**Object Oriented Development**

Module 1 Datatypes

**This document includes the answers to the exercises**

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## **Please note:**

Be careful about looking at the solutions too quickly; make sure you’ve given yourself time to wrestle with the concepts you just learned before looking at a solution. Also, there are several ways to solve many of the exercises, and the solutions only show one possible way to complete each exercise.

# Section 1 - Strings

## 1.1 Simple Message

Store a message in a String, and then display that message.

## 1.2 Full name

Store your first name in a String variable called firstName. Store your second name in another String variable called secondName. Create a third String variable called fullName, it’s value should be the value of the firstName variable followed by a space followed by the value of the lastName variable. Display the value of the fullName variable.

## 1.3 Personal Message

Store a person’s name in a variable, and print a message to that person. Your message should be simple, such as, “Hello Eric, would you like to learn some Java today?”

## 1.4 Name operations

Store your name in a String. Now use String methods to display each of the following pieces of information:

* The length of your name
* Your name in upper case
* The first letter of your name
* The last letter of your name

e.g If the name is “Nick” we should see:

4

NICK

N

k

## 1.5: Sentence operations

Create a String which contains the following text: “this is a sentence”. Now use String methods to display each of the following pieces of information:

* Display the position of the first space (should be 4)
* Display the position of the last space (should be 9)
* Display the position of the first letter x (should be -1)
* Display the first 4 characters of the String (should show “this”)
* Display the characters of the String from position 10 onwards (should show “sentence”)
* Display the characters in positions 5,6,7 & 8 (should show “is a”)
* Does the sentence contain the letter “a”? Display true or false.
* Does the sentence contain the letter “x”? Display true or false.
* Add the text “is “ to the start of the String and “?” to the end of the String and display the new value of the String
* Replace the first letter “t” with the letter “T” and display the new value of the String

# Section 2 – Primitive Numbers

## 2.1 Favourite number

Store your favorite number in an int. Then, using that variable, create a message that reveals your favorite number. Display that message.

e.g. My favourite number is 99

## 2.2 Adding ints

Create two int variables. One should store the number 5 and the other should store the number 3. Display the value of the two variables added together (i.e. 8).

## 2.3 Arithmetic

Create an int variable called counter and give it the value 0;

Now do the following:

* Increment counter (i.e. increase it’s value by one)
* Add 5 to counter.
* Decrement counter (i.e. decrease it’s value by one)
* Subtract 2 from counter.
* Double counter’s value.
* Display the value of counter (it should be 6)

## 2.4 Dividing different ints and doubles

Create the following int variables:

a with a value of 5, b with a value of 2.

Create the following double variables.

c with a value of 5, d with a value of 2.

Display the values of the following:

* a divided by b
* c divided by d
* c divided by b
* a divided by d

What do you notice? How might this affect calculating percentages?

# Section 3 – chars

## 3.1 Unicode numbers

Create a char called letter and give it the value of ‘a’.

Create an int called code and give it the value of 98.

* Display the value of the letter variable cast to an int (should be 97)
* Display the value of the code variable cast to a char (should be ‘b’)
* Display the value of the number 36 cast to a char (should be a $)

## 3.2 Difference between letters

* Display the value of ‘c’ minus ‘a’ (should be 2)
* Display the value of ‘z’ minus ‘a’ (should be 25)

## 3.3 Adding chars and Strings

Create a char called char1 and give it the value ‘x’

Create a char called char2 and give it the value ‘y’

Create a char called char3 and give it the value ‘z’

Create a String called string1 and give it the value “z”

Create a String called string2 and give it the value “y”

Display the following:

* char1 + char2 + char3
* char1 + char2 + string2
* char1 + string1 + char3

What do you notice?

# Section 4 – Wrappers

## 4.1 Convert Strings to ints

Create a String called number1 and give it the value “5”.

Create a String called number2 and give it the value “3”.

Use the parseInt() method of the Integer class to convert the Strings into ints. Add the ints together and display the result (should show 8)

## 4.2 Convert Strings to doubles

Create a String called number1 and give it the value “5.3”.

Create a String called number2 and give it the value “3.2”.

Use the parseDouble() method of the Double class to convert the Strings into doubles. Add the doubles together and display the result (should show 8.5)

## 4.3 Extracting numbers from Strings

Create a String called string1 and give it the value “abc11”.

Create a String called string2 and give it the value “9xyz”.

Create a String called string3 and give it the value “abc7xyz”.

Extract the numbers from the strings, convert them into ints and display the value of them added together (should show 27)

ANSWERS

# Section 1 - Strings

## 1.1 Simple Message

Store a message in a String, and then display that message.

System.***out***.println("this is a message");

## 1.2 Full name

Store your first name in a String variable called firstName. Store your second name in another String variable called secondName. Create a third String variable called fullName, it’s value should be the value of the firstName variable followed by a space followed by the value of the lastName variable. Display the value of the fullName variable.

String firstName = "John";

String lastName = "Smith";

String fullName = firstName+" "+lastName;

System.***out***.println(fullName);

## 1.3 Personal Message

Store a person’s name in a variable, and print a message to that person. Your message should be simple, such as, “Hello Eric, would you like to learn some Java today?”

String name = "Eric";

System.***out***.println("Hello "+name+" would you like to learn some Java today?");

## 1.4 Name operations

Store your name in a String. Now use String methods to display each of the following pieces of information:

String name = "Nick";

* The length of your name

System.***out***.println(name.length());

* Your name in upper case

System.***out***.println(name.toUpperCase());

* The first letter of your name

System.***out***.println(name.charAt(0));

* The last letter of your name

System.***out***.println(name.charAt(3));

## 1.5: Sentence operations

Create a String which contains the following text: “this is a sentence”. Now use String methods to display each of the following pieces of information:

String sentence = "this is a sentence";

* Display the position of the first space (should be 4)

System.***out***.println(sentence.indexOf(' '));

* Display the position of the last space (should be 9)

System.***out***.println(sentence.lastIndexOf(' '));

* Display the position of the first letter x (should be -1)

System.***out***.println(sentence.indexOf('x'));

* Display the first 4 characters of the String (should show “this”)

System.***out***.println(sentence.substring(0, 4));

* Display the characters of the String from position 10 onwards (should show “sentence”)

System.***out***.println(sentence.substring(10));

* Display the characters in positions 5,6,7 & 8 (should show “is a”)

System.***out***.println(sentence.substring(5,9));

* Does the sentence contain the letter “a”? Display true or false.

System.***out***.println(sentence.contains("a"));

* Does the sentence contain the letter “x”? Display true or false.

System.***out***.println(sentence.contains("x"));

* Add the text “is “ to the start of the String and “?” to the end of the String and display the new value of the String

sentence = "is "+sentence+"?";

System.***out***.println(sentence);

* Replace the first letter “t” with the letter “T” and display the new value of the String

string = string.replaceFirst("t", "T");

System.***out***.println(sentence);

# Section 2 – Primitive Numbers

## 2.1 Favourite number

Store your favorite number in an int. Then, using that variable, create a message that reveals your favorite number. Display that message.

e.g. My favourite number is 99

**int** favouriteNumber = 99;

## System.*out*.println("My favourite number is "+favouriteNumber);

## 2.2 Adding ints

Create two int variables. One should store the number 5 and the other should store the number 3. Display the value of the two variables added together (i.e. 8).

**int** num1 = 5;

**int** num2 = 3;

System.***out***.println(num1 + num2);

## 2.3 Arithmetic

Create an int variable called counter and give it the value 0;

Now do the following:

* Increment counter (i.e. increase it’s value by one)

counter ++;

* Add 5 to counter.

counter +=5;

* Decrement counter (i.e. decrease it’s value by one)

counter --;

* Subtract 2 from counter.

counter -=2;

* Double counter’s value.

counter \*=2;

* Display the value of counter (it should be 6)

System.***out***.println(counter);

## 2.4 Dividing different ints and doubles

Create the following int variables:

a with a value of 5, b with a value of 2.

Create the following double variables.

c with a value of 5, d with a value of 2.

Display the values of the following:

* a divided by b 5/2 = 2
* c divided by d 5.0/2.0 = 2.5
* c divided by b 5.0/2 = 2.5
* a divided by d 5/2.0 = 2.5

What do you notice?

If you do arithmetic using ints and no other data types the result with always be an int. In the case of division this means that the answer will always be rounded down.

Be aware of this when trying to calculate percentages:

2 / 50 \* 100 gives you 0%

2.0 / 50 \* 100 gives you 4%

2 \* 100.0 /50 gives you 4%

# Section 3 – chars

## 3.1 Unicode numbers

Create a char called letter and give it the value of ‘a’.

Create an int called code and give it the value of 98.

**char** letter = 'a';

**int** code = 98;

* Display the value of the letter variable cast to an int (should be 97)

System.***out***.println((**int**) letter);

* Display the value of the code variable cast to a char (should be ‘b’)

System.***out***.println((**char**) code);

* Display the value of the number 36 cast to a char (should be a $)

System.***out***.println((**char**) 36);

## 3.2 Difference between letters

* Display the value of ‘c’ minus ‘a’ (should be 2)

System.***out***.println('c' - 'a');

* Display the value of ‘z’ minus ‘a’ (should be 25)

System.***out***.println('z' - 'a');

## 3.3 Adding chars and Strings

Create a char called char1 and give it the value ‘x’

Create a char called char2 and give it the value ‘y’

Create a char called char3 and give it the value ‘z’

**char** char1 = 'x';

**char** char2 = 'y';

**char** char3 = 'z';

Create a String called string1 and give it the value “z”

Create a String called string2 and give it the value “y”

String string1 = "z";

String string2 = "y";

Display the following:

* char1 + char2 + char3

System.***out***.println(char1+char2+char3);

* char1 + char2 + string2

System.***out***.println(char1+char2+string1);

* char1 + string1 + char3

System.***out***.println(char1+string2+char3);

What do you notice?

Adding 2 consecutive chars gives the sum of their Unicode values. Adding a char and a String creates a new String containing the characters from both.

# Section 4 – Wrappers

## 4.1 Convert Strings to ints

Create a String called number1 and give it the value “5”.

Create a String called number2 and give it the value “3”.

Use the parseInt() method of the Integer class to convert the Strings into ints. Add the ints together and display the result (should show 8)

String number1 = "5";

String number2 = "3";

**int** int1 = Integer.*parseInt*(number1);

**int** int2 = Integer.*parseInt*(number2);

System.***out***.println(int1+int2);

## 4.2 Convert Strings to doubles

Create a String called number1 and give it the value “5.3”.

Create a String called number2 and give it the value “3.2”.

Use the parseDouble() method of the Double class to convert the Strings into doubles. Add the doubles together and display the result (should show 8.5)

String number1 = "5.3";

String number2 = "3.2";

**double** double1 = Double.*parseDouble*(number1);

**double** double2 = Double.*parseDouble*(number2);

System.***out***.println(double1+double2);

## 4.3 Extracting numbers from Strings

Create a String called string1 and give it the value “abc11”.

Create a String called string2 and give it the value “9xyz”.

Create a String called string3 and give it the value “abc7xyz”.

Extract the numbers from the strings, convert them into ints and display the value of them added together (should show 27)

String string1 = "abc11";

String string2 = "9xyz";

String string3 = "abc7xyz";

String string1Digits = string1.substring(3);

String string2Digits = string2.substring(0, 1);

String string3Digits = string3.substring(3, 4);

**int** num1 = Integer.*parseInt*(string1Digits);

**int** num2 = Integer.*parseInt*(string2Digits);

**int** num3 = Integer.*parseInt*(string3Digits);

System.***out***.println(num1+num2+num3);