

# Experiment ‘p6\_2\_c\_replace\_even\_with\_zero’ Results

December 18, 2025

**Experiment outcome:** SUCCESS

**Bad responses:** 0

**Responses containing assume :** 0

**Resolution attempts:** 6

**Hard fails (resolution):** 5

**Soft fails (resolution):** 0

**Verification attempts:** 1

## Problem Specification

**Problem name:** p6\_2\_c\_replace\_even\_with\_zero

**Natural language statement:** Write a method to replace all even elements in an array with 0.

**Method signature:** p6\_2\_c\_replace\_even\_with\_zero(arr: seq<int>) returns (result: seq<int>)

### Ensures

- $|result| == |arr|$
- $\forall i :: 0 \leq i < |arr| \implies (arr[i] \% 2 == 0 \implies result[i] == 0) \ \&\& \ (arr[i] \% 2 \neq 0 \implies result[i] == arr[i])$

## 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 to replace all even elements in an array with 0.

The signature should be:

```
method p6_2_c_replace_even_with_zero(arr: seq<int>) returns (result: seq<int>)
```

The method should respect the following contract:

```
ensures |result| == |arr|, ensures forall i :: 0 <= i < |arr| ==> (arr[i] % 2 == 0 ==>
    result[i] == 0) && (arr[i] % 2 != 0 ==> result[i] == arr[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-Co55zJLAt3RwPBy2SGP5TTiBpv5P9

**Model:** gpt-5.1-chat-latest

**Created at:** 1766052023

**Finish reason:** stop

**Usage:** 364 tokens in, and 54 tokens out

```
{
    result := seq i | 0 <= i < |arr| :: if arr[i] % 2 == 0 then 0 else arr[i];
}
```

### Program → GenAI

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

```
problem_data/p6_2_c_replace_even_with_zero/program.dfy(5,16): Error: openparen expected
|
5 | result := seq i | 0 <= i < |arr| :: if arr[i] % 2 == 0 then 0 else arr[i];
| ^
```

```
problem_data/p6_2_c_replace_even_with_zero/program.dfy(5,35): Error: comma expected
|
5 | result := seq i | 0 <= i < |arr| :: if arr[i] % 2 == 0 then 0 else arr[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-Co561EoSZCoPXrApAkfirzkagD0z5

**Model:** gpt-5.1-chat-latest

**Created at:** 1766052025

**Finish reason:** stop

**Usage:** 661 tokens in, and 121 tokens out

```
{  
    result := seq (i | 0 <= i < |arr|) :: (if arr[i] % 2 == 0 then 0 else arr[i]);  
}
```

## Program → GenAI

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

```
problem_data/p6_2_c_replace_even_with_zero/program.dfy(5,35): Error: comma expected  
|  
5 | result := seq (i | 0 <= i < |arr|) :: (if arr[i] % 2 == 0 then 0 else arr[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-Co564YHwjUXcrHf5BTHyJDfrFDEyI

**Model:** gpt-5.1-chat-latest

**Created at:** 1766052028

**Finish reason:** stop

**Usage:** 796 tokens in, and 185 tokens out

```
{  
    result := seq i | 0 <= i && i < |arr| :: (if arr[i] % 2 == 0 then 0 else arr[i]);  
}
```

## Program → GenAI

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

```

problem_data/p6_2_c_replace_even_with_zero/program.dfy(5,16): Error: openparen expected
|
5 | result := seq i | 0 <= i && i < |arr| :: (if arr[i] % 2 == 0 then 0 else arr[i]);
| ^

problem_data/p6_2_c_replace_even_with_zero/program.dfy(5,40): Error: comma expected
|
5 | result := seq i | 0 <= i && i < |arr| :: (if arr[i] % 2 == 0 then 0 else arr[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-Co567k0nsENerhtAHL5U20CcndczP  
**Model:** gpt-5.1-chat-latest  
**Created at:** 1766052031  
**Finish reason:** stop  
**Usage:** 1132 tokens in, and 183 tokens out

```
{
  result := seq(i | 0 <= i < |arr|) (if arr[i] % 2 == 0 then 0 else arr[i]);
}
```

## Program → GenAI

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

```

problem_data/p6_2_c_replace_even_with_zero/program.dfy(5,34): Error: comma expected
|
5 | result := seq(i | 0 <= i < |arr|) (if arr[i] % 2 == 0 then 0 else arr[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-Co56BdKZ3gmLYfokVXBG8qVosAv5u  
**Model:** gpt-5.1-chat-latest  
**Created at:** 1766052035

**Finish reason:** stop

**Usage:** 1255 tokens in, and 120 tokens out

```
{  
    result := seq(i | 0 <= i < |arr|) :: (if arr[i] % 2 == 0 then 0 else arr[i]);  
}
```

## Program → GenAI

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

```
problem_data/p6_2_c_replace_even_with_zero/program.dfy(5,34): Error: comma expected  
|  
5 | result := seq(i | 0 <= i < |arr|) :: (if arr[i] % 2 == 0 then 0 else arr[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:** chatmpl-Co56DbGIEpWyBYIcon87vzzIC7Xr3

**Model:** gpt-5.1-chat-latest

**Created at:** 1766052037

**Finish reason:** stop

**Usage:** 1452 tokens in, and 483 tokens out

```
{  
    var res: seq<int> := [];  
    var i := 0;  
    while i < |arr|  
        invariant 0 <= i <= |arr|  
        invariant |res| == i  
        invariant forall j :: 0 <= j < i ==> (arr[j] % 2 == 0 ==> res[j] == 0) && (arr[j] % 2  
            ↳ != 0 ==> res[j] == arr[j])  
    {  
        res := res + [if arr[i] % 2 == 0 then 0 else arr[i]];  
        i := i + 1;  
    }  
    result := res;  
}
```

## Final Program

```
method p6_2_c_replace_even_with_zero(arr: seq<int>) returns (result: seq<int>)  
ensures |result| == |arr|
```

```

ensures forall i :: 0 <= i < |arr| ==> (arr[i] % 2 == 0 ==> result[i] == 0) &&
      ↪ arr[i] % 2 != 0 ==> result[i] == arr[i])
{
var res: seq<int> := [];
var i := 0;
while i < |arr|
    invariant 0 <= i <= |arr|
    invariant |res| == i
    invariant forall j :: 0 <= j < i ==> (arr[j] % 2 == 0 ==> res[j] == 0) && (arr[j] % 2
      ↪ != 0 ==> res[j] == arr[j])
{
    res := res + [if arr[i] % 2 == 0 then 0 else arr[i]];
    i := i + 1;
}
result := res;
}

```

## Total Token Usage

**Input tokens:** 5660  
**Output tokens:** 1146  
**Reasoning tokens:** 704  
**Sum of ‘total tokens’:** 6806

## Experiment Timings

Overall Experiment started at 1766052025066, ended at 1766052047365, lasting 22299ms (22.30 seconds)  
**Iteration #4** started at 1766052033644, ended at 1766052037245, lasting 3601ms (3.60 seconds)  
**Iteration #5** started at 1766052037245, ended at 1766052039431, lasting 2186ms (2.19 seconds)  
**Iteration #6** started at 1766052039431, ended at 1766052047365, lasting 7934ms (7.93 seconds)  
**Iteration #1** started at 1766052025067, ended at 1766052027605, lasting 2538ms (2.54 seconds)  
**Iteration #2** started at 1766052027605, ended at 1766052030469, lasting 2864ms (2.86 seconds)  
**Iteration #3** started at 1766052030469, ended at 1766052033644, lasting 3175ms (3.18 seconds)