

PRAC 2

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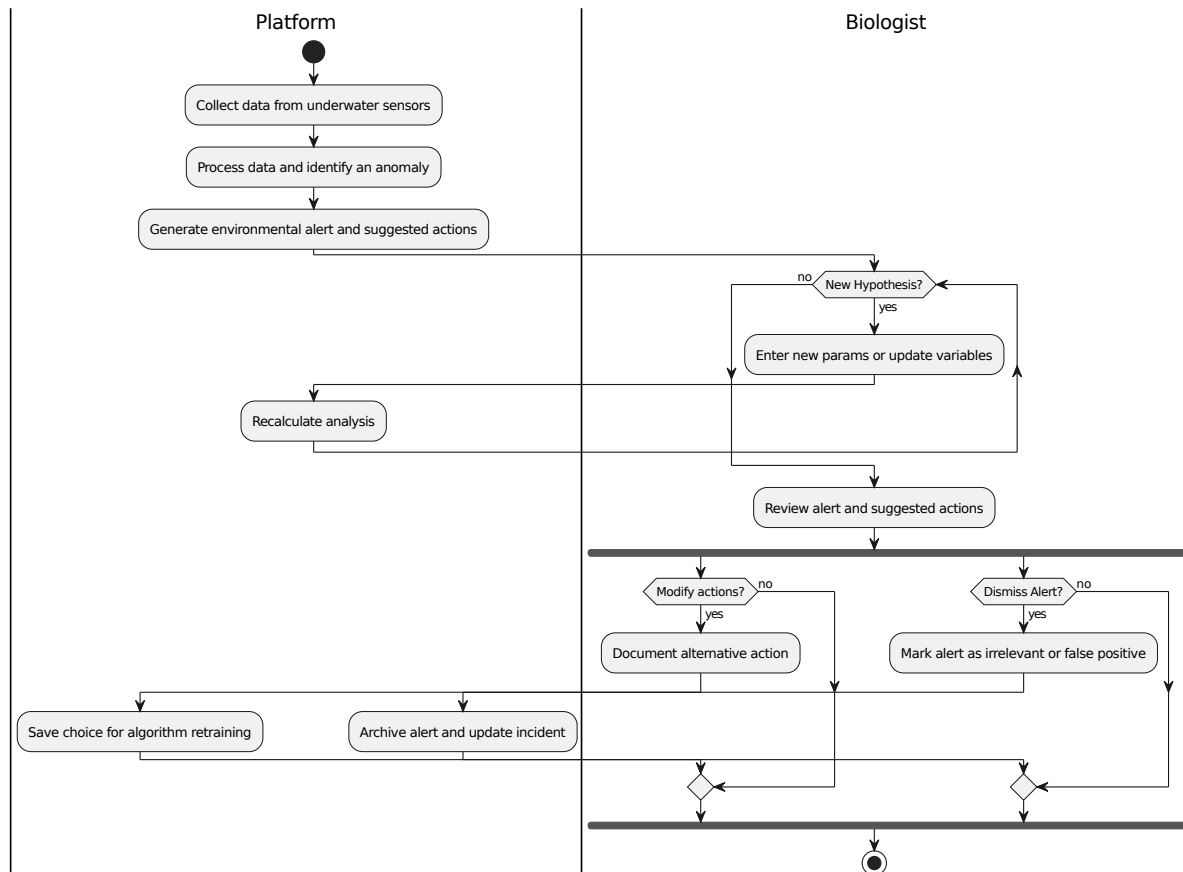
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Self-Responsibility Declaration

I certify that I have carried out Practice 2 completely individually and only with the help that the teaching staff of this subject considers appropriate, according to the instructions explained in the “Originality in the evaluation” section of the classroom. I understand that non-original work and/or the use of generative AI will mean that the submitted activity will not be corrected and will automatically be assigned a grade of 0.

Question 1

Here is a Swimlane activity diagram based on the success and alternate scenarios.



Question 2

Use cases

Old ones:

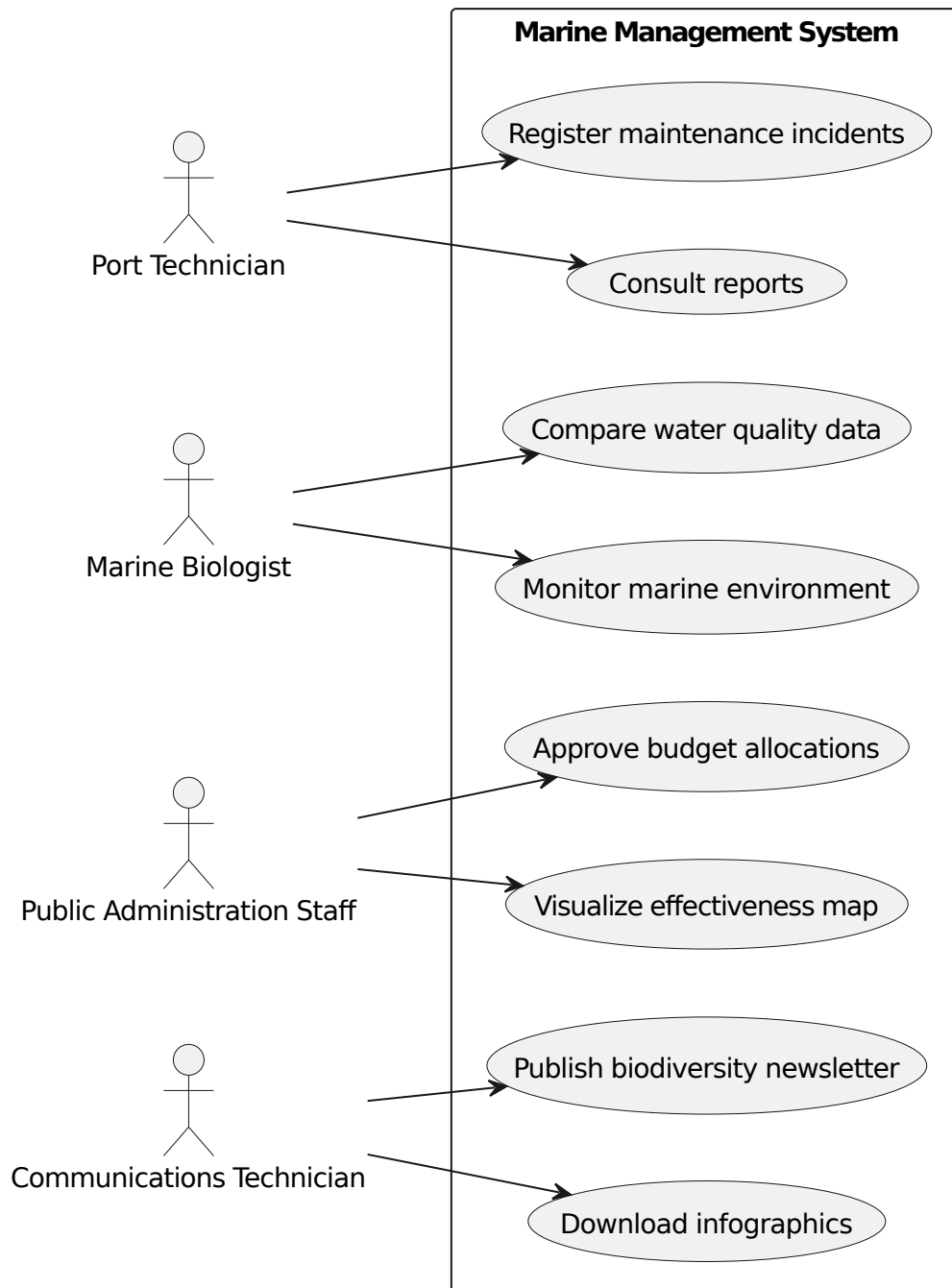
1. As a port technician, I want to consult reports to know the status of marine space indicators.
2. As a marine biologist, I want to monitor the marine environment to detect changes in the ecosystem and adjust regeneration strategies to ensure its health.
3. As public administration staff, I want to visualize on a map the effectiveness of interventions in various ports to efficiently allocate available funds.
4. As a communications technician, I want to download infographics to clearly show citizens the improvement in biodiversity.

New ones:

5. As a port technician, I want to register maintenance incidents for marine sensors.
6. As a marine biologist, I want to compare current water quality data with historical data.

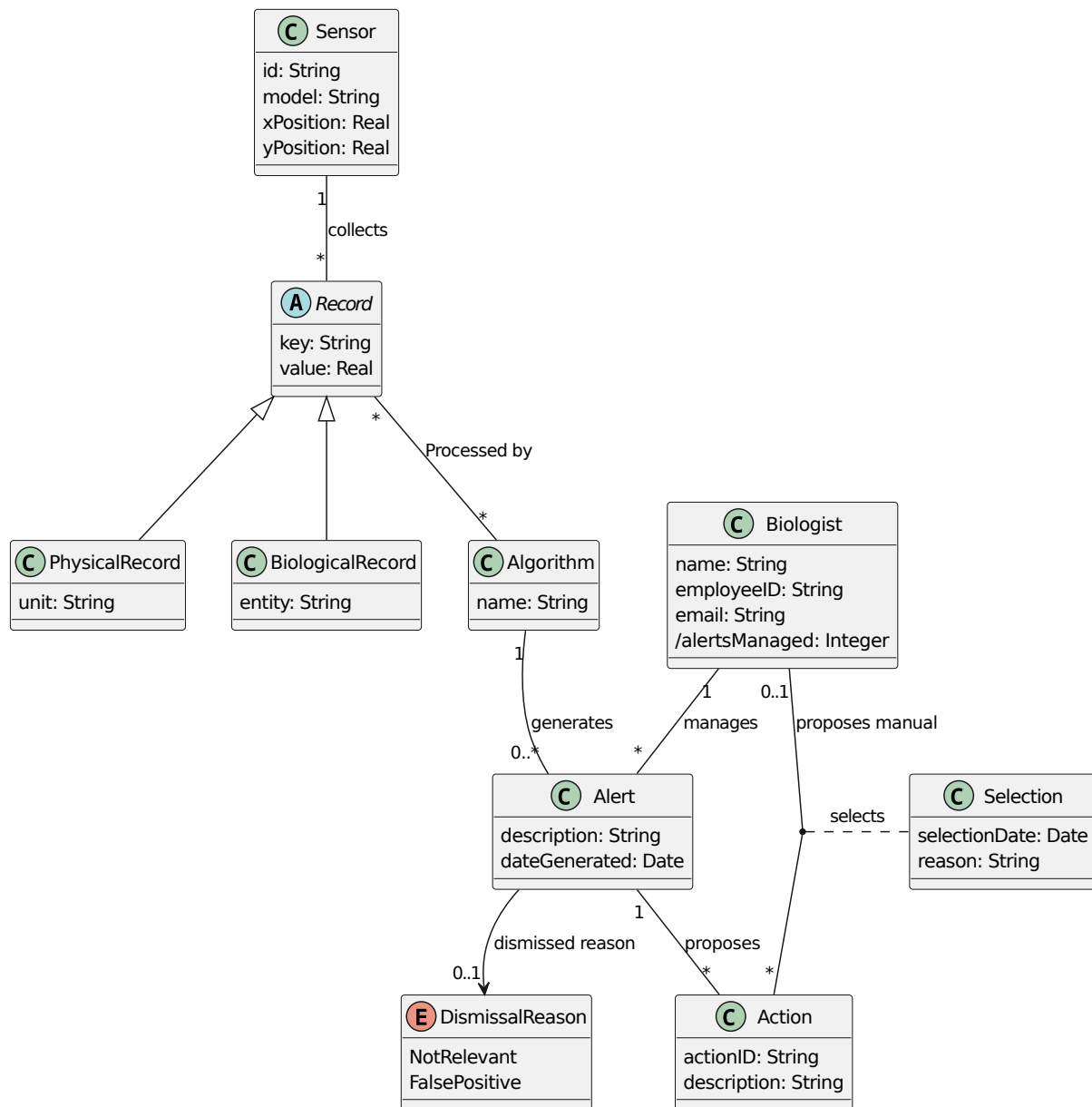
7. As public administration Staff, I want to approve budget allocations for specific port interventions.
8. As a communications technician, I want to publish an annual biodiversity newsletter for the public web portal.

Use case diagram



Question 3

Class diagram



Keys, constraints and derived information

Keys of the domain classes

These attributes act as unique identifiers for each class:

- **Sensor:** `id`
- **Action:** `actionID`
- **Biologist:** `employeeID`
- **Algorithm:** `name` : Since the system will store the name to identify the algorithm that processes data, it functions as the unique key here.

Integrity Constraints

- **Record Specialization:** Every `Record` has to be specifically a `PhysicalRecord` or `BiologicalRecord` . No plain generic records allowed, so

`Record` works as an abstract class.

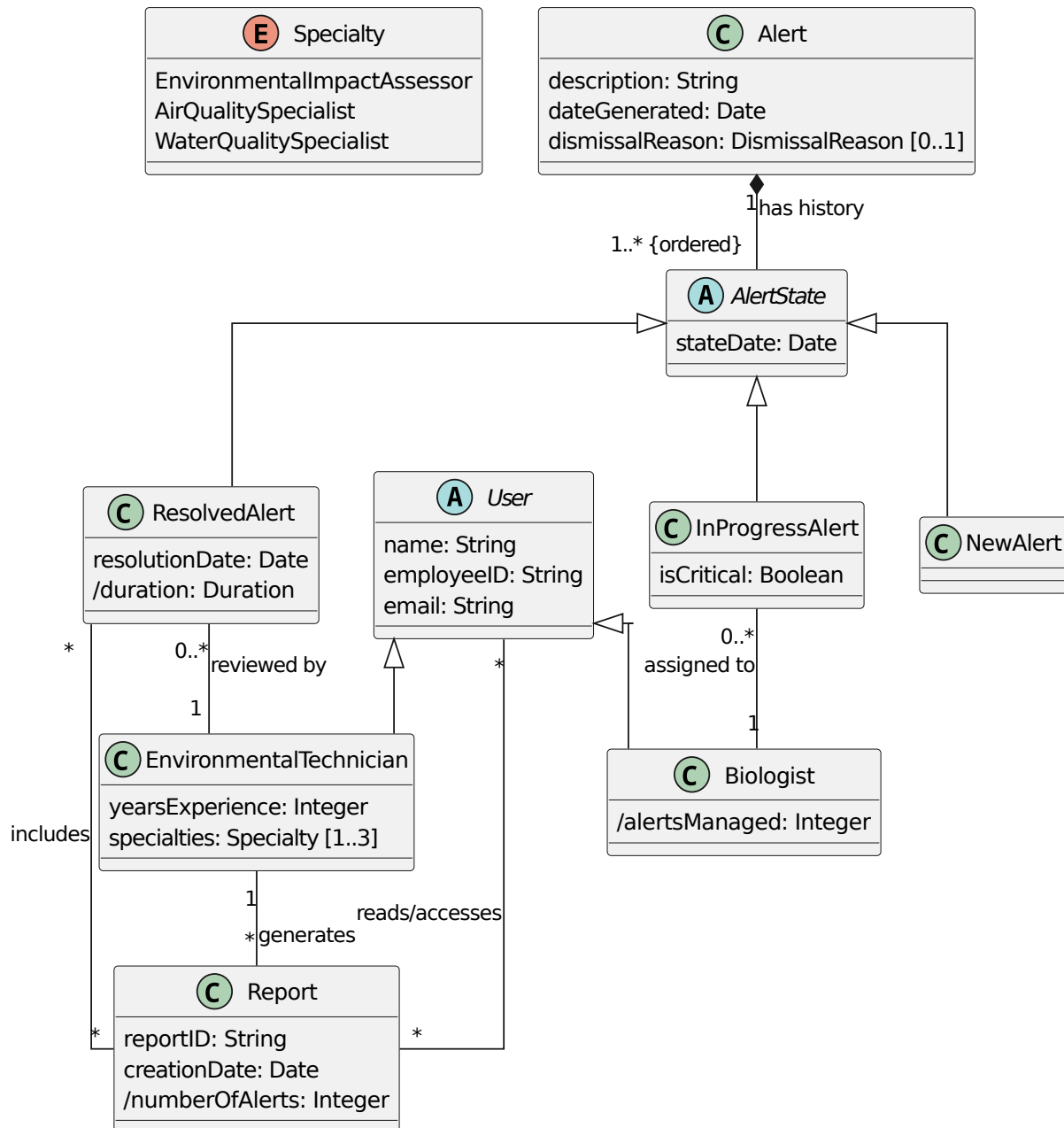
- **Dismissal Reason Validity:** The `dismissalReason` is limited to just “not relevant” or “false positive” which may be expressed as an enumeration.
- **Dismissal Logic:** You only store a `dismissalReason` when the alert is actually dismissed.
- **Alert Management:** Each `Alert` gets handled by just one `Biologist`, as the description notes that an alert is managed only by a single biologist.
- **Action Origin:** An `Action` comes from either an `Algorithm` or a `Biologist`, but never from both at the same time (this is a case of an exclusive OR).

Derived Information

- **Biologist:** `/alertsManaged`: You can get this by simply counting how many `Alert` instances are linked to the `Biologist` via the “manages” relationship right now.

Question 4

Class Diagram



Keys, constraints and derived information

Keys of the domain classes

These attributes act as unique identifiers for their class:

- **Sensor:** `id`
- **Action:** `actionID`
- **Report:** `reportID`
- **User (Biologist / EnvironmentalTechnician):** `employeeID`
- **Algorithm:** `name` : since algorithms are named uniquely in the system.
- **Record:** `Sensor.id` + `timestamp` + `key` . It's not one single field, but the combination of all three do make it unique.

Integrity Constraints

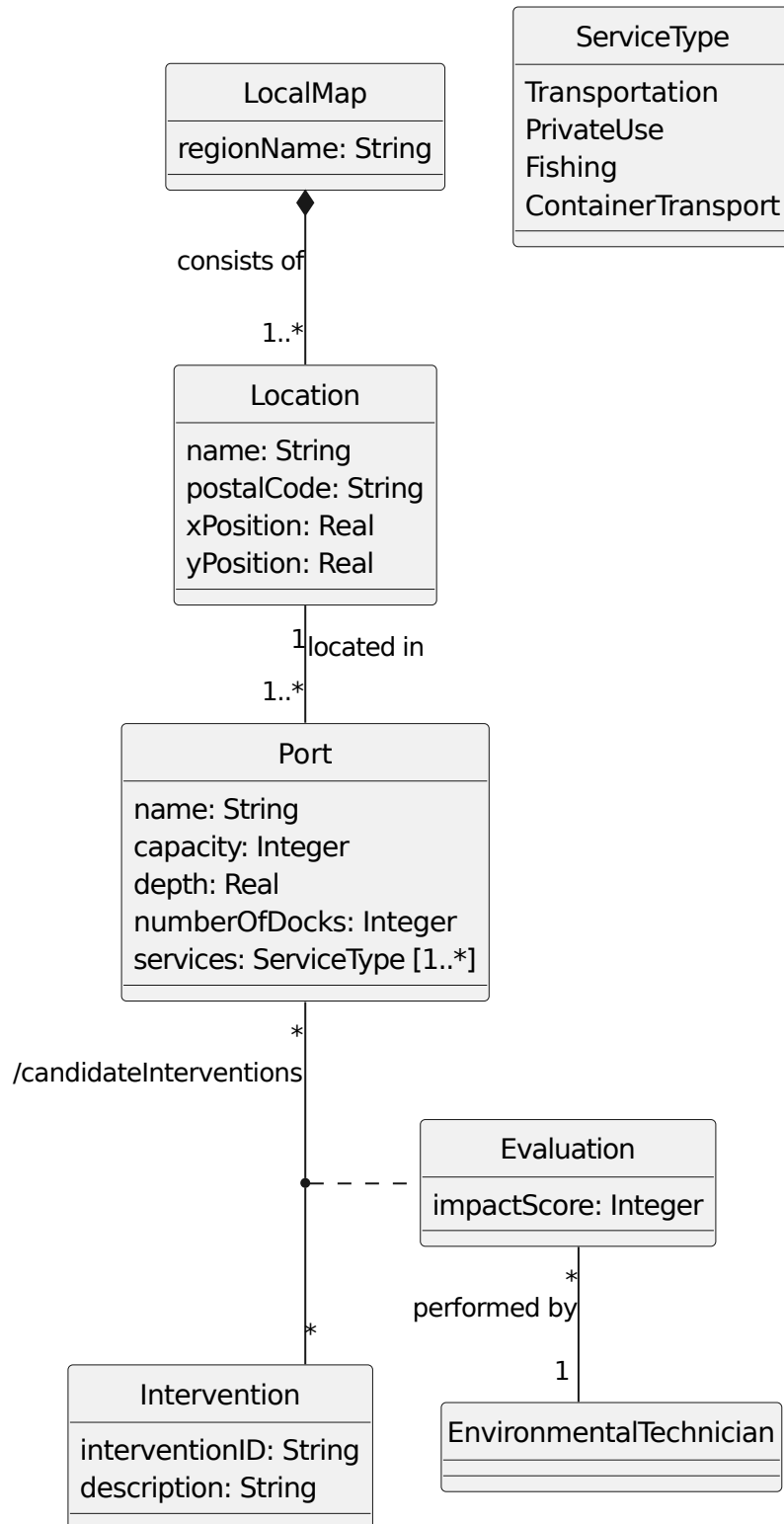
- **State Transitions:** Alerts have to go through states in order from `New` to `InProgress` to `Resolved`.
- **InProgress Assignment:** Once it's `InProgress`, it has to be handed off to a `Biologist`.
- **Resolution Review:** For `Resolved` alerts, they need a check from an `EnvironmentalTechnician` before closing.
- **Report Content:** Reports can only pull in alerts that are already `Resolved`.
- **Technician Specialties:** Each `EnvironmentalTechnician` needs 1 to 3 specialties (thus the [1..3] in the diagram).
- **Dismissal Status:** If there's a `dismissalReason`, the alert isn't active anymore.
- **User Uniqueness:** We can't have two users with the same `employeeID` or `email`.

Derived Information

- **Biologist:** `/alertsManaged`: we can count the `InProgressAlert` assigned to that Biologist at a given time.
- **ResolvedAlert:** `/duration`: we can subtract the `dateGenerated` from the `resolutionDate` to get how long it took.
- **Report:** `/numberOfAlerts`: we can count the `ResolvedAlert` connected to the report through the "includes" link.

Question 5

Class Diagram



Note

The Classes from previous exercises are omitted because they remain the same. They all stem from the `EnvironmentalTechnician`

Keys, constraints and derived information

Keys of the domain classes

- **Location:** postalCode
- **Intervention:** interventionID
- **LocalMap:** regionName
- **Port:** name (assuming port names are unique within a location/map context, though `name` is the standard identifier provided)

Integrity Constraints

- **Location:** `postalCode` must be unique.
- **Port:** `services` must contain at least one value (`[1..*]`).
- **Evaluation:** `impactScore` must be an integer between 1 and 10.
- **EnvironmentalTechnician:** A single technician performs the evaluation.

Derived Information

- **Port:** `/candidateInterventions` : Represents interventions calculated by the system based on the impact of interventions in ports with similar characteristics, rather than executed interventions.