Java Complete Cheatsheet for Beginners

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A quick reference guide for beginners learning Java programming

1 Java Basics

Java is a high-level, object-oriented programming language known for its portability and robustness. It runs on the Java Virtual Machine (JVM).

1.1 First Program

```java
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello, World!");
    }
}
```

1.2 Comments

```java
// Single-line comment
/* Multi-line comment */
/** Documentation comment */
```

2 Data Types

2.1 Primitive Types

- `byte`: 8-bit integer (-128 to 127)
- `short`: 16-bit integer
- `int`: 32-bit integer
- `long`: 64-bit integer (add `L` suffix)
- `float`: 32-bit float (add `F` suffix)
- `double`: 64-bit float
- `boolean`: `true` or `false`
- `char`: 16-bit Unicode character (e.g., `'A'`)

2.2 Non-Primitive Types

- `String`: e.g., `"Hello"`
- Arrays: e.g., `int[] numbers`
- Classes and Objects

3 Variables

```java
int age = 25; // Declaration and initialization
String name = "Samir";
final double PI = 3.14159; // Constant
```

4 Operators

4.1 Arithmetic

```java
+ - * / % (modulus)
int a = 10, b = 3;
int sum = a + b; // 13
int mod = a % b; // 1
```

4.2 Comparison

```java
== != > < >= <=
boolean isEqual = (a == b); // false
```

4.3 Logical

```java
&& (AND) || (OR) ! (NOT)
boolean result = (a > 5 && b < 5); // true
```

5 Control Flow

5.1 If-Else

```java
if (age >= 18) {
    System.out.println("Adult");
} else {
    System.out.println("Minor");
}
```

5.2 Switch

```java
int day = 2;
switch (day) {
    case 1: System.out.println("Monday"); break;
    case 2: System.out.println("Tuesday"); break;
    default: System.out.println("Invalid");
}
```

5.3 Loops

```java
// For loop
for (int i = 0; i < 5; i++) {
    System.out.println(i);
}
// While loop
int i = 0;
while (i < 5) {
    System.out.println(i);
    i++;
}
// Do-while loop
do {
    System.out.println(i);
    i++;
} while (i < 5);
```

6 Arrays

```java
int[] numbers = {1, 2, 3, 4, 5};
int[] arr = new int[5]; // Empty array
arr[0] = 10; // Assign value
System.out.println(numbers.length); // 5
```

7 Methods

```java
public int add(int a, int b) {
    return a + b;
}
// Calling method
int sum = add(5, 3); // 8
```

8 Classes and Objects

```java
public class Car {
    String model;
    int year;

    public Car(String model, int year) {
        this.model = model;
        this.year = year;
    }

    public void display() {
        System.out.println(model + " " + year);
    }
}
// Creating object
Car myCar = new Car("Toyota", 2020);
myCar.display(); // Toyota 2020
```

9 Inheritance

```java
public class Vehicle {
    String brand;
}
public class Car extends Vehicle {
    int wheels = 4;
}
Car car = new Car();
car.brand = "Honda";
```

10 Exception Handling

```
try {
    int[] arr = {1, 2};
    System.out.println(arr[5]);
} catch (ArrayIndexOutOfBoundsException e) {
    System.out.println("Error: " + e);
} finally {
    System.out.println("This always runs");
}
```

11 String Methods

```
String str = "Hello";
str.length(); // 5
str.toUpperCase(); // "HELLO"
str.substring(1, 3); // "el"
str.contains("lo"); // true
```

12 Input/Output

```
import java.util.Scanner;
Scanner scanner = new Scanner(System.in);
System.out.print("Enter name: ");
String name = scanner.nextLine();
System.out.println("Hello, " + name);
scanner.close();
```

13 Collections

```
import java.util.ArrayList;
ArrayList<String> list = new ArrayList<>();
list.add("Apple"); // Add item
list.get(0); // "Apple"
list.remove(0); // Remove item
```

14 Tips for Beginners

- Practice coding daily on platforms like LeetCode.
- Use an IDE like IntelliJ IDEA or Eclipse.
- Read the official Java documentation: https://docs.oracle.com/en/java/
- Join communities like Stack Overflow.