

Experiment ‘p6_7_reverse_array’ Results

December 18, 2025

Experiment outcome: SUCCESS

Bad responses: 0

Responses containing assume : 0

Resolution attempts: 2

Hard fails (resolution): 1

Soft fails (resolution): 0

Verification attempts: 1

Problem Specification

Problem name: p6_7_reverse_array

Natural language statement: Write a method that reverses the sequence of elements in an array. For example, if you call the method with the array [1, 4, 9, 16, 9, 7, 4, 9, 11] then the array is changed to [11, 9, 4, 7, 9, 16, 9, 4, 1].

Method signature: p6_7_reverse_array(arr: seq<int>) returns (reversed: seq<int>)

Ensures

- $|\text{reversed}| == |\text{arr}|$
- $\forall i :: 0 \leq i < |\text{reversed}| \implies \text{reversed}[i] == \text{arr}[|\text{arr}| - 1 - i]$

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 reverses the sequence of elements in an array. For example, if you
→ call the method with the array [1, 4, 9, 16, 9, 7, 4, 9, 11] then the array is
→ changed to [11, 9, 4, 7, 9, 16, 9, 4, 1].

The signature should be:

```
method p6_7_reverse_array(arr: seq<int>) returns (reversed: seq<int>)
```

The method should respect the following contract:

```
ensures |reversed| == |arr|, ensures forall i :: 0 <= i < |reversed| ==> reversed[i] ==  
→ arr[|arr| - 1 - 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-Co5BZJqAWXcGLgiRPeDXstDkoFiVZ

Model: gpt-5.1-chat-latest

Created at: 1766052369

Finish reason: stop

Usage: 460 tokens in, and 112 tokens out

```
{  
    reversed := seq i | 0 <= i < |arr| :: arr[|arr| - 1 - i];  
}
```

Program → GenAI

When using dafny resolve, the below error is emitted and resolve fails:

```
problem_data/p6_7_reverse_array/program.dfy(5,18): Error: openparen expected  
|  
5 | reversed := seq i | 0 <= i < |arr| :: arr[|arr| - 1 - i];  
| ^
```

```
problem_data/p6_7_reverse_array/program.dfy(5,37): Error: comma expected  
|  
5 | reversed := seq i | 0 <= i < |arr| :: arr[|arr| - 1 - i];  
| ^
```

```
2 parse errors detected in program.dfy
```

Correct the error by altering only the method body. Produce and show only the Dafny body,
↳ 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-Co5BcwmkazH1aXpHBOM69bWnSeTAW

Model: gpt-5.1-chat-latest

Created at: 1766052372

Finish reason: stop

Usage: 667 tokens in, and 384 tokens out

```
{
    var r := [];
    var i := |arr|;
    while i > 0
        invariant 0 <= i <= |arr|
        invariant |r| == |arr| - i
        invariant forall k :: 0 <= k < |r| ==> r[k] == arr[|arr| - 1 - k]
    {
        i := i - 1;
        r := r + [arr[i]];
    }
    reversed := r;
}
```

Final Program

```
method p6_7_reverse_array(arr: seq<int>) returns (reversed: seq<int>)
    ensures |reversed| == |arr|
    ensures forall i :: 0 <= i < |reversed| ==> reversed[i] == arr[|arr| - 1 - i]
{
    var r := [];
    var i := |arr|;
    while i > 0
        invariant 0 <= i <= |arr|
        invariant |r| == |arr| - i
        invariant forall k :: 0 <= k < |r| ==> r[k] == arr[|arr| - 1 - k]
    {
        i := i - 1;
        r := r + [arr[i]];
    }
    reversed := r;
}
```

Total Token Usage

Input tokens: 1127

Output tokens: 496

Reasoning tokens: 320

Sum of ‘total tokens’: 1623

Experiment Timings

Overall Experiment started at 1766052371854, ended at 1766052380730, lasting 8876ms (8.88 seconds)

Iteration #1 started at 1766052371855, ended at 1766052374327, lasting 2472ms (2.47 seconds)

Iteration #2 started at 1766052374327, ended at 1766052380730, lasting 6403ms (6.40 seconds)