Getting Started

Hello.java {.row-span-2}

```
public class Hello {
  // main method
  public static void main(String[] args)
  {
    // Output: Hello, world!
    System.out.println("Hello, world!");
  }
}
```

Compiling and running

```
$ javac Hello.java
$ java Hello
Hello, world!
```

Variables

```
int num = 5;
float floatNum = 5.99f;
char letter = 'D';
boolean bool = true;
String site = "cheatsheets.zip";
```

Primitive Data Types {.row-span-2}

Data Type	Size	Default	Range
`byte`	1 byte	0	-128 ^to^ 127
`short`	2 byte	0	-2^15^ ^to^ 2^15^-1
`int`	4 byte	0	-2^31^ ^to^ 2^31^-1
`long`	8 byte	0	-2^63^ ^to^ 2^63^-1
`float`	4 byte	0.0f	*N/A*
`double`	8 byte	0.0d	*N/A*
`char`	2 byte	\u0000	0 ^to^ 65535
`boolean`	*N/A*	false	true / false

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Strings

```
```

```
String first = "John";
String last = "Doe";
String name = first + " " + last;
System.out.println(name);
```

See: Strings

Loops

```
String word = "CheatSheets";
for (char c: word.toCharArray()) {
  System.out.print(c + "-");
}
// Outputs: C-h-e-a-t-S-h-e-e-t-s-
```

See: Loops

Arrays

```
char[] chars = new char[10];
chars[0] = 'a'
chars[1] = 'b'

String[] letters = {"A", "B", "C"};
int[] mylist = {100, 200};
boolean[] answers = {true, false};
```

See: Arrays

Swap

```
int a = 1;
int b = 2;
System.out.println(a + " " + b); // 1 2

int temp = a;
a = b;
b = temp;
System.out.println(a + " " + b); // 2 1
```

Type Casting

```
// Widening
// byte<short<int<long<float<double
int i = 10;
long l = i;                 // 10

// Narrowing
```

```
double d = 10.02;
long l = (long)d;          // 10

String.valueOf(10);        // "10"
Integer.parseInt("10");    // 10
Double.parseDouble("10"); // 10.0
```

Conditionals

```
int j = 10;

if (j == 10) {
  System.out.println("I get printed");
} else if (j > 10) {
  System.out.println("I don't");
} else {
  System.out.println("I also don't");
}
```

See: Conditionals

User Input

```
Scanner in = new Scanner(System.in);
String str = in.nextLine();
System.out.println(str);

int num = in.nextInt();
System.out.println(num);
```

Java Strings

Basic

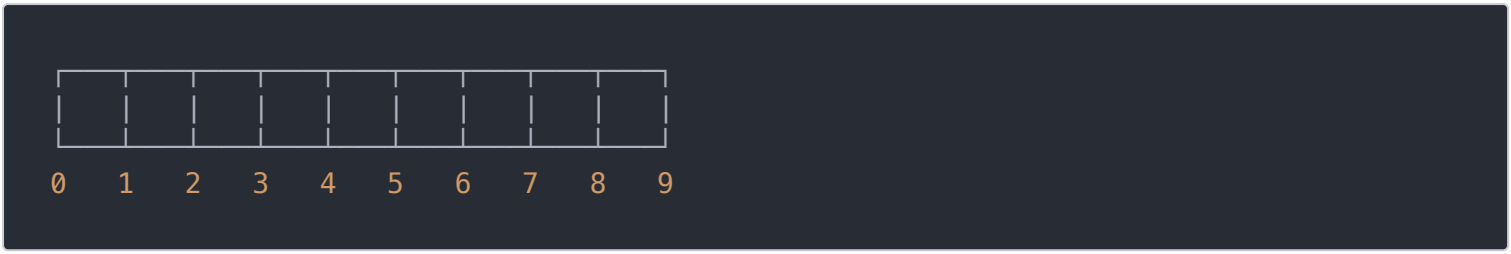
```
String str1 = "value";
String str2 = new String("value");
String str3 = String.valueOf(123);
```

Concatenation

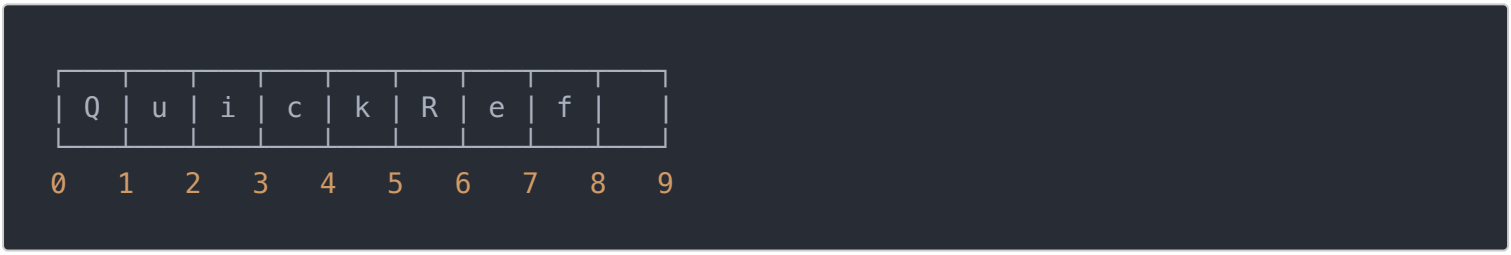
```
String s = 3 + "str" + 3;     // 3str3
String s = 3 + 3 + "str";     // 6str
String s = "3" + 3 + "str";   // 33str
String s = "3" + "3" + "23";  // 3323
String s = "" + 3 + 3 + "23"; // 3323
String s = 3 + 3 + 23;        // Incompatible types
```

StringBuilder {.row-span-3}

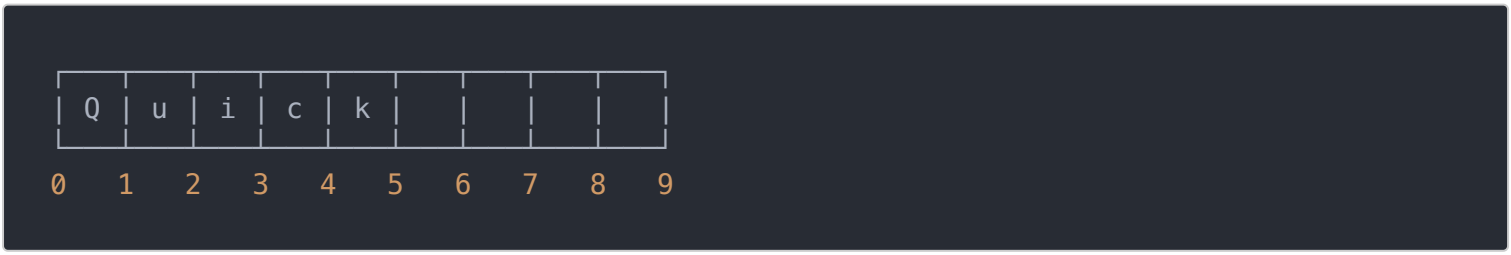
StringBuilder sb = new StringBuilder(10);



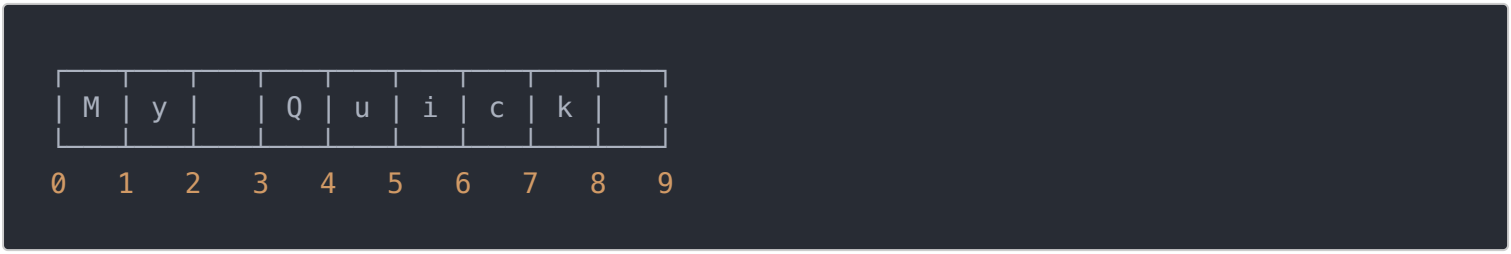
sb.append("QuickRef");



sb.delete(5, 9);



sb.insert(0, "My ");



sb.append("!");

Comparison

```
String s1 = new String("QuickRef");
String s2 = new String("QuickRef");

s1 == s2          // false
s1.equals(s2)     // true

"AB".equalsIgnoreCase("ab")  // true
```

Manipulation

```
String str = "Abcd";

str.toUpperCase();     // ABCD
str.toLowerCase();     // abcd
str.concat("#");       // Abcd#
str.replace("b", "-"); // A-cd

"  abc ".trim();       // abc
"ab".toCharArray();    // {'a', 'b'}
```

Information

```
String str = "abcd";

str.charAt(2);       // c
str.indexOf("a")     // 0
str.indexOf("z")     // -1
str.length();        // 4
str.toString();      // abcd
str.substring(2);    // cd
str.substring(2,3);  // c
str.contains("c");   // true
str.endsWith("d");   // true
str.startsWith("a"); // true
str.isEmpty();       // false
```

Immutable

```
String str = "hello";
str.concat("world");

// Outputs: hello
System.out.println(str);
```

```
String str = "hello";
String concat = str.concat("world");

// Outputs: helloworld
System.out.println(concat);
```

Once created cannot be modified, any modification creates a new String

Java Arrays

Declare

```java
int[] a1;
int[] a2 = {1, 2, 3};
int[] a3 = new int[]{1, 2, 3};

int[] a4 = new int[3];
a4[0] = 1;
a4[2] = 2;
a4[3] = 3;
```

Modify

```java
int[] a = {1, 2, 3};
System.out.println(a[0]); // 1

a[0] = 9;
System.out.println(a[0]); // 9

System.out.println(a.length); // 3
```

Loop (Read & Modify)

```java
int[] arr = {1, 2, 3};
for (int i=0; i < arr.length; i++) {
    arr[i] = arr[i] * 2;
    System.out.print(arr[i] + " ");
}
// Outputs: 2 4 6
```

Loop (Read)

```java
String[] arr = {"a", "b", "c"};
for (String a: arr) {
    System.out.print(a + " ");
}
// Outputs: a b c
```

Multidimensional Arrays

```java
int[][] matrix = { {1, 2, 3}, {4, 5} };

int x = matrix[1][0];  // 4
// [[1, 2, 3], [4, 5]]
Arrays.deepToString(matrix);

int[][] a = matrix;
for (int i = 0; i < a.length; ++i) {
  for(int j = 0; j < a[i].length; ++j) {
    System.out.println(a[i][j]);
```

```
  }
}
// Outputs: 1 2 3 4 5 6 7
```

Sort

```
char[] chars = {'b', 'a', 'c'};
Arrays.sort(chars);

// [a, b, c]
Arrays.toString(chars);
```

Java Conditionals

Operators {.row-span-2}

- +
- -
- *
- /
- %
- =
- ++
- --
- ! {.marker-none .cols-4}

- ==
- !=
- >
- >=
- <
- <= {.marker-none .cols-4}

- &&
- ||
- ?:{data-tooltip="Ternary (shorthand for if-then-else statement)"} {.marker-none .cols-4}

- instanceof {.marker-none}

- ~
- <<
- >>
- >>>
- &
- ^
- | {.marker-none .cols-4}

If else

```java
int k = 15;
if (k > 20) {
  System.out.println(1);
} else if (k > 10) {
  System.out.println(2);
} else {
  System.out.println(3);
}
```

Switch {.row-span-2}

```java
int month = 3;
String str;
switch (month) {
  case 1:
    str = "January";
    break;
  case 2:
    str = "February";
    break;
  case 3:
    str = "March";
    break;
  default:
    str = "Some other month";
    break;
}

// Outputs: Result March
System.out.println("Result " + str);
```

Ternary operator

```java
int a = 10;
int b = 20;
int max = (a > b) ? a : b;

// Outputs: 20
System.out.println(max);
```

Java Loops

For Loop

```java
for (int i = 0; i < 10; i++) {
  System.out.print(i);
}
// Outputs: 0123456789
```

```
for (int i = 0,j = 0; i < 3; i++,j--) {
  System.out.print(j + "|" + i + " ");
}
// Outputs: 0|0 -1|1 -2|2
```

Enhanced For Loop

```
int[] numbers = {1,2,3,4,5};

for (int number: numbers) {
  System.out.print(number);
}
// Outputs: 12345
```

Used to loop around array's or List's

While Loop

```
int count = 0;

while (count < 5) {
  System.out.print(count);
  count++;
}
// Outputs: 01234
```

Do While Loop

```
int count = 0;

do {
  System.out.print(count);
  count++;
} while (count < 5);
// Outputs: 01234
```

Continue Statement

```
for (int i = 0; i < 5; i++) {
  if (i == 3) {
    continue;
  }
  System.out.print(i);
}
// Outputs: 01245
```

Break Statement

```
for (int i = 0; i < 5; i++) {
  System.out.print(i);
  if (i == 3) {
    break;
  }
}
// Outputs: 0123
```

Java Collections Framework

Java Collections {.col-span-2}

Collection	Interface	Ordered	Sorted	Thread safe	Duplicate	Nullable
ArrayList	List	Y	*N*	*N*	Y	Y
Vector	List	Y	*N*	Y	Y	Y
LinkedList	List, Deque	Y	*N*	*N*	Y	Y
CopyOnWriteArrayList	List	Y	*N*	Y	Y	Y
HashSet	Set	*N*	*N*	*N*	*N*	One `null`
LinkedHashSet	Set	Y	*N*	*N*	*N*	One `null`
TreeSet	Set	Y	Y	*N*	*N*	*N*
CopyOnWriteArraySet	Set	Y	*N*	Y	*N*	One `null`
ConcurrentSkipListSet	Set	Y	Y	Y	*N*	*N*
HashMap	Map	*N*	*N*	*N*	*N (key)*	One `null` *(key)*
HashTable	Map	*N*	*N*	Y	*N (key)*	*N (key)*
LinkedHashMap	Map	Y	*N*	*N*	*N (key)*	One `null` *(key)*
TreeMap	Map	Y	Y	*N*	*N (key)*	*N (key)*
ConcurrentHashMap	Map	*N*	*N*	Y	*N (key)*	*N*
ConcurrentSkipListMap	Map	Y	Y	Y	*N (key)*	*N*
ArrayDeque	Deque	Y	*N*	*N*	Y	*N*
PriorityQueue	Queue	Y	*N*	*N*	Y	*N*
ConcurrentLinkedQueue	Queue	Y	*N*	Y	Y	*N*
ConcurrentLinkedDeque	Deque	Y	*N*	Y	Y	*N*
ArrayBlockingQueue	Queue	Y	*N*	Y	Y	*N*
LinkedBlockingDeque	Deque	Y	*N*	Y	Y	*N*
PriorityBlockingQueue	Queue	Y	*N*	Y	Y	*N*

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ArrayList

```
List<Integer> nums = new ArrayList<>();

// Adding
nums.add(2);
nums.add(5);
nums.add(8);

// Retrieving
System.out.println(nums.get(0));

// Indexed for loop iteration
for (int i = 0; i < nums.size(); i++) {
    System.out.println(nums.get(i));
}

nums.remove(nums.size() - 1);
nums.remove(0); // VERY slow

for (Integer value : nums) {
    System.out.println(value);
}
```

HashMap

```
Map<Integer, String> m = new HashMap<>();
m.put(5, "Five");
m.put(8, "Eight");
m.put(6, "Six");
m.put(4, "Four");
m.put(2, "Two");

// Retrieving
System.out.println(m.get(6));

// Lambda forEach
m.forEach((key, value) -> {
    String msg = key + ": " + value;
    System.out.println(msg);
});
```

HashSet

```
Set<String> set = new HashSet<>();
if (set.isEmpty()) {
    System.out.println("Empty!");
}

set.add("dog");
set.add("cat");
set.add("mouse");
```

```
set.add("snake");
set.add("bear");

if (set.contains("cat")) {
    System.out.println("Contains cat");
}

set.remove("cat");
for (String element : set) {
    System.out.println(element);
}
```

ArrayDeque

```
Deque<String> a = new ArrayDeque<>();

// Using add()
a.add("Dog");

// Using addFirst()
a.addFirst("Cat");

// Using addLast()
a.addLast("Horse");

// [Cat, Dog, Horse]
System.out.println(a);

// Access element
System.out.println(a.peek());

// Remove element
System.out.println(a.pop());
```

Misc

Access Modifiers {.col-span-2}

Modifier	Class	Package	Subclass	World
public	Y	Y	Y	Y
protected	Y	Y	Y	*N*
no modifier	Y	Y	*N*	*N*
private	Y	*N*	*N*	*N*

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Regular expressions

```
String text = "I am learning Java";
// Removing All Whitespace
```

```
text.replaceAll("\\s+", "");

// Splitting a String
text.split("\\|");
text.split(Pattern.quote("|"));
```

See: Regex in java

Comment

```
// I am a single line comment!

/*
And I am a
multi-line comment!
*/

/**
 * This
 * is
 * documentation
 * comment
 */
```

Keywords {.col-span-2}

- abstract
- continue
- for
- new
- switch
- assert
- default
- goto
- package
- synchronized
- boolean
- do
- if
- private
- this
- break
- double
- implements
- protected
- throw
- byte
- else
- import
- public
- throws

- case
- enum
- instanceof
- return
- transient
- catch
- extends
- int
- short
- try
- char
- final
- interface
- static
- void
- class
- finally
- long
- strictfp
- volatile
- const
- float
- native
- super
- while {.marker-none .cols-6}

Math methods

Method	Description
`Math.max(a,b)`	Maximum of a and b
`Math.min(a,b)`	Minimum of a and b
`Math.abs(a)`	Absolute value a
`Math.sqrt(a)`	Square-root of a
`Math.pow(a,b)`	Power of b
`Math.round(a)`	Closest integer
`Math.sin(ang)`	Sine of ang
`Math.cos(ang)`	Cosine of ang
`Math.tan(ang)`	Tangent of ang
`Math.asin(ang)`	Inverse sine of ang
`Math.log(a)`	Natural logarithm of a
`Math.toDegrees(rad)`	Angle rad in degrees
`Math.toRadians(deg)`	Angle deg in radians

Try/Catch/Finally

```java
try {
  // something
} catch (Exception e) {
  e.printStackTrace();
} finally {
  System.out.println("always printed");
}
```