Topic 1.8: Special Operations

Learning Goals (Week 1):

- Identify data types based on value
- Map variables to the current values
- Perform basic operations on variables
- Create and use Java and user-defined methods
- Format Printed Output
- Obtain and process user input from the console
- Use booleans, conditionals, and compound conditionals correctly
- Select and implement different types of loops depending on scenario
- **Use special String and Math operations**
- Successfully implement and manipulate java arrays

Escape Characters

- Used to “escape” characters or sequences of characters in a String that have a special meaning in the context of a String literal

- \” Allows a double quote character to show up in a String literal (rather than symbolizing the opening/closing of a String)
- \n New line
- \\ Backward slash literal
- \t Tab (3-5 spaces depending on your System settings)
- There are others, these are the common ones

```
System.out.println(“Hello\nThisw will be on a new line.” +
“\nSo will this and \tthis will be tabbed. \“This will be in quotes.\””);
```

Special String Methods (Some we already talked about)

- Check if two Strings identical: equals()

```
if(“hello”.equals(“hello”)) {} // true
if(“hello”.equals(“Hello”)) {} // false h != H
```

- Check for equality, NOT case-sensitive: equalsIgnoreCase()

```
if(“hello”.equalsIgnoreCase(“hello”)) {} // true
if(“hello”.equalsIgnoreCase(“Hello”)) {} // true
```

Special String Methods (Some we already talked about)

- Check if two Strings identical: equals()

```
if(“hello”.equals(“hello”)) {} // true
if(“hello”.equals(“Hello”)) {} // false h != H
```

- Check for equality, NOT case-sensitive: equalsIgnoreCase()

```
if(“hello”.equalsIgnoreCase(“hello”)) {} // true
if(“hello”.equalsIgnoreCase(“Hello”)) {} // true
```

- Length of a String (number of characters): length()

```
int a = “hello”.length() \\ 5
int b = “”.length()      \\ 0
```

- Char at position *i*: charAt(i)

```
System.out.println(“hello”.charAt(0)); \\ prints ‘h’
System.out.println(“hello”.charAt(“hello”.length()-1); \\ prints ‘o’
System.out.println(“hello”.charAt(“hello”.length())); \\ prints ???
```

Special Math Methods

- `double Math.pow(double x, double y)`
  - takes x to the power y

- `double Math.sqrt(double x)`
  - gives the square root of x

- `int Math.min(int x, int y)`
- `int Math.max(int x, int y)`
  - give the minimum or maximum of the two
  - there are also versions for long, float, and double

- `double Math.random( )`
  - gives a random double in the range 0 ≤ x <1
  - note there is nothing inside ( ) – but they still must be there!

There are many many more...

You can always visit the online documentation to learn more:

https://docs.oracle.com/javase/8/docs/api/java/lang/Math.html

Pause & Practice

Create a Java program that includes two methods: the **main()** method and a **squareUser()** method. The **main()** method is the starting point of your program. The s**quareUser()** method should be declared as **public static int squareUser()**. Its role is to prompt the user to input a number. You will need to use the **Scanner** class and its **.nextLine()** method to read the user's input as a string. Once you have the input, convert this string to an **integer**. Then, calculate the square of this number using the **appropriate method from the Math class**. Finally, **squareUser()** should return the squared value.

In your **main()** method, call **squareUser()** and print the value it returns to the console. This program, when run, will allow the user to input a number and then display the square of that number.

Pause & Practice (Solution)

```
import java.util.Scanner;

public class SquareNumberProgram {
    public static void main(String[] args) {
        int squaredValue = squareUser();
        System.out.println("The square of the entered number is: " + squaredValue);
    }

    public static int squareUser() {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Please enter a number:");
        String input = scanner.nextLine();

        // Convert the input String to an integer
        int number = Integer.parseInt(input);

        // Square the number
        return (int) Math.pow(number, 2);
    }
}
```