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Week 4

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Week 4 Q20

## Syntax

Syntax is the grammar of programming languages. It dictates how a program is written and formatted so it can be read by the compiler as intended.

Ex: `int x = 4; // Good` | `x: int === 4' //Bad`

## Libraries

Libraries are compilations of code and functions that others have created. They can be imported and used in a program. Libraries are important because they allow you to build on top of things that have already been built, saving time.

Ex:

`Import java.util.Scanner; //Scanner libraries.` Has built in functions to allow for user input

## Operators

Like in math, java has several operators that are used for comparisons and computations.

Ex:

`&&, ||, !` //and, or and not

`+, -, *, /` //Math operators

`< <= > >=` //Comparison operators

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## Variables

Variables are aliases for values and locations in memory where values are stored. Variables are first declared and initialized with a value, and then the OS memory manager will assign the value a location in RAM. Variables also have naming conventions, such as camel case, which dictate how variables are written. These are not required, but highly recommended as they make long variable names easier to read.

Ex:

```
Int myVariable = 4; //Alias: myVariable, Location: 0fa08c0a
```

## Datatypes

Datatypes are part of variable declarations that dictate what type of variable is being declared.

There are several datatypes that store different types of information, and allocate various amounts of memory.

Ex:

Int - stores numbers. 4 Bytes

Char - stores single characters. 2 Bytes

Bool - stores true/false. 1 Byte

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### Order of operations

Like in math, compilers also rely on the order of operations to compute expressions in a specific order. To avoid confusion in the computation of longer expressions, both mathematicians and compilers use the order of operations to prioritize certain operations over others, and maintain consistency with others.

Ex:

PEMDAS - Parentheses, Exponents, Multiplication, Division, Addition, Subtraction

### Printf

Similar to print or println, java also has a printf function, which means print formatted. This allows the programmer to format in which way something is printed to the terminal.

Ex:

```
System.out.printf("Hello %s!%n", "World");
```