

Experiment ‘p4_3_e_positions_of_vowels’ Results

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Experiment outcome: SUCCESS

Bad responses: 0

Responses containing assume : 0

Resolution attempts: 1

Hard fails (resolution): 0

Soft fails (resolution): 0

Verification attempts: 1

Problem Specification

Problem name: p4_3_e_positions_of_vowels

Natural language statement: Write a method that takes a string and returns the positions of all vowels in the string.

Method signature: p4_3_e_positions_of_vowels(s: string) returns (positions: seq<int>)

Ensures

- forall p :: p in positions ==> 0 <= p < |s| && s[p] in ['a','e','i','o','u','A','E','I','O','U']
- forall i :: 0 <= i < |s| && s[i] in ['a','e','i','o','u','A','E','I','O','U'] ==> i in positions

GenAI interactions

Below you will find all interactions between the ‘user’ (program) and the ‘assistant’ (OpenAI).

Program → GenAI

You are given the following task to perform in Dafny:

Write a method that takes a string and returns the positions of all vowels in the string.

The signature should be:

method p4_3_e_positions_of_vowels(s: string) returns (positions: seq<int>)

The method should respect the following contract:

ensures forall p :: p in positions ==> 0 <= p < |s| && s[p] in ['a','e','i','o','u','A','E','I','O','U'], ensures forall i :: 0 <= i < |s| && s[i] in ['a','e','i','o','u','A','E','I','O','U'] ==> i in positions

Produce and show only the Dafny body of this method, including the curly braces that surround it. Do not show the signature nor contract. You must not use 'assume' anywhere in your code.

GenAI → Program

System fingerprint:

ID: chatcmpl-Co4dvrTStGcPtvC44zdReNibCGOyQ

Model: gpt-5.1-chat-latest

Created at: 1766050283

Finish reason: stop

Usage: 420 tokens in, and 334 tokens out

```
{
  var r: seq<int> := [];
  var i := 0;
  while i < |s|
    invariant 0 <= i <= |s|
    invariant forall p :: p in r ==> 0 <= p < i && s[p] in ['a','e','i','o','u','A','E','I','O','U']
    invariant forall j :: 0 <= j < i && s[j] in ['a','e','i','o','u','A','E','I','O','U'] ==> j in r
  {
    if s[i] in ['a','e','i','o','u','A','E','I','O','U'] {
      r := r + [i];
    }
    i := i + 1;
  }
  positions := r;
}
```

Final Program

```
method p4_3_e_positions_of_vowels(s: string) returns (positions: seq<int>)
  ensures forall p :: p in positions ==> 0 <= p < |s| && s[p] in ['a','e','i','o','u'
    ↪ ', 'A','E','I','O','U']
  ensures forall i :: 0 <= i < |s| && s[i] in ['a','e','i','o','u','A','E','I','O',''
    ↪ 'U'] ==> i in positions
{
  var r: seq<int> := [];
  var i := 0;
  while i < |s|
    invariant 0 <= i <= |s|
    invariant forall p :: p in r ==> 0 <= p < i && s[p] in ['a','e','i','o','u','A','E','I'
      ↪ ', 'O','U']
    invariant forall j :: 0 <= j < i && s[j] in ['a','e','i','o','u','A','E','I','O','U']
      ↪ ==> j in r
  {
    if s[i] in ['a','e','i','o','u','A','E','I','O','U'] {
      r := r + [i];
    }
    i := i + 1;
  }
  positions := r;
}
```

Total Token Usage

Input tokens: 420

Output tokens: 334

Reasoning tokens: 128

Sum of ‘total tokens’: 754

Experiment Timings

Overall Experiment started at 1766050285056, ended at 1766050291171, lasting 6115ms (6.12 seconds)

Iteration #1 started at 1766050285057, ended at 1766050291171, lasting 6114ms (6.11 seconds)