Name:_____

CMSC 113 Computer Science 1
Fall 2018
Exam 1

This exam contains 8 Questions on pages numbered 1-7.

This exam is designed to be taken in 80 minutes.

This is a closed book/notes exam.

All Java statements you write should be syntactically correct.
There will be no partial credit for incorrect use of Java syntax.

Good Luck!

Question	**Points**	**Max Points**
1		**15**
2		**10**
3		**10**
4		**10**
5		**10**
6		**10**
7		**10**
8		**10**
9		**15**
Total		**100**

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Question 1 (15 points)

Part 1. Basic Java Knowledge. Write Java command(s) to do the following:

(1) Define a floating point variable named, **x** _____

(2) Set the variable **x** (from above) to 42.3 _____

(3) Increment the value in **x** by 5.9 _____

(4) Compute the square root of **x** and place it in **x** _____

(5) Convert the value of **x** to an integer and save the result in an integer variable **y**: _____

(6) Convert **theta** (type **double**) from degrees to radians _____

(7) Define an array named **a** of type **double**. _____

(8) Create the array **a** from (7) above to have 100 elements.

_____

(9) Set the element at index 42 in **a** (above) to the value of π. _____

(10) Set the element at index 39 in **a** (above) to a random number between [0..1) _____

Part 2. Linux Knowledge. Write the Linux command that is used to do the following:

(11) Create directories _____

(12) List directory contents _____

(13) Copy files & directories _____

(14) Change directory _____

(15) View file contents _____

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Question 2 (10 points) Write Java **commands** to exchange the contents of two integer variables **x** and **y**.

```
int x = …, int y = …;
```

Question 3 (10 points) Write Java **commands** to create an array named **x** of **N** elements and fill it up with random integers between [10..10000] (inclusive).

Question 4 (10 points) x is the same array as in Question 3 above. Study carefully the Java commands shown below:

```
int r = x[0];
for (int i=1; i < x.length; i++) {
   if (x[i] < r) {
      r = x[i];
   }
}
```

(a) How many times will the for-loop be executed? _____

(b) Describe, in one sentence, what the set of commands is computing.

Question 5 (10 points) Given three integer variables, **x**, **y**, **z** (assume already defined) write Java **commands** to assign to a variable **max** (you have to define it) the largest value in **x**, **y**, and **z**.

Question 6 (10 points) Here is an algorithm for computing the GCD of two numbers **a** and **b**:

```
while (a ≠ b)
    if a > b
        a ← a – b
    else
        b ← b - a
```

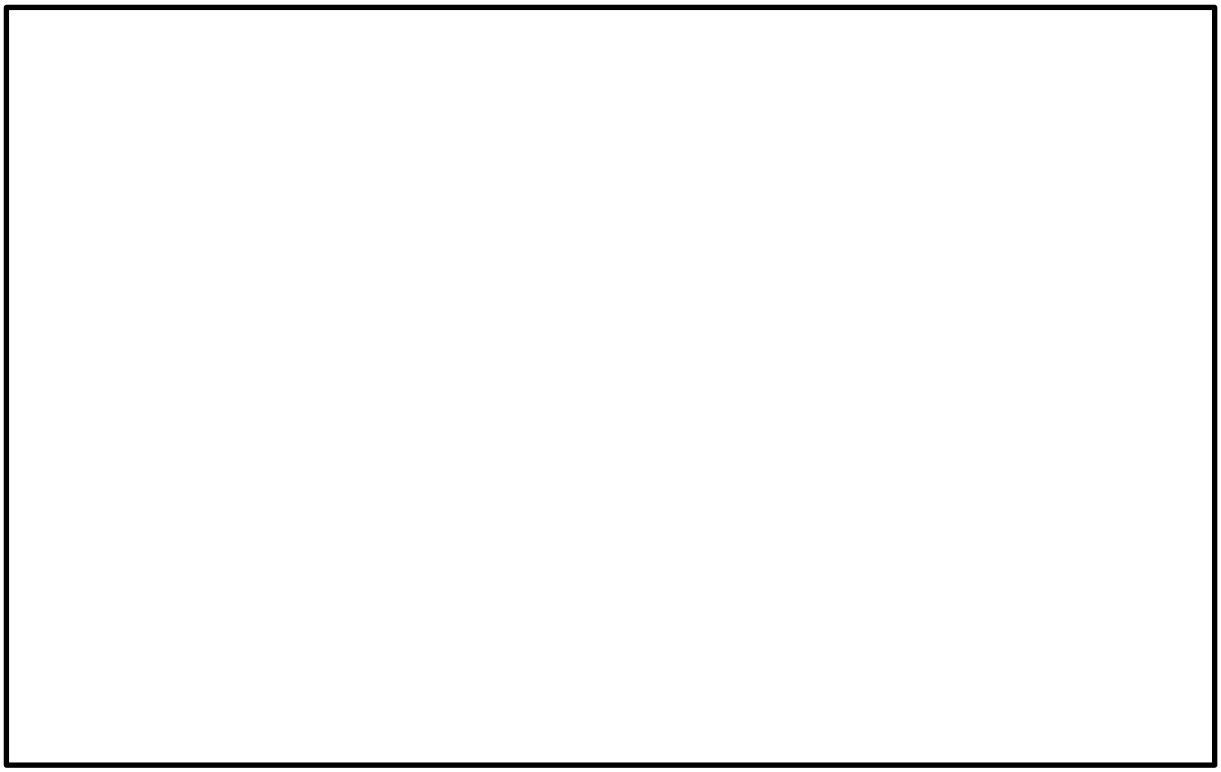
Assuming **a**, and **b** are already defined (as integers), write Java **commands** to code the above algorithm.

Question 7 (10 points)

What will be **the exact output** when the following Java statements are executed:

```
int n = 5;

for (int i=0; i < n; i++) {
   for (int j=i+1; j < n; j++) {
      StdOut.printf("(%2d, %2d, %3d)\n", i, j, i+j);
   }
}
```



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Question 8 (10 points)

Write a **complete Java program** that displays all odd powers of 3 between 0 and 30 (i.e. $3^i \; where \; 0 < i \leq 30 \; and \; i \; is \; odd$). Output a table (see box) showing the power 3 is being raised to, as well as the result, on each line. You may use a TAB character ('\t') to separate and align the two numbers on each line. Alternately, you may use the **StdOut.printf()** function to format the output as shown.

Example Output

```
1       3
3       27
5       243
7       2187
…       …
```

Question 9 (15 points) Write a **complete Java program** called **`LuckySeven`** that simulates the tossing of two six-sided dice and computes the estimated probability of obtaining a sum of 7 on each roll. Your program should input N, the number of trials as an integer from the command line. Here is a sample output:

```
$ java LuckySeven 10000
The probability of obtaining a 7 in 10000 trials is 0.17
```

You have to ensure that the output of the program is exactly as specified above.