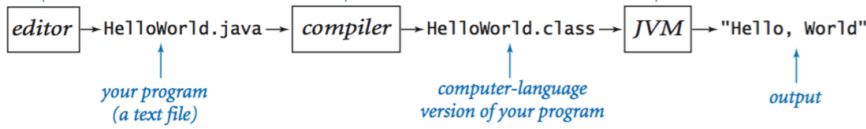


use any text editor to create your program

type `javac HelloWorld.java` to compile your program

type `java HelloWorld` to execute your program



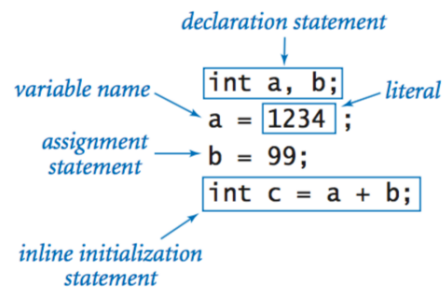
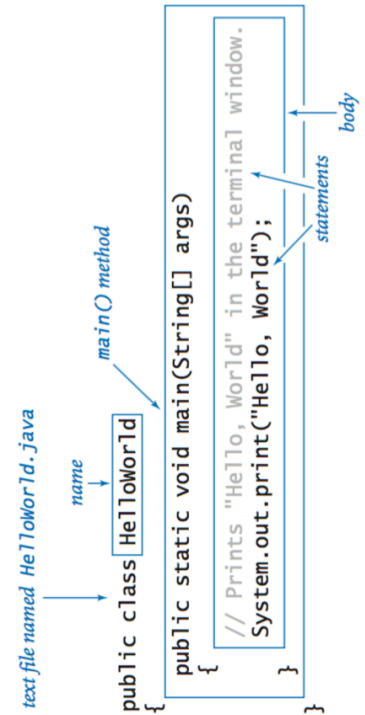
UbIn3\$

Ubiquitous Networked Embedded System

type	set of values	common operators	sample literal values
int	integers	+ - * / %	99 12 2147483647
double	floating-point numbers	+ - * /	3.14 2.5 6.022e23
boolean	boolean values	&& !	true false
char	characters		'A' '1' '%' '\n'
String	sequences of characters	+	"AB" "Hello" "2.5"

method call	library	return type	value
<code>Integer.parseInt("123")</code>	Integer	int	123
<code>Double.parseDouble("1.5")</code>	Double	double	1.5
<code>Math.sqrt(5.0*5.0 - 4.0*4.0)</code>	Math	double	3.0
<code>Math.log(Math.E)</code>	Math	double	1.0
<code>Math.random()</code>	Math	double	random in [0, 1)
<code>Math.round(3.14159)</code>	Math	long	3
<code>Math.max(1.0, 9.0)</code>	Math	double	9.0

expression	expression type	expression value
<code>(1 + 2 + 3 + 4) / 4.0</code>	double	2.5
<code>Math.sqrt(4)</code>	double	2.0
<code>"1234" + 99</code>	String	"123499"
<code>11 * 0.25</code>	double	2.75
<code>(int) 11 * 0.25</code>	double	2.75
<code>11 * (int) 0.25</code>	int	0
<code>(int) (11 * 0.25)</code>	int	2
<code>(int) 2.71828</code>	int	2
<code>Math.round(2.71828)</code>	long	3
<code>(int) Math.round(2.71828)</code>	int	3
<code>Integer.parseInt("1234")</code>	int	1234



<code>void System.out.print(String s)</code>	print s
<code>void System.out.println(String s)</code>	print s, followed by a newline
<code>void System.out.println()</code>	print a newline
<code>int Integer.parseInt(String s)</code>	convert s to an int value
<code>double Double.parseDouble(String s)</code>	convert s to a double value
<code>long Long.parseLong(String s)</code>	convert s to a long value

initialization is a separate statement

loop-continuation condition

braces are optional when body is a single statement

```

int power = 1;
while ( power <= n/2 )
{
    power = 2*power;
}
    
```

body

initialize another variable in a separate statement

declare and initialize a loop control variable

loop-continuation condition

increment

```

int power = 1;
for (int i = 0; i <= n; i++)
{
    System.out.println(i + " " + power);
    power = 2*power;
}
    
```

body

boolean expression

sequence of statements

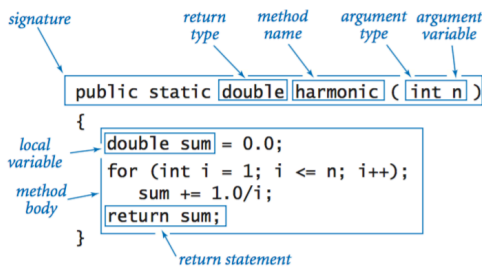
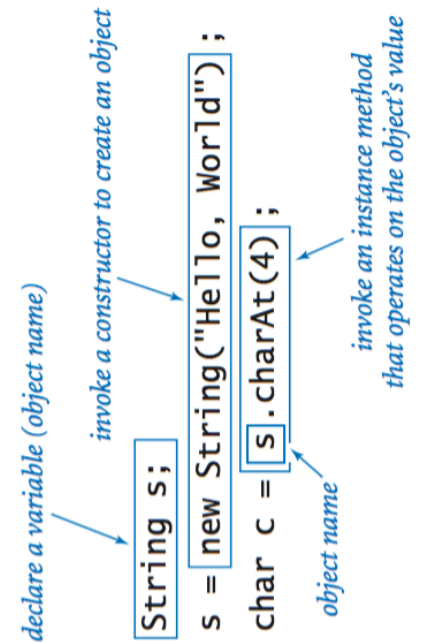
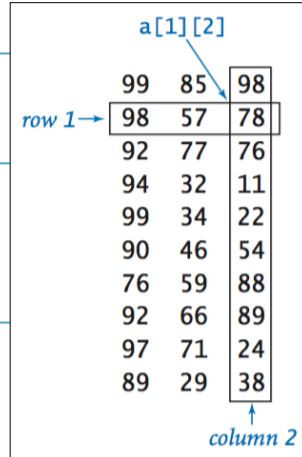
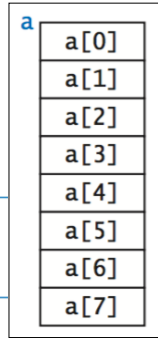
```

if ( x > y )
{
    int t = x;
    x = y;
    y = t;
}
    
```

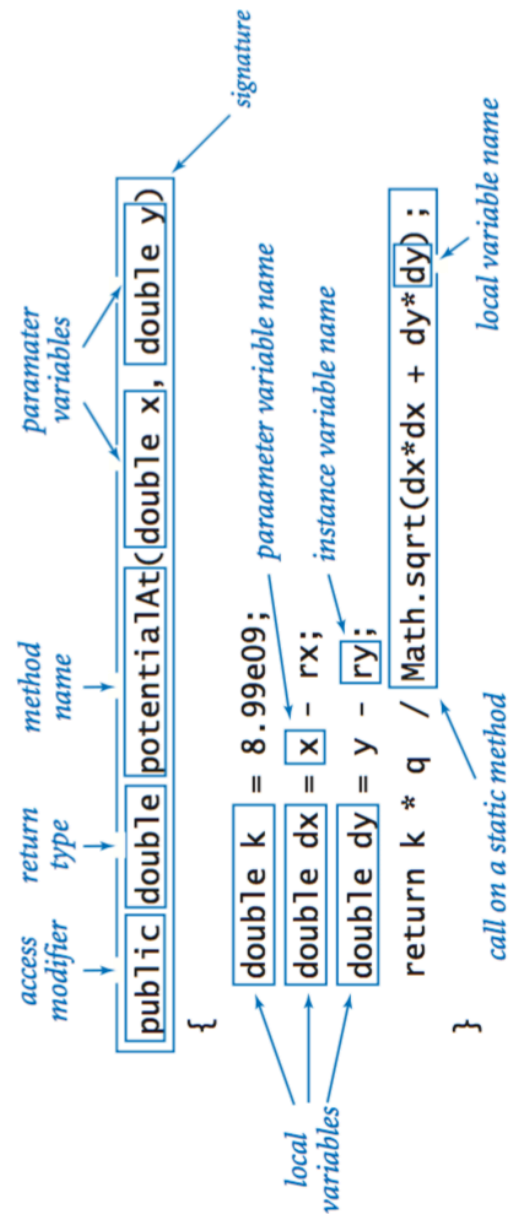
```
String[] SUITS = { "Clubs", "Diamonds", "Hearts", "Spades" };
```

```
String[] RANKS = {
    "2", "3", "4", "5", "6", "7", "8", "9", "10",
    "Jack", "Queen", "King", "Ace"
};
```

create an array with random values	double[] a = new double[n]; for (int i = 0; i < n; i++) a[i] = Math.random();
print the array values, one per line	for (int i = 0; i < n; i++) System.out.println(a[i]);
find the maximum of the array values	double max = Double.NEGATIVE_INFINITY; for (int i = 0; i < n; i++) if (a[i] > max) max = a[i];
compute the average of the array values	double sum = 0.0; for (int i = 0; i < n; i++) sum += a[i]; double average = sum / n;
reverse the values within an array	for (int i = 0; i < n/2; i++) { double temp = a[i]; a[i] = a[n-1-i]; a[n-i-1] = temp; }
copy sequence of values to another array	double[] b = new double[n]; for (int i = 0; i < n; i++) b[i] = a[i];



absolute value of an int value	public static int abs(int x) { if (x < 0) return -x; else return x; }
absolute value of a double value	public static double abs(double x) { if (x < 0.0) return -x; else return x; }
primality test	public static boolean isPrime(int n) { if (n < 2) return false; for (int i = 2; i <= n/i; i++) if (n % i == 0) return false; return true; }
hypotenuse of a right triangle	public static double hypotenuse(double a, double b) { return Math.sqrt(a*a + b*b); }
harmonic number	public static double harmonic(int n) { double sum = 0.0; for (int i = 1; i <= n; i++) sum += 1.0 / i; return sum; }
uniform random integer in [0, n)	public static int uniform(int n) { return (int) (Math.random() * n); }
draw a triangle	public static void drawTriangle(double x0, double y0, double x1, double y1, double x2, double y2) { StdDraw.line(x0, y0, x1, y1); StdDraw.line(x1, y1, x2, y2); StdDraw.line(x2, y2, x0, y0); }



declare a variable (object name)

invoke a constructor to create an object

```
String s;
s = new String("Hello, World");
char c = s.charAt(4);
```

object name

invoke an instance method that operates on the object's value

```
String a = new String("now is");
String b = new String("the time");
String c = new String(" the");
```

instance method call	return type	return value
a.length()	int	6
a.charAt(4)	char	'i'
a.substring(2, 5)	String	"w i"
b.startsWith("the")	boolean	true
a.indexOf("is")	int	4
a.concat(c)	String	"now is the"
b.replace("t", "T")	String	"The Time"
a.split(" ")	String[]	{ "now", "is" }
b.equals(c)	boolean	false

public class String

String(String s)	create a string with the same value as s
String(char[] a)	create a string that represents the same sequence of characters as in a[]
int length()	number of characters
char charAt(int i)	the character at index i
String substring(int i, int j)	characters at indices i through (j-1)
boolean contains(String substring)	does this string contain substring?
boolean startsWith(String prefix)	does this string start with prefix?
boolean endsWith(String postfix)	does this string end with postfix?
int indexOf(String pattern)	index of first occurrence of pattern
int indexOf(String pattern, int i)	index of first occurrence of pattern after i
String concat(String t)	this string, with t appended
int compareTo(String t)	string comparison
String toLowerCase()	this string, with lowercase letters
String toUpperCase()	this string, with uppercase letters
String replace(String a, String b)	this string, with as replaced by bs
String trim()	this string, with leading and trailing whitespace removed
boolean matches(String regexp)	is this string matched by the regular expression?
String[] split(String delimiter)	strings between occurrences of delimiter
boolean equals(Object t)	is this string's value the same as t's?
int hashCode()	an integer hash code

