Senior Python Developer Coding Assessment

Dear Candidate,

This assessment evaluates your ability to process an XML request, apply business rules, and generate a JSON response. Please carefully review the following instructions, sample request, and sample response.

Task

Implement Business Logic

Write Python code to:

- Parse the XML request using appropriate Python libraries (e.g., `xml.etree.ElementTree` or `lxml`).
- Validate the request data against the defined rules.
- Apply calculations and transformations as specified.
- Generate a JSON response conforming to the sample structure.
- Use proper type hints.

Core Requirements

Language Code
- Use `var_filters_cg` for language validation.
- `VALID_LANGUAGES = {'en', 'fr', 'de', 'es'}`
- Default language: `en`

Options Quota
- `optionsQuota` must be an integer no greater than `50`. If not provided, default to `20`.

Required Parameters
- `Configuration->Parameters` must include:
  - `password` (str)
  - `username` (str)
  - `CompanyID` (integer)
- Return an error if any are missing.

Search Type and Destinations
- If `SearchType` is `"Single"`, `<AvailDestinations>` must contain exactly one element.
- If `SearchType` is `"Multiple"`, `<AvailDestinations>` can have multiple elements (maximum defined by `AllowedHotelCount`).

Date Validation
- `StartDate` must be at least 2 days after today.
- The stay duration (`EndDate - StartDate`) must be at least 3 nights.
- Use Python's `datetime` module for calculations.

Currency
- Allowed values: `EUR`, `USD`, `GBP`.
- Default: `EUR`.

Nationality
- Allowed values: `US`, `GB`, `CA`.
- Default: `US`.

Markets
- Allowed values: `US`, `GB`, `CA`, `ES`.
- Default: `ES`.

Room and Passenger Rules
- Each `<Paxes>` block represents a room (maximum: `AllowedRoomCount`).
- Each `<Pax>` block represents a passenger (maximum per room: `AllowedRoomGuestCount`).
- Passengers age 5 or under are `Child`. Others are `Adult`.
- A `Child` must have an accompanying `Adult` in the same room.
- Maximum `Child` per room: `AllowedChildCountPerRoom`.

Response Operations
- Calculate `selling_price` by applying the markup percentage to `price->net`.
- If the `price->currency` differs from the request `Currency`, convert using the provided exchange rates.
- Update response fields: `selling_price`, `markup`, `exchange_rate`, and `selling_currency`.

Sample Request

```xml
<AvailRQ xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <timeoutMilliseconds>25000</timeoutMilliseconds>
    <source>
        <languageCode>en</languageCode>
    </source>
    <optionsQuota>20</optionsQuota>
    <Configuration>
        <Parameters>
            <Parameter password="XXXXXXXXXX" username="YYYYYYYYY"
CompanyID="123456"/>
        </Parameters>
    </Configuration>
    <SearchType>Multiple</SearchType>
    <StartDate>14/10/2024</StartDate>
    <EndDate>16/10/2024</EndDate>
    <Currency>USD</Currency>
    <Nationality>US</Nationality>
</AvailRQ>
```

Sample Response

```
[
  {
    "id": "A#1",
    "hotelCodeSupplier": "39971881",
    "market": "US",
    "price": {
      "minimumSellingPrice": null,
      "currency": "USD",
      "net": 132.42,
      "selling_price": 136.66,
      "selling_currency": "USD",
      "markup": 3.2,
      "exchange_rate": 1.0
    }
  }
]
```

This assessment focuses solely on coding. Please provide a working implementation that follows the outlined requirements. Good luck!

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