

Review Sheet for Test #1

1. Basics

- a. Variables vs literals
 - i. A literal represents a specific, unchanging value
 - ii. A variable is a named piece of memory where a value can be stored,
- b. Primitive types vs reference types
 - i. A primitive type is a data type where the data is stored directly in the memory.
 - ii. A reference type is a data type that has methods defined on it.
- c. Variables
 - i. Declaring variables
 - ii. Initializing variables
 - iii. Assigning values to variables
 - 1. `int x = 3;`
`int y = x;`
`x++;`
 - iv. Compound assignment eg:
 - 1. `Product *= value;`
 - 2. `Total += i;`
 - v. Data Types
 - 1. `int`
 - 2. `double`
 - 3. `char`
 - 4. `boolean`
 - 5. `String`
 - 6. `Scanner`
 - vi. Operator precedence
 - 1. `*` / `/` come before `+` -
 - 2. We need to put parentheses around lower precedence subexpressions to force Java to evaluate them first.

2. Input/Output

- a. `System.out` vs `System.err`
- b. `println` vs `print`
- c. `Scanner`

- i. How to create a Scanner?
 - 1. `Scanner s = new Scanner(System.in);`
- ii. The import statement
- iii. Reading in input
 - 1. `int x = s.nextInt();`
 - 2. `double y = s.nextDouble();`
 - 3. `String word = s.next();`
 - 4. `String line = s.nextLine();`

3. Conditionals

- a. If-statement
 - i. Header – `if(Boolean test) {`
 - ii. Body – the statements that are executed if the test is true.
- b. Else
 - i. Is executed if the Boolean test is false
 - ii. Can have another if inside of it
- c. Cascading ifs
 - i. If-else if-else if- else if-- else
- d. Nested if
 - i. `if (test) {`
 - `if(other test) {`
- e. and `&&`
- f. or `||`
- g. not `!`
- h. precedence order is `!` then `&&` then `||`
- i. switch
- j. ternary operator

4. Loops

- a. For loops
 - i. Header
 - 1. Initialization step
 - 2. Boolean test
 - 3. Update
 - ii. Body
 - 1. Statements that are executed during each iteration of the loop
 - iii. Execution of a for loop

1. Initialization step
2. Boolean test (if true, go to step 3. If not, stop)
3. Body
4. Update
5. Go back to step 2

iv. The header method

1. The user tells you up front how many pieces of data they have to process. Solution is to run a for loop that counts that many iterations and ask the user for their input one item at a time.

b. While loops

i. A Boolean test

ii. Body

iii. Execution of a while loop

1. Check the Boolean test. If true, go to step 2
2. Run the body of the loop.
3. Go back to step 1

iv. Trailer method

1. User can tell you when they want to stop by inputting a sentinel. Solution is to prompt the user for data. If it's not the sentinel, process the data and then prompt for another data item.

5. Problem solving

- a. Is a number even? Odd? Divisible by d?
- b. Is a number prime? Composite?
- c. Is a character upper case? Lower case?
- d. Converting to/from upper case
- e. Adding up a bunch of numbers
- f. Multiplying up a bunch of numbers
- g. Swapping
- h. Finding the average of a few numbers
- i. Finding the min or max of 2 and 3 numbers.