CSDS132 - Lab 1: January 18th, 2024

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1. 5 * 2 → 10, 2 + 20 * 10 → 202, (2 - 20) * 10 → -180
    a. + represents addition, - represents subtraction, and * represents multiplication
    b. The computer always follows PEMDAS
2. 5 - 2 → 3, 5 - 2.0 → 3.0, 6.0 - 5 → 1.0, 6.0 - 5.0 → 1.0
    a. The first is an integer, the rest are floating point numbers - if there is at least one float in the expression, the result is a float
3. 11 / 5 → 2, 11.0 / 5.0 → 2.2, 11 % 5 → 1, 12 % 5 → 2, 4 / 5 * 10.0 → 0.0
    a. / is division, % is remainder after division
    b. If the values do not contain decimal points, the result is rounded down, but if they do contain decimal points, the answer contains a predetermined amount of values beyond the decimal.
    c. The expression ⅘ was rounded down to 0, so the final result ended up being 0 * 10
4. 2147483647 + 1 → -2147483648, Integer.MAX_VALUE → 2147483647, Integer.MAX_VALUE + 1 → -2147483648, Integer.MAX_VALUE + 2 → -2147483647, Integer.MIN_VALUE → -2147483648, Integer.MIN_VALUE - 1 → 2147483647
    a. Adding a value to the maximum integer value will loop around to the minimum value, and if you subtract from the minimum value it loops back to the maximum value. This cutoff value is 2^{31}
5. Double.MAX_VALUE → $1.7976931348623158*10^{308}$, Double.MAX_VALUE + 10 → $1.7976931348623158*10^{308}$, Double.MAX_VALUE / 10 → $1.7976931348623158*10^{307}$, Double.MAX_VALUE * 10 → Infinity, Double.MIN_VALUE → 4.9E-324, Double.MIN_VALUE*10 → 4.9E-324, Double.MIN_VALUE/10 → 0.0
    a. Max: adding essentially does nothing, can divide or subtract, multiplying sends it to infinity; Min: dividing sends it to 0, multiplying works, if adding or subtracting, min is treated as 0
6. 4<5: true, 5.01>5.00: true, 6>5>4: error: cannot compare a boolean to an int, 2==2: true, 2==3:false
    a. < and > compare numbers and return either true or false depending on the statement made
    b. == equates two values and returns true or false depending on whether the statement is correct or not.
    c. The data type produced by 6>5 is boolean, so it results with true. True cannot be compared with a number, so when the computer tries to evaluate true > 4, an error is passed.

7. (int)5.3=5, (int)5.9=5, (double)4=4.0, (int)2.5+2.5=4.5

    a. Int has no decimal places, but double does
    b. Placing (int) to the left of a value turns it into an integer, removing any decimal places, but placing (double) to the left of a value adds a decimal place to it (as it becomes a double).
    c. 2.5 is a double, so it will remain a double when an integer is added to it.

8. ‘a’ → a, ‘a’ + 1 = 98, (char)(‘a’ + 1) → b, 3==3: true, ‘3’== ‘3’: true , ‘3’==3: false.
    a. The single quote turns the letter into a character value.
    b. ‘a’+1 behaved differently than (char)(‘a’ + 1) because the first expression was treated as an integer expression and the second was treated as a character expression.
    c. ~~~~~~~