



Il linguaggio Java

Programmi d'esempio

Gli stream

File (caratteri)

```
import java.io.*;
public class CopyChars {
    public static void main(String[] args)
        throws IOException {
        String path = "/* un path */";
        String src = path + "pippo.txt";
        String dst = path + "pluto.txt";

        FileReader in = new FileReader(src);
        FileWriter out = new FileWriter(dst);
        int c;

        while ((c = in.read()) != -1)
            out.write(c);
        in.close();
        out.close();
    }
}
```

File (byte)

```
import java.io.*;
public class CopyBytes {
    public static void main(String[] args)
        throws IOException {
        String path = "/* un path */";
        String src = path + "pippo.txt";
        String dst = path + "paperino.txt";

        FileInputStream in = new FileInputStream(src);
        FileOutputStream out = new FileOutputStream(dst);
        int c;

        while ((c = in.read()) != -1)
            out.write(c);

        in.close();
        out.close();
    }
}
```

BufferedCopy

```
import java.io.*;

public class BufferedCopy {
    public static void main(String[] args)
        throws IOException {

        String path = "/* un path */";
        String src = path + "pippo.txt";
        String dst = path + "topolino.txt";

        FileReader fin = new FileReader(src);
        // buffin wraps fin
        BufferedReader buffin = new BufferedReader(fin);
        FileWriter fout = new FileWriter(dst);
        // printout wraps fout
        PrintWriter printout = new PrintWriter(fout);

        String curline;
        while ((curline = buffin.readLine()) != null)
            printout.println(curline);
            buffin.close();
            // indispensabile per il flush dei dati
            printout.close();
        }
    }
}
```

BufferedCopy (autoflush)

```
import java.io.*;

public class BufferedCopy {
    public static void main(String[] args)
        throws IOException {

        String path = "/* un path */";
        String src = path + "pippo.txt";
        String dst = path + "topolino.txt";

        FileReader fin = new FileReader(src);
        // buffin wraps fin
        BufferedReader buffin = new BufferedReader(fin);
        FileWriter fout = new FileWriter(dst);
        // printout wraps fout with autoflush
        PrintWriter printout = new PrintWriter(fout, true);
        String curline;

        while ((curline = buffin.readLine()) != null)
            // autoflush
            printout.println(curline);
        buffin.close();
        printout.close();
    }
}
```

I flussi filtro (I) [1]

```
import java.io.*;
public class IOFormattato {
    private final static String cammino = /* un path */;

    public static void main(String[] args) {
        String nomeFile = cammino + "mio.dat";
        DataOutputStream dout = null;
        DataInputStream din = null;
        double d = -2.5; int i = 3; String s = "ciao!";

        try{
            FileOutputStream fout =
                new FileOutputStream(nomeFile);
            dout = new DataOutputStream(fout);
            dout.writeDouble(d);
            dout.writeInt(i);
            dout.writeUTF(s);
        } catch (IOException e) {
            System.out.println(e);
        }
        finally {
            if ( dout != null )
                try {
                    dout.close();
                } catch (IOException e) {
                    System.out.println("close failed: " + e);
                }
        }
    } // continua ...
}
```

Utilizzare i flussi filtro (I) [2]

```
i = 0;
d = 0.0;
s = null;
try{
    FileInputStream fin =
        new FileInputStream(nomeFile);
    din = new DataInputStream(fin);
    d = din.readDouble();
    i = din.readInt();
    s = din.readUTF();
    din.close();
    System.out.println("d = " + d +
        " i = " + i + " s = " + s);
} catch (IOException e) {
    System.out.println(e);
}
finally {
    if ( din != null )
        try {
            din.close();
        } catch (IOException e) {
            System.out.println("close failed: " + e);
        }
}
} // main
} // class
```

Utilizzare i flussi filtro (II) [1]

```
import java.io.*;
public class DataIODemo {
public static void main(String[] args) throws IOException {

    String filename = "un path";
    DataOutputStream out =
        new DataOutputStream(
            new FileOutputStream(filename));

    double[] prices = { 19.99, 9.99, 15.99, 3.99, 4.99 };
    int[] units = { 12, 8, 13, 29, 50 };
    String[] desc = {"Java T-shirt", "Java Mug",
                    "Duke Juggling Dolls", "Java Pin",
                    "Java Key Chain"};
    for (int i = 0; i < prices.length; i++) {
        out.writeDouble(prices[i]);
        out.writeChar('\t');
        out.writeInt(units[i]);
        out.writeChar('\t');
        out.writeChars(desc[i]);
        out.writeChar('\n');
    }
    out.close();

    DataInputStream in = new DataInputStream(
        new FileInputStream(filename));

    double price;
    int unit;
    StringBuffer desc;
    double total = 0.0;

    // continua
```


Utilizzare i flussi filtro (II) [2]

```
try {
    while (true) {
        price = in.readDouble();
        in.readChar();    // throws out the tab
        unit = in.readInt();
        in.readChar();    // throws out the tab
        char chr;
        desc = new StringBuffer(20);
        char lineSep =
            System.getProperty("line.separator").charAt(1);
        while ((chr = in.readChar()) != lineSep)
            desc.append(chr);
        System.out.println("You've ordered "
            + unit + " units of " + desc + " at $"
            + price);
        total = total + unit * price;
    }
} catch (EOFException e) {}
    System.out.println("For a TOTAL of: $"
        + total);

    in.close();
} // main
} // class
```

```
//You've ordered 12 units of Java T-shirt at $19.99
//You've ordered 8 units of Java Mug at $9.99
//You've ordered 13 units of Duke Juggling Dolls at $15.99
//You've ordered 29 units of Java Pin at $3.99
//You've ordered 50 units of Java Key Chain at $4.99
//For a TOTAL of: $892.88000000000001
```

Serializzazione (I)[1]

```
import java.io.*;
import java.util.*;

class Employee implements Serializable {
    public Employee() {}
    public Employee(String n, double s, int year, int month,
                                                              int day) {

        name = n;
        salary = s;
        GregorianCalendar calendar
            = new GregorianCalendar(year, month - 1, day);
        // GregorianCalendar uses 0 for January
        hireDay = calendar.getTime();
    }

    public String getName() { return name; }
    public double getSalary() { return salary; }
    public Date getHireDay() { return hireDay; }
    public void raiseSalary(double byPercent) {
        double raise = salary * byPercent / 100;
        salary += raise;
    }
    public String toString() {
        return getClass().getName() + "[name=" + name
            + ",salary=" + salary + ",hireDay=" + hireDay + "];"
    }
    private String name;
    private double salary;
    private Date hireDay;
}
```

Serializzazione (I)[2]

```
class Manager extends Employee {  
    public Manager(String n, double s, int year, int month, int day) {  
        super(n, s, year, month, day);  
        bonus = 0;  
    }  
    public double getSalary() {  
        double baseSalary = super.getSalary();  
        return baseSalary + bonus;  
    }  
    public void setBonus(double b) {  
        bonus = b;  
    }  
    public String toString() {  
        return super.toString() + "[bonus=" + bonus + "];"  
    }  
    private double bonus;  
}
```

Serializzazione (I)[3]

```
import java.io.*;
import java.util.*;

class ObjectFileTest {
    public static void main(String[] args) {
        Manager boss = new Manager("Carl Cracker", 80000, 1987, 12, 15);
        boss.setBonus(5000);
        Employee[] staff = new Employee[3];
        staff[0] = boss;
        staff[1] = new Employee("Harry Hacker", 50000, 1989, 10, 1);
        staff[2] = new Employee("Tony Tester", 40000, 1990, 3, 15);
        try {
            // salva i record
            ObjectOutputStream out = new ObjectOutputStream(new
                FileOutputStream("employee.dat"));

            out.writeObject(staff);
            out.close();

            // rilege i record in un nuovo array
            ObjectInputStream in = new ObjectInputStream(new
                FileInputStream("employee.dat"));
            Employee[] newStaff = (Employee[])in.readObject();
            in.close();

            for (int i = 0; i < newStaff.length; i++)
                System.out.println(newStaff[i]);
        }
        catch (Exception e)
        {
            e.printStackTrace();
        }
    }
}
```

Externalizable (I)[1]

```
import java.io.*;
import java.util.*;

class Blip1 implements Externalizable {
    public Blip1() {
        System.out.println("Blip1.Blip1");
    }
    public void writeExternal(ObjectOutput out) throws IOException {
        System.out.println("Blip1.writeExt");
    }
    public void readExternal(ObjectInput in) throws IOException,
        ClassNotFoundException {
        System.out.println("Blip1.readExt");
    }
}

class Blip2 implements Externalizable {
    public Blip2() {
        System.out.println("Blip2.Blip2");
    }
    public void writeExternal(ObjectOutput out) throws IOException {
        System.out.println("Blip2.writeExt");
    }
    public void readExternal(ObjectInput in) throws IOException,
        ClassNotFoundException {
        System.out.println("Blip2.readExt");
    }
} // continua
```

Externalizable (I)[2]

```
// continua
```

```
public class Blips {
    public static void main(String args[]) throws IOException,
                                   ClassNotFoundException {

        Blip1 b1 = new Blip1();
        Blip2 b2 = new Blip2();
        ObjectOutputStream o = new ObjectOutputStream(
                               new FileOutputStream("Blips.out"));

        o.writeObject(b1);
        o.writeObject(b2);
        o.close();
        ObjectInputStream in = new ObjectInputStream(
                               new FileInputStream("Blips.out"));

        b1 = (Blip1)in.readObject();
        b2 = (Blip2)in.readObject();
    }
}

// -- output --
// Blip1.Blip1
// Blip2.Blip2
// Blip1.writeExt
// Blip2.writeExt
// Blip1.Blip1
// Blip1.readExt
// Blip2.Blip2
// Blip2.readExt
```

Externalizable (II)[1]

```
import java.io.*;
import java.util.*;
class Blip3 implements Externalizable {
    int i;
    String s;
    public Blip3() {
        System.out.println("Blip3.Blip3()");
    }
    public Blip3(String x, int a) {
        System.out.println("Blip3.Blip3 (String, int)");
        s = x;
        i = a;
    }
    public String toString() {
        return "Blip3[i = " + i + "; s = " + s + "];";
    }
    public void writeExternal(ObjectOutput out) throws
        IOException {
        System.out.println("Blip3.writeExt");
        out.writeObject(s);
        out.writeInt(i);
    }
    public void readExternal(ObjectInput in) throws IOException,
        ClassNotFoundException {
        System.out.println("Blip3.readExt");
        s = (String)in.readObject();
        i = in.readInt();
    }
}
// continua
```

Externalizable (II)[2]

```
// continua
public static void main(String args[]) throws IOException,
                                   ClassNotFoundException {
    Blip3 b3 = new Blip3("ciao", 1);
    ObjectOutputStream o = new ObjectOutputStream(
        new FileOutputStream("Blip3.out"));

    o.writeObject(b3);
    o.close();
    ObjectInputStream in = new ObjectInputStream(
        new FileInputStream("Blip3.out"));

    b3 = (Blip3)in.readObject();
    System.out.println(b3);
}
} // class Blip3

// output
// Blip3.Blip3 (String, int)
// Blip3.writeExt
// Blip3.Blip3()
// Blip3.readExt
// Blip3[i = 1; s = ciao]
```


Flussi ad accesso casuale [1]

```
class Prodotto {
    private String nome;
    private double prezzo;
    private int score;

    public Prodotto(String unNome, double unPrezzo, int unScore) {
        nome = unNome;
        prezzo = unPrezzo;
        score = unScore;
    }

    public Prodotto() {}

    public String toString() {
        return "Prodotto[nome = " + nome +
            "; prezzo = " + prezzo +
            "; score = " + score + "];"
    }

    String ritornaNome(){ return nome; }
    double ritornaPrezzo() { return prezzo; }
    int ritornaScore() {return score; }

} // Prodotto
```

Flussi ad accesso casuale [2]

```
public class RASStream {
    static final int LUNGHEZZASTRINGA = 20;
    static final int LUNGHEZZARECORD =
        LUNGHEZZASTRINGA * 2 + 4 + 8;
    private final static String cammino = /* un path */;

    public static void main(String[] args)
    {
        Prodotto[] p = new Prodotto[] {
            new Prodotto("pippo", 2.5, 1),
            new Prodotto("pluto", 4.2, 3),
            new Prodotto("minnie", 5.7, 2)};
        String nomeFile = cammino + "Prodotti.dat";
        RandomAccessFile raf = null;

        try {
            raf = new RandomAccessFile(nomeFile, "rw");
        } catch (FileNotFoundException e) {
            System.out.println(e);
        }

        // continua
    }
}
```

Flussi ad accesso casuale [3]

```
try {
    for (int i = 0; i < p.length; i++) {
        scriviStringaFissa(raf, p[i].ritornaNome(),
                           LUNGHEZZASTRINGA);
        raf.writeDouble(p[i].ritornaPrezzo());
        raf.writeInt(p[i].ritornaScore());
    }

    int record = 2; // posizione del record
    long position = (record - 1) * LUNGHEZZARECORD;
    raf.seek(position);

    String n = leggiStringaFissa(raf,
    LUNGHEZZASTRINGA);
    double d = raf.readDouble();
    int i = raf.readInt();
    System.out.println(new Prodotto(n, d, i));
} catch(IOException e) {
    System.out.println(e);
}

// continua
```

Flussi ad accesso casuale [4]

```
finally {  
    if ( raf != null )  
        try {  
            raf.close();  
        } catch (IOException e) {  
            System.out.println("close failed: " +  
                                e);  
        }  
}  
} // main
```

Flussi ad accesso casuale (5)

```
static void scriviStringaFissa(RandomAccessFile f, String s,
                               int n) throws IOException {
    if ( s.length() < n ) {
        f.writeChars(s);
        for ( int i = s.length(); i < n; i++ )
            f.writeChar(' ');
    }
    else f.writeChars(s.substring(0, n));
}

static String leggiStringaFissa(RandomAccessFile f, int n)
                               throws IOException {
    String b = "";
    for ( int i = 0; i < n; i++ ) b += f.readChar();
    return b.trim();
}

} // class
```

Lettura formattata da tastiera (I)

```
import java.io.*;
import java.util.StringTokenizer;

public class LettoreTastiera extends BufferedReader {
    private StringTokenizer stok = null;

    public LettoreTastiera(InputStream in)
    {
        super(new InputStreamReader(in));
    }

    private String prendiElemento()
        throws IOException {
        if ( (stok == null) || (!stok.hasMoreElements()) ) {
            String linea = readLine();
            stok = new StringTokenizer(linea, " ");
        }
        return (String)stok.nextElement();
    }

    double leggiDouble() throws IOException
    {
        return Double.parseDouble(prendiElemento());
    }
}
// continua
```

Letture formattata da tastiera (II)

```
int leggiInt() throws IOException
{
    return Integer.parseInt(prendiElemento());
}

} // class
```