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JANUARY
SATURDAY

20

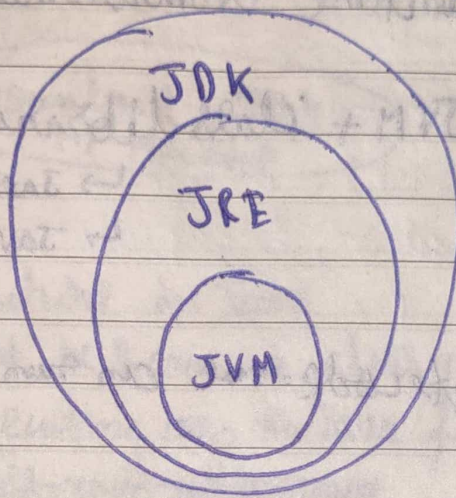
2024

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Java

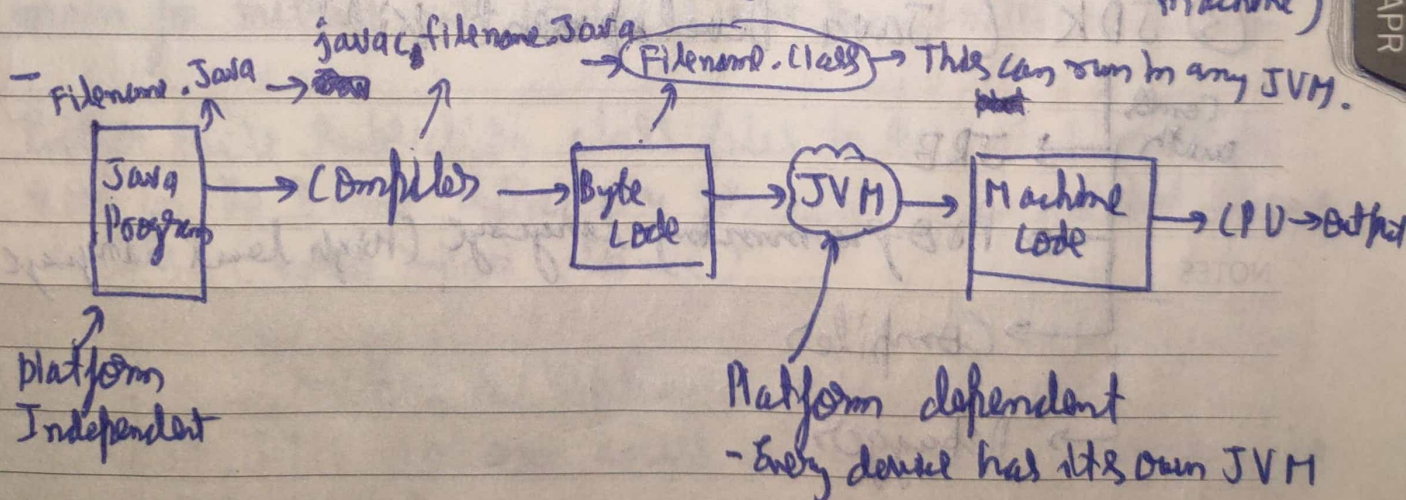
- Platform Independent
- Portability [WORA → Write Once Run Anywhere]

3 Main components



① JVM (Java Virtual Machine)

- Abstract Machine (ie ~~hard~~ software not an actual machine)



Be faithful in small things because it is in them that your strength lies

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MONDAY

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2024 |||||

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9 - JVM has (JIT compiler) (Just In Time compiler)

10

11

12 ② JRE (Java Runtime Environment)

1 - It consists of JVM + 'class libraries.

↳ Java.Math

↳ Java.util etc.

2

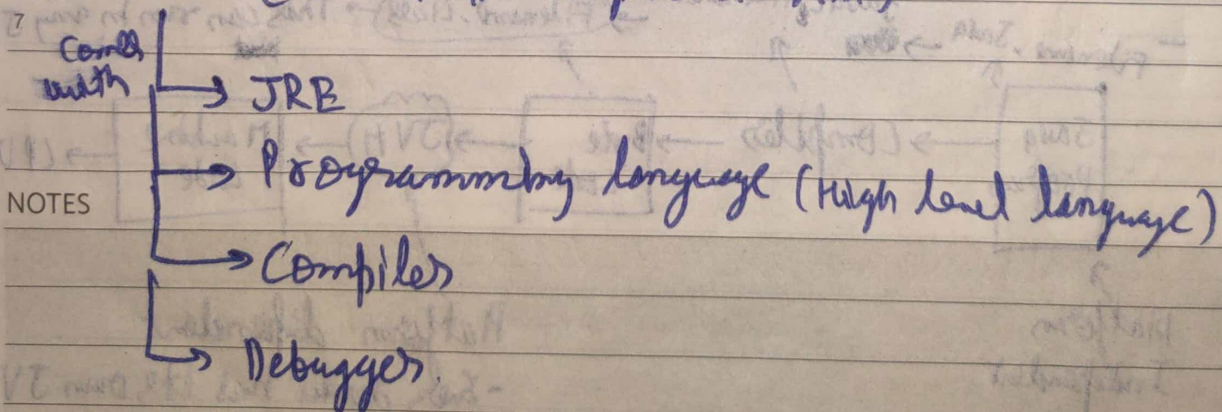
3 - If we have a bytecode we can run it using JRE

4

Bytecode → JVM ← JRE libraries.

5

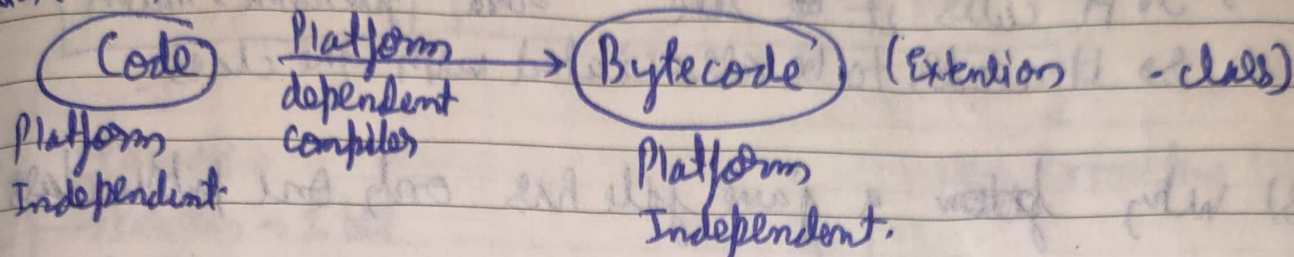
6 ③ JDK (Java Development Kit)



The greatest test of courage on earth is to bear defeat without losing heart

JVM JDK JRE → Platform dependent.

Extension (.java)



Download JDK in Machine

★ About file structure in Java

(1) filename must be same as class name.

(2) If we are executing any ~~file~~ Java file. It should have

~~public class name~~
public static void main() { } function.

So that JVM directly calls it without having to look for the class name with main.

(3) Other classes that are going to be called from this .Java file (The main one) may not have main method but it will not run independently.

Either these subsidiary class files to be called must be kept in the same directory or can be imported through headers. (~~not~~ import class name)

(Q.) Why main method is kept in a public class?

→ B. For JVM to ~~own~~ access it. ~~otherwise~~ (Private method not accessible)

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$\frac{1}{i} + \frac{1}{i}$
 use i increment i
 then then
 increment use it.

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(Q) Why a main method is static?

→ JVM calls it like Java `filename.main`
 so it needs to be associated with the class.

(Q) Why ~~java~~ a java file has only one public class?

→ A .file can have multiple classes but only one 'public' class. (code will run ~~but it's not ideal~~ if compiled using
`javac filename.java`). But it is ideal
 for simplification, Encapsulation, & readability.

PTD PTD

* Access Specifiers in Java:

1. Public :-

- Applicable on classes, methods, and variables
- Used when you want it to be accessible from any other code.

2. Protected :-

- Applicable on methods and variables
- used ~~within~~ inside the same class or by children of parent class

NOTES 3. Default :- (No need to mention anything before class declaration)

- Applicable on classes, methods and variables
- used ~~not~~ within same package. [package name] header

4. Private

- Applicable on methods and variables
- Only ~~to~~ within same class (not by children or extended class)

The great aim of education is not knowledge, but action

n bits \rightarrow Signed $\rightarrow (-2^{n-1} \text{ to } 2^{n-1}-1)$

\rightarrow unsigned $\rightarrow (0 \text{ to } 2^n-1)$

n-1

JANUARY
THURSDAY

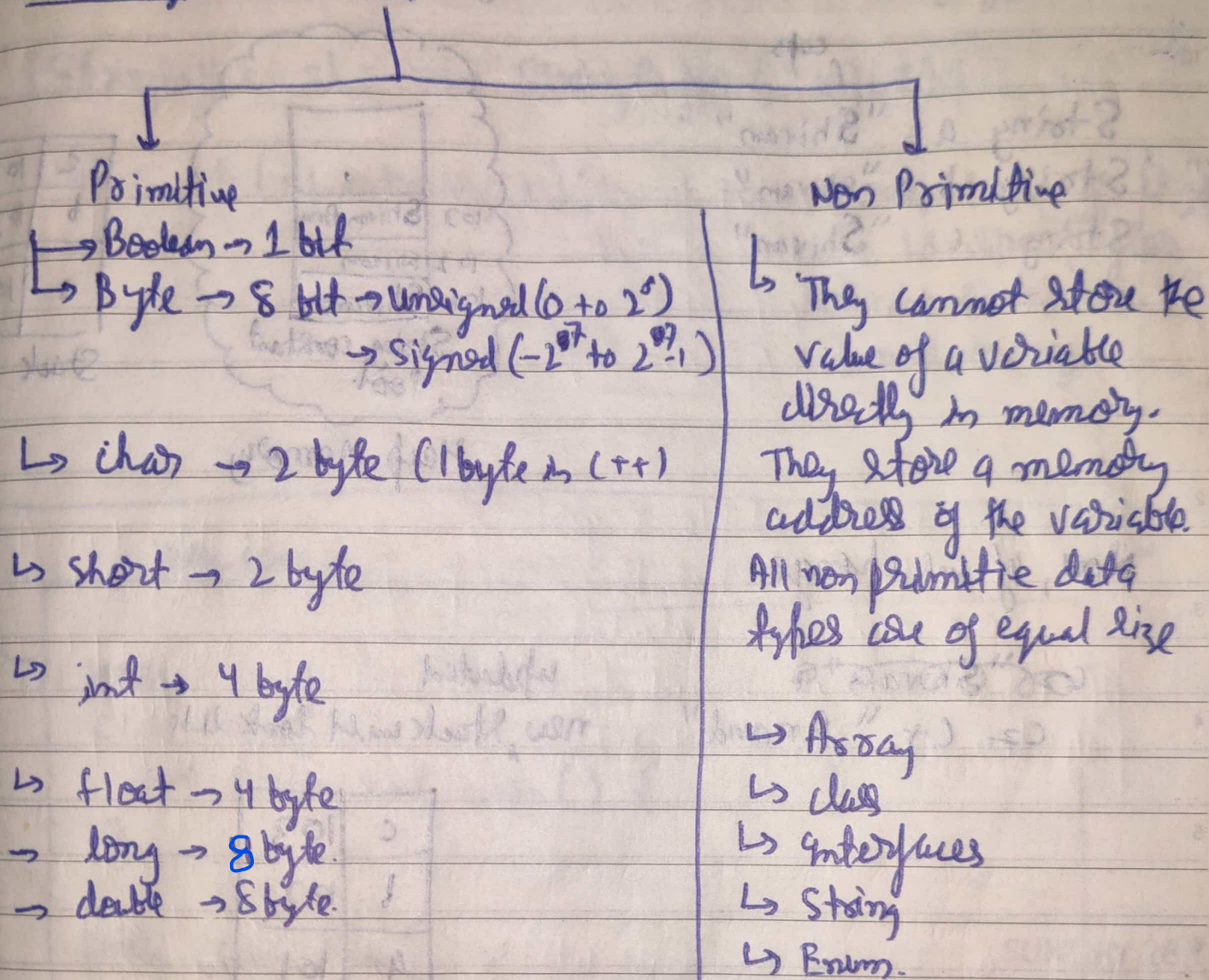
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* Data types in Java



* Java is statically typed datatype i.e. variable type need to be defined

* Literals are the constant values assigned to a data type

* float $x = 0.5f$

double $x = 0.5d$

long $x = 324L$

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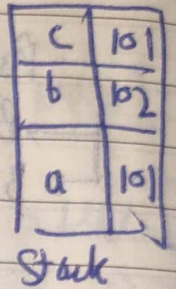
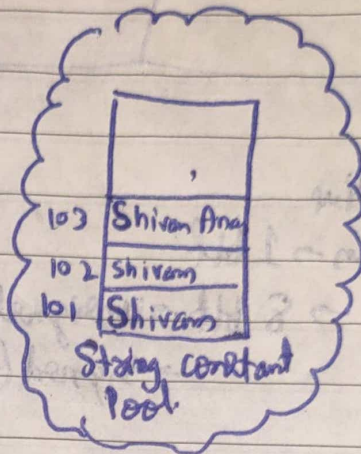
★ Mutable vs Immutable String in Java.

10

String a = "Shivam"
 String b = "Shivam"
 String c = "Shivam"

11

12



Now, if we change:

3

~~c = "Shivam"~~

4

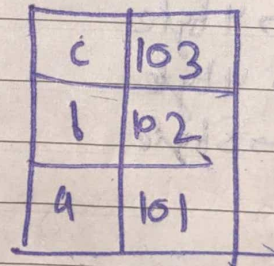
c = c + " Anand"

updated

new stack will look like

5

6



7

★

If any string is unused then it can be sent to garbage collection.

NOTES

By default, String in java is immutable

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~~java~~ java filename.java → Directly compile and run (no bytecode is created separately) (after Java 11)
 javac filename.java → will create ^{bytecode} after compilation with ^{class extension} - class extension
 Now you can use java class name to execute

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To use mutable string in Java, we use StringBuffer.

```
StringBuffer sb = new StringBuffer("hello");
```

sb.setLength(sb.capacity()); → will output 21 as it gives extra 16 ^{initial} space, after hello in order to accommodate change.

Hello.java

```

public
class xyz {
    public static void main() { }
}

```

```

public class Hello {
    public static void main(String[] args) { }
}

```

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after compiling, if using java ~~dot~~ hello.java, xyz class's main will run, because in this it will run the first main it encounters.

If we do "javac hello.java" then ~~main~~ ^{it} will run.
 Plans are only good intentions unless they immediately degenerate into hard work.
 and it will ~~create~~ ^{create} the class file for each class separately.
 Now you can do "java xyz" and "java hello" to run those compiled class separately.

01

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when we do

sent (obj of class)

we can override this method

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object to store method is called

This method is public.

9 Arrays in Java10 `int[] marks = new int[5];`11 class
to have
similar
type of data
in contiguous block.

reference

contiguous memory allocation in heap

1 `int[][] marks = new int[5][5];` 2-d array.3 direct initialization of method like4 `int sum(int a, int b) {`
5 `return (a+b);`
6 `}`will make it ~~public~~ public by default:7 A static method can only call another static method inside it.

or any primitive data type

8 In java you cannot pass a single integer by reference.

NOTES Only objects of a class is passed by reference. because the variable name is basically the reference.