

Experiment 'p6_1_process_array_reverse_order' Results

December 18, 2025

Experiment outcome: SUCCESS

Bad responses: 0

Responses containing assume : 0

Resolution attempts: 7

Hard fails (resolution): 6

Soft fails (resolution): 0

Verification attempts: 1

Problem Specification

Problem name: p6_1_process_array_reverse_order

Natural language statement: Write a method that takes an array of ten integers and then returns all elements in reverse order.

Method signature: p6_1_process_array_reverse_order(arr: seq<int>) returns (reversed: seq<int>)

Ensures

- `|reversed| == |arr|`
- `forall i :: 0 <= i < |reversed| ==> reversed[i] == arr[|arr| - 1 - i]`

Requires

- `|arr| == 10`

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 an array of ten integers and then returns all elements in
↪ reverse order.

The signature should be:

method p6_1_process_array_reverse_order(arr: seq<int>) returns (reversed: seq<int>)

The method should respect the following contract:

requires |arr| == 10, 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: chatcmpl-Co55M410KckB6ZWXrs9YNDTYxQSHU

Model: gpt-5.1-chat-latest

Created at: 1766051984

Finish reason: stop

Usage: 346 tokens in, and 48 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_1_process_array_reverse_order/program.dfy(6,18): Error: openparen
↪ expected

```
|
6 | reversed := seq i | 0 <= i < |arr| :: arr[|arr| - 1 - i];
| ^
```

problem_data/p6_1_process_array_reverse_order/program.dfy(6,37): Error: comma expected

```
|
6 | 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: chatcmpl-Co55P72PBbNCx9zOMQ8YAYdolKqQ6

Model: gpt-5.1-chat-latest

Created at: 1766051987

Finish reason: stop

Usage: 618 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_1_process_array_reverse_order/program.dfy(6,36): Error: comma expected

```
|  
6 | reversed := seq(i | 0 <= i < |arr|) arr[|arr| - 1 - i];  
| ^
```

1 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: chatcmpl-Co55SOcOgp2GFpsWbaCeAm8u82aeV

Model: gpt-5.1-chat-latest

Created at: 1766051990

Finish reason: stop

Usage: 738 tokens in, and 114 tokens out

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

Program → GenAI

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

```
problem_data/p6_1_process_array_reverse_order/program.dfy(6,18): Error: openparen
  ↳ expected
```

```
|
6 | reversed := seq i | 0 <= i && i < |arr| :: arr[|arr| - 1 - i];
| ^
```

```
problem_data/p6_1_process_array_reverse_order/program.dfy(6,42): Error: comma expected
```

```
|
6 | reversed := seq i | 0 <= i && 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: chatcmpl-Co55UOt6YXXheCjF26cJzASrSecC1

Model: gpt-5.1-chat-latest

Created at: 1766051992

Finish reason: stop

Usage: 1045 tokens in, and 240 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_1_process_array_reverse_order/program.dfy(6,37): Error: comma expected
```

```
|
6 | reversed := seq(i | 0 <= i < |arr| :: arr[|arr| - 1 - i]);
| ^
```

1 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: chatcmpl-Co55XW8OnURoOrlqvq2LpnhFRtgE6

Model: gpt-5.1-chat-latest

Created at: 1766051995

Finish reason: stop

Usage: 1161 tokens in, and 241 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_1_process_array_reverse_order/program.dfy(6,19): Error: openparen
  ↪ expected
```

```
6 | reversed := (seq i | 0 <= i < |arr| :: arr[|arr| - 1 - i]);
  | ^
```

```
problem_data/p6_1_process_array_reverse_order/program.dfy(6,38): Error: comma expected
```

```
6 | 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: chatcmpl-Co55belyNAkz7Aal4IQDz7saLYkFg

Model: gpt-5.1-chat-latest

Created at: 1766051999

Finish reason: stop

Usage: 1463 tokens in, and 304 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_1_process_array_reverse_order/program.dfy(6,18): Error: unresolved
  ↳ identifier: i
|
6 | reversed := seq(i | 0 <= i < |arr|, arr[|arr| - 1 - i]);
| ^

problem_data/p6_1_process_array_reverse_order/program.dfy(6,27): Error: unresolved
  ↳ identifier: i
|
6 | reversed := seq(i | 0 <= i < |arr|, arr[|arr| - 1 - i]);
| ^

problem_data/p6_1_process_array_reverse_order/program.dfy(6,54): Error: unresolved
  ↳ identifier: i
|
6 | reversed := seq(i | 0 <= i < |arr|, arr[|arr| - 1 - i]);
| ^

problem_data/p6_1_process_array_reverse_order/program.dfy(6,24): Error: sequence
  ↳ construction must use an integer-based expression for the sequence size (got bool)
|
6 | reversed := seq(i | 0 <= i < |arr|, arr[|arr| - 1 - i]);
| ^^

problem_data/p6_1_process_array_reverse_order/program.dfy(6,20): Error: first argument to
  ↳ | must be of a bitvector type (instead got int)
|
6 | reversed := seq(i | 0 <= i < |arr|, arr[|arr| - 1 - i]);
| ^

problem_data/p6_1_process_array_reverse_order/program.dfy(6,20): Error: second argument
  ↳ to | must be of a bitvector type (instead got int)
|
6 | reversed := seq(i | 0 <= i < |arr|, arr[|arr| - 1 - i]);
| ^

problem_data/p6_1_process_array_reverse_order/program.dfy(6,41): Error: sequence-
  ↳ construction initializer expression expected to have type 'nat ~> ?' (instead got
  ↳ 'int')
|
6 | reversed := seq(i | 0 <= i < |arr|, arr[|arr| - 1 - i]);
| ^

7 resolution/type 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: chatcmpl-Co55fgF3vs4W5E4yx3ySs9yM2pq1i

Model: gpt-5.1-chat-latest

Created at: 1766052003

Finish reason: stop

Usage: 2403 tokens in, and 385 tokens out

```
{
  var tmp := new int[|arr|];
  var j := 0;
  while j < |arr|
    invariant 0 <= j <= |arr|
    invariant forall k :: 0 <= k < j ==> tmp[k] == arr[|arr| - 1 - k]
  {
    tmp[j] := arr[|arr| - 1 - j];
    j := j + 1;
  }
  reversed := tmp[..];
}
```

Final Program

```
method p6_1_process_array_reverse_order(arr: seq<int>) returns (reversed: seq<int>)
  requires |arr| == 10
  ensures |reversed| == |arr|
  ensures forall i :: 0 <= i < |reversed| ==> reversed[i] == arr[|arr| - 1 - i]
{
  var tmp := new int[|arr|];
  var j := 0;
  while j < |arr|
    invariant 0 <= j <= |arr|
    invariant forall k :: 0 <= k < j ==> tmp[k] == arr[|arr| - 1 - k]
  {
    tmp[j] := arr[|arr| - 1 - j];
    j := j + 1;
  }
  reversed := tmp[..];
}
```

Total Token Usage

Input tokens: 7774

Output tokens: 1444

Reasoning tokens: 1024

Sum of ‘total tokens’: 9218

Experiment Timings

Overall Experiment started at 1766051986403, ended at 1766052011886, lasting 25483ms (25.48 seconds)

Iteration #4 started at 1766051994587, ended at 1766051997832, lasting 3245ms (3.25 seconds)

Iteration #5 started at 1766051997832, ended at 1766052001260, lasting 3428ms (3.43 seconds)

Iteration #6 started at 1766052001260, ended at 1766052005726, lasting 4466ms (4.47 seconds)

Iteration #7 started at 1766052005726, ended at 1766052011885, lasting 6159ms (6.16 seconds)

Iteration #1 started at 1766051986404, ended at 1766051989006, lasting 2602ms (2.60 seconds)

Iteration #2 started at 1766051989006, ended at 1766051991979, lasting 2973ms (2.97 seconds)

Iteration #3 started at 1766051991979, ended at 1766051994587, lasting 2608ms (2.61 seconds)