Reporte de Práctica #2

Selections

Ingeniería Informática

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Expediente 285802

2025-1

- **Programming Exercises**

1. (Algebra: solving quadratic equation) The two roots of a quadratic equation $ax^2 + bx + c = 0$ can be obtained using the following formula:

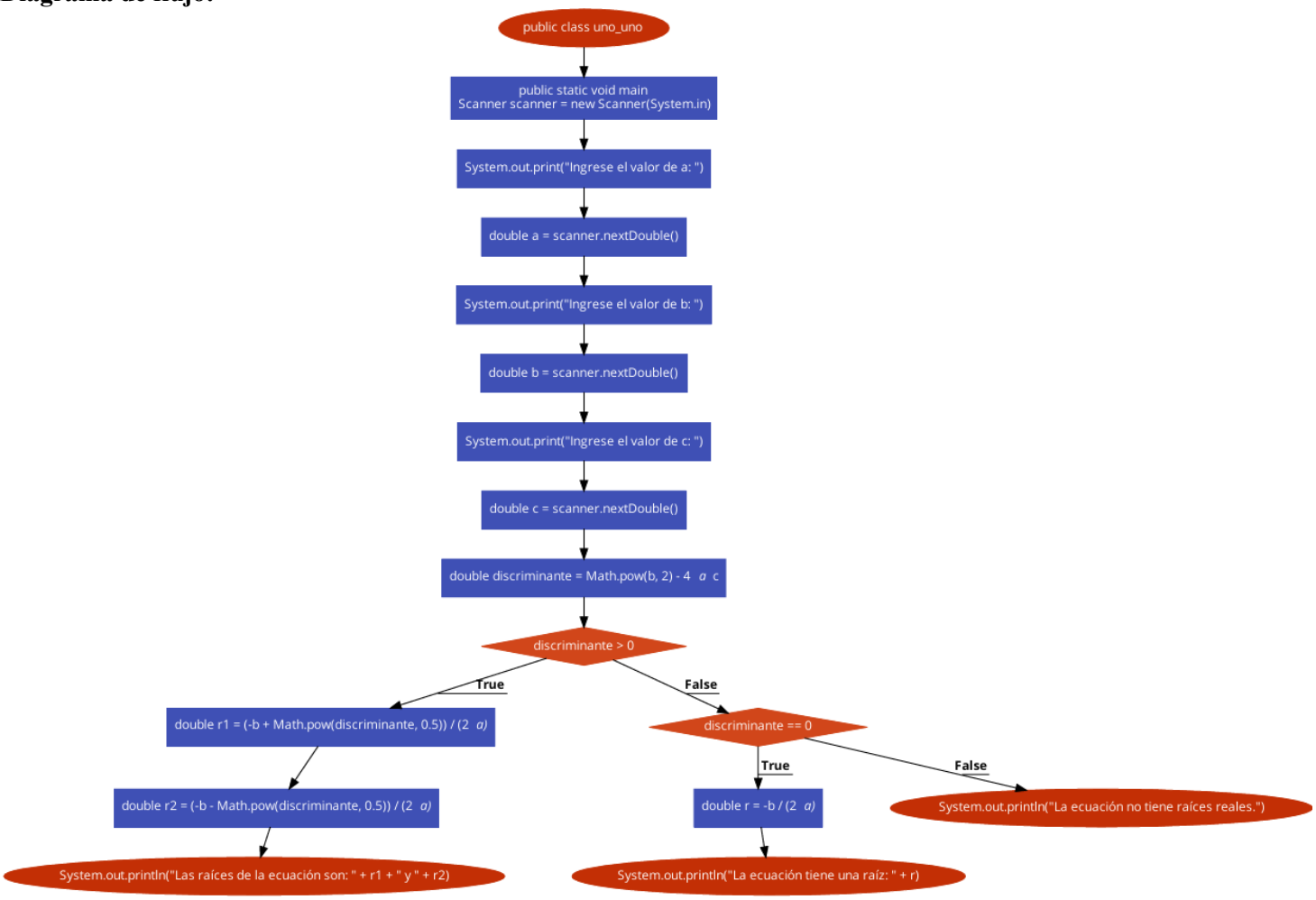
$$r_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \qquad r_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$b^2 - 4ac$ is called the discriminant of the quadratic equation. If it is positive, the equation has two real roots. If it is zero, the equation has one root. If it is negative the equation has no real roots

Write a program that prompts the user to enter values for a,b, and c and displays the result based on the discriminant. If the discriminant is positive, display two roots. If the discriminant is 0, display one root. Otherwise, display "The equation has no real roots"

Note you can use Math.pow(x,0.5) to compute $\sqrt{x}$.

Diagrama de flujo:

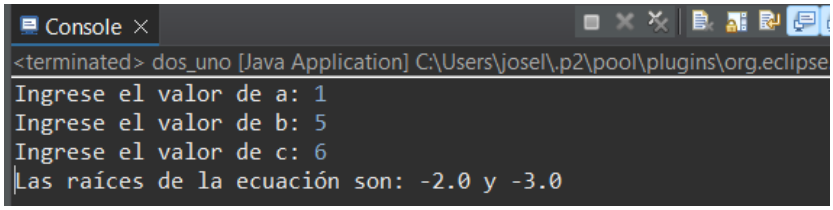


Código:

```
package prueba;
import java.util.Scanner;
public class dos_uno {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		 Scanner scanner = new Scanner(System.in);
		System.out.print("Ingrese el valor de a: ");
		double a = scanner.nextDouble();
		System.out.print("Ingrese el valor de b: ");
		double b = scanner.nextDouble();
		System.out.print("Ingrese el valor de c: ");
		double c = scanner.nextDouble();
		double discriminante = Math.pow(b, 2) - 4 * a * c;
		if (discriminante > 0) {
		   double r1 = (-b + Math.pow(discriminante, 0.5)) / (2 * a);
		   double r2 = (-b - Math.pow(discriminante, 0.5)) / (2 * a);
		   System.out.println("Las raíces de la ecuación son: " + r1 + " y " + r2);
		} else if (discriminante == 0) {
```

```
            double r = -b / (2 * a);
            System.out.println("La ecuación tiene una raíz: " + r);
        } else {
            System.out.println("La ecuación no tiene raíces reales.");
        }
    }
}
```

Pantalla:

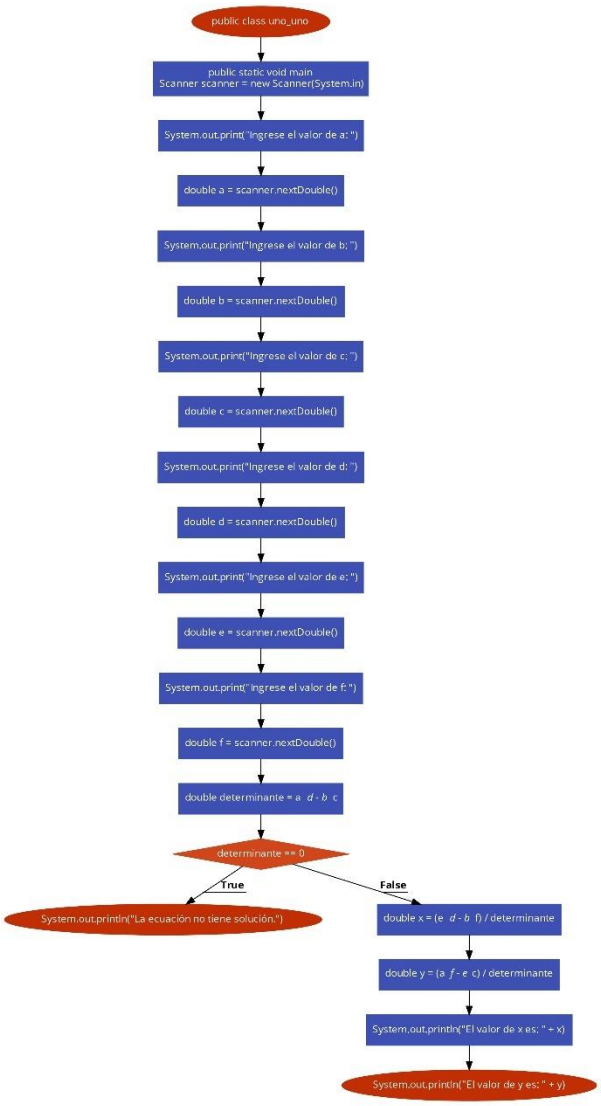


2. (Algebra: solving 2x2 linear equation) You can use Cramer's rule to solve the following 2x2 system of linear equation:

$$ax + by = e \qquad x = \frac{ed - bf}{ad - bc} \qquad y = \frac{af - ec}{ad - bc}$$
$$cx + dy = f$$

Write a program that prompts the user to enter a,b,c,d,e and f and display the result. If ad-bc is 0, report that "The equation has no solution"

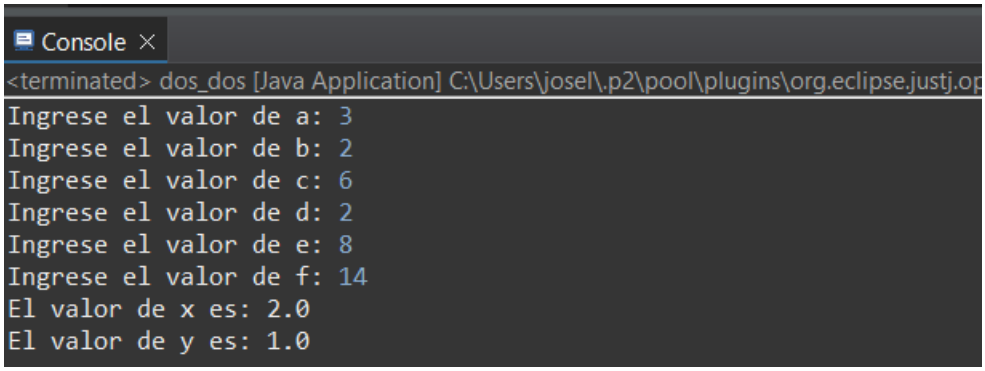
Diagrama de flujo:



Código:

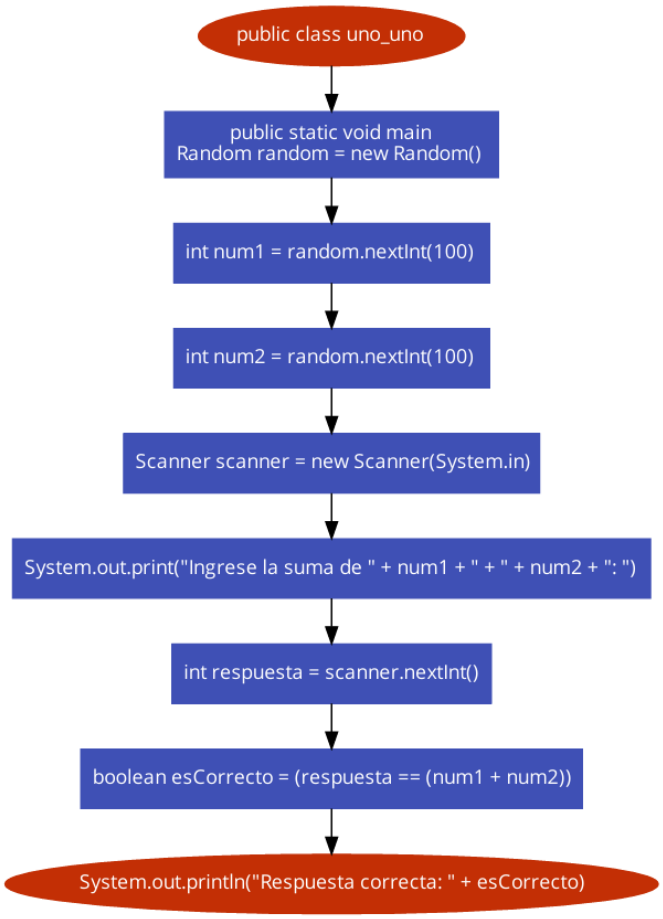
```
package prueba;
import java.util.Scanner;
public class dos_dos {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Scanner scanner = new Scanner(System.in);
	System.out.print("Ingrese el valor de a: ");
	double a = scanner.nextDouble();
	System.out.print("Ingrese el valor de b: ");
	double b = scanner.nextDouble();
	System.out.print("Ingrese el valor de c: ");
	double c = scanner.nextDouble();
	System.out.print("Ingrese el valor de d: ");
	double d = scanner.nextDouble();
	System.out.print("Ingrese el valor de e: ");
	double e = scanner.nextDouble();
	System.out.print("Ingrese el valor de f: ");
	double f = scanner.nextDouble();
	double determinante = a * d - b * c;
	if (determinante == 0) {
	   System.out.println("La ecuación no tiene solución.");
	}
	else {
	   double x = (e * d - b * f) / determinante;
	   double y = (a * f - e * c) / determinante;
	   System.out.println("El valor de x es: " + x);
	   System.out.println("El valor de y es: " + y);
	}
	    }

}
```

Pantalla:



3. (Game: learning addition) Write a program that generates two integers under 100 and prompts the user to enter the sum of these two integers. The program then reports true if the answer is correct, false otherwise.

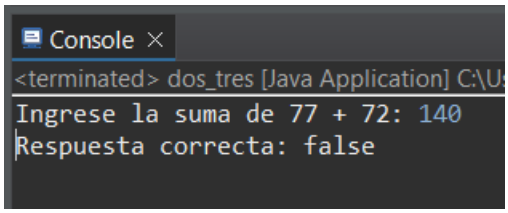
Diagrama de flujo:

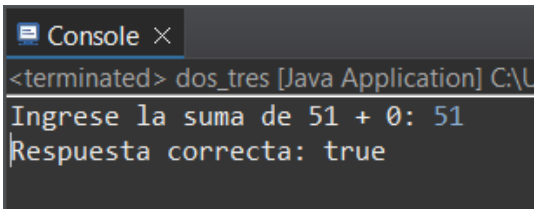


Código:

```
package prueba;
import java.util.Scanner;
import java.util.Random;
public class dos_tres {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		Random random = new Random();
	int num1 = random.nextInt(100);
	int num2 = random.nextInt(100);
	Scanner scanner = new Scanner(System.in);
	System.out.print("Ingrese la suma de " + num1 + " + " + num2 + ": ");
	int respuesta = scanner.nextInt();
	boolean esCorrecto = (respuesta == (num1 + num2));
	System.out.println("Respuesta correcta: " + esCorrecto);
	}
}
```

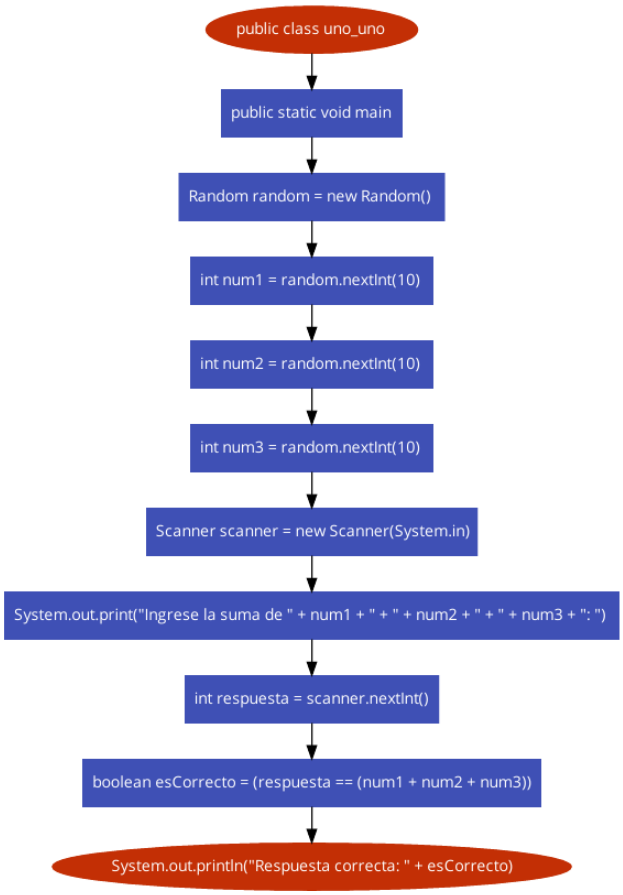
Pantalla:





4. (Game: addition for three numbers) Write a program that generates three single-digit integers and prompt the user to enter the sum of these three integers.

Diagrama de flujo:

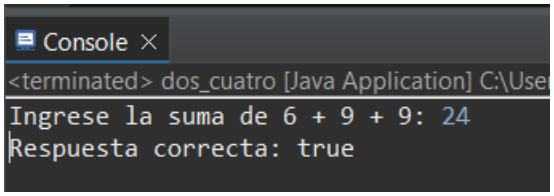


Código:

```
package prueba;
import java.util.Scanner;
import java.util.Random;
public class dos_cuatro {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		 Random random = new Random();
		int num1 = random.nextInt(10);
		int num2 = random.nextInt(10);
		int num3 = random.nextInt(10);
```

```
        Scanner scanner = new Scanner(System.in);
        System.out.print("Ingrese la suma de " + num1 + " + " + num2 + " + " + num3 + ": ");
        int respuesta = scanner.nextInt();
        boolean esCorrecto = (respuesta == (num1 + num2 + num3));
        System.out.println("Respuesta correcta: " + esCorrecto);
    }
}
```

Pantalla:



5. (Geometry: two rectangles) Write a program that prompts the user to enter the center x-, y-coordinates, width, and height of two rectangles and determines whether the second rectangle is inside the first or overlaps with the first, as shown in Figure 1.-

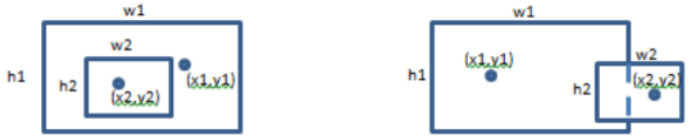
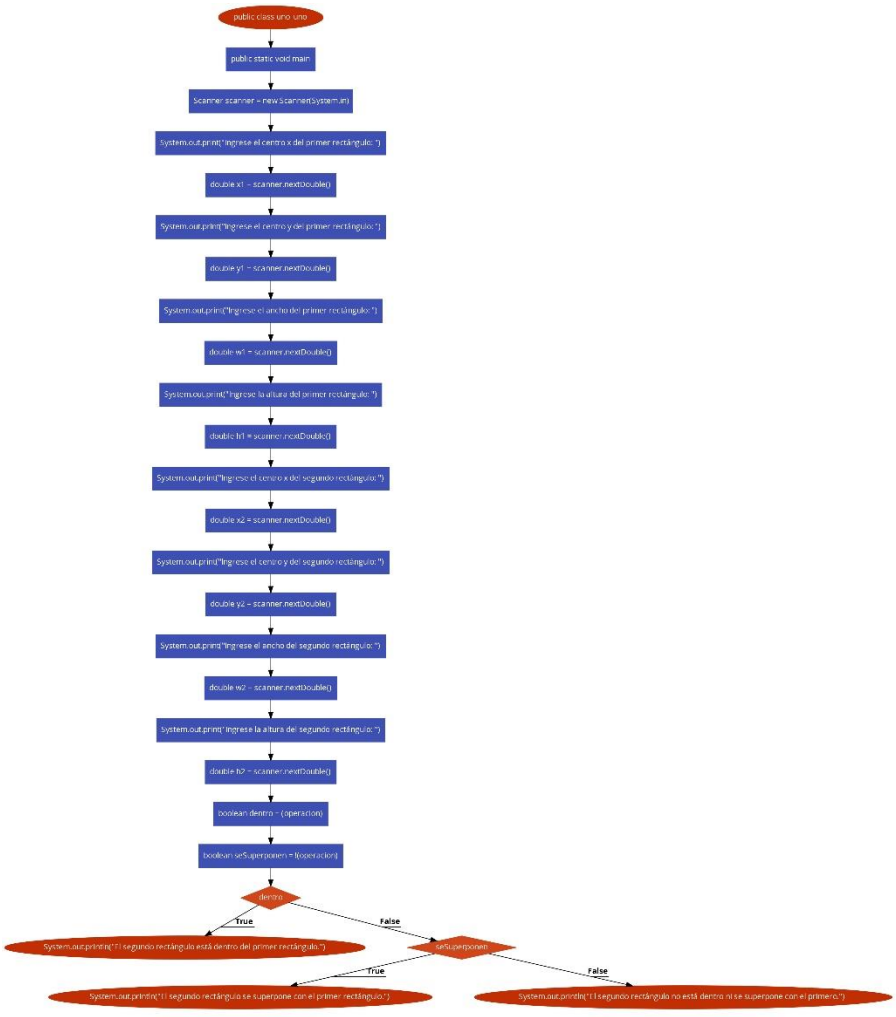


Figure 1.- (a) A rectangle is inside another one (b)

Diagrama de flujo:



Código:

```
package prueba;
import java.util.Scanner;
public class dos_cinco {
	public static void main(String[] args) {
		// TODO Auto-generated method stub
		 Scanner scanner = new Scanner(System.in);
		System.out.print("Ingrese el centro x del primer rectángulo: ");
		double x1 = scanner.nextDouble();
		System.out.print("Ingrese el centro y del primer rectángulo: ");
		double y1 = scanner.nextDouble();
		System.out.print("Ingrese el ancho del primer rectángulo: ");
		double w1 = scanner.nextDouble();
		System.out.print("Ingrese la altura del primer rectángulo: ");
		double h1 = scanner.nextDouble();
		System.out.print("Ingrese el centro x del segundo rectángulo: ");
		double x2 = scanner.nextDouble();
		System.out.print("Ingrese el centro y del segundo rectángulo: ");
		double y2 = scanner.nextDouble();
		System.out.print("Ingrese el ancho del segundo rectángulo: ");
		double w2 = scanner.nextDouble();
		System.out.print("Ingrese la altura del segundo rectángulo: ");
		double h2 = scanner.nextDouble();
		boolean dentro = (x2 - w2 / 2 >= x1 - w1 / 2) && (x2 + w2 / 2 <= x1 + w1 / 2) &&
				(y2 - h2 / 2 >= y1 - h1 / 2) && (y2 + h2 / 2 <= y1 + h1 / 2);
		boolean seSuperponen = !(x2 + w2 / 2 < x1 - w1 / 2 || x2 - w2 / 2 > x1 + w1 / 2 ||
					y2 + h2 / 2 < y1 - h1 / 2 || y2 - h2 / 2 > y1 + h1 / 2);
		if (dentro) {
		   System.out.println("El segundo rectángulo está dentro del primer rectángulo.");
		}
		else if (seSuperponen) {
		   System.out.println("El segundo rectángulo se superpone con el primer rectángulo.");
		}
		else {
		   System.out.println("El segundo rectángulo no está dentro ni se superpone con el primero.");
		}
	}
}
```

Pantalla: