

Week2Lab – 10 pts

Pre-lab questions

1. There are many String methods in Java that we did not use in class this week. Using the Oracle documentation for [String](#), determine what the output for each of these lines of code would be for an input String of "Chocolate Chip" stored in a variable named str.
 - a. `char a = str.charAt(1);` **h**
 - b. `int b = str.compareTo("Oreo");` **-12**
 - c. `int c = str.compareToIgnoreCase("chocolate chip");` **0**
 - d. `String d = str.concat(" Cookie");` **"Chocolate Chip Cookie"**
 - e. `boolean e = str.contains('z');` **false**
 - f. `int f = str.indexOf('a');` **6**
 - g. `int g = str.indexOf('h', 5);` **11**
 - h. `String h = str.substring(10);` **Chip**
2. There are two ways to add Randomness to our programs. We used the Random class, however, there is also a Random as part of the Math class.
Math.random() returns a double between 0.0 and 1.0 exclusive (will never return 1)
Random randgen = new Random(); //requires an import statement
int numb = randgen.nextInt(10); //produces a random int between 0 and 10 exclusive (will never return 10)

Use each of these to produce a random int in the range 21 to 55 inclusive (both 21 AND 55 may be returned)

a. Using Math.random()

```
int randNum = (int) (Math.random() * (55-21) + 21);
```

b. Using Random class

```
Random rand = new Random();  
int randNum = 21 + rand.nextInt(56-21);
```

Choose one of the following problems to solve with a small (all in main) Java program.

1. Statistics
2. Dice Simulation
3. Soundex

Choose a problem, restate it to make sure you fully understand the problem you are solving. Create a plan to solve it by writing it out in English and/or pseudocode. (The English is optional; the pseudocode is not). Then implement your solution in Java in the same iterative way we modeled in class. Start with a working program, then add to it. Use the Scanner class to collect input from the user (remember, you may want to add that functionality AFTER you know your algorithm works correctly). You must provide an answer to the user in a user-friendly way...just giving them a number is not very friendly! Test your

solution with several different sets of input values to make sure your algorithm is producing correct results (check with a calculator).

Statistics

Provide formatted output for based statistics on three test grades. Ask the user for each test grade then supply them with a nicely formatted report that includes the average, the min, the max, the range or spread. Hint: Min and Max are Math methods but they only take two values!

Dice Simulation

Create a dice simulation to be used in a math class. Randomly generate the roll on 2 10 sided dice. Then output each number, the sum of those numbers, the difference between those numbers, the product of those numbers, the division with remainder (both as ints), the die 1 number raised to the power of the die 2 number. Use printf to format the output to the user. The output should look like an answer key for the teacher/aide/parent: The formula with the numbers followed by the result.

Ex:

Addition: $6 + 5 = 11$

We need to generate 2 random numbers and perform arithmetic operations on them

```
/* Generate the random numbers */
```

```
dice1Num = (int)(1 + Math.Random() * (10 - 1));
```

```
dice2Num = (int)(1 + Math.Random() * (10 - 1));
```

```
/* Calculate */
```

```
sum = dice1Num + dice2Num;
```

```
difference = dice1Num - dice2Num;
```

```
product = dice1Num * dice2Num;
```

```
quotient = dice1Num / dice2Num;
```

```
remainder = dice1Num % dice2Num;
```

```
power = Math.pow(dice1Num, dice2Num)
```

Print all calculations

Soundex

Before computers Census workers used the following algorithm to normalize names that sound the same but are spelled differently.

For all names greater than 2 letters (you can assume all names are greater than two letters, or deal with two letter names if you know how):

1. Remove the second of all double letters
Randall -> Randal
Aaronson -> Aronson
2. Remove all vowels (a, e, i, o, u, y) unless it is the first letter
Randal -> Rndl
Aronson -> Arnsn

Ask user for surname, return the Soundex version of their name.