

The number of loops calculates to -71.

For loops do not execute the loop code if the number of loops is less than or equal to 0.

The value of sum therefore remains 0.

Worksheet 40 Join Variables Of Different Data Types

In this worksheet you will join variables of different data types

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet40.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet40 {
4.      public static void main(String[] args) {
5.          String s = "Is 0 equal to 0? ";
6.          boolean b = true;
7.          System.out.println(s + b);
8.      }
9.  }
```

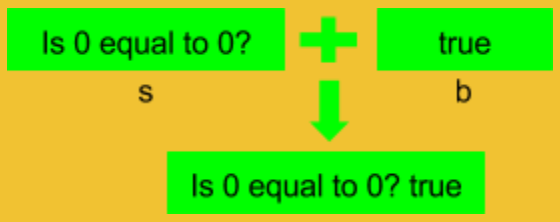
Fix any errors, run your program and verify your program has the output shown below

```
Is 0 equal to 0? true
```

Key Learning

Line 7 uses a **join expression s + b**

s+b joins the String value of **s** with the the boolean value of **b** to create **a new String value**



Worksheet 41 Join Variables Of Different Data Types

In this worksheet you will join variables of different data types

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet41.java
Step 3
Type in the code below
Step 4
Add code on on Line 5 to declare a String variable s with the value "Is 0 equal to 1? "

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet41 {
4.      public static void main(String[] args) {
5.
6.          boolean b = false;
7.          System.out.println(s + b);
8.      }
9.  }
```

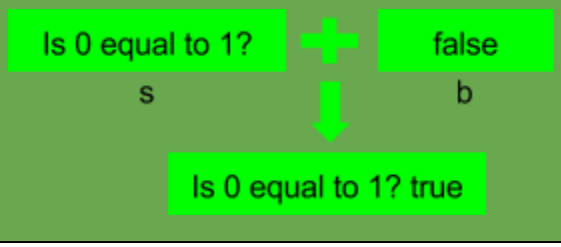
Fix any errors, run your program and verify your program has the output shown below

```
Is 0 equal to 1? false
```

Lets Code This!

Add a join expression on Line 7.

The join expression should return the String "Is 0 equal to 1? false"



Worksheet 42 Boolean Expression

In this worksheet you will use the == (equals) boolean expression using integers

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet42.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet42 {
4.     public static void main(String[] args) {
5.        String s = "Is 0 equal to 0? ";
6.        boolean b = 0 == 0;
7.        System.out.println(s + b);
8.     }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Is 0 equal to 0? true
```

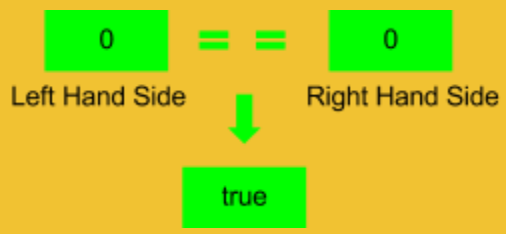
Key Learning

Line 6 uses a **equals expression.**

An equals expression has a value on the left side of the == and a value on the right side

The equals expression is true if the left side is equal to the right side

The equals expression is false if the left side is not equal to the right side



Worksheet 43 Boolean Expression

In this worksheet you will use the != (not equals) boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet43.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet43 {
4.      public static void main(String[] args) {
5.          String s = "Is 0 not equal to 0? ";
6.          boolean b = 0 != 0;
7.          System.out.println(s + b);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Is 0 not equal to 0? false
```

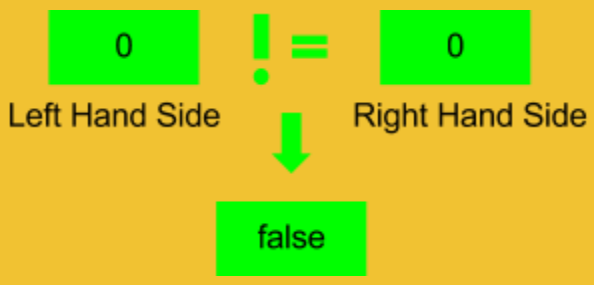
Key Learning

Line 6 uses a **not equals expression.**

A not equals expression has a value on the left side of the != and a value on the right side.

The not equals expression is true if the left side is **not equal** to the right side.

The equals expression is false if the left side is **equal** to the right side.



Worksheet 44 Boolean Expression

In this worksheet you will use the <= (less than or equals) boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet44.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet44 {
4.     public static void main(String[] args) {
5.        String s = "Is 0 less than or equal to 0? ";
6.        boolean b = 0 <= 0;
7.        System.out.println(s + b);
8.     }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Is 0 less than or equal to 0? true
```

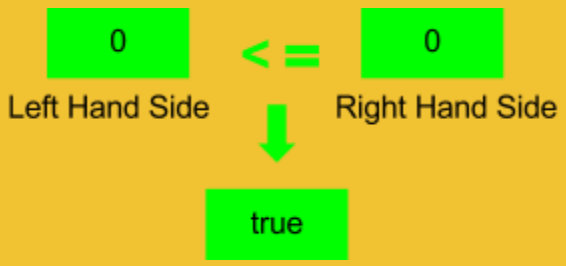
Key Learning

Line 6 uses a **less than or equals expression.**

A less than or equals expression has a value on the left of the <= and a value on the right.

The less than or equals expression is true if the left side is **less than OR equal** to the right side.

The less than or equals expression is false if the left side is **greater** than the right side.



Worksheet 45 Boolean Expression

In this worksheet you will use the < (less than) boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet40.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet45 {
4.      public static void main(String[] args) {
5.          String s = "Is 0 less than 0? ";
6.          boolean b = 0 < 0;
7.          System.out.println(s + b);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Is 0 less than 0? false
```

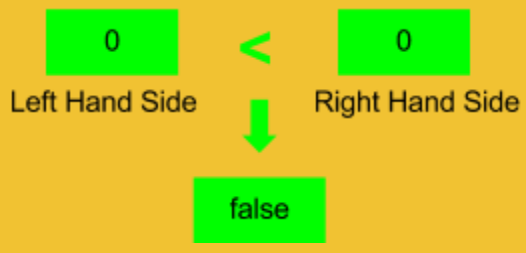
Key Learning

Line 6 uses a **less than expression.**

A less than expression has a value on the left of the < and a value on the right.

The less than expression is true if the left side is **less than** to the right side.

The less than expression is false if the left side is **greater than or equals** the right side.



Worksheet 46 Boolean Expression

In this worksheet you will use the >= (greater than or equals) boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet46.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet46 {
4.     public static void main(String[] args) {
5.        String s = "Is 0 greater than or equals 0? ";
6.        boolean b = 0 >= 0;
7.        System.out.println(s + b);
8.     }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Is 0 greater than or equals 0? true
```

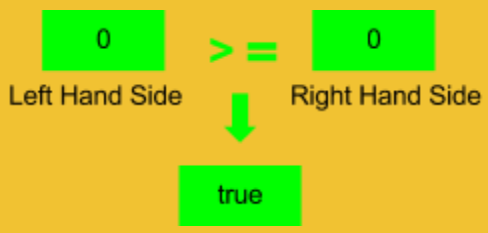
Key Learning

Line 6 uses a **greater than or equals expression.**

A greater than or equals expression has a value on the left of the >= and a value on the right.

The greater than or equals expression is true if the left is **greater than or equals** the right side.

The greater than or equals expression is false if the left side is **less than** the right side.



Worksheet 47 Boolean Expression

In this worksheet you will use the > (greater than) boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet47.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet47 {
4.      public static void main(String[] args) {
5.          String s = "Is 0 greater than 0? ";
6.          boolean b = 0 > 0;
7.          System.out.println(s + b);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Is 0 greater than 0? false
```

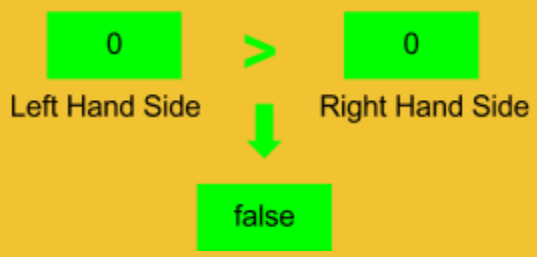
Key Learning

Line 6 uses a **greater than expression.**

A greater than expression has a value on the left of the > and a value on the right.

The greater than expression is true if the left side is **greater than** to the right side.

The greater than expression is false if the left side is **less than or equals** the right side



Worksheet 48 Using Variables In A Boolean Expression

In this worksheet you will use variables in a boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet48.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet48 {
4.      public static void main(String[] args) {
5.          int len = 10;
6.          int i = 0;
7.          boolean b = i < len;
8.          System.out.println(b);
9.      }
10. }
```

Fix any errors, run your program and verify your program has the output shown below

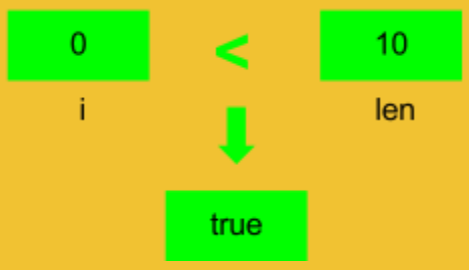
```
true
```

Key Learning

Line 7 uses a int variables **i** and **len** in a **less than expression.**

Java will use the values of the variables to compare the left side with the right side.

The expression evaluates to **0 < 10 which is true**



Worksheet 49 Using Variables In A Boolean Expression

In this worksheet you will use variables in a boolean expression

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet49.java
Step 3
Type in the code below
Step 4
Add code on Line 7 to declare a boolean variable b. The value of b is a **less than** expression using variables i and len.

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet49 {
4.      public static void main(String[] args) {
5.          int len = 1;
6.          int i = 2;
7.
8.          System.out.println(b);
9.      }
10. }
```

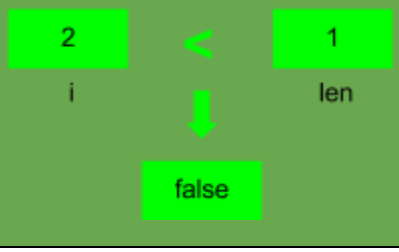
Fix any errors, run your program and verify your program has the output shown below

```
false
```

Lets Code This!

Line 7 uses a int variables **i** and **len** in a **less than expression.**

Java will use the values of the variables to compare the left side with the right side



Worksheet 50 Create And Access An Array

In this worksheet you will create an array and and access an array

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet50.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet50 {
4.      public static void main(String[] args) {
5.          int[] scores = new int[] { 98, 99, 76, 84, 91 };
6.          System.out.println("First score is " + scores[0]);
7.          System.out.println("Last score is " + scores[4]);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

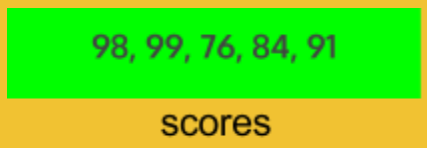
```
First score is 98
Last score is 91
```

Key Learning

An array is a lists of values in a specific order.

Line 5 creates an array and stores it in the scores variable.

Visually, it does:



Lines 6 and 7 access the array

The first value 98, is is at index 0. The last value 91, is is at index 4

0	1	2	3	4
98	99	76	84	91

Worksheet 51 Access The Length Of An Array

In this worksheet you will access the length of an array

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet51.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet51 {
4.      public static void main(String[] args) {
5.          int[] scores = new int[] { 98, 99, 76, 84, 91 };
6.          System.out.println("The length of the array is " + scores.length);
7.      }
8.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
The length of the array is 5
```

Key Learning

Every array has a "property" called length, which is the number of values in the array

Worksheet 52 Access The Values Of An Array

In this worksheet you will access the values of an array

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet47.java
Step 3
Type in the code below
Step 4
Add lines of code on line 6, 7, 8, 9, 10 to output as shown below

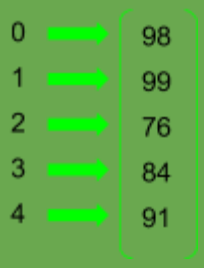
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet52 {
4.      public static void main(String[] args) {
5.          int[] scores = new int[] { 98, 99, 76, 84, 91 };
6.
7.
8.
9.
10.
11.     }
12. }
```

Fix any errors, run your program and verify your program has the output shown below

```
91
76
99
84
98
```

Let's Code This!

The array values are accessed using the indexes shown below. For example, score[1] will access the value 99



Worksheet 53 Multiply Consecutive Natural Numbers

In this worksheet you will use a simple for loop to multiply integers from 1 to 10

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet53.java
Step 3
Type in the code below
Step 4
Add the for loop code on Line 8,9,10 to multiply integers from 1 to 10

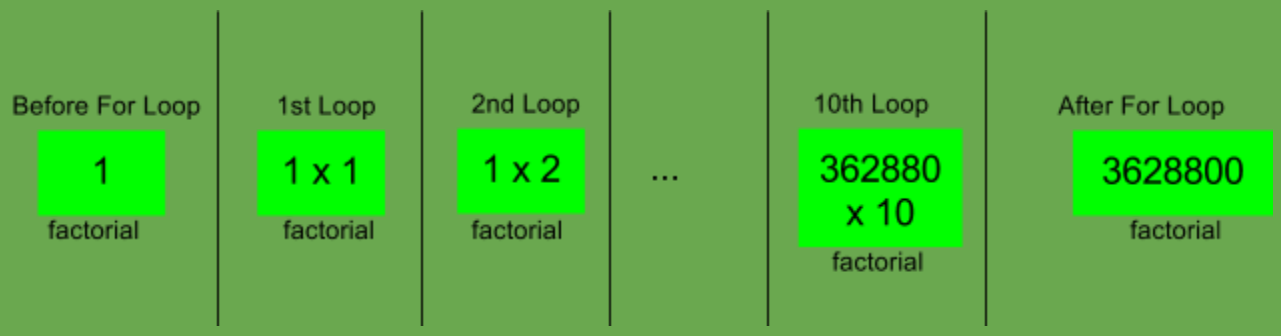
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet53 {
4.     public static void main(String[] args) {
5.        int factorial = 1;
6.        int firstNum = 1;
7.        int lastNum = 10;
8.
9.
10.
11.       System.out.println("1x2x..x10="+factorial);
12.    }
13. }
```

Fix any errors, run your program and verify your program has the output shown below

```
1x2x..x10=3628800
```

Lets Code This!

Use the figure below to add the for loop code



Worksheet 54 Check If An int is Even Or Odd

In this worksheet you will use the % (mod) operator

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet49.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet54 {
4.     public static void main(String[] args) {
5.        int i = 0;
6.        boolean isEven = i % 2 == 0;
7.        System.out.println("0 is even is " + isEven);
8.        i = 1;
9.        boolean isOdd = i % 2 == 1;
10.       System.out.println("1 is odd is " + isOdd);
11.    }
12. }
```

Fix any errors, run your program and verify your program has the output shown below

```
0 is even is true
1 is odd is true
```

Key Learning

The % mod is just the remainder after divison

0 % 2 == 0 is true

1 % 2 == 1 is false

Worksheet 55 Sum Even Integers from 1 upto 100

In this worksheet you will use a simple for loop to sum even integers from 1 upto 100

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet55.java
Step 3
Type in the code below

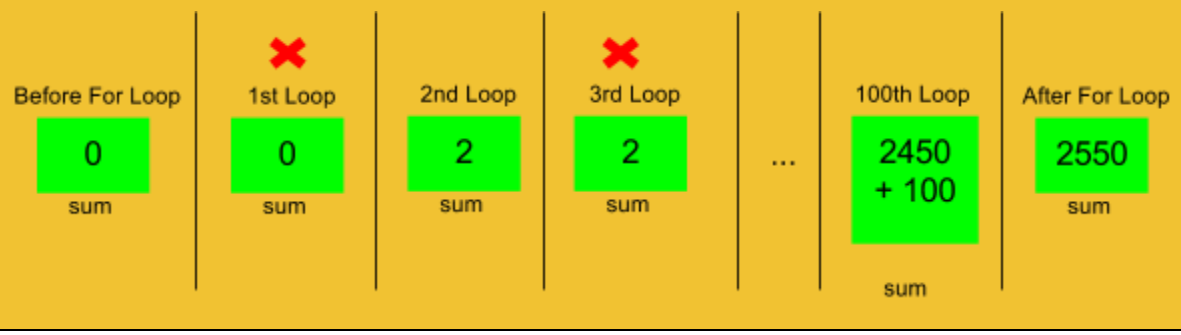
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet55 {
4.      public static void main(String[] args) {
5.          int sum = 0;
6.          int firstNum = 1;
7.          int lastNum = 100;
8.          for (int i = firstNum; i <= lastNum; i++) {
9.              if (i % 2 == 0) {
10.                 sum = sum + i;
11.             }
12.         }
13.         System.out.println("sum of even integers from "+firstNum+" to "+lastNum+" is "+sum);
14.     }
15. }
```

Fix any errors, run your program and verify your program has the output shown below

```
sum of even integers from 1 to 100 is 2550
```

Key Learning

In the code above, the statement on Line 10 will be executed only 50 times even though the loop repeats 100 times



Worksheet 56 Sum Odd Integers

In this worksheet you will use a simple for loop to sum odd integers from 1 upto 100

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet56.java
Step 3
Type in the code below
Step 4
Add the code on lines 9 to 11 to filter and sum odd integers

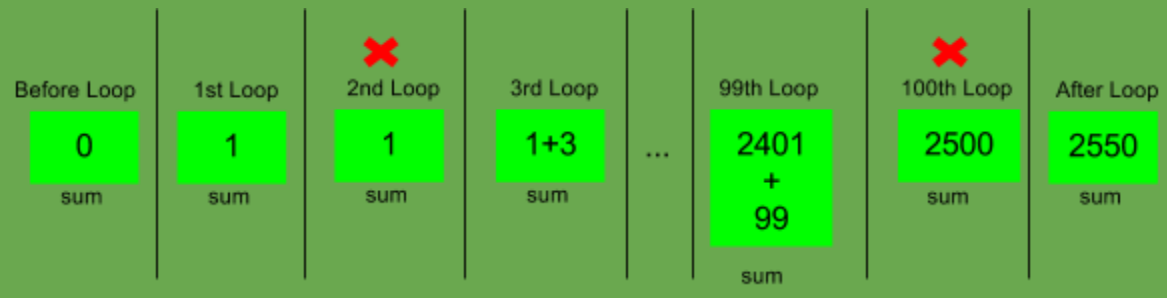
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet56 {
4.      public static void main(String[] args) {
5.          int sum = 0;
6.          int firstNum = 1;
7.          int lastNum = 100;
8.          for (int i = firstNum; i <= lastNum; i++) {
9.
10.
11.
12.         }
13.         System.out.println("sum of odd integers from "+firstNum+" to "+lastNum+" is "+sum);
14.     }
15. }
```

Fix any errors, run your program and verify your program has the output shown below

```
sum of odd integers from 1 to 100 is 2500
```

Let's Code This!

In the code above, the statement on Line 10 will be executed only 50 times even though the loop repeats 100 times



Worksheet 57 Declare char Variables Using Encoding

In this worksheet you will declare a char variable.

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet57.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet57 {
4.     public static void main(String[] args) {
5.        char c = 72;
6.        System.out.print(c);
7.     }
8.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
H
```

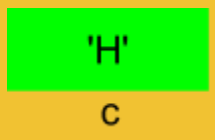
Key Learning

A char represents a character . Every character has a code number called the Unicode code number

72 is the decimal code number for 'H'

Line 5 declares an char

Visuallu, it does:



Worksheet 58 Commonly Used Unicode Code Numbers

In this worksheet you will review commonly used Unicode Code Numbers

Unicode Code Numbers

Upper case Alphabets

A	B	C	D	E	F	G	H	I	J	K	L	M	N
65	66	67	68	69	70	71	72	73	74	75	76	77	78
O	P	Q	R	S	T	U	V	W	X	Y	Z		
79	80	81	82	83	84	85	86	87	88	89	90		

Lower Case Alphabets

a	b	c	d	e	f	g	h	i	j	k	l	m	n
97	98	99	100	101	102	103	104	105	106	107	108	109	110
o	p	q	r	s	t	u	v	w	x	y	z		
111	112	113	114	115	116	117	118	119	120	121	122		

Digits

0	1	2	3	4	5	6	7	8	9				
48	49	50	51	52	53	54	55	56	57				

Punctuation

Blank	!	"	#	$	%	&	'	(	)	*	+	,	-
32	33	34	35	36	37	38	39	40	41	42	43	44	45
.	/	:	;	<	=	>	?	@	[	/	]	^	_
46	47	58	59	60	61	62	63	64	91	92	93	94	95
`	{	|	}	~									
96	123	124	125	126									

Worksheet 59 Create Strings Using chars

In this worksheet you will create a String by joining chars

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet59.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet59 {
4.      public static void main(String[] args) {
5.          String s = "";
6.          s = s + 'H' + 'e' + 'l' + 'l' + 'o' + ' ' + 'W' + 'o' + 'r' + 'l' + 'd';
7.          System.out.print(s);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Hello World
```

Key Learning

Line 6 uses a join expression.

The join expression joins chars to create a String.

'H'	'e'	'l'	'l'	'o'	' '	'W'	'o'	'r'	'l'	'd'

Worksheet 60 Create A String Using char encoding

In this worksheet you will create a String using char encoding

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet60.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet60 {
4.      public static void main(String[] args) {
5.          String s = "";
6.          s = s + (char) 72 + (char) 101 + (char) 108 + (char) 108 + (char) 111 + (char) 32 + (char) 87 + (char) 111 + (char) 114
    + (char) 108 +(char) 100;
7.          System.out.print(s);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Hello World
```

Key Learning

Line 6 uses a char join expression.

The join expression joins chars using their char encodings to create a String.

72	101	108	108	111	32	87	111	114	108	100
'H'	'e'	'l'	'l'	'o'	' '	'W'	'o'	'r'	'l'	'd'

Worksheet 61 Create Strings Using char encoding

In this worksheet you will create a String using char encoding

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet61.java
Step 3
Type in the code below
Step 4
Complete Line 7 - Construct the String "Java" using char encoding

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet61 {
4.     public static void main(String[] args) {
5.        String s = "";
6.        s = s + (char) 74 + ;
7.        System.out.print(s);
8.     }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
Java
```

Lets Code This!

Line 6 constructs the String using a char join expression using the character encodings.

J	a	v	a							
74	97	118	97							

Worksheet 62 Replace A char In A String

In this worksheet you will replace a char in a String

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet62.java
Step 3
Type in the code below

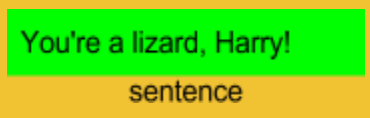
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet62 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "You're a lizard, Harry!";
7.          sentence = sentence.replace('l', 'w');
8.          System.out.println(sentence);
9.      }
10. }
```

Fix any errors, run your program and verify your program has no output

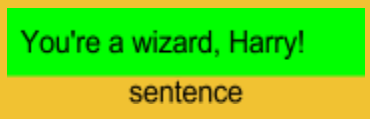
```
You're a wizard, Harry!
```

Key Learning

Line 6 creates the sentence variable



The method expression sentence.replace('l', 'w') returns a new String with all occurences of 'l' replaced with 'w'



Worksheet 63 Loop through and filter the chars in a String

In this worksheet you will add code to loop through and filter the chars in a String

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet63.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet63 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "You're a wizard, Harry!";
7.          int count = 0;
8.          for (int i = 0; i < sentence.length(); i++) {
9.              if (sentence.charAt(i) == 'r') {
10.                 count++;
11.             }
12.         }
13.         System.out.println("Number of 'r' chars=" + count);
14.     }
15. }
```

Fix any errors, run your program and verify your program has no output

```
Number of 'r' chars=4
```

Key Learning

The length of the String is 23 since the String has 23 chars.

Y	o	u	'	r	e		a		w	i	z	a	r	d	,		H	a	r	r	y	!
0	1	2	3	4	5	6	7	8	9	10	11	12	13	13	15	16	17	18	19	20	21	22

The loop variable i has the value 0 in the first loop and 22 in the last loop.

The method expression sentence.charAt(i) returns the char at the index location i where i is the loop variable.

'r' is at index locations 4, 13, 19 and 20.

Worksheet 64 Loop through and filter the chars in a Sentence

In this worksheet you will use a for loop to loop through and filter the chars in a Sentence

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet59.java
Step 3
Type in the code below
Step 4
Add code on Lines 9, 10 and 11 - Loop through and count the number of blank chars in the Sentence

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet64 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "You're a wizard, Harry!";
7.          int count = 0;
8.          for (int i = 0; i < sentence.length(); i++) {
9.
10.
11.
12.         }
13.         System.out.println("Number of blank chars=" + count);
14.     }
15. }
```

Fix any errors, run your program and verify your program has no output

Number of ' ' chars=3

Let's Code This!

The method expression sentence.charAt(i) returns the char at the index location i

Y	o	u	'	r	e		a		w	i	z	a	r	d	,		H	a	r	r	y	!
0	1	2	3	4	5	6	7	8	9	10	11	12	13	13	15	16	17	18	19	20	21	22

The for loop on Line 8 makes 23 loops. The loop variable i has the value 0 in the first loop and 22 in the last loop.

Worksheet 65 Reverse a Sentence

In this worksheet you will use a for loop to reverse a sentence

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet65.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet65 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "You're a wizard, Harry!";
7.          String reversed = "";
8.          for (int i = 0; i < sentence.length(); i++) {
9.              reversed = sentence.charAt(i) + reversed;
10.         }
11.         System.out.println("Reversed sentence is " + reversed);
12.     }
13. }
```

Fix any errors, run your program and verify your program has no output

```
Reversed sentence is !yrraH ,draziw a er'uoY
```

Key Learning

The for loop on Line 8 loops 23 times. The reversed sentence is constructed incrementally in each loop.

Loop #	Sentence after loop completes
1	!
2	!y
3	!yr
...	
23	!yrraH ,draziw a er'uoY

Worksheet 66 Count punctuation characters in a sentence

In this worksheet you will count the punctuation characters in a sentence using a for loop

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet66.java
Step 3
Type in the code below
Step 4

Add code on Lines 12 - 17 - Add 2 if condition statements on lines 12-14 and 15-17 to filter for , and !

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet66 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "You're a wizard, Harry!";
7.          int count = 0;
8.          for (int i = 0; i < sentence.length(); i++) {
9.              if (sentence.charAt(i) == '\'') {
10.                 count++;
11.             }
12.
13.
14.
15.
16.
17.
18.         }
19.         System.out.println("# punctuation chars =" + count);
20.     }
21. }
```

Fix any errors, run your program and verify your program has no output

```
# punctuation chars =3
```

Lets Code This!

Punctuation chars are ' (single-quote) , (comma) ! (exclamation)

' is special char that is represented in code using '\''
The other char are represented as ',' (comma) '!' (exclamation)

Worksheet 67 Count words in a sentence

In this worksheet you will use a for loop to count the words in a sentence

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet67.java
Step 3
Type in the code below
Step 4
Add a for loop to Line 9, 10 and 11 that loops through all chars in the sentence and increases count by 1 if the char is a blank

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet67 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "I'll be famous one day, but for now I'm stuck in middle school with a bunch of morons.";
7.          int count = 0;
8.          for (int i = 0; i < sentence.length(); i++) {
9.
10.
11.
12.         }
13.         count++;
14.         System.out.println("# words = " + count);
15.     }
16. }
```

Fix any errors, run your program and verify your program has no output

```
# words = 18
```

Lets Code This!

A word is a sequence of chars with no spaces.

Every new word after the first one is separated from the previous word by a single space.

Add a for loop that loops through each character in the sentence

If the char is a space, increase the count by 1.

Worksheet 68 Get part of a string

In this worksheet you will use a for loop to count the words in a sentence

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet68.java
Step 3
Type in the code below
Step 4
Modify Lines 7 and 8 to get the outputs as shown below. Reference the table below to get the index positions.

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet68 {
4.
5.      public static void main(String[] args) {
6.          String sentence = "I'll be famous one day, but for now I'm stuck in middle school with a bunch of morons.";
7.          String sub1 = ;
8.          String sub2 = ;
9.          System.out.println(sub1 + sub2);
10.     }
11. }
```

Fix any errors, run your program and verify your program has no output

famous for now

Lets Code This!

sentence.substring(startIndex, endIndex) returns a new string made up of characters at startIndex **upto but not including endIndex**

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I	'	l	l		b	e		f	a	m	o	u	s		o
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
n	e		d	a	y	,		b	u	t		f	o	r	
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
n	o	w		I	'	m		s	t	u	c	k		i	n
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63

Worksheet 69 Create a for loop within a for loop

In this worksheet you will create a for loop within a for loop

Step 1
Open Workbook Project
Step 2
Open Source File `Worksheet69.java`
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  import java.util.Arrays;
4.
5.  public class Worksheet69 {
6.      public static void main(String[] args) {
7.          int[] arr = new int[] { 4, 8, 7, 6, 2, 1 };
8.          System.out.println("Before Sort " + Arrays.toString(arr));
9.          for (int i = 0; i < arr.length - 1; i++) {
10.             for (int j = i + 1; j < arr.length; j++) {
11.                 if (arr[i] > arr[j]) {
12.                     int tmp = arr[i];
13.                     arr[i] = arr[j];
14.                     arr[j] = tmp;
15.                 }
16.             }
17.         }
18.         System.out.println("After Sort " + Arrays.toString(arr));
19.     }
20. }
```

Fix any errors, run your program and verify your program has the output shown below

```
Before Sort [4, 8, 7, 6, 2, 1]
After Sort [1, 2, 4, 6, 7, 8]
```

Key Learning
The outer for loop makes 5 loops. The outer loop variable starts at 0 and ends at 4.

The inner for loop loops a different number of times based on the outer loop variable.

Outer Loop Variable	0	1	2	3	4
# Of Inner Loops	5	4	3	2	1

Worksheet 70 Scramble a String

In this worksheet you will use char arrays to scramble a String

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet70.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet70 {
4.      public static void main(String[] args) {
5.          char[] alphabets = new char[] { 'a', 'b', 'c', 'd', 'e',
6.                  'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o', 'p',
7.                  'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z', ' '};
8.          char[] code = new char[] { 't', 'h', 'i', 's', 'm',
9.                  'a', 'w', 'c', 'o', 'd', 'e', 'l', 'v', 'r', 'b', 'y',
10.                 'x', 'j', 'f', 'g', 'k', 'n', 'p', 'q', 'u', 'z', ' '};
11.         String sentence = "i love sugar cookies";
12.         String codedSentence = "";
13.         for (int i = 0; i < sentence.length(); i++) {
14.             for (int j = 0; j < alphabets.length; j++) {
15.                 if (sentence.charAt(i) == alphabets[j]) {
16.                     codedSentence = codedSentence + code[j];
17.                 }
18.             }
19.         }
20.         System.out.println(sentence);
21.         System.out.println(codedSentence);
22.     }
23. }
```

Fix any errors, run your program and verify your program has the output shown below

```
i love sugar cookies
o lbnm fkwtj ibbeom
```

Key Learning

char arrays are accessed similar to int arrays (See earlier Worksheet 50).

Worksheet 71 Convert A single char To A String

In this worksheet you will convert a single char to a String

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet71.java
Step 3
Type in the code below

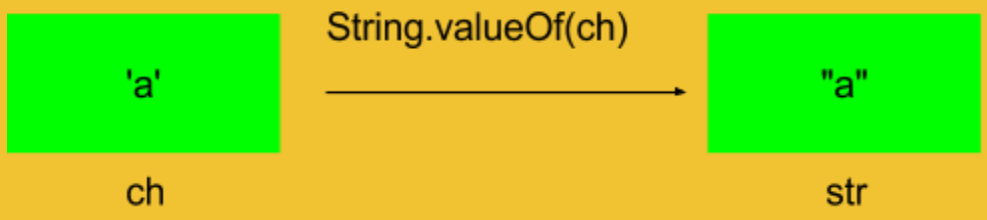
```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet71 {
4.      public static void main(String[] args) {
5.          char ch = 'a';
6.          String str = String.valueOf(ch);
7.          System.out.println(str);
8.      }
9.  }
```

Fix any errors, run your program and verify your program has the output shown below

```
a
```

Key Learning

Any char can be converted to a String using the String.valueOf method expression



Worksheet 72 Convert lower case chars to UPPER CASE

In this worksheet you will convert lower case chars to UPPER CASE in a String

Step 1
Open Workbook Project
Step 2
Open Source File Worksheet72.java
Step 3
Type in the code below

```
1.  package com.tinkeracademy.workbook;
2.
3.  public class Worksheet72 {
4.
5.      public static void main(String[] args) {
6.          String[] lowercaseAlphabets = {
7.                  "c", "o", "k", "i", "e", "s"
8.          };
9.          String[] uppercaseAlphabets = {
10.                 "C", "O", "K", "I", "E", "S"
11.         };
12.         String lowercaseWord = "cookies";
13.         String uppercaseWord = "";
14.         for (int i=0; i<lowercaseWord.length(); i++) {
15.             for (int j = 0; j < lowercaseAlphabets.length; j++) {
16.                 String str = String.valueOf(lowercaseWord.charAt(i));
17.                 if (str.equals(lowercaseAlphabets[j])) {
18.                     uppercaseWord = uppercaseWord + uppercaseAlphabets[j];
19.                 }
20.             }
21.         }
22.         System.out.println(uppercaseWord);
23.     }
24. }
```

Fix any errors, run your program and verify your program has the output shown below

```
COOKIES
```

Key Learning
String arrays are similar to char arrays but are simpler to create using opening { and closing } braces.

This program converts lowercase characters to uppercase characters for the String "cookies" to create the new String "COOKIES"

Assignment : Java Application: UpsideDown Text

In the next set of worksheets you will complete a assignment code a complete Java Application.

UPSIDEDOWNTEXT

Generating ⊥XƎ⊥NMOpƎpISɹ∩ is popular!

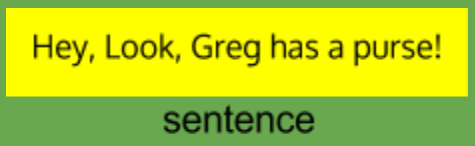
Our Java Application will generate upsidedown text similar to http://www.upsidedowntext.com

¡pƎ⊥ɹ∀⊥S ⊥ƎϽ S⊥Ǝ⅂

Step 01 UpsideDownText

In this worksheet you will declare the variable **sentence**

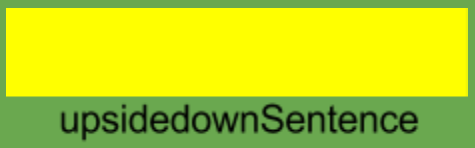
Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Use the figure below to create the variable declaration on Line 33 within the main method



Step 02 UpsideDownText

In this worksheet you will declare the variable **upsidedownSentence**

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Use the figure below to create the variable declaration on Line 34 within the main method



The variable declaration stores an empty String

An empty String can be represented using 2 double quote with no chars in between like this ""

Step 03 UpsideDownText

In this worksheet you will add code to the outer for loop

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Add an outer for loop on Line 35 within the main method

The for loop loop variable is i

The for loop should loop over the length of the sentence

In the first loop i should have the value 0

Step 04 UpsideDownText

In this worksheet you will declare a char variable

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Create the variable declaration on Line 36 within the outer for loop

The variable declaration should declare a char variable name ch

The variable declaration should use a method expression that returns the char at an index location

The index location is the loop variable i

Step 05 UpsideDownText

In this worksheet you will declare a String variable

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Create the variable declaration on Line 37 within the outer for loop

The variable declaration should declare a String variable named s

The variable declaration should use a method expression that returns the valueOf of ch

Step 06 UpsideDownText

In this worksheet you will add code to the inner for loop

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Add an inner for loop on Line 38 within the outer for loop

The for loop loop variable is j

The for loop should loop over the length of the up array

In the first loop j should have the value 0

Step 07 UpsideDownText

In this worksheet you will declare a String variable

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Create the variable declaration on Line 39 within the inner for loop

The variable declaration should declare a String variable named **u**

The variable declaration should set the value of u to the value stored in the **up** array at index **j**

The value stored in the up array at index j can be accessed using up[j]

Step 08 UpsideDownText

In this worksheet you will declare a String variable

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Create the variable declaration on Line 40 within the inner for loop

The variable declaration should declare a boolean variable named **isEquals**

The variable declaration should use the isEquals method to compare the 2 Strings u and s

Step 09 UpsideDownText

In this worksheet you will add code to the If Block

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Add an If Block on Line 41 within the inner for loop

The code on Line 41 for the If Block should use the isEquals boolean variable as the condition

Step 10 UpsideDownText

In this worksheet you will declare a String variable

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Create the variable declaration on Line 42 within the if block

The variable declaration should declare a String variable named `rev`

The variable declaration should use the equals method to compare the two Strings `U` and `S`

Step 11 UpsideDownText

In this worksheet you will assign a new value to a String variable

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Add an assignment statement for upsideDownSentence on Line 43 within the If Block

The variable declaration should assign a new value to the String variable upsidedownSentence

The variable declaration should use an String join expression

The join expression should join rev and upsidedownSentence

Step 12 UpsideDownText

In this worksheet you will assign a output a variables value

Step 1
Open Workbook Project
Step 2
Open Source File UpsideDownText.java
Step 3
Output the value of the variable upsidedownSentence within the main method **after the outer for loop**

Use System.out.println to output the value of upsidedownSentence.

Fix any errors, run your program and verify your program has the output shown below

¡ǝsɹnd ɐ sɐɥ ƃɐɹƃ ʞoo˥ ʎǝH

Try a different sentence and verify the output.

You made it. Congratulations!

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