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Lab Works for Algorithm and Data Structures

Homework 1.1

Problem a)

```
public class Homework1 {
    public static void main(String[] args){
        //We are going to generate random integers on some particular ranges
utilizing Math.random()
        //First, we declare necessary variables
        int min; //min is used to define the inclusive lower bound of the range
        int max; //max is used to define the inclusive upper bound of the range
        int random; //random is used to contain the randomized integer

        // a). 0,1,2,3
        min = 0;
        max = 3;
        //basically we make use of Math.floor to round down the produced number and
(int) to convert it to Integer data type
        //the usage of (max - min + 1) + min) might seem complicated but really it
is not
        //Math.random generates number [0,1) meaning inclusive to 0 but not 1
        //so to generate desired numbers we need to do some basic mathematical
operation
        //additionally, to ease the testing process we utilize for loop
        for(int i=0; i<10; i++) {
            random = (int)Math.floor(Math.random() * (max - min + 1) + min);
            System.out.print(random + " ");
        }
 C:\Users\ASUS\.jdks\openjdk-19.0.2\bin\java.exe
 2 0 1 3 2 1 0 2 2 1
 Process finished with exit code 0
```

Problem b)

```
// b). 1,2,3,4,5,6
min = 1;
max = 6;
//basically the same as problem a)
//we just need to change the values of min and max
for(int i=0; i<10; i++) {
    random = (int)Math.floor(Math.random() * (max - min + 1) + min);
    System.out.print(random + " ");
}
 C:\Users\ASUS\.jdks\openjdk-19.0.2\bin\java.exe
 6 4 6 1 1 5 4 2 3 4
 Process finished with exit code 0
```

Problem c)

```
// c). 2,4,6,8
min = 1;
max = 4;
//this one is a bit trickier but basically what we do here is
//generating random numbers [1,4] and multiplied it with two
for(int i=0; i<10; i++) {
    random = (int)Math.floor(Math.random() * (max - min + 1) + min) * 2;
    System.out.print(random + " ");
}
```

```
C:\Users\ASUS\.jdks\openjdk-19.0.2\bin\java.exe
6 8 4 4 2 6 2 8 4 8
Process finished with exit code 0
```

Problem d)

```
        // d). -5,-4,...,4,5
        min = -5;
        max = 5;
        //basically the same as problem a)
        //we just need to change the values of min and max
        for(int i=0; i<10; i++) {
            random = (int)Math.floor(Math.random() * (max - min + 1) +
min);
            System.out.print(random + " ");
        }
    }
}
```

```
C:\Users\ASUS\.jdks\openjdk-19.0.2\bin\java.exe
4 -3 0 -5 1 -3 3 -4 -5 5
Process finished with exit code 0
```

Homework 1.2

```
public class Homework2 {
    public static void main(String[] args) {
        int a,b;
        for(int i=1; i<10; i++){
            for(int j=1; j<10; j++){
                System.out.print(i + "×" + j + "=" + i*j + "\t");
            }
            System.out.println("");
        }
    }
}
```

```
C:\Users\ASUS\.jdks\openjdk-19.0.2\bin\java.exe "-javaagent:C:\Program
1×1=1   1×2=2   1×3=3   1×4=4   1×5=5   1×6=6   1×7=7   1×8=8   1×9=9
2×1=2   2×2=4   2×3=6   2×4=8   2×5=10  2×6=12  2×7=14  2×8=16  2×9=18
3×1=3   3×2=6   3×3=9   3×4=12  3×5=15  3×6=18  3×7=21  3×8=24  3×9=27
4×1=4   4×2=8   4×3=12  4×4=16  4×5=20  4×6=24  4×7=28  4×8=32  4×9=36
5×1=5   5×2=10  5×3=15  5×4=20  5×5=25  5×6=30  5×7=35  5×8=40  5×9=45
6×1=6   6×2=12  6×3=18  6×4=24  6×5=30  6×6=36  6×7=42  6×8=48  6×9=54
7×1=7   7×2=14  7×3=21  7×4=28  7×5=35  7×6=42  7×7=49  7×8=56  7×9=63
8×1=8   8×2=16  8×3=24  8×4=32  8×5=40  8×6=48  8×7=56  8×8=64  8×9=72
9×1=9   9×2=18  9×3=27  9×4=36  9×5=45  9×6=54  9×7=63  9×8=72  9×9=81
```