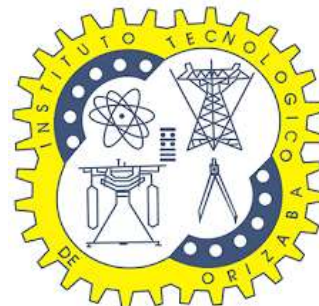




**TECNOLÓGICO
NACIONAL DE MÉXICO**



Tecnológico nacional de México

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Programación orientada a Objetos

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Ejercicio 1:

Problemática:

En cierta empresa de fabricación de ropa, se requiere sistematizar el proceso, se fabrican diversidad de prendas de vestir tanto para caballeros como damas, no se fabrica ropa de niños, de cada prenda se tiene un registro de modelo, tela, costo de producción por pieza, genero (masculino, femenino o mixto),

OPERACION	TIPO DE DATO	ARGUMENTO	ALCANCE	temporada (primavera, verano, otoño o invierno), cuando se produce un lote de cada prenda, se registra número de lote, número de piezas, fecha de fabricación.
constructor		Modelo, tela, costo, temporada, genero	publico	
Obtenermodelo	String		public	
Obtenertela	String		public	
Obtenercosto	float		public	
Obtenertemporada	String		public	
Otenergenero	String		public	

De cada lote debe calcularse el costo de producción del lote, así como el monto de recuperación que se obtendrá después de su venta, el precio de venta por pieza es siempre 15% más del costo de producción y por lote completo es por cada pieza el 5% más del costo de producción.

Análisis:

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD
Modelo	String	1	Si
Tela	String	1	Si
Costo	float	1	Si
Temporada	String	1	Si
Genero	Genero	1	Si

Prenda

OPERACION	TIPO DE DATO	ARGUMENTO	ALCANCE	Prenda
constructor		Modelo, tela, costo, temporada, genero	publico	
Obtenermodelo	String		public	

Obtener tela	String	public
Obtener costo	float	public
Obtener temporada	String	public
Otener genero	String	public

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD
Numerodelote	int	1	Si
Numero De Prendas	int	1	Si
Fecha De Fabricacion	LocalDate	1	Si
Costo	float	1	si

Lote

OPERACION	TIPO DE DATO	ARGUMENTO	ALCANCE
Constructor		Numerodelote, Numerodeprendas, Fechadefabricacion, costo	publico
ObtenerNumerodelote	int		public
ObtenerNumerodePrendas	int		public
ObtenerfechadeFabricacion	LocalDate		public
ObtenerCosto	String		public

lote

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD
CostoProduccion	float	1	Si
Ganancia	float	1	si

Ganancia

Ganancia

OPERACION	TIPO DE DATO	ARGUMENTO	ALCANCE
constructor		CostoProduccion, ganancia	publico
ObtenerCostoProduccion	float		public

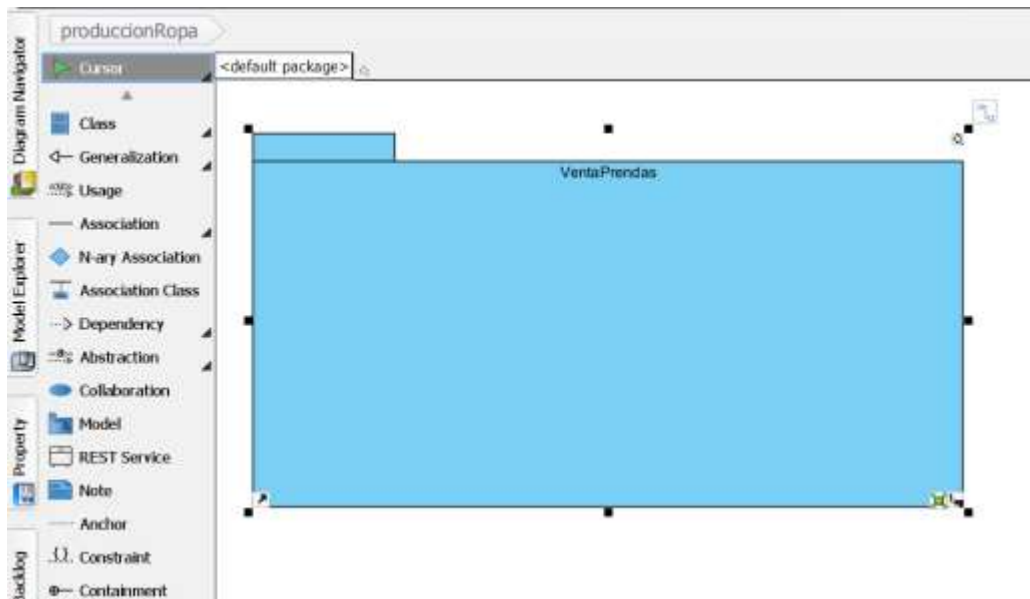
CalcularGanancia	float	CostoProduccion,numeroDePrendas	public
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Diagrama Uml:

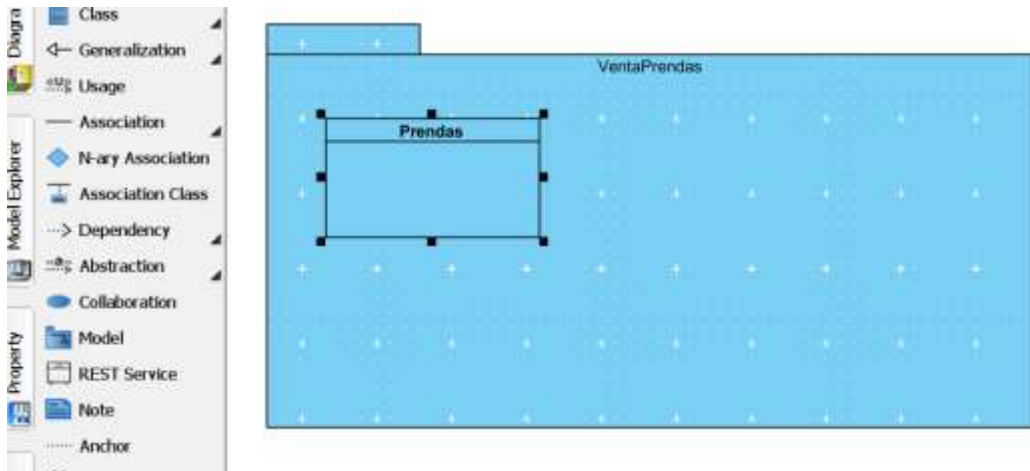
Creación de la clase:



Creación del package:



Creación de clase “Prendas”:



Declaración de atributos:



Declaración atributo “modelo”(String):

The screenshot shows the 'Attribute Specification' dialog box with the 'General' tab selected. The 'Name' field contains 'modelo'. The 'Classifier' field shows a tree view with 'VentaPrendas.Prendas' selected. The 'Initial value' field is empty. The 'Multiplicity' dropdown is set to '<Unspecified>', with 'Ordered' and 'Unique' checkboxes. The 'Visibility' dropdown is set to 'private'. The 'Type' dropdown is set to 'string'. The 'Type modifier' dropdown is set to '<Unspecified>'. The 'Scope' dropdown is set to 'instance'. The 'Aggregation' dropdown is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID'. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “Tela”(String):

The screenshot shows the 'Attribute Specification' dialog box with the 'General' tab selected. The 'Name' field contains 'tela'. The 'Classifier' field shows a tree view with 'VentaPrendas.Prendas' selected. The 'Initial value' field is empty. The 'Multiplicity' dropdown is set to '<Unspecified>', with 'Ordered' and 'Unique' checkboxes. The 'Visibility' dropdown is set to 'private'. The 'Type' dropdown is set to 'String'. The 'Type modifier' dropdown is set to '<Unspecified>'. The 'Scope' dropdown is set to 'instance'. The 'Aggregation' dropdown is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID'. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

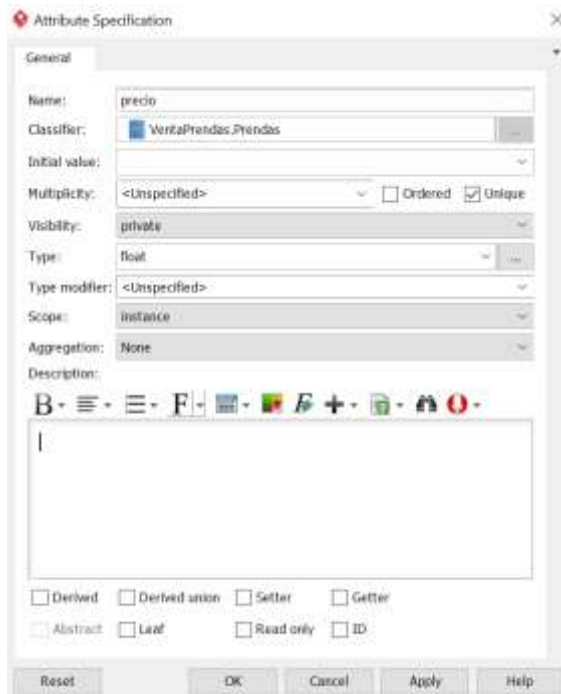
Declaración atributo “temporada”(String):

The screenshot shows the 'Attribute Specification' dialog box with the 'General' tab selected. The attribute name is 'temporada'. The classifier is 'VentaPrendas.Prendas'. The initial value is empty. The multiplicity is '<Unspecified>' with 'Unique' checked. The visibility is 'private'. The type is 'string'. The type modifier is '<Unspecified>'. The scope is 'instance'. The aggregation is 'None'. The description field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The bottom buttons are 'Reset', 'OK', 'Cancel', 'Apply', and 'Help'.

Declaración atributo “genero”(String):

The screenshot shows the 'Attribute Specification' dialog box with the 'General' tab selected. The attribute name is 'genero'. The classifier is 'VentaPrendas.Prendas'. The initial value is empty. The multiplicity is '<Unspecified>' with 'Unique' checked. The visibility is 'private'. The type is 'string'. The type modifier is '<Unspecified>'. The scope is 'instance'. The aggregation is 'None'. The description field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The bottom buttons are 'Reset', 'OK', 'Cancel', 'Apply', and 'Help'.

Declaración atributo “precio”(float):

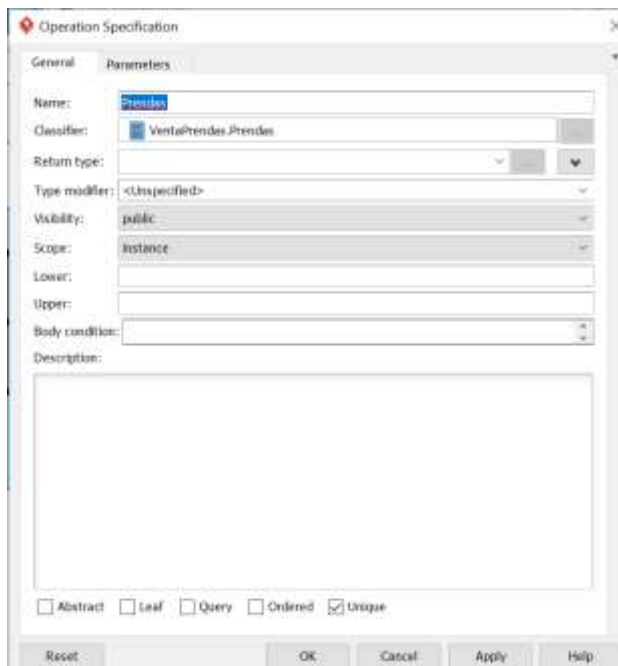


The 'Attribute Specification' dialog box is shown with the 'General' tab selected. It contains the following fields and options:

- Name: precio
- Classifier: VentaPrendas.Prendas
- Initial value: (empty)
- Multiplicity: <Unspecified> (with checkboxes for Ordered and Unique, where Unique is checked)
- Visibility: private
- Type: float
- Type modifier: <Unspecified>
- Scope: instance
- Aggregation: None
- Description: (text area with a rich text toolbar)
- Checkboxes at the bottom: ☐ Derived, ☐ Derived union, ☐ Setter, ☐ Getter, ☐ Abstract, ☐ Leaf, ☐ Read only, ☐ ID
- Buttons at the bottom: Reset, OK, Cancel, Apply, Help

Declaración métodos:

Declaración constructor:



The 'Operation Specification' dialog box is shown with the 'General' tab selected. It contains the following fields and options:

- Name: precio
- Classifier: VentaPrendas.Prendas
- Return type: (empty)
- Type modifier: <Unspecified>
- Visibility: public
- Scope: instance
- Lower: (empty)
- Upper: (empty)
- Body condition: (empty)
- Description: (text area)
- Checkboxes at the bottom: ☐ Abstract, ☐ Leaf, ☐ Query, ☐ Ordered, ☒ Unique
- Buttons at the bottom: Reset, OK, Cancel, Apply, Help

Declaración parámetros del constructor:

Parameter Specification

General

Name: modelo

Operation: Prendas

Type: string

Type modifier: <Unspecified>

Direction: inout

Default value:

Multiplicity: <Unspecified> ☐ Ordered ☒ Unique

Description:

B · ≡ · ≡ · F ·   F + ·   O ·

Reset OK Cancel Apply Help

Parameter Specification

General

Name: tela

Operation: Prendas

Type: string

Type modifier: <Unspecified>

Direction: inout

Default value:

Multiplicity: <Unspecified> ☐ Ordered ☒ Unique

Description:

B · ≡ · ≡ · F ·   F + ·   O ·

Reset OK Cancel Apply Help

Parameter Specification

General

Name: temporada

Operation: Prendas

Type: string

Type modifier: <Unspecified>

Direction: inout

Default value:

Multiplicity: <Unspecified> ☐ Ordered ☒ Unique

Description:

B · ≡ · ≡ · F ·   F + ·   O ·

Reset OK Cancel Apply Help

Parameter Specification

General

Name: genero

Operation: Prendas

Type: string

Type modifier: <Unspecified>

Direction: inout

Default value:

Multiplicity: <Unspecified> ☐ Ordered ☒ Unique

Description:

Reset OK Cancel Apply Help

Parameter Specification

General

Name: costo

Operation: Prendas

Type: float

Type modifier: <Unspecified>

Direction: inout

Default value:

Multiplicity: <Unspecified> ☐ Ordered ☒ Unique

Description:

Reset OK Cancel Apply Help

Declaración operación obtenerModelo:

The screenshot shows the 'Operation Specification' dialog box for the operation 'obtenerModelo'. The 'General' tab is active. The 'Name' field contains 'obtenerModelo'. The 'Classifier' field shows a tree view with 'VentaPendientes.Pendientes' selected. The 'Return type' field contains 'string'. The 'Type modifier' is set to '<Unspecified>'. The 'Visibility' is 'public', 'Scope' is 'instance', and 'Lower' and 'Upper' are empty. The 'Body condition' and 'Description' fields are empty. At the bottom, the 'Unique' checkbox is checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración operación obtenerTela:

The screenshot shows the 'Operation Specification' dialog box for the operation 'obtenerTela'. The 'General' tab is active. The 'Name' field contains 'obtenerTela'. The 'Classifier' field shows a tree view with 'VentaPendientes.Pendientes' selected. The 'Return type' field contains 'string'. The 'Type modifier' is set to '<Unspecified>'. The 'Visibility' is 'public', 'Scope' is 'instance', and 'Lower' and 'Upper' are empty. The 'Body condition' and 'Description' fields are empty. At the bottom, the 'Unique' checkbox is checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

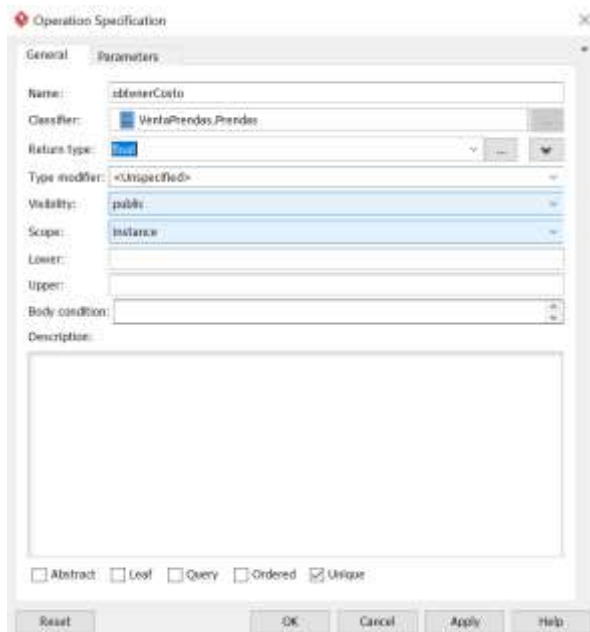
Declaración operación obtenerTemporada:

The screenshot shows the 'Operation Specification' dialog box for the operation 'obtenerTemporada'. The 'General' tab is active. The 'Name' field contains 'obtenerTemporada'. The 'Classifier' field shows a tree view with 'VentaPendientes.Pendientes' selected. The 'Return type' field contains 'string'. The 'Type modifier' is set to '<Unspecified>'. The 'Visibility' is 'public', 'Scope' is 'instance', and 'Lower' and 'Upper' are empty. The 'Body condition' and 'Description' fields are empty. At the bottom, the 'Unique' checkbox is checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

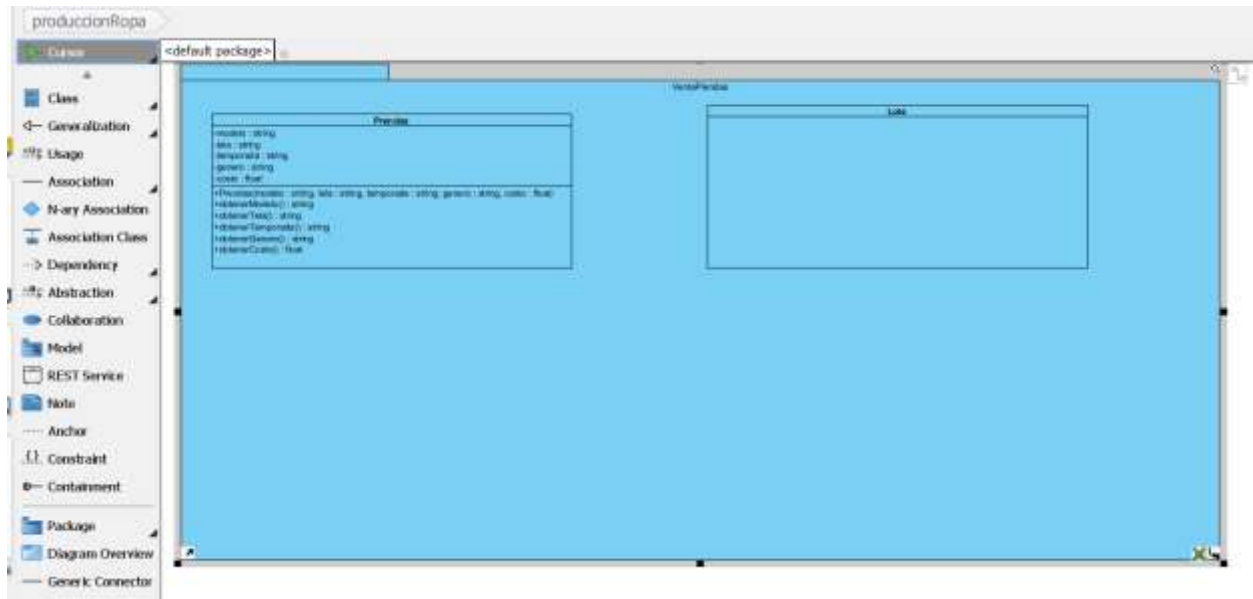
Declaración operación obtenerGenero:

The screenshot shows the 'Operation Specification' dialog box for the operation 'obtenerGenero'. The 'General' tab is active. The 'Name' field contains 'obtenerGenero'. The 'Classifier' field shows a tree view with 'VentaPendientes.Pendientes' selected. The 'Return type' field contains 'string'. The 'Type modifier' is set to '<Unspecified>'. The 'Visibility' is 'public', 'Scope' is 'instance', and 'Lower' and 'Upper' are empty. The 'Body condition' and 'Description' fields are empty. At the bottom, the 'Unique' checkbox is checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración operación obtenerCosto:



Creación de clase "lote":



Declaración de Atributos:

Declaración atributo “numeroDeLote”(int):

The image shows the 'Attribute Specification' dialog box in a software modeling tool. The 'General' tab is selected. The 'Name' field contains 'numeroDeLote'. The 'Classifier' field shows 'VentaPrendas.Lote'. The 'Initial value' field is empty. The 'Multiplicity' field is set to '<Unspecified>', with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' field is set to 'private'. The 'Type' field is set to 'int'. The 'Type modifier' field is set to '<Unspecified>'. The 'Scope' field is set to 'Instance'. The 'Aggregation' field is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “numeroDePrendas”(int):

The image shows the 'Attribute Specification' dialog box in a software modeling tool. The 'General' tab is selected. The 'Name' field contains 'numeroDePrendas'. The 'Classifier' field shows 'VentaPrendas.Lote'. The 'Initial value' field is empty. The 'Multiplicity' field is set to '<Unspecified>', with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' field is set to 'private'. The 'Type' field is set to 'int'. The 'Type modifier' field is set to '<Unspecified>'. The 'Scope' field is set to 'Instance'. The 'Aggregation' field is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “fechaDeFabricacion”(localDate):

The image shows the 'Attribute Specification' dialog box with the 'General' tab selected. The 'Name' field contains 'fechaDeFabricacion'. The 'Classifier' dropdown shows 'VentaPrendas.Lote'. The 'Initial value' field is empty. The 'Multiplicity' dropdown is set to '<Unspecified>', with 'Ordered' and 'Unique' checkboxes. The 'Visibility' dropdown is set to 'private'. The 'Type' dropdown is set to 'localDate'. The 'Type modifier' dropdown is set to '<Unspecified>'. The 'Scope' dropdown is set to 'instance'. The 'Aggregation' dropdown is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID'. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “costo”(float):

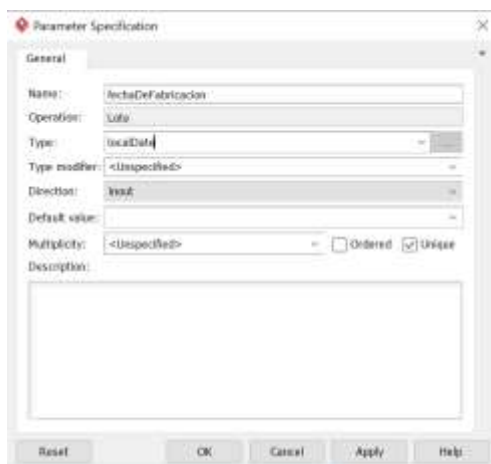
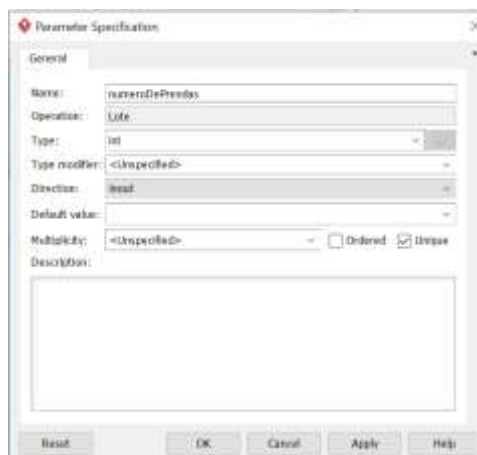
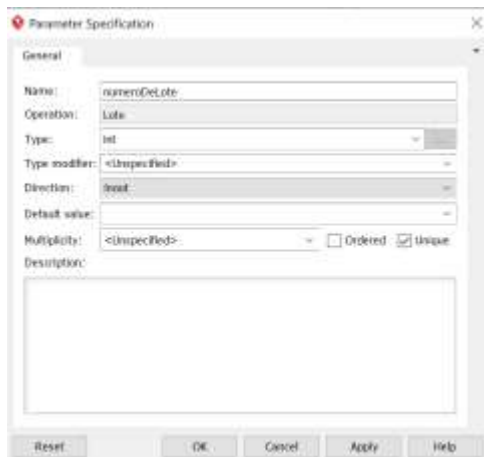
The image shows the 'Attribute Specification' dialog box with the 'General' tab selected. The 'Name' field contains 'costo'. The 'Classifier' dropdown shows 'VentaPrendas.Lote'. The 'Initial value' field is empty. The 'Multiplicity' dropdown is set to '<Unspecified>', with 'Ordered' and 'Unique' checkboxes. The 'Visibility' dropdown is set to 'private'. The 'Type' dropdown is set to 'float'. The 'Type modifier' dropdown is set to '<Unspecified>'. The 'Scope' dropdown is set to 'instance'. The 'Aggregation' dropdown is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID'. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración métodos:

Declaración de constructor:



Declaración parámetros constructor:



Declaración operación obtenerNumeroDeLote:

The screenshot shows the 'Operation Specification' dialog box with the 'General' tab selected. The 'Name' field is 'obtenerNumeroDeLote'. The 'Classifier' is 'VentaPrendas.Lote'. The 'Return type' is 'int'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaracion operación obtenerNumeroDePrendas:

The screenshot shows the 'Operation Specification' dialog box with the 'General' tab selected. The 'Name' field is 'obtenerNumeroDePrendas'. The 'Classifier' is 'VentaPrendas.Lote'. The 'Return type' is 'int'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

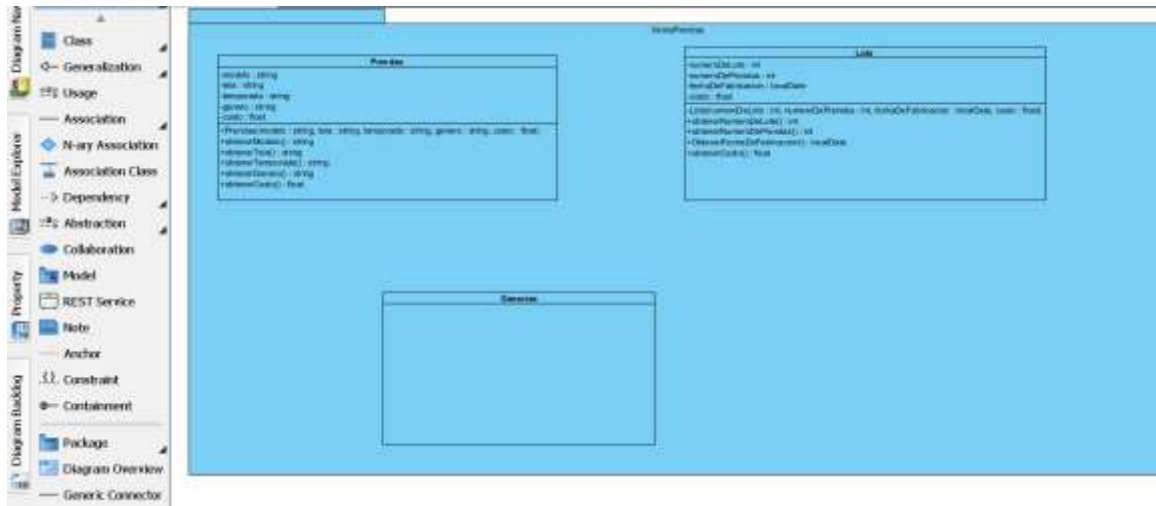
Declaración operación obtenerFechaDeFabricacion:

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field contains 'obtenerFechaDeFabricacion'. The 'Classifier' field contains 'VentasProdas.Lote'. The 'Return type' field contains 'localDate'. The 'Type modifier' field contains '<Unspecified>'. The 'Visibility' field contains 'public'. The 'Scope' field contains 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' field is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración operación obtenerCosto:

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field contains 'obtenerCosto'. The 'Classifier' field contains 'VentasProdas.Lote'. The 'Return type' field contains 'float'. The 'Type modifier' field contains '<Unspecified>'. The 'Visibility' field contains 'public'. The 'Scope' field contains 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' field is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Creación de clase "Ganancias":



Declaración de Atributos:

Declaración atributo "costoProduccion"(float):

Attribute Specification

General

Name:

Classifier:

Initial value:

Multiplicity: ☐ Ordered ☒ Unique

Visibility:

Type:

Type modifier:

Scope:

Aggregation:

Description:

B

≡

≡

F

...

F

+

...

...

...

O

☐ Derived ☐ Derived union ☐ Setter ☐ Getter

☐ Abstract ☐ Leaf ☐ Read only ☐ ID

Reset OK Cancel Apply Help

Declaración atributo “ganancia”(float):

The 'Attribute Specification' dialog box is shown with the 'General' tab selected. The 'Name' field contains 'ganancia'. The 'Classifier' field shows 'VentaPrendas.Ganacias'. The 'Initial value' field is empty. The 'Multiplicity' field is set to '<Unspecified>', with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' field is set to 'private'. The 'Type' field is set to 'float'. The 'Type modifier' field is set to '<Unspecified>'. The 'Scope' field is set to 'instance'. The 'Aggregation' field is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración métodos:

Declaración método constructor:

The 'Attribute Specification' dialog box is shown with the 'General' tab selected. The 'Related models' section at the top shows 'ganancia : float'. The 'Name' field contains 'ganancia'. The 'Classifier' field shows 'VentaPrendas.Ganacias'. The 'Initial value' field is empty. The 'Multiplicity' field is set to '<Unspecified>', with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' field is set to 'private'. The 'Type' field is set to 'float'. The 'Type modifier' field is set to '<Unspecified>'. The 'Scope' field is set to 'instance'. The 'Aggregation' field is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaracion parámetros constructor:

Parameter Specification dialog for the 'costo' parameter. The 'General' tab is active. Fields include: Name: costo, Operation: Genesies, Type: float, Type modifier: <Unspecified>, Direction: inout, Default value: (empty), Multiplicity: <Unspecified>, Ordered: ☐, Unique: ☒. A description text area is at the bottom with a toolbar.

Parameter Specification dialog for the 'ganancia' parameter. The 'General' tab is active. Fields include: Name: ganancia, Operation: Genesies, Type: float, Type modifier: <Unspecified>, Direction: inout, Default value: (empty), Multiplicity: <Unspecified>, Ordered: ☐, Unique: ☒. A description text area is at the bottom with a toolbar.

Declaración método obtenerCosto:

Operation Specification dialog for the 'obtenerCosto' method. The 'General' tab is active. Fields include: Name: obtenerCosto, Classifier: VentaPendientes.Generals, Return type: float, Type modifier: <Unspecified>, Visibility: public, Scope: instance, Lower: (empty), Upper: (empty), Body condition: (empty). At the bottom, there are checkboxes for Abstract, Leaf, Query, Ordered, and Unique (checked). A description text area is in the middle with a toolbar.

Declaración metodo calcularGanancia:

The 'Operation Specification' dialog box is shown with the 'Parameters' tab selected. The 'Name' field contains 'calcularGanancia'. The 'Classifier' field contains 'VentaPrendas-Ganancias'. The 'Return type' is set to 'A'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'Instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' field is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Parámetros calcular ganancia:

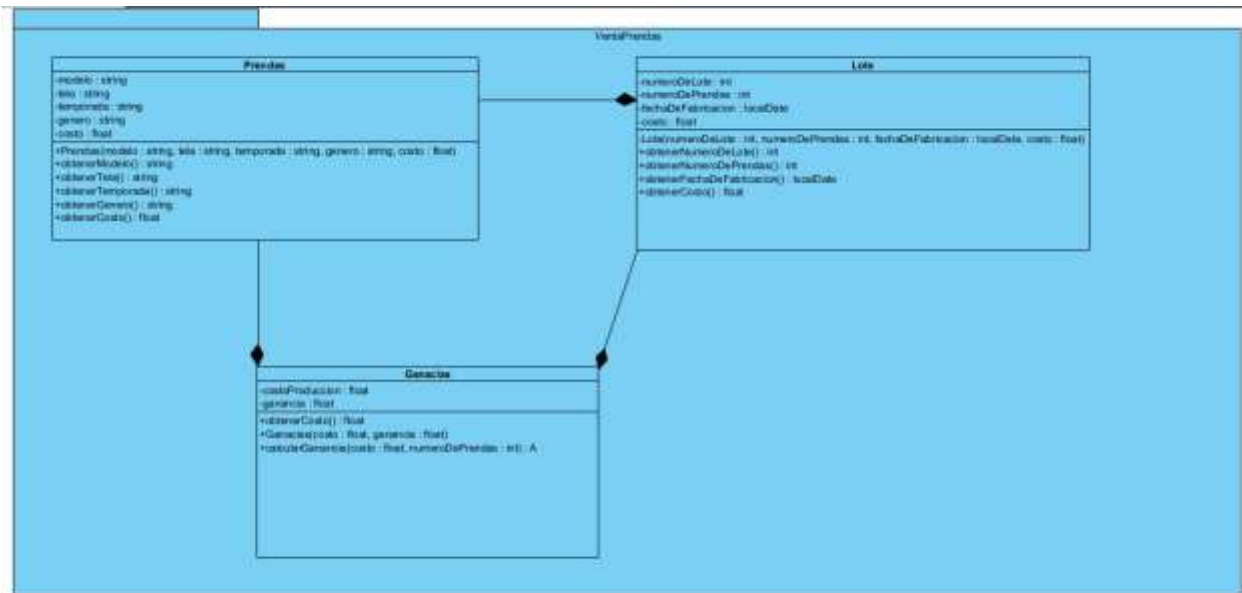
Two 'Parameter Specification' dialog boxes are shown side-by-side. The left dialog box is for the 'costo' parameter, with 'Name' set to 'costo', 'Operation' set to 'calcularGanancia', 'Type' set to 'float', 'Type modifier' set to '<Unspecified>', 'Direction' set to 'input', 'Default value' empty, 'Multiplicity' set to '<Unspecified>', 'Ordered' unchecked, and 'Unique' checked. The right dialog box is for the 'numeroDePrendas' parameter, with 'Name' set to 'numeroDePrendas', 'Operation' set to 'calcularGanancia', 'Type' set to 'int', 'Type modifier' set to '<Unspecified>', 'Direction' set to 'input', 'Default value' empty, 'Multiplicity' set to '<Unspecified>', 'Ordered' unchecked, and 'Unique' checked. Both dialog boxes have 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons at the bottom.

Relaciones clases:

Para el primer caso costo es completamente dependiente de las clases “Prendas” y “Lote” ya que sin esta no tendría caso como calcular la ganancia de ambas.

Por lo cual elegiremos la opción de composición ya que es completamente dependiente del otro;

Para el segundo caso el lote es una extensión de varias prendas por lo cual seria inútil que hubiera un lote sin prendas.



Ejercicio 2:

Una empresa agrícola ha decidido sistematizar el control de la producción frutal que tiene, para lo cual de cada fruta se describe su nombre, la extensión del terreno (hectáreas) dedicadas a su cultivo y producción, el tiempo de cosecha (Cada fruta puede tener 1 o más periodos de cosecha), la cantidad estimada a cosechar por hectárea en cada periodo (cada periodo por condiciones de estación climática puede tener diferentes cantidades estimadas), costo de producción promedio por tonelada y el precio de venta promedio por tonelada. Por cada fruta se puede agregar o eliminar un periodo de cosecha, se puede obtener el costo total de un periodo, así como las ganancias estimadas en un periodo.

Análisis:

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD	
Nombre	String	1	Si	frutas
AreaDelTerreno	float	1	Si	
Periodo	Periodo		Si	
CostoDeProduccion	float		Si	
CostoDeVenta	float		Si	

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD	
temporada	String	1	si	Periodo
cantidadPorHectarea	int	1	si	
tiempodecosecha	float	1	Si	

frutas

OPERACION	TIPO DE DATO	ARGUMENTO	ALCANCE
constructor		Nombre, areaDelTerreno, periodo, CostoDeProduccion, CostoDeVenta	publico
ObtenerNombre	String		public
ObtenerAreaDelTerreno	float	Largo, Ancho	public

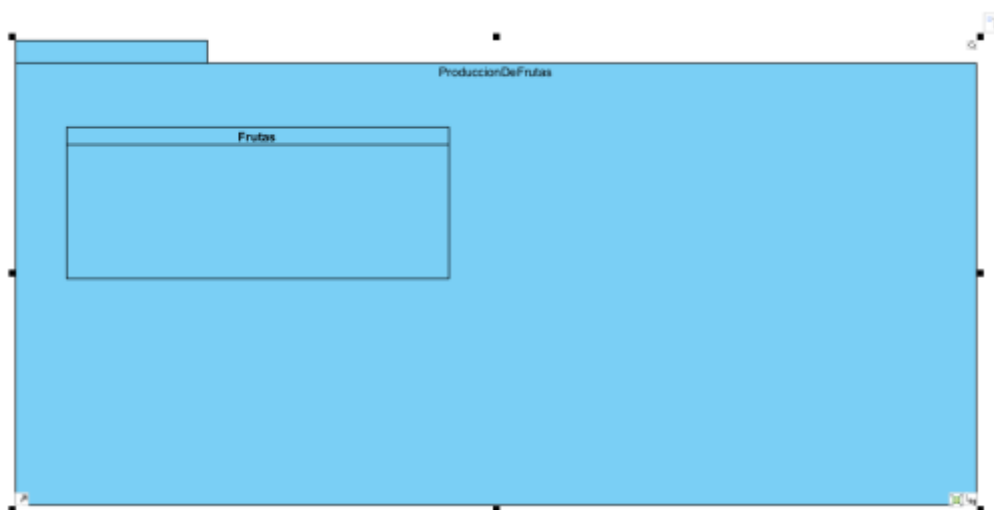
ObtenerPeriodos	Periodo[]		public
ObtenerCostoDeProduccion	float		public
ObtenerCostoDeVenta	float		public
CalcularGanancias	float	CostoDeProduccion, CostoDeVenta,Periodo	public
agregarPeriodo	void		public
eliminarPeriodo	void		public

Periodo

OPERACION	TIPO DE DATO	ARGUMENTO	ALCANCE
constructor		Temporada,cantidadPorHectarea,TiempoDeCosecha	publico
ObtenerTemporada	String		public
ObtenerCantidadPorHectarea	float	Largo,Ancho	public
TiempoDeCosecha	Periodo[]		public

Diagrama uml:

Creación de clase “Fruta”:



Declaración atributos:

Declaración atributo “nombre” (String):

The screenshot shows the 'Attribute Specification' dialog box with the 'General' tab selected. The 'Name' field is set to 'Nombre'. The 'Classifier' field shows a tree view with 'poo.actividad1.ProduccionDeFrutas.Frutas' selected. The 'Initial value' field is empty. The 'Multiplicity' is set to '<Unspecified>' with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' is set to 'private'. The 'Type' is set to 'String'. The 'Type modifier' is set to '<Unspecified>'. The 'Scope' is set to 'instance'. The 'Aggregation' is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “areaDelTerreno” (float):

The screenshot shows the 'Attribute Specification' dialog box with the 'General' tab selected. The 'Name' field is set to 'areaDelTerreno'. The 'Classifier' field shows a tree view with 'poo.actividad1.ProduccionDeFrutas.Frutas' selected. The 'Initial value' field is empty. The 'Multiplicity' is set to '<Unspecified>' with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' is set to 'private'. The 'Type' is set to 'float'. The 'Type modifier' is set to '<Unspecified>'. The 'Scope' is set to 'instance'. The 'Aggregation' is set to 'None'. The 'Description' field is empty. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “Periodo” (Periodo):

The image shows the 'Attribute Specification' dialog box in a modeling tool. The 'General' tab is selected. The 'Name' field contains 'periodo'. The 'Classifier' field shows a package icon and the text 'poo.actividad1.ProduccionDeFrutas.Frutas'. The 'Initial value' field is empty. The 'Multiplicity' field is set to '<Unspecified>', with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' field is set to 'private'. The 'Type' field is set to 'Periodo'. The 'Type modifier' field is set to '<Unspecified>'. The 'Scope' field is set to 'instance'. The 'Aggregation' field is set to 'None'. The 'Description' field is a large empty text area. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. At the very bottom are buttons for 'Reset', 'OK', 'Cancel', 'Apply', and 'Help'.

Declaración atributo “costoDeProduccion” (float):

The image shows the 'Attribute Specification' dialog box in a modeling tool. The 'General' tab is selected. The 'Name' field contains 'costoDeProduccion'. The 'Classifier' field shows a package icon and the text 'poo.actividad1.ProduccionDeFrutas.Frutas'. The 'Initial value' field is empty. The 'Multiplicity' field is set to '<Unspecified>', with 'Ordered' unchecked and 'Unique' checked. The 'Visibility' field is set to 'private'. The 'Type' field is set to 'float'. The 'Type modifier' field is set to '<Unspecified>'. The 'Scope' field is set to 'instance'. The 'Aggregation' field is set to 'None'. The 'Description' field is a large empty text area. At the bottom, there are checkboxes for 'Derived', 'Derived union', 'Setter', 'Getter', 'Abstract', 'Leaf', 'Read only', and 'ID', all of which are unchecked. At the very bottom are buttons for 'Reset', 'OK', 'Cancel', 'Apply', and 'Help'.

Declaración atributo “costoDeVenta” (float):

Attribute Specification

General

Name: costoDeVenta

Classifier: poo.actividad1.ProduccionDefrutas.Frutas

Initial value:

Multiplicity: <Unspecified> ☐ Ordered ☒ Unique

Visibility: private

Type: float

Type modifier: <Unspecified>

Scope: instance

Aggregation: None

Description:

☐ Derived ☐ Derived union ☐ Setter ☐ Getter

☐ Abstract ☐ Leaf ☐ Read only ☐ ID

Reset OK Cancel Apply Help

Declaración métodos:

Declaración constructor:

Operation Specification

General

Name: constructor

Classifier: poo.actividad1.ProduccionDefrutas.Frutas

Return type:

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☐ Unique

Reset OK Cancel Apply Help

Declaración parámetros constructor:

The image displays three instances of the 'Parameter Specification' dialog box, each showing the configuration for a different parameter. The dialog box is divided into a 'General' tab and a 'Description' field.

Parameter 1: nombre

- Name: nombre
- Operation: Frutas
- Type: String
- Type modifier: <Unspecified>
- Direction: inout
- Default value:
- Multiplicity: <Unspecified> ☐ Ordered ☒ Unique
- Description:

Parameter 2: areaDelTerreno

- Name: areaDelTerreno
- Operation: Frutas
- Type: float
- Type modifier: <Unspecified>
- Direction: inout
- Default value:
- Multiplicity: <Unspecified> ☐ Ordered ☒ Unique
- Description:

Parameter 3: periodo

- Name: periodo
- Operation: Frutas
- Type: Periodo
- Type modifier: <Unspecified>
- Direction: inout
- Default value:
- Multiplicity: <Unspecified> ☐ Ordered ☒ Unique
- Description:

Parameter 4: costoDeProduccion

- Name: costoDeProduccion
- Operation: Frutas
- Type: float
- Type modifier: <Unspecified>
- Direction: inout
- Default value:
- Multiplicity: <Unspecified> ☐ Ordered ☒ Unique
- Description:

Parameter 5: costoDeVenta

- Name: costoDeVenta
- Operation: Frutas
- Type:
- Type modifier: <Unspecified>
- Direction: inout
- Default value:
- Multiplicity: <Unspecified> ☐ Ordered ☒ Unique
- Description:

Declaración método "ObtenerNombre" (String):

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field contains 'obtenerNombre'. The 'Classifier' field shows a package structure: 'poo.actividad1.ProduccionDeFrutas.Frutas'. The 'Return type' field is empty. The 'Type modifier' is set to '<Unspecified>'. The 'Visibility' is 'public' and the 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' field is empty. The 'Description' field is a large empty text area. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' being checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración método “obtenerAreaDelTerreno” (float):

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field contains 'obtenerAreaDelTerreno'. The 'Classifier' field shows a package structure: 'poo.actividad1.ProduccionDeFrutas.Frutas'. The 'Return type' field contains 'float'. The 'Type modifier' is set to '<Unspecified>'. The 'Visibility' is 'public' and the 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' field is empty. The 'Description' field is a large empty text area. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' being checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración método “ObtenerPeriodo” (Periodo):

The screenshot shows the 'Operation Specification' dialog box with the 'General' tab selected. The 'Name' field is 'obtenerPeriodo'. The 'Classifier' is 'poo.actividad1.ProduccionDeFrutas.Frutas'. The 'Return type' is 'float'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'Instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique' (which is checked). The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración método “ObtenerCostoDeProduccion” (float):

The screenshot shows the 'Operation Specification' dialog box with the 'General' tab selected. The 'Name' field is 'obtenerCostoDeProduccion'. The 'Classifier' is 'poo.actividad1.ProduccionDeFrutas.Frutas'. The 'Return type' is 'float'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'Instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique' (which is checked). The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración método “ObtenerCostoDeVenta” (float):

The image shows a software interface titled "Operation Specification" with a close button (X) in the top right corner. It has two tabs: "General" and "Parameters", with "General" currently selected. The form contains the following fields and options:

- Name:** A text field containing "obtenerCostoDeVenta".
- Classifier:** A dropdown menu showing "poo.actividad1.ProduccionDeFrutas.Frutas".
- Return type:** A dropdown menu showing "float".
- Type modifier:** A dropdown menu showing "<Unspecified>".
- Visibility:** A dropdown menu showing "public".
- Scope:** A dropdown menu showing "Instance".
- Lower:** An empty text field.
- Upper:** An empty text field.
- Body condition:** A dropdown menu.
- Description:** A large, empty text area.
- Options:** A row of checkboxes: ☐ Abstract, ☐ Leaf, ☐ Query, ☐ Ordered, and ☒ Unique.

At the bottom of the dialog are five buttons: "Reset", "OK", "Cancel", "Apply", and "Help".

Declaración método “calcularGanancias” (float):

The screenshot shows the 'Operation Specification' dialog box with the 'General' tab selected. The 'Name' field is 'calcularGarantias'. The 'Classifier' is 'pos.actividadL.ProduccionDeFrutas.Frutas'. The 'Return type' is 'float'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique' (which is checked). The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración método “eliminarPeriodo” (void):

The screenshot shows the 'Operation Specification' dialog box with the 'General' tab selected. The 'Name' field is 'eliminarPeriodo()'. The 'Classifier' is 'pos.actividadL.ProduccionDeFrutas.Frutas'. The 'Return type' is 'void'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique' (which is checked). The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración método “agregarPeriodo” (void):

Operation Specification

General Parameters

Name: agregarPeriodo

Classifier: poo.actividad1.ProduccionDeFrutas.Frutas

Return type: void

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

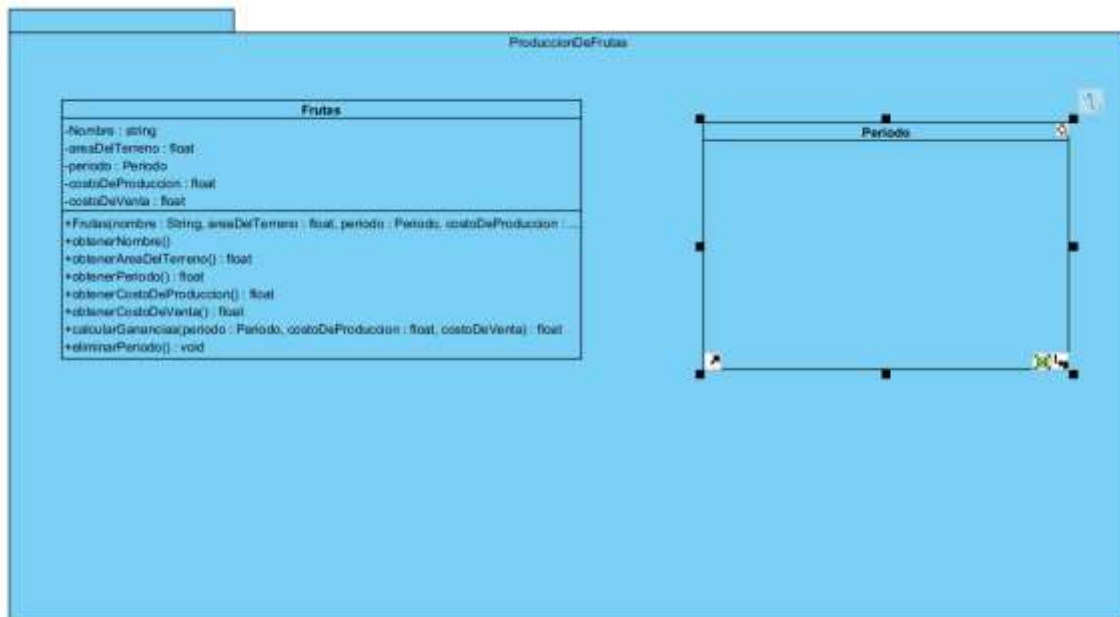
Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Creación de clase “Periodo”:



Declaración atributos:

Declaración atributo “Temporada”:

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field is 'temporada'. The 'Classifier' is 'poo.actividad1.ProduccionDeFrutas.Periodo'. The 'Return type' is 'String'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “cantidadPorHectarea”:

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field is 'cantidadPorHectarea'. The 'Classifier' is 'poo.actividad1.ProduccionDeFrutas.Periodo'. The 'Return type' is 'int'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique', with 'Unique' checked. The 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons are at the bottom.

Declaración atributo “tiempoDeCosecha”:

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field is 'BranjeDeCosecha'. The 'Classifier' is 'poo.actividad.ProduccionDeFrutas.Periodo'. The 'Return type' is 'float'. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique' (which is checked). There are also 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Declaración métodos:

Declaración constructor:

The screenshot shows the 'Operation Specification' dialog box with the 'Parameters' tab selected. The 'Name' field is 'Periodo'. The 'Classifier' is 'poo.actividad.ProduccionDeFrutas.Periodo'. The 'Return type' is empty. The 'Type modifier' is '<Unspecified>'. The 'Visibility' is 'public'. The 'Scope' is 'instance'. The 'Lower' and 'Upper' fields are empty. The 'Body condition' is empty. The 'Description' field is empty. At the bottom, there are checkboxes for 'Abstract', 'Leaf', 'Query', 'Ordered', and 'Unique' (which is checked). There are also 'Reset', 'OK', 'Cancel', 'Apply', and 'Help' buttons.

Declaración método obtenerTemporada:

Operation Specification

General Parameters

Name: obtenerTemporada

Classifier: poo.actividad1.ProduccionDeFrutas.Periodo

Return type: String

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Declaración método obtenerTiempoDeCosecha:

Operation Specification

General Parameters

Name: obtenerTiempoDeCosecha

Classifier: poo.actividad1.ProduccionDeFrutas.Periodo

Return type: float

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Declaración método obtenerCantidadPorCosecha:

Operation Specification

General Parameters

Name: obtenerCantidadPorCosecha

Classifier: poo.actividad1.ProduccionDeFrutas.Periodo

Return type: int

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

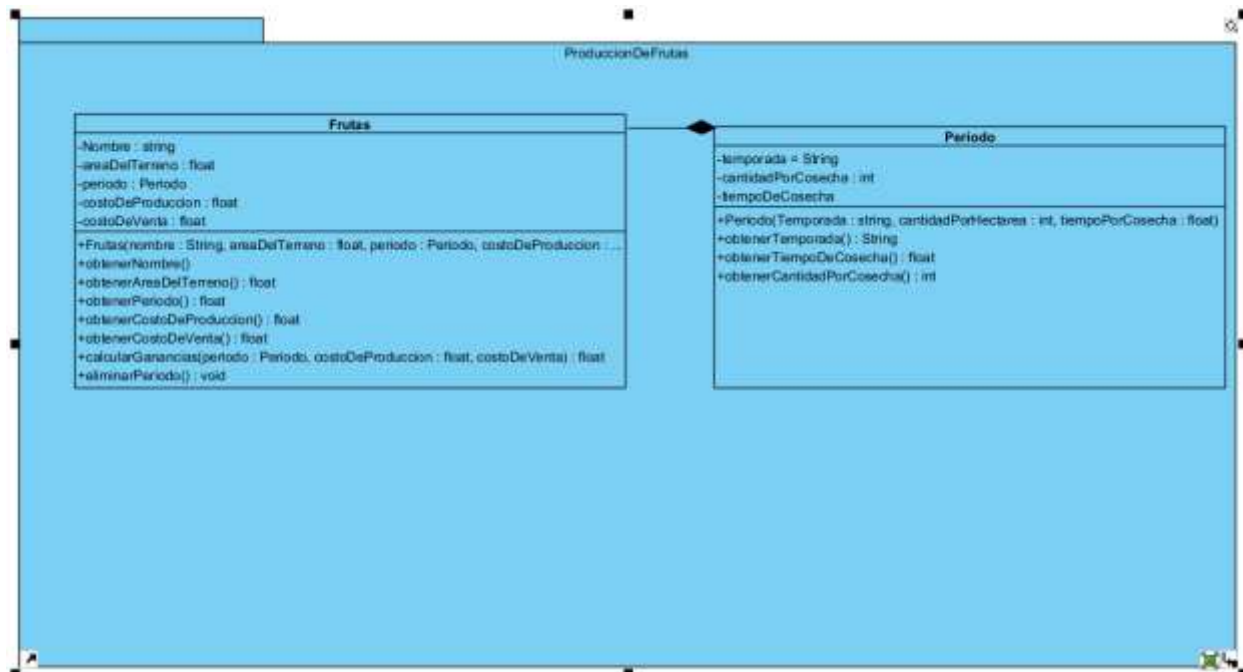
Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Relación de clases:

Es una composición ya que el periodo es completamente dependiente.



Ejercicio 3:

Problemática:

El observatorio astronómico de San Pedro Mártir, de acuerdo a sus observaciones necesita un catálogo de los cuerpos celestes descubiertos para lo cual de cada cuerpo celeste se describe la ubicación en el espacio estelar en relación a las posiciones geográficas espaciales (expresado en grado de latitud (norte o sur) y grados de longitud (este o oeste)) periodo de ubicación (mes(es) donde se observó en dicha posición), distancia aproximada a la tierra (años luz o km/segundos), el nombre que se le asigno, la composición del cuerpo estelar (gases, solidos, líquidos). De cada cuerpo celeste se puede obtener el desplazamiento con respecto a otra observación del mismo cuerpo en un periodo distinto.

Análisis:

CuerpoCeleste

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD
NOMBRE	String	1	Sí
COMPOSICION	String	1	Sí
DISTANCIAATIERRA	double	1	Sí
UNIDADDISTANCIA	String	1	Sí

Observacion

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD
FECHA OBSERVACION	Date	1	Sí
PERIODO MESES	String	1	Sí

PosicionEspacial

ATRIBUTO	TIPO DE DATO	CARDINALIDAD	OBLIGATORIEDAD
LATITUD GRADOS	double	1	Sí

DIRECCIONLATITUD	String	1	Sí
LONGITUDGRADOS	double	1	Sí
DIRECCIONLONGITUD	String	1	Sí

- Operaciones para clase "CuerpoCeleste":

Operación	Tipo de dato	Argumentos	Alcance
Constructor		nombre, composicion, distanciaATierra, unidadDistancia	público
calcularDesplazamiento	double	obs1: Observacion, obs2: Observacion	público
agregarObservacion	void	observacion: Observacion	público
obtenerNombre	String		público

Operaciones para clase "Observación":

OPERACIÓN	TIPO DE DATO	ARGUMENTOS	ALCANCE
CONSTRUCTOR		fechaObservacion, periodoMeses, posicion: PosicionEspacial	público
OBTENERFECHA	Date		público
OBTENERPOSICION	PosicionEspacial		público

Nota Elihu: El constructor no lleva tipo de dato en la columna "Tipo de dato" porque es especial, "siempre retorna una instancia de la clase que está construyendo".

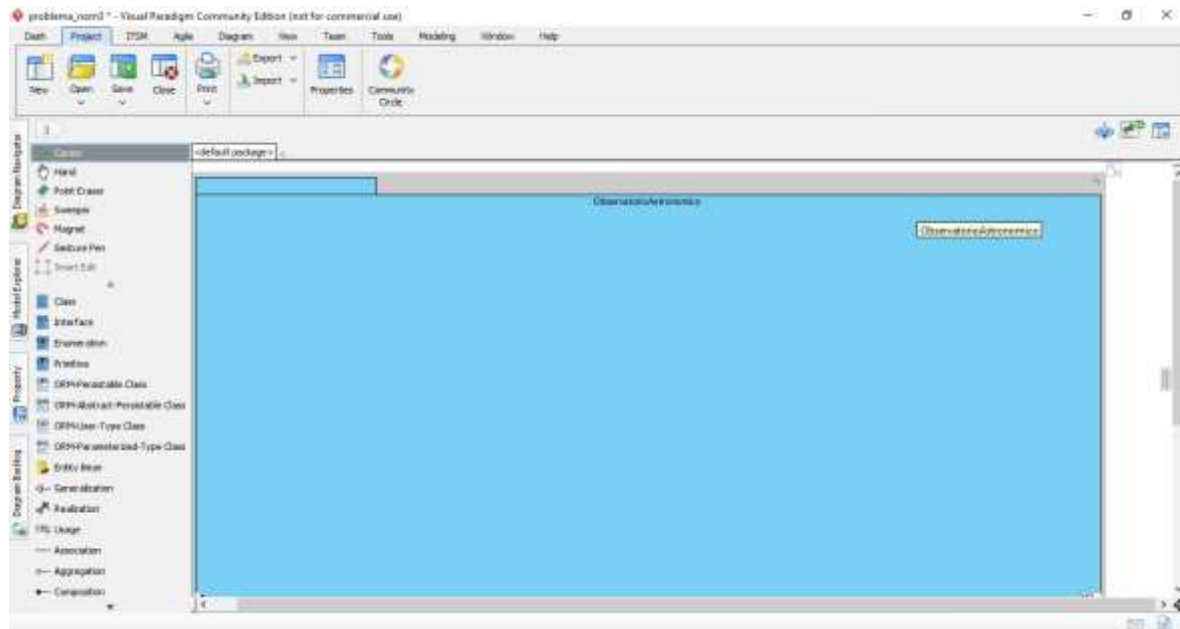
Operaciones para clase "PosicionEspacial":

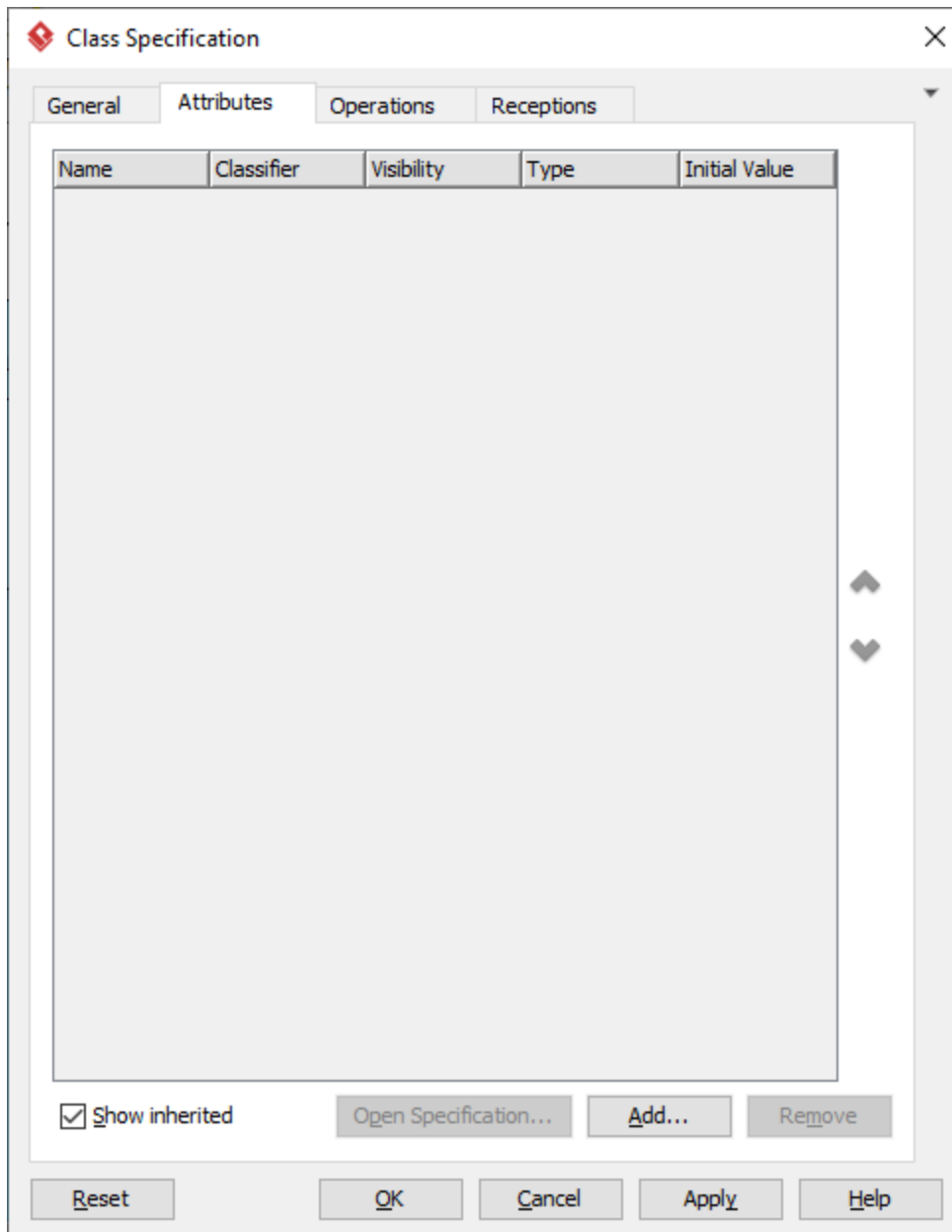
OPERACIÓN	TIPO DE DATO	ARGUMENTOS	ALCANCE
CONSTRUCTOR		latitudGrados, direccionLatitud, longitudGrados, direccionLongitud	público
CALCULARDISTANCIA	double	otraPosicion: PosicionEspacial	público

TeCNM

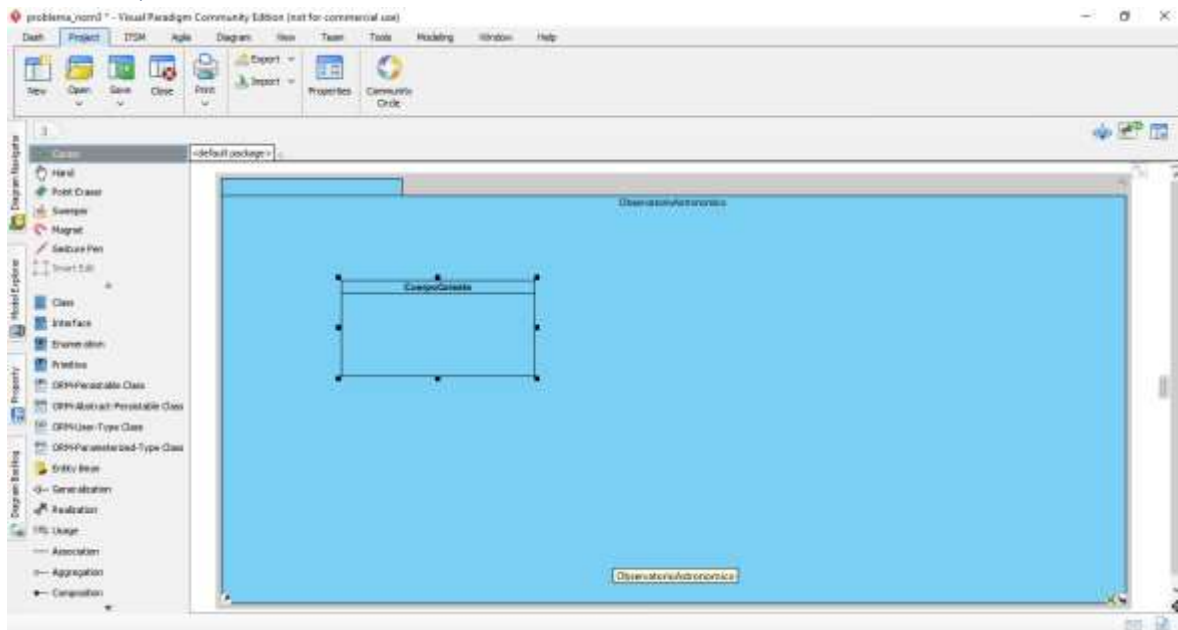
Diagrama Uml:

Creación de la clase:





Clase composición, atributos:



Attribute Specification

General

Name:

Classifier:

Initial value:

Multiplicity: ☐ Ordered ☒ Unique

Visibility:

Type:

Type modifier:

Scope:

Aggregation:

Description:

☐ Derived ☐ Derived union ☐ Setter ☐ Getter

☐ Abstract ☐ Leaf ☐ Read only ☐ ID

Attribute Specification

General

Name:
Classifier:
Initial value:
Multiplicity: ☐ Ordered ☒ Unique
Visibility:
Type:
Type modifier:
Scope:
Aggregation:
Description:

☐ Derived ☐ Derived union ☐ Setter ☐ Getter ☐ Abstract ☐ Leaf ☐ Read only ☐ ID

Reset OK Cancel Apply Help

Attribute Specification

General

Name:
Classifier:
Initial value:
Multiplicity: ☐ Ordered ☒ Unique
Visibility:
Type:
Type modifier:
Scope:
Aggregation:
Description:

☐ Derived ☐ Derived union ☐ Setter ☐ Getter ☐ Abstract ☐ Leaf ☐ Read only ☐ ID

Reset OK Cancel Apply Help

Parameter Specification

General

Name:
Operation:
Type:
Type modifier:
Direction:
Default value:
Multiplicity: ☐ Ordered ☒ Unique
Description:

Reset OK Cancel Apply Help

Creación clase observación, atributos:

The image displays three screenshots of a UML modeling software interface, showing the process of creating a class and its attributes.

Class Specification Dialog:

- General Tab:**
 - Name: `Observacion`
 - Parent: `ObservatorioAstronomico`
 - Visibility: `public`
 - Description: (Empty text area)
 - Options: ☐ Abstract, ☐ Leaf, ☐ Root, ☐ Active, ☐ Final specialization, ☐ Business model

Attribute Specification Dialog (Top):

- Related models:** `fechaObservacion : Date`
- General Tab:**
 - Name: `fechaObservacion`
 - Classifier: `ObservatorioAstronomico.Observacion`
 - Initial value: (Empty text area)
 - Multiplicity: `<Unspecified>`, ☐ Ordered, ☒ Unique
 - Visibility: `public`
 - Type: `Date`
 - Type modifier: `<Unspecified>`
 - Scope: `instance`
 - Aggregation: `None`
 - Description: (Empty text area)
 - Options: ☐ Derived, ☐ Derived union, ☐ Setter, ☐ Getter, ☐ Abstract, ☐ Leaf, ☐ Read only, ☐ ID

Attribute Specification Dialog (Bottom):

- Related models:** `periodoMeses : string`
- General Tab:**
 - Name: `periodoMeses`
 - Classifier: `ObservatorioAstronomico.Observacion`
 - Initial value: (Empty text area)
 - Multiplicity: `<Unspecified>`, ☐ Ordered, ☒ Unique
 - Visibility: `private`
 - Type: `string`
 - Type modifier: `<Unspecified>`
 - Scope: `instance`
 - Aggregation: `None`
 - Description: (Empty text area)
 - Options: ☐ Derived, ☐ Derived union, ☐ Setter, ☐ Getter, ☐ Abstract, ☐ Leaf, ☐ Read only, ☐ ID

Creación de la clase Posicion espacial:

The image displays four screenshots of a UML modeling tool's configuration windows, arranged in a 2x2 grid. The top row shows the 'Attribute Specification' dialog for two attributes: 'latitudGrados' (double) and 'direccionLatitud' (string). The bottom row shows the 'Class Specification' dialog for the 'PosicionEspacial' class and the 'Attribute Specification' dialog for the 'longitudGrados' (double) attribute.

Top Left: Attribute Specification (latitudGrados : double)

- Related models: latitudGrados : double
- General tab:

 - Name: latitudGrados
 - Classifier: ObservatorioAstronomico.PosicionEspacial
 - Initial value: (empty)
 - Multiplicity: <Unspecified> (Ordered: ☐, Unique: ☒)
 - Visibility: private
 - Type: double
 - Type modifier: <Unspecified>
 - Scope: instance
 - Aggregation: None
 - Description: (empty text area)
 - Options: ☐ Derived, ☐ Derived union, ☐ Setter, ☐ Getter, ☐ Abstract, ☐ Leaf, ☐ Read only, ☐ ID

- Buttons: Reset, OK, Cancel, Apply, Help

Top Right: Attribute Specification (direccionLatitud : string)

- Related models: direccionLatitud : string
- General tab:

 - Name: direccionLatitud
 - Classifier: ObservatorioAstronomico.PosicionEspacial
 - Initial value: (empty)
 - Multiplicity: <Unspecified> (Ordered: ☐, Unique: ☒)
 - Visibility: private
 - Type: string
 - Type modifier: <Unspecified>
 - Scope: instance
 - Aggregation: None
 - Description: (empty text area)
 - Options: ☐ Derived, ☐ Derived union, ☐ Setter, ☐ Getter, ☐ Abstract, ☐ Leaf, ☐ Read only, ☐ ID

- Buttons: Reset, OK, Cancel, Apply, Help

Bottom Left: Class Specification (PosicionEspacial)

- General tab:

 - Name: PosicionEspacial
 - Parent: ObservatorioAstronomico
 - Visibility: public
 - Description: (empty text area)
 - Options: ☐ Abstract, ☐ Leaf, ☐ Root, ☐ Active, ☐ Final specialization, ☐ Business model

- Buttons: Reset, OK, Cancel, Apply, Help



Bottom Right: Attribute Specification (longitudGrados : double)

- Related models: longitudGrados : double
- General tab:

 - Name: longitudGrados
 - Classifier: ObservatorioAstronomico.PosicionEspacial
 - Initial value: (empty)
 - Multiplicity: <Unspecified> (Ordered: ☐, Unique: ☒)
 - Visibility: private
 - Type: double
 - Type modifier: <Unspecified>
 - Scope: instance
 - Aggregation: None
 - Description: (empty text area)
 - Options: ☐ Derived, ☐ Derived union, ☐ Setter, ☐ Getter, ☐ Abstract, ☐ Leaf, ☐ Read only, ☐ ID

- Buttons: Reset, OK, Cancel, Apply, Help

Attribute Specification ✕

Related models:   direccionLongitud : string Go

General

Name:

Classifier: ...

Initial value:

Multiplicity: Ordered ☒ Unique ☒

Visibility:

Type: ...

Type modifier:

Scope:

Aggregation:

Description:

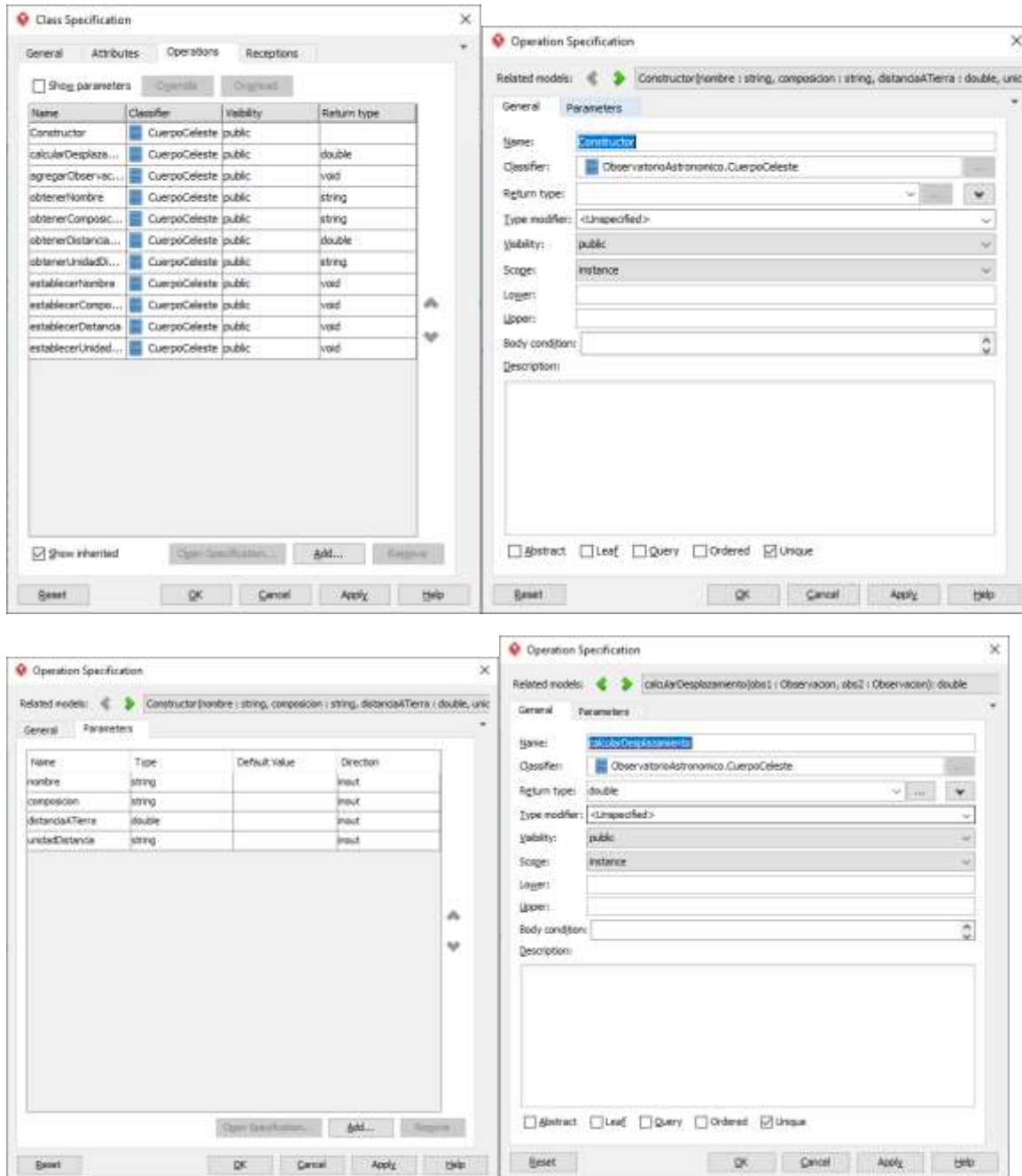
☐ Derived ☐ Derived union ☐ Setter ☐ Getter

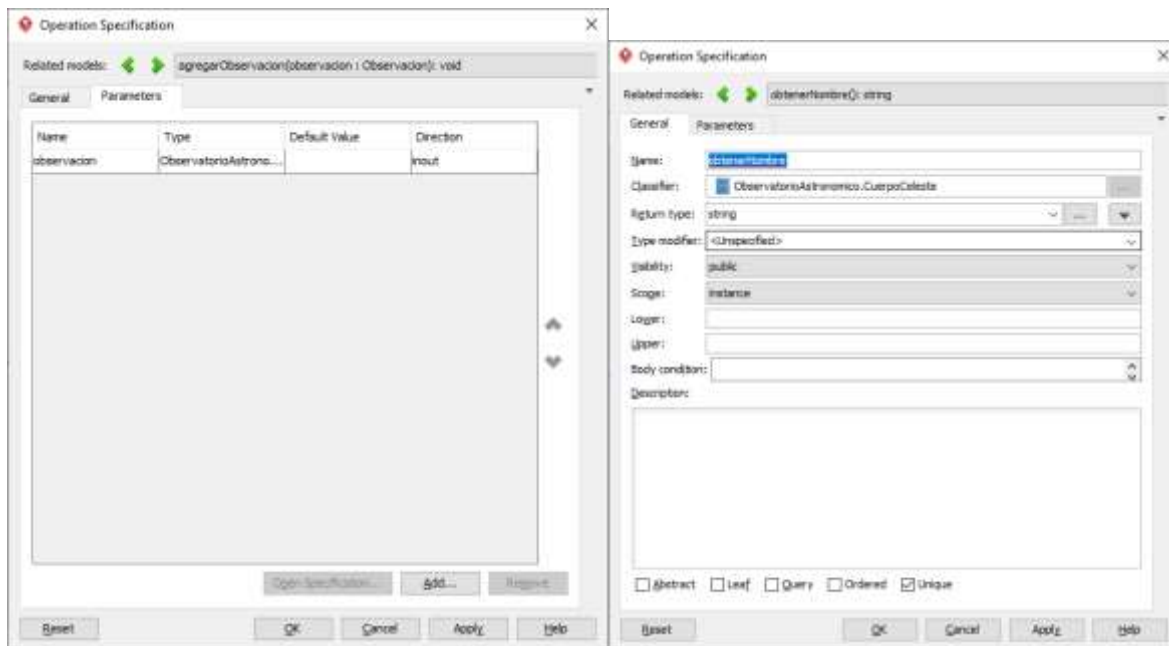
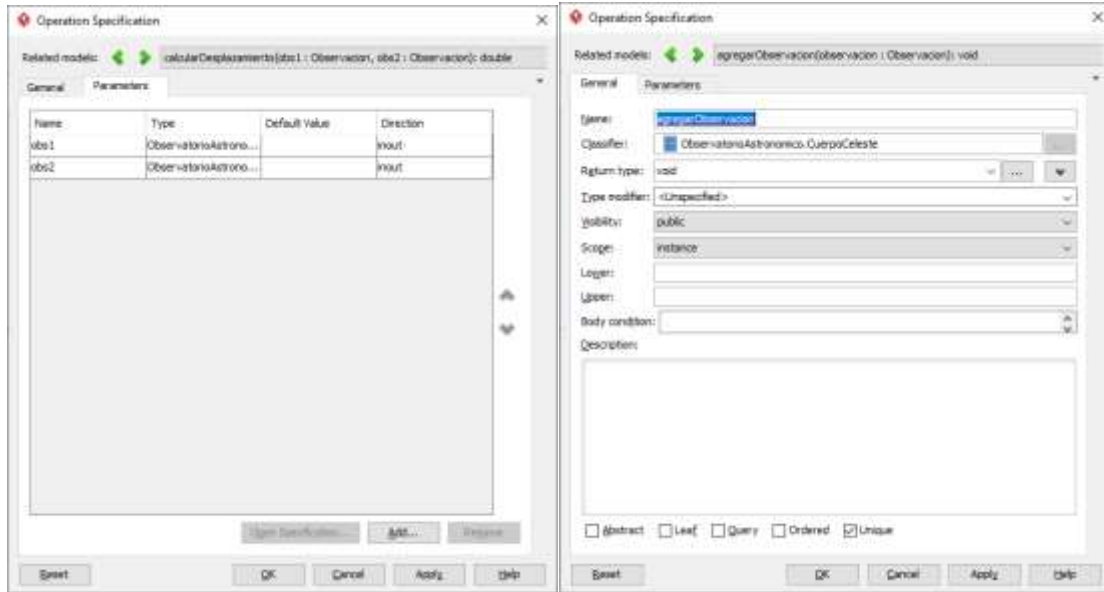
☐ Abstract ☐ Leaf ☐ Read only ☐ ID

Reset OK Cancel Apply Help

OPERACIONES DE LAS CLASES :

CLASE 1:





Operation Specification

Related models: obtenerComposicion(): string

General Parameters

Name: obtenerComposicion

Classifier: ObservatorioAstronomico.CuerpoCeleste

Return type: string

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: obtenerDistanciaATierra(): double

General Parameters

Name: obtenerDistanciaATierra

Classifier: ObservatorioAstronomico.CuerpoCeleste

Return type: double

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: obtenerUnidadDistancia(): string

General Parameters

Name: obtenerUnidadDistancia

Classifier: ObservatorioAstronomico.CuerpoCeleste

Return type: string

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerNombre(nombre: string): void

General Parameters

Name: establecerNombre

Classifier: ObservatorioAstronomico.CuerpoCeleste

Return type: void

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

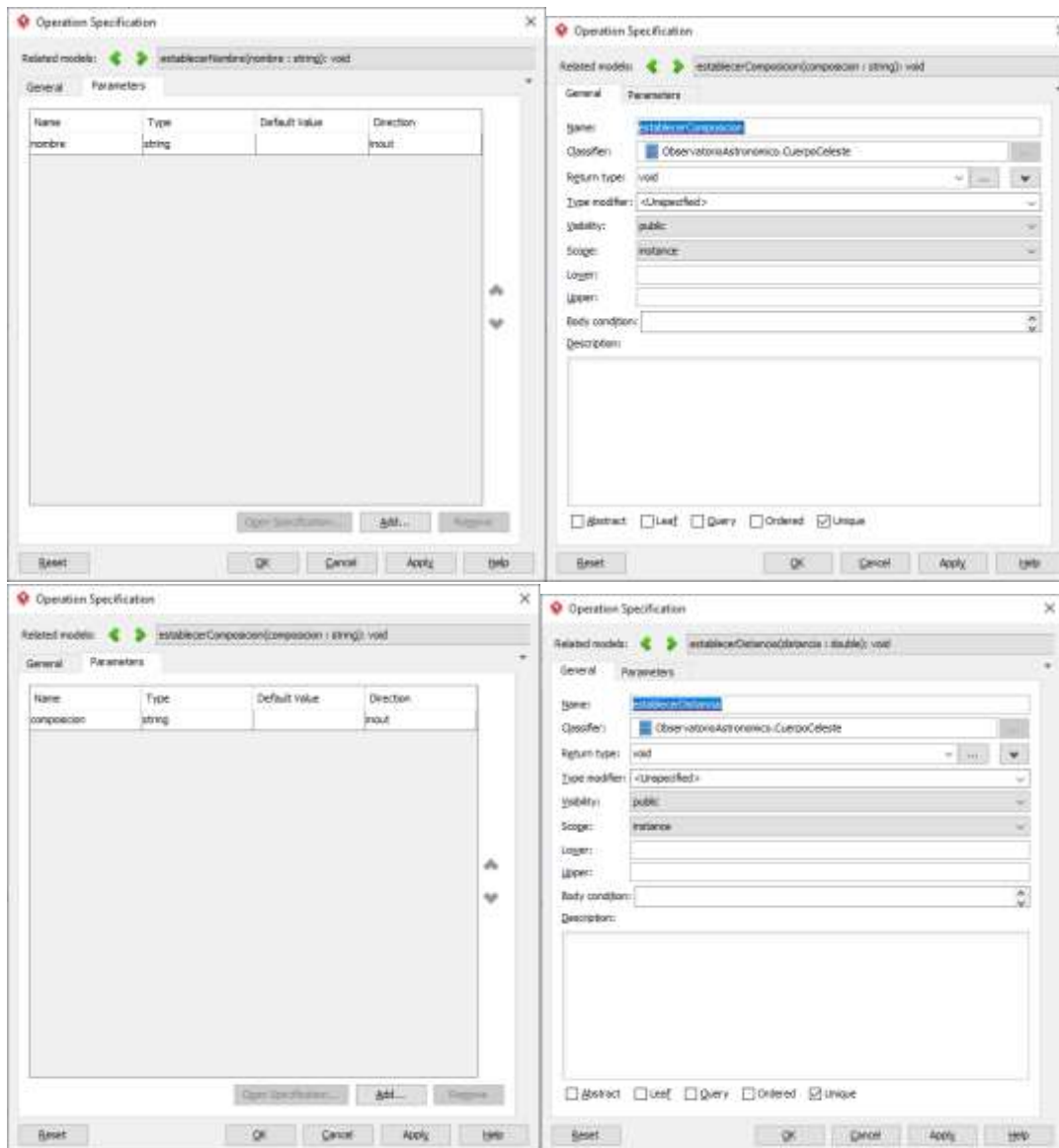
Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help



Operation Specification

Related models: establecerDistancia(distancia : double): void

General Parameters

Name	Type	Default Value	Direction
distancia	double		inout

Open Specification... Add... Remove

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerUnidadDistancia(unidad : string): void

General Parameters

Name: establecerUnidadDistancia

Classifier: ObservatorioAstronomico.CuerpoCeleste

Return type: void

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Upper:

Lower:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerUnidadDistancia(unidad : string): void

General Parameters

Name	Type	Default Value	Direction
unidad	string		inout

Open Specification... Add... Remove

Reset OK Cancel Apply Help

OPERACIONES CLASE OBSERVACION:

Operation Specification

Related models: Observacion(fechaObservacion : Date, periodoMeses : string, posicon : Posicon)

General Parameters

Name: Observacion

Classifier: ObservatorioAstronomico.Observacion

Return type:

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: Observacion(fechaObservacion : Date, periodoMeses : string, posicon : Posicon)

General Parameters

Name	Type	Default Value	Direction
fechaObservacion	Date		inout
periodoMeses	string		inout
posicon	ObservatorioAstrono...		inout

Open Specifications... Add... Remove

Reset OK Cancel Apply Help

Operation Specification [X]

Related models: [Navigation icons] obtenerFecha(): Date

General | Parameters

Name: obtenerFecha

Classifier: [Icon] ObservatorioAstronomico.Observacion ...

Return type: Date [v] ... [v]

Type modifier: <Unspecified> [v]

Visibility: public [v]

Scope: instance [v]

Lower: [Text box]

Upper: [Text box]

Body condition: [Text box] [v]

Description: [Text area]

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

[Reset] [OK] [Cancel] [Apply] [Help]

Operation Specification [X]

Related models: [Navigation icons] obtenerPeriodo(): String

General | Parameters

Name: obtenerPeriodo

Classifier: [Icon] ObservatorioAstronomico.Observacion ...

Return type: String [v] ... [v]

Type modifier: <Unspecified> [v]

Visibility: public [v]

Scope: instance [v]

Lower: [Text box]

Upper: [Text box]

Body condition: [Text box] [v]

Description: [Text area]

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

[Reset] [OK] [Cancel] [Apply] [Help]

Operation Specification

Related models: obtenerPosicion(): PosicionEspacial

General Parameters

Name: obtenerPosicion

Classifier: ObservatorioAstronomico.Observacion ...

Return type: ObservatorioAstronomico.PosicionEspacial ...

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerFecha(fecha : Date): void

General Parameters

Name: establecerFecha

Classifier: ObservatorioAstronomico.Observacion ...

Return type: void ...

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerFecha(fecha : Date): void

General Parameters

Name	Type	Default Value	Direction
fecha	Date		inout

Open Specifiers... Add... Remove

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerPeriodo(periodo : string): void

General Parameters

Name: establecerPeriodo

Classifier: ObservatorioAstronomico.Observacion ...

Return type: void ...

Type modifier: <Unspecified> ...

Visibility: public ...

Scope: instance ...

Lower: ...

Upper: ...

Body condition: ...

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerPeriodo(periodo : string) : void

General Parameters

Name	Type	Default Value	Direction
periodo	string		inout

Open Specification... Add... Remove

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerPosicion(posicion : PosicionEspacial) : void

General Parameters

Name:

Classifier:

Return type:

Type modifier:

Visibility:

Scope:

Layer:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: establecerPosicion(posicion : PosicionEspacial) : void

General Parameters

Name	Type	Default Value	Direction
posicion	ObservatorioAstrono...		inout

Open Specification... Add... Remove

Reset OK Cancel Apply Help

OPERACIONES CLASE POSICION ESPACIAL:

Operation Specification

Related models: PosicionEspacial(altitudGrados : double, direccionLatitud : string, longitudGrados : double)

General Parameters

Name: PosicionEspacial

Classifier: ObservatorioAstronomico.PosicionEspacial

Return type: <Unspecified>

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower: <Unspecified>

Upper: <Unspecified>

Body condition: <Unspecified>

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: PosicionEspacial(altitudGrados : double, direccionLatitud : string, longitudGrados : double)

General Parameters

Name	Type	Default Value	Direction
altitudGrados	double		inout
direccionLatitud	string		inout
longitudGrados	double		inout
direccionLongitud	string		inout

Open Specification... Add... Remove

Reset OK Cancel Apply Help

Operation Specification [X]

Related models: calcularDistancia(otraPosicion : PosicionEspacial): double

General **Parameters**

Name:

Classifier: ...

Return type: ...

Type modifier:

Visibility:

Scope:

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Operation Specification [X]

Related models: calcularDistancia(otraPosicion : PosicionEspacial): double

General **Parameters**

Name	Type	Default Value	Direction
otraPosicion	ObservatorioAstrono...		inout

Operation Specification

Related models: obtenerLatitudGrados(): double

General Parameters

Name: obtenerLatitudGrados

Classifier: ObservatorioAstronomico.PosicionEspacial

Return type: double

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: obtenerDireccionLatitud(): string

General Parameters

Name: obtenerDireccionLatitud

Classifier: ObservatorioAstronomico.PosicionEspacial

Return type: string

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: obtenerLongitudGrados(): double

General **Parameters**

Name: obtenerLongitudGrados

Classifier: ObservatorioAstronomico.PosicionEspacial ...

Return type: double ...

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset **OK** **Cancel** **Apply** **Help**

Operation Specification

Related models: obtenerDireccionLongitud(): string

General **Parameters**

Name: obtenerDireccionLongitud

Classifier: ObservatorioAstronomico.PosicionEspacial ...

Return type: string ...

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset **OK** **Cancel** **Apply** **Help**

Operation Specification [X]

Related models: < > obtenerLatitudCompleta(): string

General Parameters

Name: obtenerLatitudCompleta

Classifier: ObservatorioAstronomico.PosicionEspacial ...

Return type: string ...

Type modifier: <Unspecified> ...

Visibility: public ...

Scope: instance ...

Lower: ...

Upper: ...

Body condition: ...

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification [X]

Related models: < > obtenerLongitudCompleta(): string

General Parameters

Name: obtenerLongitudCompleta

Classifier: ObservatorioAstronomico.PosicionEspacial ...

Return type: string ...

Type modifier: <Unspecified> ...

Visibility: public ...

Scope: instance ...

Lower: ...

Upper: ...

Body condition: ...

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Reset OK Cancel Apply Help

Operation Specification

Related models: convertirACadena(): string

General Parameters

Name:

Classifier: ...

Return type: ...

Type modifier:

Visibility:

Scope:

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Operation Specification

Related models: establecerLatitud(altitud : double, direccion : string): void

General Parameters

Name:

Classifier: ...

Return type: ...

Type modifier:

Visibility:

Scope:

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

The image displays three screenshots of the 'Operation Specification' dialog box, showing different tabs and configurations for two operations: 'establecerLatitud' and 'establecerLongitud'.

Top Left Screenshot: 'establecerLatitud' Parameters Tab

Related models: establecerLatitud(latitud : double, direccion : string) : void

General Parameters

Name	Type	Default Value	Direction
latitud	double		inout
direccion	string		inout

Buttons: Open Specification..., Add..., Remove, Reset, OK, Cancel, Apply, Help

Top Right Screenshot: 'establecerLongitud' General Tab

Related models: establecerLongitud(longitud : double, direccion : string) : void

General Parameters

Name: establecerLongitud

Classifier: ObservatorioAstronomico.PosicionEspecial

Return type: void

Type modifier: <Unspecified>

Visibility: public

Scope: instance

Lower:

Upper:

Body condition:

Description:

☐ Abstract ☐ Leaf ☐ Query ☐ Ordered ☒ Unique

Buttons: Reset, OK, Cancel, Apply, Help

Bottom Screenshot: 'establecerLongitud' Parameters Tab

Related models: establecerLongitud(longitud : double, direccion : string) : void

General Parameters

Name	Type	Default Value	Direction
longitud	double		inout
direccion	string		inout

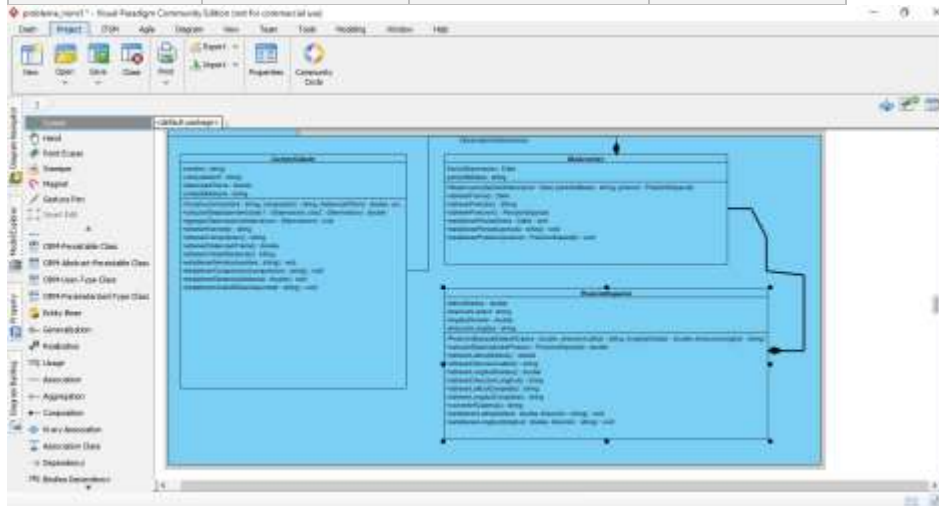
Buttons: Open Specification..., Add..., Remove, Reset, OK, Cancel, Apply, Help

RELACIÓN 1: CuerpoCeleste → Observacion

Clase Origen	Tipo Relación	Clase Destino	Cardinalidad
CuerpoCeleste	Composición	Observacion	1..*

RELACIÓN 2: Observacion → PosicionEspacial

Clase Origen	Tipo Relación	Clase Destino	Cardinalidad
Observacion	Composición	PosicionEspacial	1



URL repositorio:

<https://github.com/Jynsst/practica0>