

Experiment ‘p4_3_c_replace_vowels’ Results

December 18, 2025

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_c_replace_vowels

Natural language statement: Write a method that takes a string and returns the string, with all vowels replaced by an underscore.

Method signature: p4_3_c_replace_vowels(s: string) returns (result: string)

Ensures

- $|result| == |s|$
- $\forall i :: 0 \leq i < |s| \Rightarrow (\text{if } s[i] \in ['a', 'e', 'i', 'o', 'u', 'A', 'E', 'I', 'O', 'U'] \text{ then } result[i] == '_' \text{ else } result[i] == s[i])$

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 string, with all vowels replaced by an ↪ underscore.

The signature should be:

```
method p4_3_c_replace_vowels(s: string) returns (result: string)
```

The method should respect the following contract:

```
ensures |result| == |s|, ensures forall i :: 0 <= i < |s| ==> (if s[i] in ['a','e','i','o'  
↪ ','u','A','E','I','O','U'] then result[i] == '_' else result[i] == s[i])
```

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: chatmpl-Co4d8G99TUlKGK0DBy0VId9lNhgoN

Model: gpt-5.1-chat-latest

Created at: 1766050234

Finish reason: stop

Usage: 374 tokens in, and 422 tokens out

```
{
    var arr := new char[|s|];
    var i := 0;
    while i < |s|
        invariant 0 <= i <= |s|
        invariant forall j :: 0 <= j < i ==> (if s[j] == 'a' || s[j] == 'e' || s[j] == 'i' ||
            ↪ s[j] == 'o' || s[j] == 'u' || s[j] == 'A' || s[j] == 'E' || s[j] == 'I' || s[j] ==
            ↪ == 'O' || s[j] == 'U' then arr[j] == '_' else arr[j] == s[j])
    {
        var c := s[i];
        if c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u' ||
            c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U'
        {
            arr[i] := '_';
        } else {
            arr[i] := c;
        }
        i := i + 1;
    }
```

```

    result := arr[..];
}

```

Final Program

```

method p4_3_c_replace_vowels(s: string) returns (result: string)
    ensures |result| == |s|
    ensures forall i :: 0 <= i < |s| ==> (if s[i] in ['a','e','i','o','u','A','E','I'
        ↪ ','O','U'] then result[i] == '_' else result[i] == s[i])
{
    var arr := new char[|s|];
    var i := 0;
    while i < |s|
        invariant 0 <= i <= |s|
        invariant forall j :: 0 <= j < i ==> (if s[j] == 'a' || s[j] == 'e' || s[j] == 'i' ||
            ↪ s[j] == 'o' || s[j] == 'u' || s[j] == 'A' || s[j] == 'E' || s[j] == 'I' || s[j]
            ↪ == 'O' || s[j] == 'U' then arr[j] == '_' else arr[j] == s[j])
    {
        var c := s[i];
        if c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u' ||
            c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U'
        {
            arr[i] := '_';
        } else {
            arr[i] := c;
        }
        i := i + 1;
    }
    result := arr[..];
}

```

Total Token Usage

Input tokens: 374

Output tokens: 422

Reasoning tokens: 128

Sum of ‘total tokens’: 796

Experiment Timings

Overall Experiment started at 1766050235460, ended at 1766050242242, lasting 6782ms (6.78 seconds)

Iteration #1 started at 1766050235460, ended at 1766050242242, lasting 6782ms (6.78 seconds)