

Jhonnatan Peñate

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Arquitectura de Software

Miércoles, 28 de enero de 2026

Practicas 1 y 2

```
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python\tutorias> $env:PYTHONPATH="."; python -m pytest -q
..
[100%]
2 passed in 0.10s
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python\tutorias>
```

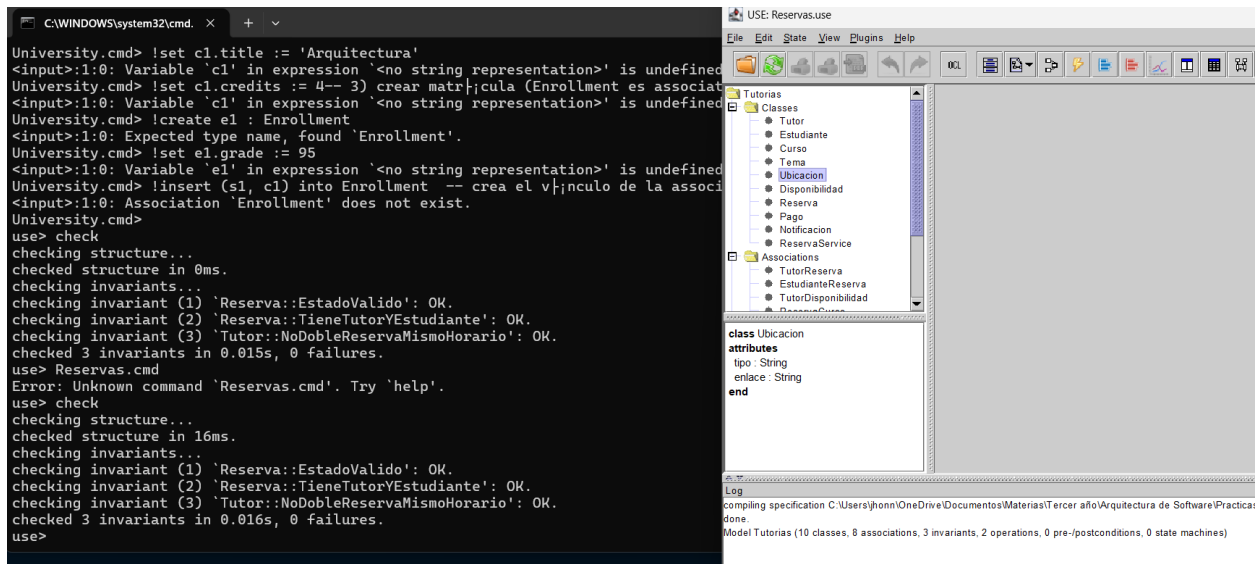
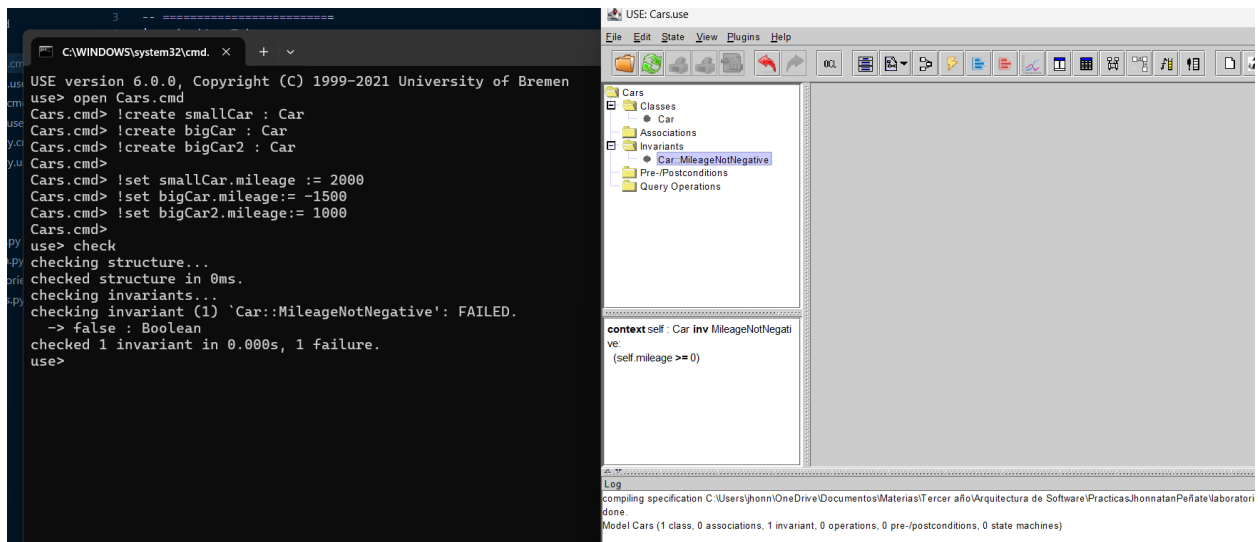
```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  POSTMAN CONSOLE
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python> ^C
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python> cd tutorias; $env:PYTHONPATH="."; python -m uvicorn app.api.main:app --re
load
INFO: Will watch for changes in these directories: ['C:\\Users\\jhonn\\OneDrive\\Documentos\\Mate
rias\\Tercer año\\Arquitectura de Software\\PracticasJhonnatanPeñate\\laboratorio1-python\\tutorias']
INFO: Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO: Started reloader process [13648] using WatchFiles
INFO: Started server process [16084]
INFO: Waiting for application startup.
INFO: Application startup complete.
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  POSTMAN CONSOLE
INFO: Will watch for changes in these directories: ['C:\\Users\\jhonn\\OneDrive\\Documentos\\Mate
rias\\Tercer año\\Arquitectura de Software\\PracticasJhonnatanPeñate\\laboratorio1-python\\tutorias']
INFO: Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO: Started reloader process [13648] using WatchFiles
INFO: Started server process [16084]
INFO: Waiting for application startup.
INFO: Application startup complete.
INFO: Shutting down
INFO: Waiting for application shutdown.
INFO: Application shutdown complete.
INFO: Finished server process [16084]
INFO: Stopping reloader process [13648]
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
```

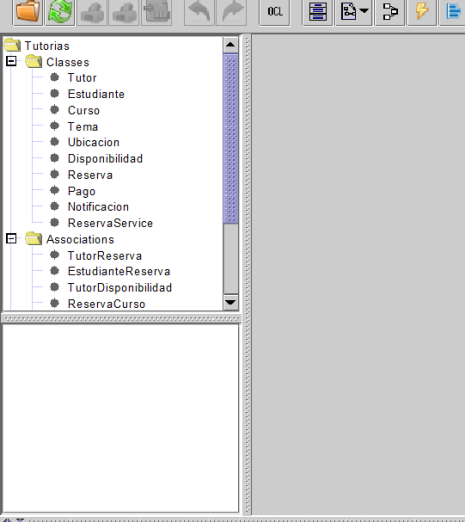
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS POSTMAN CONSOLE

```
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python> ^C
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python> cd tutorias; $env:PYTHONPATH="."; python -m uvicorn app.api.main:app --re
load --host 127.0.0.1 --port 8000
INFO: Will watch for changes in these directories: ['C:\Users\jhonn\OneDrive\Documentos\Mate
rias\Tercer año\Arquitectura de Software\PracticasJhonnatanPeñate\laboratorio1-python\tutorias']
INFO: Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO: Started reloader process [13084] using WatchFiles
INFO: Started server process [22548]
INFO: Waiting for application startup.
INFO: Application startup complete.
```

```
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python> ^C
PS C:\Users\jhonn\OneDrive\Documentos\Materias\Tercer año\Arquitectura de Software\PracticasJhonnatan
Peñate\laboratorio1-python> cd tutorias; $env:PYTHONPATH="."; python -m uvicorn app.api.main:app --ho
st 127.0.0.1 --port 8001
INFO: Started server process [24652]
INFO: Waiting for application startup.
INFO: Application startup complete.
INFO: Uvicorn running on http://127.0.0.1:8001 (Press CTRL+C to quit)
```



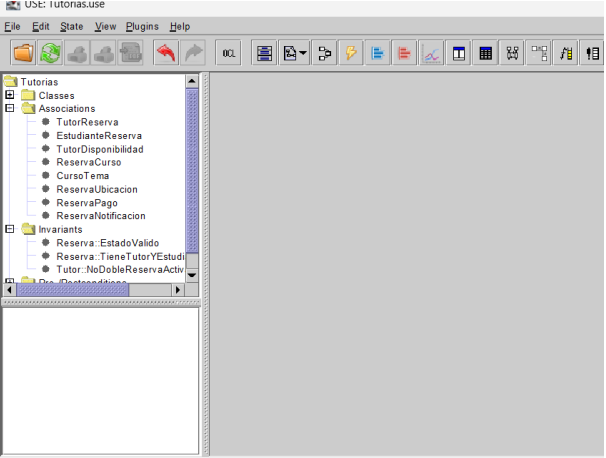
```
Reservas.cmd> !create r3 : Reserva
<input>:1:0: Expected type name, found 'Reserva'.
Reservas.cmd> !set r3.fechaHora := '2026-01-20T12:00'
<input>:1:0: Variable 'r3' in expression '<no string representation>' is u
Reservas.cmd> !insert (t1, r3) into TutorReserva
<input>:1:0: Association 'TutorReserva' does not exist.
Reservas.cmd> !insert (e1, r3) into EstudianteReserva
<input>:1:0: Association 'EstudianteReserva' does not exist.
Reservas.cmd>
use> check
checking structure...
checked structure in 0ms.
checking invariants...
checking invariant (1) 'Reserva::EstadoValido': OK.
checking invariant (2) 'Reserva::TieneTutorYEstudiante': OK.
checking invariant (3) 'Tutor::NoDobleReservaMismoHorario': OK.
checked 3 invariants in 0.016s, 0 failures.
use> !set r2.estado := #CANCELADA
<input>:1:0: Variable 'r2' in expression '<no string representation>' is u
use> !set r3.estado := #CREADA
<input>:1:0: Variable 'r3' in expression '<no string representation>' is u
use> check
checking structure...
checked structure in 0ms.
checking invariants...
checking invariant (1) 'Reserva::EstadoValido': OK.
checking invariant (2) 'Reserva::TieneTutorYEstudiante': OK.
checking invariant (3) 'Tutor::NoDobleReservaMismoHorario': OK.
checked 3 invariants in 0.000s, 0 failures.
use>
```



The screenshot shows the Tutorias model editor. On the left, a tree view displays the model structure: Classes (Tutor, Estudiante, Curso, Tema, Ubicacion, Disponibilidad, Reserva, Pago, Notificacion, ReservaService) and Associations (TutorReserva, EstudianteReserva, TutorDisponibilidad, ReservaCurso). The right pane shows the Log window with the following text:

```
Log
compiling specification C:\Users\jhonn\OneDrive\Documents\Materias\Tercer año\Arq
done.
Model Tutorias (10 classes, 8 associations, 3 invariants, 2 operations, 0 pre-/postcon
```

```
C:\WINDOWS\system32\cmd. X + v
Tutorias.cmd> !insert (e1, r3) into EstudianteReserva
Tutorias.cmd> -- =====
Tutorias.cmd> -- VERIFICAR INVARIANTES
Tutorias.cmd> -- =====
Tutorias.cmd> -- En el prompt de USE ejecutar:
Tutorias.cmd> -- check
Tutorias.cmd> --
Tutorias.cmd> -- Para corregir violaciones:
Tutorias.cmd> -- !set r2.estado := #CANCELADA
Tutorias.cmd> -- !set r3.estado := #CREADA
Tutorias.cmd> -- check
Tutorias.cmd>
use> check
checking structure...
Multiplicity constraint violation in association 'ReservaUbicacion':
  Object 'r2' of class 'Reserva' is connected to 0 objects of class 'Ubica
  at association end 'ubicacion' but the multiplicity is specified as '1'.
Multiplicity constraint violation in association 'ReservaUbicacion':
  Object 'r3' of class 'Reserva' is connected to 0 objects of class 'Ubica
  at association end 'ubicacion' but the multiplicity is specified as '1'.
checked structure in 32ms.
checking invariants...
checking invariant (1) 'Reserva::EstadoValido': FAILED.
  -> false : Boolean
checking invariant (2) 'Reserva::TieneTutorYEstudiante': OK.
checking invariant (3) 'Tutor::NoDobleReservaActivaMismoHorario': FAILED.
  -> false : Boolean
checked 3 invariants in 0.007s, 2 failures.
use>
```



The screenshot shows the Tutorias model editor. On the left, a tree view displays the model structure: Classes (Tutor, Estudiante, Curso, Tema, Ubicacion, Disponibilidad, Reserva, Pago, Notificacion, ReservaService) and Associations (TutorReserva, EstudianteReserva, TutorDisponibilidad, ReservaCurso, ReservaUbicacion, ReservaPago, ReservaNotificacion). The right pane shows the Log window with the following text:

```
Log
compiling specification C:\Users\jhonn\OneDrive\Documents\Materias\Tercer año\Arquitectura de Software\Practicas\jhonnatan\Peñax
done.
Model Tutorias (10 classes, 8 associations, 3 invariants, 2 operations, 3 pre-/postconditions, 0 state machines)
```

```
C:\WINDOWS\system32\cmd. X + v
University.cmd> !create s1 : Student
University.cmd> !set s1.id := 1
University.cmd> !set s1.name := 'Ana'
University.cmd> !set s1.email := 'ana@uni.edu'
University.cmd> !create s2 : Student
University.cmd> !set s2.id := 2
University.cmd> !set s2.name := 'Luis'
University.cmd> !set s2.email := 'ana@uni.edu' -- viola UniqueEmail-- 2) crear c
University.cmd> !create c1 : Course
University.cmd> !set c1.code := 'ARQ101'
University.cmd> !set c1.title := 'Arquitectura'
University.cmd> !set c1.credits := 4-- 3) crear matrícula (Enrollment es asociat
University.cmd> !create e1 : Enrollment
<input>:1:0: Cannot instantiate association class 'Enrollment' without participant
University.cmd> !set e1.grade := 95
<input>:1:0: Variable 'e1' in expression '<no string representation>' is undefined
University.cmd> !insert (s1, c1) into Enrollment -- crea el vínculo de la asoci
University.cmd>
use> check
checking structure...
checked structure in 0ms.
checking invariants...
checking invariant (1) 'Course::CreditsPositive': OK.
checking invariant (2) 'Enrollment::GradeRange': FAILED.
-> false : Boolean
checking invariant (3) 'Student::IdPositive': OK.
checking invariant (4) 'Student::UniqueEmail': FAILED.
-> false : Boolean
checked 4 invariants in 0.015s, 2 failures.
use>
```

USE: University.use

File Edit State View Plugins Help

- University
 - Classes
 - Student
 - Course
 - Enrollment
 - Associations
 - Invariants
 - Student:IdPositive
 - Student:UniqueEmail
 - Course:CreditsPositive
 - Enrollment:GradeRange
 - Pre-/Postconditions
 - Query Operations

Log

compiling specification C:\Users\johann\OneDrive\Documents\Materias\Tercer año
done.

Model University (3 classes, 1 association, 4 invariants, 0 operations, 0 pre-/postco

```
C:\WINDOWS\system32\cmd. X + v
University.cmd> !set c1.credits := 4-- 3) crear matrícula (Enrollment es asociat
University.cmd> !create e1 : Enrollment
<input>:1:0: Cannot instantiate association class 'Enrollment' without participant
University.cmd> !set e1.grade := 95
<input>:1:0: Variable 'e1' in expression '<no string representation>' is undefined
University.cmd> !insert (s1, c1) into Enrollment -- crea el vínculo de la asoci
University.cmd>
use> check
checking structure...
checked structure in 0ms.
checking invariants...
checking invariant (1) 'Course::CreditsPositive': OK.
checking invariant (2) 'Enrollment::GradeRange': FAILED.
-> false : Boolean
checking invariant (3) 'Student::IdPositive': OK.
checking invariant (4) 'Student::UniqueEmail': FAILED.
-> false : Boolean
checked 4 invariants in 0.016s, 2 failures.
use> !set s2.email := 'luis@uni.edu'
use> check
checking structure...
checked structure in 0ms.
checking invariants...
checking invariant (1) 'Course::CreditsPositive': OK.
checking invariant (2) 'Enrollment::GradeRange': FAILED.
-> false : Boolean
checking invariant (3) 'Student::IdPositive': OK.
checking invariant (4) 'Student::UniqueEmail': OK.
checked 4 invariants in 0.016s, 1 failure.
use>
```

USE: University.use

File Edit State View Plugins Help

- University
 - Classes
 - Student
 - Course
 - Enrollment
 - Associations
 - Invariants
 - Student:IdPositive
 - Student:UniqueEmail
 - Course:CreditsPositive
 - Enrollment:GradeRange
 - Pre-/Postconditions
 - Query Operations

Log

compiling specification C:\Users\johann\OneDrive\Documents\Materias\Tercer año\Arquitectura de Software\Pre
done.

Model University (3 classes, 1 association, 4 invariants, 0 operations, 0 pre-/postconditions, 0 state machines)