

# CDA 3100: In-class Assignment 1

## Section 2 Recitation Session

### Problem Statement

Does an array of integers belong to a geometric series?

### Description

In mathematics, a geometric series is the sum of an infinite number of terms with a constant ratio between successive terms.

$$\sum_{k=0}^{\infty} ar^k = a + ar + ar^2 + ar^3 + ar^4 + \dots$$

The geometric series can be defined by just two parameters: coefficient  $a$  and common ratio  $r$ . Common ratio  $r$  is the ratio of any term with the previous term in the series. Or equivalently, common ratio  $r$  is the term multiplier used to calculate the next term in the series.

We are given an array of **5** integers. Write an assembly program that checks if the array is part of a geometric series. If so, the program prints the value of  $r$  after a success message in console. If the array is not part of a geometric series, print an error message in the console. Let us assume,  $a, r$  are integers and  $a > 0$  and  $r > 0$  for simplicity.

#### Example Input 1

2, 4, 12, 12, 24

#### Output

ERROR: the given array does not belong to a geometric series.

#### Example Input 2

1, 3, 9, 27, 81

#### Output

SUCCESS: the given array belongs to a geometric series.

Common ratio: 3

#### Example Input 3

2, 4, 8, 16, 32

#### Output

SUCCESS: the given array belongs to a geometric series.

Common ratio: 2

#### Example Input 1

3, 9, 27, 54, 108

#### Output

ERROR: the given array does not belong to a geometric series.

Hint: You can build your code on top of the following template

```
.data
test_array: .word 1, 3, 9, 27, 81 # constructs an array of 5 32-bit integers in memory

.text
main:
la $t0, test_array # load the address of the starting number of test_array into $t0

# Your code goes here...

li $v0, 10
syscall
```