



ENSA Agadir

GINFO1

**TP-TD N°3:
Programmation Orientée Objet
en JAVA**

EL IDRISSEI Nohaila

Encadrant : M. A.WALID

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Exercise 1 :

```
package Axe3D;

public class Point3D {
    double x, y, z;
    char nom ;

    public Point3D (char nom, double x, double y, double z ) {
        this.nom = nom;
        this.x = x;
        this.y = y;
        this.z = z;
    }
    void affiche () {
        System.out.println(nom+"(" + x + "," + y + "," + z + ")");
    }
    void translate(double dx, double dy, double dz) {
        x += dx;
        y += dy;
        z += dz;
    }
}

package Axe3D;

public class Main {
    public static void main(String[] args) {
        Point3D A = new Point3D('a', 15.5, 12, 6);
        System.out.println("*****Avant Translation*****");
        A.affiche();
        A.translate(1, 2, 0.5);
        System.out.println("*****Apres Translation*****");
        A.affiche();
    }
}
```

➤ Output :

```
*****Avant Translation*****
a(15.5,12.0,6.0)
*****Apres Translation*****
a(16.5,14.0,6.5)
```

Exercice 2 :

```
package Axe3D;

public class Point3D {
    double x, y, z;
    char nom ;

    public Point3D (char nom, double x, double y, double z ) {
        this.nom = nom;
        this.x =x;
        this.y = y;
        this.z = z;
    }

    public String toString() {
        return nom+"(" + x + ", " + y + ", " + z + ")";
    }
    public boolean equals(Point3D p) {
        return nom == p.nom && x == p.x && y == p.y && z == p.z ;
    }
}
```

```
package Axe3D;

public class Main {

    //La fonction de deplacement :
    public static void translate(Point3D a, double dx, double dy, double dz) {
        a.x += dx;
        a.y += dy;
        a.z += dz;
    }

    public static void main(String[] args) {

        //la creation de 3 points :
        Point3D A = new Point3D('a', 15.5, 12, 6);
        Point3D B = new Point3D('a', 15, 11, 8);
        Point3D C = new Point3D('c', 10, 3, 0);

        //L'affichage de leurs caracteristiques :
        System.out.println("*****Avant Translation*****");
        System.out.println(A.toString());
        System.out.println("*****");
        System.out.println(B);
        System.out.println("*****");
        System.out.println(C);

        //Les deplacer :
        translate(A, 0.5, 0, 1);
        translate(B, 1, 1, -1);
        translate(C, 0, 0, 0.5);
    }
}
```

```

        ///L'affichage de leurs caracteristiques Apres le deplacement :
        System.out.println("*****Apres Translation*****");
        System.out.println(A.toString());
        System.out.println("*****");
        System.out.println(B);
        System.out.println("*****");
        System.out.println(C);

        //Les comparer :
        System.out.println("*****Comparaison*****");
        System.out.println("A-et-B" + A.equals(B));
        System.out.println("*****");
        System.out.println("A-et-C" + A.equals(C));
        System.out.println("*****");
        System.out.println("C-et-B" + C.equals(B));
    }
}

```

➤ Output :

```

*****Avant Translation*****
a(15.5,12.0,6.0)
*****
a(15.0,11.0,8.0)
*****
c(10.0,3.0,0.0)
*****Apres Translation*****
a(16.0,12.0,7.0)
*****
a(16.0,12.0,7.0)
*****
c(10.0,3.0,0.5)
*****Comparaison*****
A et B true
*****
A et C false
*****
C et B false

```

```

package NbComplexes;

public class Complexe {
    double r, i;

    public Complexe(double r, double i) {
        this.r = r;
        this.i = i;
    }

    public String toString() {
        if(r == 0 && i != 0) {
            return i + "i";
        }
        else if(r != 0 && i == 0) {
            return r + "";
        }
        else if(r != 0 && i < 0) {
            return r + "-" + i + "i";
        }
        else if(r == 0 && i == 0) {
            return "0";
        }
        return r + "+-" + i + "-i";
    }

    public boolean equals(Complexe x) {
        return i == x.i && r == x.r ;
    }
}

```

```

package NbComplexes;

public class Test{
    public static void main(String[] args) {
        Complexe x = new Complexe(5, 3);
        Complexe y = new Complexe(0, -3);
        Complexe z = new Complexe(0, 0);
        Complexe t = new Complexe(10.5, 0);
        Complexe k = new Complexe(12.5, -4.45);

        System.out.println("x=-" +x);
        System.out.println("y=-" +y);
        System.out.println("z=-" +z);
        System.out.println("t=-" +t);
        System.out.println("k=-" +k);
    }
}

```

➤ Output :

```
x = 5.0 + 3.0 i
y = -3.0i
z = 0
t = 10.5
k = 12.5 -4.45i
```

Exercice 3 - Partie 2 :

```
package NbComplexes;

public class Complexe {
    double r, i;

    public Complexe(double r, double i) {
        this.r = r;
        this.i = i;
    }

    public String toString() {
        if(r == 0 && i != 0) {
            return i + "i";
        }
        else if(r != 0 && i == 0) {
            return r + "";
        }
        else if(r != 0 && i < 0) {
            return r + "-" + i + "i";
        }
        else if(r == 0 && i == 0) {
            return "0";
        }
        return r + "+-" + i + "-i";
    }

    public boolean equals(Complexe x) {
        return i == x.i && r == x.r ;
    }

    public Complexe Somme(Complexe a) {
        return new Complexe(r + a.r , i + a.i);
    }

    public Complexe Produit(Complexe a) {
        return new Complexe(r*a.r - i*a.i , r*a.i + i*a.r);
    }

    public Complexe Conj() {
        return new Complexe(r , -i);
    }

    public double Module() {
        return Math.sqrt( Math.pow(r, 2) + Math.pow(i, 2));
    }
}
```

```

    public Complexe Carre() {
        return new Complexe( Math.pow(r, 2) - Math.pow(i, 2) , 2 * r * i);
    }
}

package NbComplexes;

public class Test{
    public static void main(String [] args) {
        Complexe x = new Complexe(5, 3);
        Complexe y = new Complexe(0, -3);

        System.out.println("***** Les Valeurs de x et y : *****");
        System.out.println("x = " + x);
        System.out.println("y = " + y);

        System.out.println("\n***** Le Test des methodes : *****");
        System.out.println("x + y = " + x.Somme(y));
        System.out.println("x * y = " + y.Produit(x));
        System.out.println("/x = " + x.Conj());
        System.out.println("|y| = " + y.Module());
        System.out.println("x^2 = " + x.Carre());
    }
}

```

➤ Output :

```

***** Les Valeurs de x et y : *****
x = 5.0 + 3.0 i
y = -3.0i

***** Le Test des methodes : *****
x + y = 5.0
x * y = 9.0 -15.0i
/x = 5.0 -3.0i
|y| = 3.0
x^2 = 16.0 + 30.0 i

```