

Universidad Tecnológica de Panamá
Facultad de Ingeniería en Sistemas Computacionales

Asignatura: Programación I

Examen Taller

Profesor: Napoleón Ibarra

Valor: 100 puntos

Estudiante: Angeline Urriola, Daniela Sánchez

Fecha Inicio=29/09/2025 => 12:50 PM

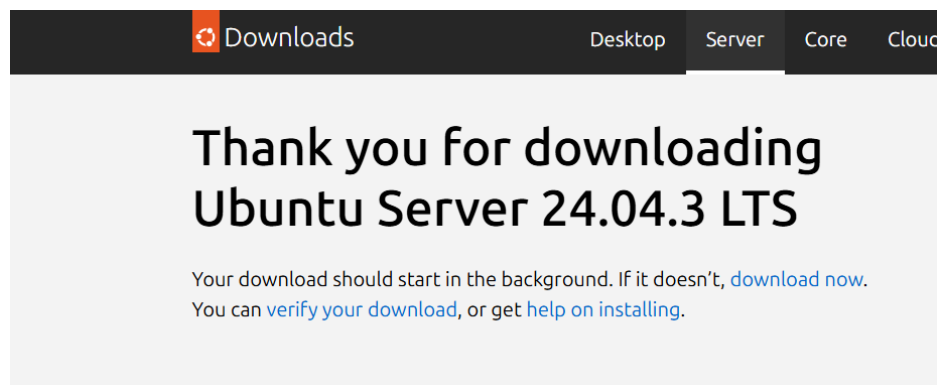
Fecha Entrega=02/09/2025 => 3:20 PM

I Parte. Laboratorio. Valor 55 puntos

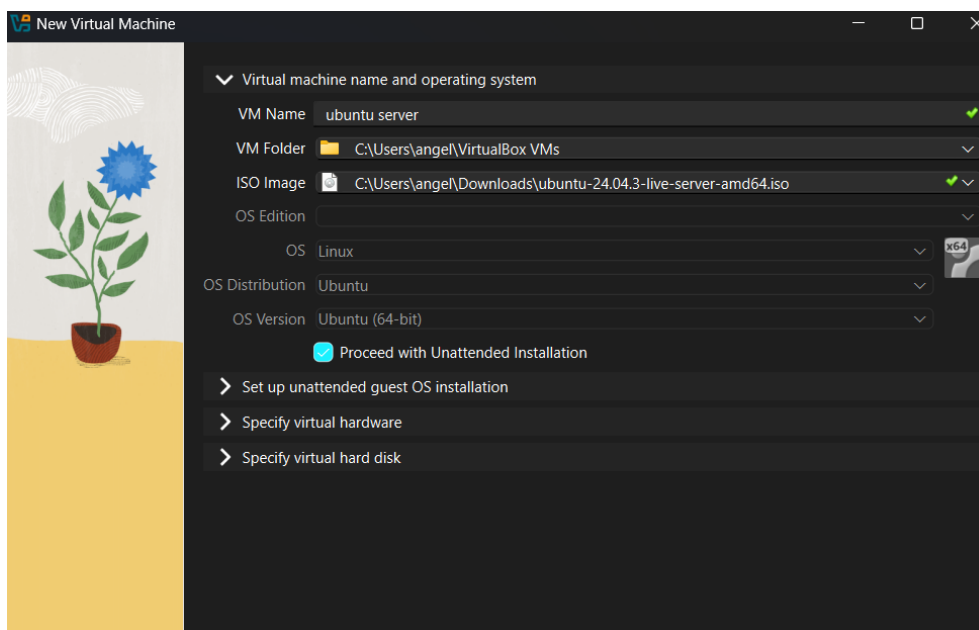
1. Elegir un software para virtualización (Virtual Box / VMware), descargar, instalar y configurarlo.
2. Descargar, instalar la distribución de Linux/Windows elegida dentro de la máquina virtual.
3. Realizar el proceso de configuración correspondiente al realizar el proceso de la instalación del 50.
4. Instalar MySQL Server (versión estable) dentro del SO, verifique su instalación, configuración.
5. Realizar la configuración del Servidor de Base de Datos (MYSQL).
6. Configure su servidor para conexión remota (TUNEL):
 - a) LINUX: SSH, Otro IDE.
 - b) WINDOWS: SSH, Remote Desktop Connection.

Se utilizó Ubuntu Server, en Virtual box

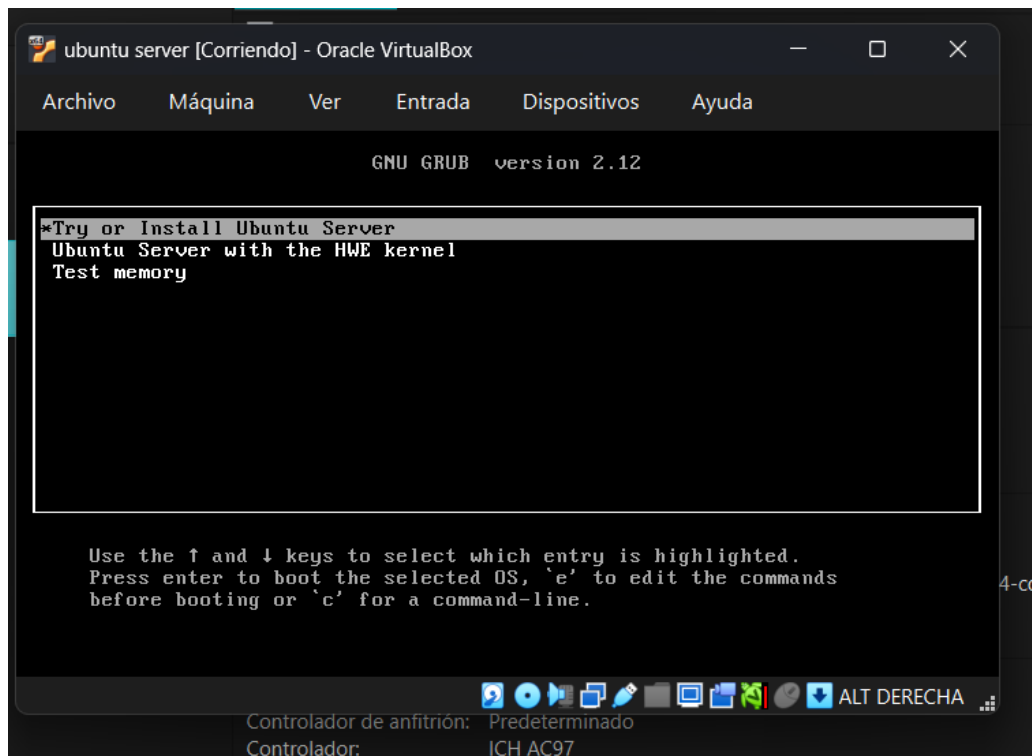
Proceso:



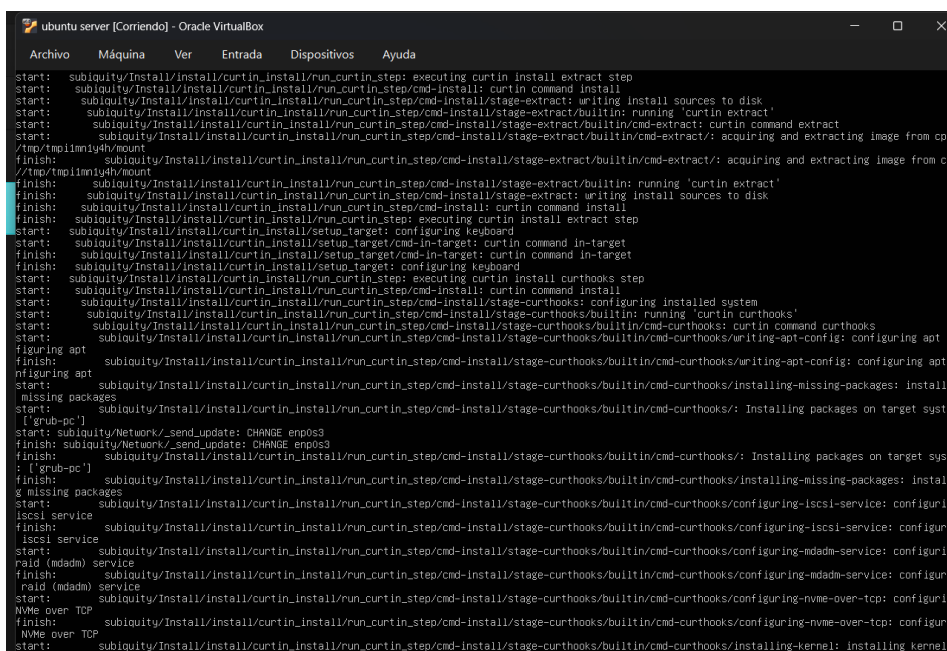
Primero, se debe ir a la página oficial de descarga de Ubuntu Server 24.04.3 LTS, desde donde se obtiene la imagen ISO necesaria para la instalación dentro de la máquina virtual.



Aquí se muestra la creación de una nueva máquina virtual en VirtualBox, con el nombre ubuntu server, y se especifica la ubicación del archivo ISO descargado (ubuntu-24.04.3-live-server-amd64.iso).



Se muestra el inicio del proceso de instalación del sistema operativo, donde aparece el menú de GRUB con la opción “Try or Install Ubuntu Server”. Aquí se inicia oficialmente la instalación del servidor Ubuntu dentro de VirtualBox.



Durante la instalación, se muestran mensajes de configuración y carga del sistema. Estas líneas indican que el instalador está configurando servicios, drivers y paquetes base del sistema operativo.

```
ubuntu@ubuntu:~$ sudo apt update && sudo apt upgrade -y
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-85-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Mon Oct  6 04:26:00 AM UTC 2025

System load:          0.08
Usage of /:           10.5% of 24.44GB
Memory usage:         5%
Swap usage:           0%
Processes:            91
Users logged in:      0
IPV4 address for enp0s3: 10.0.2.15
IPV6 address for enp0s3: fd17:625c:f037:2:a00:27ff:fe9b:4d76

Expanded Security Maintenance for Applications is not enabled.

14 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ubuntu:~$
```

Se muestra la primera pantalla posterior al inicio de sesión exitoso en el sistema Ubuntu Server. En esta se observan estadísticas del sistema como uso de memoria, carga del sistema, procesos activos y dirección IP asignada. Este paso indica que el servidor está completamente instalado y operativo.

```
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To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ubuntu:~$ sudo apt update && sudo apt upgrade -y
[sudo] password for ange:
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
4 packages can be upgraded. Run 'apt list --upgradable' to see them.
- Invalid operation upgrade
ubuntu@ubuntu:~$
```

Se utilizó el comando: `sudo apt update && sudo apt upgrade -y`, la imagen de arriba muestra el resultado de este. Este comando actualiza los repositorios de paquetes y actualiza el sistema a la versión más reciente, asegurando que todos los componentes del servidor estén actualizados antes de instalar MySQL.

```
ange@ubuntu-server:~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:9b:4d:76 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 metric 100 brd 10.0.2.255 scope global dynamic enp0s3
        valid_lft 85351sec preferred_lft 85351sec
    inet6 fd17:625c:f037:2:a00:27ff:fe9b:4d76/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 85992sec preferred_lft 13992sec
    inet6 fe80::a00:27ff:fe9b:4d76/64 scope link
        valid_lft forever preferred_lft forever
ange@ubuntu-server:~$
```

Muestra la configuración de red del servidor. Se observa la interfaz principal `enp0s3` con la dirección IP `10.0.2.15`, asignada automáticamente mediante DHCP, confirmando conectividad con la red virtual de VirtualBox.

```
ange@ubuntu-server:~$ ping -c 4 google.com
PING google.com (172.217.165.206) 56(84) bytes of data.
64 bytes from lax31s06-in-f14.1e100.net (172.217.165.206): icmp_seq=1 ttl=255 time=64.5 ms
64 bytes from lax31s06-in-f14.1e100.net (172.217.165.206): icmp_seq=2 ttl=255 time=63.2 ms
64 bytes from lax31s06-in-f14.1e100.net (172.217.165.206): icmp_seq=3 ttl=255 time=160 ms
64 bytes from lax31s06-in-f14.1e100.net (172.217.165.206): icmp_seq=4 ttl=255 time=173 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms
rtt min/avg/max/mdev = 63.209/115.199/173.432/51.565 ms
```

Este comando verifica la conectividad a Internet. El resultado muestra respuesta exitosa de los servidores de Google, sin pérdida de paquetes, lo que confirma que la conexión está activa.

```
done!
update-alternatives: using /var/lib/mecab/dic/ipadic-utf8 to provide /var/lib/mecab/dic/debian (m
Setting up libhtml-parser-perl:amd64 (3.81-1build3) ...
Setting up libhttp-message-perl (6.45-1ubuntu1) ...
Setting up mysql-server (8.0.43-0ubuntu0.24.04.2) ...
Setting up libcgi-pm-perl (4.63-1) ...
Setting up libhtml-template-perl (2.97-2) ...
Setting up libcgi-fast-perl (1:2.17-1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
ange@ubuntu-server:~$
```

Luego se utilizó el comando “`sudo apt install mysql-server -y`” para instalar mysql.

```

ange@ubuntu:~$ sudo systemctl status mysql
• mysql.service - MySQL Community Server
  Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: enabled)
  Active: active (running) since Mon 2025-10-06 04:33:31 UTC; 43s ago
  Process: 2178 ExecStartPre=/usr/share/mysql/mysql-systemd-start pre (code=exited, status=0/SUCCESS)
  Main PID: 2187 (mysqld)
  Status: "Server is operational"
  Tasks: 38 (limit: 5186)
  Memory: 361.2M (peak: 377.5M)
  CPU: 2.700s
  CGroup: /system.slice/mysql.service
          └─2187 /usr/sbin/mysqld

Oct 06 04:33:29 ubuntu:systemd[1]: Starting mysql.service - MySQL Community Server...
Oct 06 04:33:31 ubuntu:systemd[1]: Started mysql.service - MySQL Community Server.
ange@ubuntu:~$

```

Para confirmar que se instaló bien, usamos el comando que se muestra en la imagen, el resultado de la instalación es exitosa.

```

ange@ubuntu:~$ sudo mysql_secure_installation

Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD COMPONENT can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD component?

Press y|Y for Yes, any other key for No: y

There are three levels of password validation policy:

LOW      Length >= 8
MEDIUM  Length >= 8, numeric, mixed case, and special characters
STRONG Length >= 8, numeric, mixed case, special characters and dictionary          file

Please enter 0 = LOW, 1 = MEDIUM and 2 = STRONG: 0

Skipping password set for root as authentication with auth_socket is used by default.
If you would like to use password authentication instead, this can be done with the "ALTER_USER" command.
See https://dev.mysql.com/doc/refman/8.0/en/alter-user.html#alter-user-password-management for more information.

By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL without having to have
a user account created for them. This is intended only for
testing, and to make the installation go a bit smoother.
You should remove them before moving into a production
environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : y
Success.

Normally, root should only be allowed to connect from
'localhost'. This ensures that someone cannot guess at
the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : y
Success.

By default, MySQL comes with a database named 'test' that
anyone can access. This is also intended only for testing,
and should be removed before moving into a production
environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) :

```

Aquí se ejecuta el asistente de seguridad de MySQL para:

- Habilitar la validación de contraseñas.
- Eliminar usuarios anónimos.
- Deshabilitar el acceso remoto de root.
- Eliminar la base de datos de prueba.
- Con esto se asegura y fortalece la instalación del servidor MySQL.

```

ange@ubuntu:~$ sudo apt install openssh-server -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libwrap0 ncurses-term openssh-client openssh-sftp-server ssh-import-id
Suggested packages:
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard
The following NEW packages will be installed:
  libwrap0 ncurses-term openssh-server openssh-sftp-server ssh-import-id
The following packages will be upgraded:
  openssh-client
1 upgraded, 5 newly installed, 0 to remove and 13 not upgraded.
Need to get 1,786 kB of archives.
After this operation, 6,853 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 openssh-client amd64 1:9.6p1-3ubuntu13.14 [906 kB]
13% [1 openssh-client 299 kB/906 kB 33%]

```

Se instala el servicio OpenSSH, que permitirá el acceso remoto seguro al servidor.

```

ange@ubuntu:~$ sudo systemctl enable ssh
Synchronizing state of ssh.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable ssh
Created symlink /etc/systemd/system/ssh.service → /usr/lib/systemd/system/ssh.service.
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /usr/lib/systemd/system/ssh.service.
ange@ubuntu:~$ sudo systemctl start ssh
ange@ubuntu:~$ _

```

Se habilita y se inicia el servicio SSH para que se ejecute automáticamente al arrancar el sistema.

```

ange@ubuntu:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)
   Active: active (running) since Mon 2025-10-06 04:43:26 UTC; 20s ago
   TriggeredBy: ● ssh.socket
     Docs: man:sshd(8)
           man:sshd_config(5)
   Process: 2915 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 2917 (sshd)
     Tasks: 1 (limit: 5186)
    Memory: 1.2M (peak: 1.4M)
       CPU: 40ms
    CGroup: /system.slice/ssh.service
            └─2917 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Oct 06 04:43:26 ubuntu:systemd[1]: Starting ssh.service - OpenBSD Secure Shell server...
Oct 06 04:43:26 ubuntu:systemd[1]: Started ssh.service - OpenBSD Secure Shell server.
Oct 06 04:43:26 ubuntu:sshd[2917]: Server listening on 0.0.0.0 port 22.
Oct 06 04:43:26 ubuntu:sshd[2917]: Server listening on :: port 22.
Oct 06 04:43:26 ubuntu:systemd[1]: Started ssh.service - OpenBSD Secure Shell server.

```

Se confirma que el servicio SSH se encuentra activo y ejecutándose en el puerto 22, listo para aceptar conexiones remotas.

```

ange@ubuntu:~$ ssh ange@10.0.2.15
The authenticity of host '10.0.2.15 (10.0.2.15)' can't be established.
ED25519 key fingerprint is SHA256:KcTtDRc6rrDhzuhNTdEU4yWY0gnIz6RneRM2di0mI0c.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? y
Please type 'yes', 'no' or the fingerprint: yes
Warning: Permanently added '10.0.2.15' (ED25519) to the list of known hosts.
ange@10.0.2.15's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-85-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

System information as of Mon Oct  6 04:45:54 AM UTC 2025

System load:          0.13
Usage of /:            12.7% of 24.44GB
Memory usage:         13%
Swap usage:           0%
Processes:            100
Users logged in:      1
IPv4 address for enp0s3: 10.0.2.15
IPv6 address for enp0s3: fd17:625c:f037:2:a00:27ff:fe9b:4d76

Expanded Security Maintenance for Applications is not enabled.

13 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

```

Desde el entorno, se accede remotamente al servidor a través del protocolo SSH. La conexión se establece correctamente, mostrando nuevamente la información del sistema Ubuntu, lo que confirma la configuración exitosa del túnel SSH.

II Parte. Desarrollo Interfaz JAVA. Valor15 puntos

Requerimientos de la interfaz SWAT/SWING

Confeccionar una interfaz (Form1) para el desarrollo del problema propuesto, que permita el desarrollo y solución de este.

Hacer pruebas de funcionamiento y control en la aplicación.

Problema propuesto.

Una compañía de refrescos comercializa tres productos: de cola, de naranja y de limón. Se desea realizar una aplicación que calcule las ventas realizadas de cada producto. Para ello, se leerá la cantidad vendida (máximo 5000000) y el precio en Balboas de cada producto y se mostrará un informe de ventas como el que sigue.

Código:

```
1  import javax.swing.*;
2  import java.awt.*;
3  import java.awt.event.*;
4
5  public class Form1 extends JFrame implements ActionListener {
6
7      private final JTextField txtCco;
8      private final JTextField txtPco;
9      private final JTextField txtCna;
10     private final JTextField txtPna;
11     private final JTextField txtCli;
12     private final JTextField txtPli;
13     private final JTextArea txtRes;
14     private final JButton btnCalc;
15     private final JButton btnLimp;
16     private final JButton btnSalir;
17
18     public Form1() {
19         setTitle("Ventas de Refrescos");
20         setSize(600, 420);
21         setDefaultCloseOperation(EXIT_ON_CLOSE);
22         setLocationRelativeTo(null);
23         setLayout(new BorderLayout());
24     }
25 }
```



```

5      JPanel pnlDatos = new JPanel(new GridLayout(4, 3, 5, 5));
6      pnlDatos.setBorder(BorderFactory.createTitledBorder("Datos de venta"));
7
8      pnlDatos.add(new JLabel("Producto"));
9      pnlDatos.add(new JLabel("Cantidad"));
10     pnlDatos.add(new JLabel("Precio (B/.)"));
11
12     pnlDatos.add(new JLabel("Cola"));
13     txtCco = new JTextField();
14     txtPco = new JTextField();
15     pnlDatos.add(txtCco);
16     pnlDatos.add(txtPco);
17
18     pnlDatos.add(new JLabel("Naranja"));
19     txtCna = new JTextField();
20     txtPna = new JTextField();
21     pnlDatos.add(txtCna);
22     pnlDatos.add(txtPna);
23
24     pnlDatos.add(new JLabel("Limón"));
25     txtCli = new JTextField();
26     txtPli = new JTextField();
27     pnlDatos.add(txtCli);
28     pnlDatos.add(txtPli);

```

```

0      add(pnlDatos, BorderLayout.NORTH);
1
2      txtRes = new JTextArea();
3      txtRes.setEditable(false);
4      txtRes.setFont(new Font("Monospaced", Font.PLAIN, 13));
5      add(new JScrollPane(txtRes), BorderLayout.CENTER);
6
7      JPanel pnlBtns = new JPanel();
8      btnCalc = new JButton("Calcular");
9      btnLimp = new JButton("Limpiar");
10     btnSalir = new JButton("Salir");
11     pnlBtns.add(btnCalc);
12     pnlBtns.add(btnLimp);
13     pnlBtns.add(btnSalir);
14     add(pnlBtns, BorderLayout.SOUTH);
15
16     btnCalc.addActionListener(this);
17     btnLimp.addActionListener(this);
18     btnSalir.addActionListener(this);
19 }
20
21 @Override
22 public void actionPerformed(ActionEvent e) {
23     if (e.getSource() == btnCalc) calcular();

```

```

4         else if (e.getSource() == btnLimp) limpiar();
5         else if (e.getSource() == btnSalir) System.exit(0);
6     }

7
8     private boolean validarEntero(String valor, String campo) {
9         try {
10             int n = Integer.parseInt(valor);
11             if (n < 0 || n > 5_000_000) {
12                 JOptionPane.showMessageDialog(this,
13                     "La cantidad de " + campo + " debe ser entre 0 y 5,000,000.",
14                     "Valor fuera de rango", JOptionPane.WARNING_MESSAGE);
15                 return false;
16             }
17             return true;
18         } catch (NumberFormatException ex) {
19             JOptionPane.showMessageDialog(this,
20                 "Introduce solo números enteros en la cantidad de " + campo + ".",
21                 "Dato inválido", JOptionPane.ERROR_MESSAGE);
22             return false;
23         }
24     }

25
26     private boolean validarDecimal(String valor, String campo) {

```

```

        double n = Double.parseDouble(valor);
        if (n < 0 || n > 1000) {
            JOptionPane.showMessageDialog(this,
                "El precio de " + campo + " debe ser entre 0 y 1000 Balboas.",
                "Valor fuera de rango", JOptionPane.WARNING_MESSAGE);
            return false;
        }
        return true;
    } catch (NumberFormatException ex) {
        JOptionPane.showMessageDialog(this,
            "Introduce solo números válidos en el precio de " + campo + ".",
            "Dato inválido", JOptionPane.ERROR_MESSAGE);
        return false;
    }
}

private void calcular() {
    if (!validarEntero(txtCco.getText(), "Cola") || !validarDecimal(txtPco.getText(), "Cola")) return;
    if (!validarEntero(txtCna.getText(), "Naranja") || !validarDecimal(txtPna.getText(), "Naranja")) return;
    if (!validarEntero(txtCli.getText(), "Limón") || !validarDecimal(txtPli.getText(), "Limón")) return;

    int cco = Integer.parseInt(txtCco.getText());
    double pco = Double.parseDouble(txtPco.getText());
    int cna = Integer.parseInt(txtCna.getText());

```

```

double ico = cco * pco;
double ina = cna * pna;
double ili = cli * pli;
double tcan = cco + cna + cli;
double timp = ico + ina + ili;

String res = String.format(
    "%-10s %-10s %-10s %-10s\n", "Producto", "Cant.", "Precio", "Importe") +
    "-----\n" +
    String.format("%-10s %-10d %-10.2f %-10.2f\n", "Cola", cco, pco, ico) +
    String.format("%-10s %-10d %-10.2f %-10.2f\n", "Naranja", cna, pna, ina) +
    String.format("%-10s %-10d %-10.2f %-10.2f\n", "Limón", cli, pli, ili) +
    "-----\n" +
    String.format("%-10s %-10.0f %-10s %-10.2f", "Totales", tcan, "", timp);

txtRes.setText(res);
}

```

```

private void limpiar() {
    txtCco.setText("");
    txtPco.setText("");
    txtCna.setText("");
    txtPna.setText("");
}

```

```

public static void main(String[] args) {
    SwingUtilities.invokeLater(() -> new Form1().setVisible(true));
}
}

```