

Hello World!

Start your Java day with Hello World program

```
public class HelloWorld {
    public static void main(String[] args) {
        // Prints "Hello, World" to the terminal window.
        System.out.println("Hello, World");
    }
}
```

When you want to run the program, choose this class as main class

Run your code

Compile from single class up HelloWorld class

```
> javac HelloWorld.java
> java HelloWorld
```

Compile from multiple classes and choose main class

```
> javac *.java
> java HelloWorld // HelloWorld is your preferred main class
```

Variables

Type	Default Value	Memory Allocation
byte	0	8 bits
short	0	16 bits
int	0	32 bits
long	0L	64 bits
float	0.0F	32 bits (decimal)
double	0.00D	64 bits (decimal)
boolean	False	varies on implement
String	NULL	depends on character count
char	\u0000	16 bits (unicode)

Operators

Operand	What they do
=	Assign value
==	Check value/address similarity
>	More than
>=	More than or equals
>>>	Move bit to the right by 1

inverse of these operands still working the same.
For example != is not equal

Defining variable

Defining new variable attributes

```
int x = 12;
int x; // will be defined as 0
```

Define by creating new instances

```
String x = new String();
```

Type Casting (decreasing bit use)

```
Expanding data types will not require type casting. Narrowing does.
double x = 10; // Expanding data types
int y = (int) 10.222222; // Narrowing data types
```

Conditions

If statement

```
if (statement) {}
```

If - else statement

```
if (statement) {} else {}
```

Switch

```
switch (num) {
    case 1: doSomething();
        break;
    default: doThis();
        break;
}
```

Loop

```
for (int i: someArray) {}
while (something) {}
do {something} while (true)
```

Prime number function

```
if (n < 2) { return false; }
for (int i=2; i <= n/i; i++)
    if (n%i == 0) return false;
return true;
```

returns a boolean

String Pool - Optimizations

String pool is created to make the same value string use the same address. By doing that, it will save memory and time for compiler to do stuff

Basic testing

```
String s1 = "Hello World";
String s2 = "Hello World";
Check it using "=="
System.out.println(s1 == s2)
> True
```

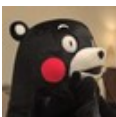
"==" will check its address

Allocate a new address using new

```
String s1 = "Hello World";
String s2 = new String();
s2 = "Hello World";
System.out.println(s1 == s2);
> False
```

Allocate new address by changing its value

```
String s1 = "Hello World";
String s2 = "Hello World";
s2 = "Hello Thailand";
System.out.println(s1 == s2);
> False
```



By Kunanon S (son9912)
cheatography.com/son9912/

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Naming Grammars

Naming should be regulated for easier recognition from others

Use Upper Camel Case for **classes**: VelocityResponseWriter

Use Lower Case for **packages**: com.company.project.ui

Use Lower Camel Case for **variables**: studentName

Use Upper Case for **constants**: MAX_PARAMETER_COUNT = 100

Use Camel Case for **enum class** names

Use Upper Case for **enum values**

Don't use '_' anywhere except constants and enum values (which are constants).

Receiving user input

There is normally 2 ways to receive user keyboard input

1. java.util.Scanner

```
Scanner x = new Scanner(System.in);
String inputString = x.next(); // for String type input
int inputInteger = x.nextInt(); // for Integer type input
```

2. String[] args from public static void main()

NOTE: args is already in a array. It can receive unlimited amount of arguments.

```
String inputString = args[0]; // for String type input.
int inputInteger = (int) args[0]; // for Integer type input
```

To use Scanner, importing Scanner library is required: `import java.Obje ct.S -
canner`

All types of input can be received. (not just String or int)

Access Modifier

	PRIVATE	DEFAULT	PROTECTED	PUBLIC
Same class	Yes	Yes	Yes	Yes
Same package Subclass	No	Yes	Yes	Yes
Same package Non-subclass	No	Yes	Yes	Yes
Different package Subclass	No	No	Yes	Yes
Different package Non-subclass	No	No	No	Yes

- Java uses <default> modifier when not assigning any.

- public modifier allows same class access

- Works in inherited class means itself and the classes that inherit from it.

Attribute modifier

Attribute Access Grants

Attribute	Access Grants
Private	Allows only in class where variable belongs
Public	Allows any class to have this attribute
Static	Attribute that dependent on class (not object)
Final	Defined once. Does not allow any change/inheritance

Methods

Methods are fucking easy, dud.

```
<modifier> <return> mthdName (<args>) { }
```

Example:

```
public double getAge () {
    return someDouble;
}
```

Constructor

Constructors allow you to create an object template. It consists of **complete procedures**.

Create a blank constructor to allow its extension classes to inherit this *super* constructor.

```
<modifier> Person () {}
```

Constructor (cont)

But will be created automatically by not writing any constructor

Create an argument-defined constructor

```
<modifier> Person (String name) {
    this.name = name;
}
```

Abstract Class

Abstract is a type of class but it **can consist of**

Create new abstract

```
<access modifier> abstract  
d () {}
```

Interface

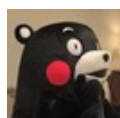
Interface is different from constructor. It **consists of incomplete assignments**

Interface allows you to *make sure* that any inherited class can do the following methods. (It's like a contract to agree that this thing must be able to do this shit.) The method is then completed in the class that implements it.

Creating a new interface

```
interface Bicycle {
    void speedUp (int increment);
}

class fuckBike implements Bicycle
{
    ...
    void speedUp (int increment) {
        speed += increment;
    }
    ...
}
```



Encapsulation

Encapsulation allows individual methods to have different access modifiers to be run, because it creates *setters* and *getters* is one way to use encapsulation to determine the value.

For example

```
private void setTime(int hour, int minute, int second) {
    this.hour = hour;
    this.minute = minute;
    this.second = second;
}
```

Inheritance

Inheritance helps class to import the superclass' method.

Importing superclass

```
class HelloWorld extends Object {}
```

Normally, the class that does not inherit any class will inherit *Object* class.*

Class can **only inherit 1 class/abstract**

Importing Interface

```
class HelloWorld inherits Interface Thing {}
```

Class can **inherit unlimited amount of interface**

Overload

We use overload when you want different input to work differently, but remains the same name.

Example of Overload

```
public printe r(String x){}
public printe r(String x, String y){}
```

If the input is 2 string, it will go to the second method instead of first one.

But you cannot overload by using the same input types with one.

For example

```
public printe r(String x){}
public printe r(String x, String y){}
public printe r(String y, String x){}
```

Overload (cont)

Override

When you have inherit some of the class from parents, but you want to do something different. In override feature, all the subclass/class object will use the newer method.

To make sure JDK knows what you are doing, type `@Override` in front of the public name. If the override is unsuccessful, JDK will returns error.

Example of overridden `helloWorld()` method :

Class Student

```
public void helloWorld(){
    System.out.println("Hello");
}
```

Class GradStudent extends Student

```
@Override
public void helloWorld(){
    System.out.println("Hello World");
}
```

Rules of Overridden methods

1. Access modifier priority can only be narrower or same as superclass
2. There is the same name method in superclass / libraries

Print with new line

```
System.out.println("Hello World");
```

Print

```
System.out.print("Hello World");
```

java.util.Scanner

Create a Scanner object

```
Scanner sc = new Scanner(System.in);
```

Accept input

```
double d = sc.nextDouble();
```

java.lang.Math

Methods	Usage
Math.max(<value 1>, <value 2>)	Returns the maximum value
Math.min(<value 1>, <value 2>)	Returns the minimum value
Math.abs(<value >)	Returns the absolute value
Math.pow(<number>, <exponent>)	Returns the power of a number
Math.sqrt(<value >)	Returns the square root

java.lang.String

Find the length -> int

```
msg.length()
```

To lower/uppercase -> String

```
msg.toLowerCase()
```

```
msg.toUpperCase()
```

Replace a string -> String

```
msg.replaceAll( String a, String b)
```

Split string between delimiter -> array

```
msg.split( String delimiter)
```

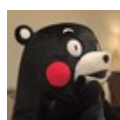
Start/end with -> boolean

```
msg.startsWith( String pre)
```

```
msg.endsWith( String post)
```

String format -> String

```
String.format( String format, args)
```



java.lang.String

Methods	Description
charAt(int index)	Returns the char value at the specified index
compareTo-(String otherString)	Compare 2 strings lexicographically
concat(String str)	Concatenate specified string
endsWith(String suffix)	Test if the string ends with specified suffix
equals(String andObject)	Test if strings values are the same
toCharArray()	Convert string to character array
toLowerCase()	Convert string to lowercase
toUpperCase()	Convert string to uppercase
toString()	Convert things to string
valueOf(<value>)	Return the representation of argument
length()	Return length of the string
replaceAll(String a, String b)	Replace string a to string b
split(String delimiter)	Split string between delimiter
startsWith(String prefix)	Test if string starts with specified prefix
format(String format, Object arg)	Format strings to the format given

There is many more in Java documents : <https://docs.oracle.com/javase/9/docs/api/java/lang/String.html>

java.util.Collection (CollectionAPI)

Provides ways to keep variables and access it faster

Ways to keep data

1. Set - Care about duplicity, not queue (eg. HashSet)
2. List - Care about queue, not duplicity (eg. LinkedList)
3. Map - Care about both queue and key duplicity (eg. HashMap)

Methods that will be included

```
boolean add(Object element);
boolean remove (Object element);
int size();
boolean isEmpty();
boolean contains( Object element );
Iterator Iterator();
```

HashMap - CollectionAPI

Method	Usability
void add (int index, Object element)	Add value to list
Object remove(int index)	Remove item #index from list
Object get(int index)	Retrieve item #index from list
void set(int index, Object element)	Set data to correspond #index
int indexOf(Object element)	Find the #index from element
ListIterator listIterator()	

It also includes all CollectionAPI methods

Create new HashMap by using

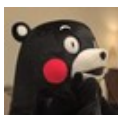
```
List x = new HashLi st();
```

HashMap - CollectionAPI

Method	Usability
Collections	
Create List of 1, 2, 3 on-the-fly	
➤ Arrays.as List(1, 2, 3)	
Convert primitive array to Stream	
➤ Arrays.st ream (p rim iti veA rray)	
Convert ArrayList to Stream	
➤ arrayL ist.st ream()	

LinkedList - CollectionAPI

Create empty LinkedList of Integer	
➤ LinkedList myList = new Linked I	er >t()
Create LinkedList with values in it	
➤ new Linked Lis t<> (Ar ray s.a s	3)))
Add an object to LinkedList	
➤ myList.ad d(50)	



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