Geekahmed1@gmail.com

Introduction to Programming using JAVA (Liang)

Check Points Answers

Chapter 4

4.1 Evaluate the following method calls:

(a) `Math.sqrt(4)`	2.0
(b) `Math.sin(2 * Math.PI)`	0
(c) `Math.cos(2 * Math.PI)`	1
(d) `Math.pow(2, 2)`	4.0
(e) `Math.log(Math.E)`	1.0
(f) `Math.exp(1)`	2.718
(g) `Math.max(2, Math.min(3, 4))`	3
(h) `Math.rint(-2.5)`	-2.0
(i) `Math.ceil(-2.5)`	-2.0
(j) `Math.floor(-2.5)`	-3.0
(k) `Math.round(-2.5f)`	-2
(l) `Math.round(-2.5)`	-2
(m) `Math.rint(2.5)`	2.0
(n) `Math.ceil(2.5)`	3.0
(o) `Math.floor(2.5)`	2.0
(p) `Math.round(2.5f)`	3
(q) `Math.round(2.5)`	3
(r) `Math.round(Math.abs(-2.5))`	3

Geekahmed1@gmail.com

4.2 True or false? The argument for trigonometric methods is an angle in radians. **true**

4.3 Write a statement that converts 47 degrees to radians and assigns the result to a variable.

```
double x = Math.toRadians(47);
```

4.4 Write a statement that converts π / 7 to an angle in degrees and assigns the result to a variable.

```
double x = Math.toDegrees(Math.PI / 7);
```

4.5 Write an expression that obtains a random integer between 34 and 55. Write an expression that obtains a random integer between 0 and 999. Write an expression that obtains a random number between 5.5 and 55.5.

```
34 + (int) (Math.random()*(55 – 34))

0 + (int) (Math.random()*1000)

5.5 + (int) (Math.random()*(55.5 – 5.5))
```

4.6 Why does the Math class not need to be imported?

The Math class is in the java.lang package. Any class in the java.lang package is automatically imported. So there is no need to import it explicitly.

4.7 What is Math.log(Math.exp(5.5))? What is Math.exp(Math.log(5.5))? What is Math.asin(Math.sin(Math.PI / 6))? What is Math.sin(Math.asin(Math.PI / 6))?

5.5
5.5
0.5235987755982988
0.5235987755982988

Geekahmed1@gmail.com

4.8 Use print statements to find out the ASCII code for '1', 'A', 'B', 'a', and 'b'. Use print statements to find out the character for the decimal codes 40, 59, 79, 85, and 90. Use print statements to find out the character for the hexadecimal code 40, 5A, 71, 72, and 7A.

```
System.out.println((int)'1');
System.out.println((int)'A');
System.out.println((int)'B');
System.out.println((int)'a');
System.out.println((int)'b');

System.out.println((char)40);
System.out.println((char)59);
System.out.println((char)79);
System.out.println((char)85);
System.out.println((char)90);

System.out.println((char)0X40);
System.out.println((char)0X5A);
System.out.println((char)0X71);
System.out.println((char)0X72);
System.out.println((char)0X7A);
```

4.9 Which of the following are correct literals for characters?

```
'1', '\u345dE', '\u3fFa', '\b', '\t'
```

'\u345dE' is wrong. It must have exactly four hex numbers in the Unicode.

4.10 How do you display the characters \ and "?

'\\' and '\"'

Geekahmed1@gmail.com

4.11 Evaluate the following:

int i = '1'; **49**

int j = '1' + '2' * ('4' - '3') + 'b' / 'a'; **100**

int k = 'a'; **97**

char c = 90; **Z**

4.12 Can the following conversions involving casting be allowed? If so, find the converted result.

char c = 'A';

int i = (int)c;

Yes, 65.

float f = 1000.34f;

int i = (int)f;

Yes, 1000.

double d = 1000.34;

int i = (int)d;

Yes, 1000.

int i = 97;

char c = (char)i;

Yes, a.

Geekahmed1@gmail.com

4.13 Show the output of the following program:

```
public class Test {
  public static void main(String[] args) {
    char x = 'a';
    char y = 'c';
    System.out.println(++x);
    System.out.println(y++);
    System.out.println(x - y);
  }
}
```

b

c

-2

4.14 Write the code that generates a random lowercase letter.

```
(int)(Math.random() * 26 + 'a')
```

4.15 Show the output of the following statements:

System.out.println('a' < 'b'); true

System.out.println('a' <= 'A');false

System.out.println('a' > 'b');false

System.out.println('a' >= 'A');true

System.out.println('a' == 'a');true

System.out.println('a' != 'b');true

Geekahmed1@gmail.com

4.16 Suppose that s1, s2, and s3 are three strings, given as follows:

String s1 = "Welcome to Java";

String s2 = "Programming is fun";

String s3 = "Welcome to Java";

What are the results of the following expressions?

a. s1 == s2 **false**

b. s2 == s3 **false**

c. s1.equals(s2) **false**

d. s1.equals(s3) **true**

e. s1.compareTo(s2) **7**

f. s2.compareTo(s3) **-7**

g. s2.compareTo(s2) **0**

h. s1.charAt(0) **W**

i. s1.indexOf('j') **-1**

j. s1.indexOf("to") **8**

k. s1.lastIndexOf('a') **14**

l. s1.lastIndexOf("o", 15) **9**

m. s1.length() **15**

n. s1.substring(5) **me to Java**

o. s1.substring(5, 11) **me to**

p. s1.startsWith("Wel") **true**

q. s1.endsWith("Java") **true**

Geekahmed1@gmail.com

r. s1.toLowerCase() welcome to java

s. s1.toUpperCase() WELCOME TO JAVA

t. s1.concat(s2) Welcome to JavaProgramming is fun

u. s1.contains(s2) false

v. "\t Wel \t".trim() Wel

4.17 Suppose that s1 and s2 are two strings. Which of the following statements or expressions are incorrect?

String s = "Welcome to Java"; Correct

String s3 = s1 + s2; Correct

String s3 = s1 – s2; Incorrect

s1 == s2; Correct

s1 >= s2; Incorrect

s1.compareTo(s2); Correct

int i = s1.length(); Correct

char c = s1(0); Incorrect

char c = s1.charAt(s1.length()); Incorrect

4.18 Show the output of the following statements (write a program to verify your results):

System.out.println("1" + 1); 11

System.out.println('1' + 1); 50

System.out.println("1" + 1 + 1); 111

System.out.println("1" + (1 + 1)); 12

System.out.println('1' + 1 + 1); 51

Geekahmed1@gmail.com

4.19 Evaluate the following expressions (write a program to verify your results):

1 + "Welcome " + 1 + 1 1Welcome 11

1 + "Welcome " + (1 + 1) 1Welcome 2

1 + "Welcome " + ('\u0001' + 1) 1Welcome 2

1 + "Welcome " + 'a' + 1 1Welcome a1

4.20 Let s1 be " Welcome " and s2 be " welcome ". Write the code for the following statements:

a. Check whether s1 is equal to s2 and assign the result to a Boolean variable isEqual.

```
boolean  isEqual = s1.equals(s2);
```

b. Check whether s1 is equal to s2, ignoring case, and assign the result to a Boolean variable isEqual.

```
boolean isEqual = s1.equalsIgnoreCase(s2);
```

c. Compare s1 with s2 and assign the result to an int variable x.

```
int x = s1.compareTo(s2);
```

d. Compare s1 with s2, ignoring case, and assign the result to an int variable x.

```
int x = s1.compareToIgnoreCase(s2);
```

e. Check whether s1 has the prefix AAA and assign the result to a Boolean variable b.

```
boolean b = s1.startsWith(“AAA”);
```

f. Check whether s1 has the suffix AAA and assign the result to a Boolean variable b.

```
boolean b = s1.endsWith(“AAA”);
```

Geekahmed1@gmail.com

g. Assign the length of s1 to an int variable x.

```
int x = s1.length();
```

h. Assign the first character of s1 to a char variable x.

```
char x = s1.charAt(0);
```

i. Create a new string s3 that combines s1 with s2.

```
String s3 = s1 + s2;
```

j. Create a substring of s1 starting from index 1.

```
String s3 = s1.subString(1);
```

k. Create a substring of s1 from index 1 to index 4.

```
String s3 = s1.subString(1,5);
```

l. Create a new string s3 that converts s1 to lowercase.

```
String s3 = s1.toLowerCase();
```

m. Create a new string s3 that converts s1 to uppercase.

```
String s3 = s1.toUpperCase();
```

n. Create a new string s3 that trims whitespaces on both ends of s1.

```
String s3 = s1.trim();
```

o. Assign the index of the first occurrence of the character e in s1 to an int variable x.

```
int x = s1.indexOf('e');
```

Geekahmed1@gmail.com

p. Assign the index of the last occurrence of the string abc in s1 to an int variable x.

```
int x = s1.lastIndexOf("abc");
```

4.21 If you run Listing 4.3 GuessBirthday.java with input 1 for Set1, Set3, and Set4 and 0 for Set2 and Set5, what will be the birthday? 13

4.22 What are the format specifiers for outputting a Boolean value, a character, a decimal integer, a floating-point number, and a string?

%b, %c, %d, %f, %s

4.23 What is wrong in the following statements?

(a) System.out.printf("%5d %d\n", 1, 2, 3);

(b) System.out.printf("%5d %f\n", 1);

(c) System.out.printf("%5d %f\n", 1, 2);

(d) System.out.printf("%.2f\n%0.3f\n", 1.23456, 2.34);

(e) System.out.printf("%08s\n", "Java");

(a) the last item 3 does not have any specifier.
(b) There is not enough items.
(c) The data for %f must a floating-point value.
(d) %0.3f is wrong. Width cannot be zero.
(e) %08s is wrong. 0 should be removed.

4.24 Show the output of the following statements.

(a) System.out.printf("amount is %f %e\n", 32.32, 32.32);

(b) System.out.printf("amount is %5.2f%% %5.4e\n", 32.327, 32.32);

(c) System.out.printf("%6b\n", (1 > 2));

(d) System.out.printf("%6s\n", "Java");

Geekahmed1@gmail.com

(e) System.out.printf("%-6b%s\n", (1 > 2), "Java");

(f) System.out.printf("%6b%-8s\n", (1 > 2), "Java");

(g) System.out.printf("%,5d %,6.1f\n", 312342, 315562.932);

(h) System.out.printf("%05d %06.1f\n", 32, 32.32);

(a) amount is 32.320000 3.233000e+01
(b) amount is 32.33% 3.2330e+01
(c) *false // * denote a space
(d) **Java // * denote a space
(e) false*Java
(f) *falseJava**
(g) 312,342 315,562.9
(h) 00032 0032.3